Appendix 1: Evidence re. the Benefits of Listening to Live Music

Translation from French to English – Text of letter (attached)

From Dr. Isabelle Peretz
Professeure titulaire, fellow of the Royal Society of Canada
Membre du Comité d'administration de la SAMS
Chaire de recherche du Canada en neurocognition musicale
Co-directeure du Laboratoire International de Recherche sur le Cerveau, la Musique et le Son (BRAMS)
Département de psychologie, Université de Montréal

To Françoise Henri
Directrice générale et artistique
La Société pour les arts en milieux de santé (SAMS)

March 24, 2017

It is with great enthusiasm that I support the organization of concerts for the most deprived members of our society, seniors who have lost their autonomy. SAMS organizes more than 600 concerts every year. We are thankful for the awareness of young professional musicians to the regrettable confinement in which older people are placed.

These elders are comfortable, yes, but where is pleasure and amazement in those de-humanized and antiseptic environments? Thanks to the work of SAMS and its board and staff, the musicians bring audiences in care this pleasure, this breath of fresh air.

As scientific research demonstrates, the benefits of music on health are now well established. I will give two recent examples. The first is a documentary made for a general audience, "Alive Inside," by Michael Rossato-Bennett, USA, 2014. It is a shattering document on the incredible effect of music on older people, in particular on those locked into dementia. The documentary vividly demonstrates that listening to well-known melodies can succeed where medication fails, and literally brings people suffering from dementia back to life. It is well proven today that music stimulates the parts of the brain that are least affected by degenerative illness. Music stimulates memory, and brings back memories. In doing so it revives the sense of identity in people who appear to have lost their sense of self. Our own research lab in Montreal has determined by experimentation that music stimulates the secretion of dopamine, the hormone of pleasure.

The second example concerns the medicinal effect of music. A meta-analysis, published in 2015 in the distinguished medical science review "The Lancet," quantifies the results of 73 rigorous studies on the effect of music. The analysis concluded that music, an inexpensive non-pharmacological intervention without side effects, facilitates recovery after surgery, reducing pain and consequently the quantity of painkillers consumed. It also reduces anxiety and the use of other medications normally associated with it, and increases wellbeing. At this point we know of no more effective, non-aggressive intervention than music. The nature of the physiological mechanisms responsible for this effect has been studied for

over ten years. The leading researches initiated at BRAMS, of which I am the Co-Director, are now expanding, particularly in the province of Quebec.

Recorded music has been used in most of the studies, and sometimes the work of music therapists, but rarely have live musicians participated. Yet, the presence of musicians at the sites adds another dimension. For example, a study by Bowden in 2016 examined the role of the music in nutritional input for residents in long terms care facilities. It was found that nutritional input was increased when musicians were performing during meals, compared to the effect of recorded music. Dr. Chabot, who co-signs this letter, testifies to this outcome. She is a young doctor, recently graduated from McGill, a resident geriatrician and a classically trained singer. For two years, she has organized concerts four times a week in the geriatric unit at St. Mary's Hospital. Most of the time she encouraged young musicians to rehearse at the hospital instead of at home. The effects were immediate. Not only did the presence of the musicians bring a sparkle to the eyes of patients, it also facilitated communication with the other patients and improved the mood of the care staff. In preparing her Masters in Neuropsychology at the University of Montreal she continues this work on a larger scale and in a more rigorous way. The whole center is supporting her interventions on the grounds that they will become standard practice. Dr. Chabot is reproducing in the geriatric milieu the same kind of work that SAMS is undertaking in care homes.

I often say, "Music is an incomparable source of pleasure. It requires relatively little effort to listen, has no side effects and is accessible to everyone. Recent research shows that music is an alternative medicine that reduces pain, diminishes response to stress and stimulates production of dopamine in the brain. When we offer a concert to our elders we offer them more than alternative medicine. We offer them a long lasting caress."

With these examples, and there are many others, I strongly reinforce the importance of music, and of the knowledge we acquired of its effect in our labs, in order that the whole population should benefit from it directly or indirectly. We should be thankful that organizations like SAMS, and initiatives like that of Dr. Chabot exist, but they cannot survive without financial support.

Thank you in advance for the attention you will give to this funding request.

Université de Montréal

Faculté des arts et des sciences
Département de psychologie

Brams
Laboratoire international
de recherche sur le cerveau,
la musique et le son

Montréal, le 24 March 2017

Françoise Henri
Directrice générale et artistique
La Société pour les arts en milieux de santé (SAMS)
1908, rue Panet, bureau 305
Montréal, Québec
H2L 3A2
www.samsante.org | 514-802-8908

Chère Françoise Henri,

C'est avec enthousiasme que je soutiens l'organisation de concerts auprès des plus démunis de notre société – à savoir, nos aînés en perte d'autonomie. La Société pour les arts en milieux de santé (SAMS) organise plus de 600 concerts par an grâce à la sensibilisation de jeunes musiciens professionnels à la situation d'isolement dans laquelle malheureusement nous plaçons les personnes âgées. Ces aînés sont confortables, certes, mais où est le plaisir et l'émerveillement dans ces environnements aseptisés, déshumanisés ? Les musiciens leur offrent ce plaisir, cette fraîcheur, grâce au travail chevronné de la SAMS et surtout de sa directrice.

Les bienfaits de la musique sur la santé sont désormais bien établis. La recherche scientifique abonde en ce sens. Je donnerai deux exemples récents. Le premier exemple est un documentaire pour le grand public, *Alife Inside* (de Michael Rossato-Bennett, États-Unis, 2014). Il s'agit d'un documentaire bouleversant sur l'incroyable effet de la musique sur les aînés, en particulier sur ceux qui sont enfermés dans la démence. Le documentaire montre de façon saisissante que la musique peut littéralement ramener à la vie des personnes atteintes de démence par l'intermédiaire de l'écoute d'un air connu et réussir là où la médication échoue. C'est prouvé aujourd'hui, la musique stimule les parties du cerveau qui sont moins atteintes par les maladies dégénératives. La musique évoque des souvenirs (stimule la mémoire) et ainsi ramène un sens d'identité à ceux qui semblent l'avoir perdue. Enfin, la musique stimule la sécrétion de dopamine (une hormone du plaisir) et cette découverte émane directement des recherches menées au sein de notre laboratoire situé à Montréal, le BRAMS.

La deuxième illustration des bienfaits de la musique est médicale. Il s'agit d'une méta-analyse (une analyse qui quantifie les effets obtenus dans 73 études rigoureuses) sur les effets de la musique et publiée dans *The Lancet* en 2015*, une prestigieuse revue des sciences médicales. Cette étude conclue que la musique, cette intervention non-pharmacologique, peu coûteuse et sécuritaire (sans effets secondaires), facilite la récupération post chirurgie en réduisant la douleur (et donc la quantité

d'analgésique), l'anxiété (et donc, la prise de médicaments associés) et augmente le bien-être. Nous ne connaissons pas actuellement d'autre méthode douce plus efficace. La nature des mécanismes physiologiques qui en sont responsables sont à l'étude depuis 10 ans environ. Ces recherches initiées au BRAMS, sont actuellement en pleine effervescence, en particulier au Québec.

Dans toutes ces études, on utilise de la musique enregistrée ou parfois un musicothérapeute, mais rarement des musiciens en chair et en os. Or, la présence de musiciens sur place ajoute une dimension supplémentaire. Par exemple, une étude de Bowden publiée en 2016** s'est penchée sur le rôle de la musique dans l'apport nutritionnel de résidents dans un centre de soin de longue durée. On a découvert que l'apport nutritionnel était davantage amélioré avec la présence de musiciens offrant des performances musicales, lors des repas comparativement à la présence de musique enregistrée. Dr. Chabot, qui co-signe cette lettre, peut en attester. Cette jeune médecin, chanteuse classique et résidente en gériatre, fraîchement diplômée de McGill, a organisé pendant 2 ans des concerts à raison de 4 séances par semaine dans sur l'unité de gériatrie du Centre Hospitalier de St. Mary's. Le plus souvent, elle encourageait de jeunes musiciens à venir pratiquer dans le milieu hospitalier plutôt que chez eux. Les effets ne se sont pas fait attendre. Non seulement la présence du musicien venait allumer une étincelle dans le regard des patients, mais elle améliorait leur communication avec les autres ainsi que l'humeur des soignants. Aujourd'hui, elle continue ce travail, à plus grande échelle et de façon plus rigoureuse, dans le cadre de sa maîtrise en neuropsychologie à l'Université de Montréal. Tout le centre hospitalier l'appui dans sa démarche dans l'espoir que son intervention devienne une pratique courante. En deux mots, Dr. Chabot reproduisait le travail de la SAMS dans le milieu gériatrique sans le savoir.

Comme je le dis souvent, « La musique est une source de plaisir inégalable. Elle demande peu d'effort à l'auditeur, n'a aucun effet secondaire et est accessible à tous. La recherche récente montre que la musique est une médecine douce, qui peut réduire la douleur, diminuer la réponse au stress et favoriser la production de dopamine dans le cerveau. En offrant un concert à nos ainés, nous leur offrons plus qu'une médecine douce, nous leur offrons une longue caresse à partager ».

Par ces exemples, parmi bien d'autres, je réitère ici l'importance de la musique et du transfert des connaissances acquises à ce titre dans nos laboratoires pour en faire bénéficier directement ou indirectement la population. Heureusement, des sociétés comme la SAMS et des initiatives bénévoles comme celle du Dr. Chabot existent. Mais elles ne peuvent pas survivre bien longtemps sans appui financier. Nous vous remercions donc d'avance à l'attention que vous voudrez bien accorder à cette demande.

Avec mes sentiments les meilleurs,

Dr. Isabelle Peretz, Professeure titulaire, fellow of the Royal Society of Canada
Membre du Comité d'administration de la SAMS

Chaire de recherche du Canada en neurocognition musicale
Co-directeure du Laboratoire International de Recherche sur le Cerveau, la Musique et le Son (BRAMS)
Département de psychologie, Université de Montréal
Courriel: Isabelle.Peretz@umontreal.ca
Tél.: (514) 343 5840

Dr. Julia Chabot, MD.CM, FRCP(c)
Interniste
Résidente en gériatrie, Université McGill
Étudiante à la maîtrise en psychologie, Université de Montréal
Courriel : julia.chabot@mail.mcgill.ca

---

*Hole, Jenny, et al. "Music as an aid for postoperative recovery in adults: a systematic review and meta-analysis." *The Lancet* 386.10004 (2015): 1659-1671.
**Bowden, M. (2016). "The effect of live versus recorded music during mealtimes on the nutritional intake of older adults in an assisted living facility". The Florida State University

A Randomized Controlled Trial Exploring the Effect of Music on Quality of Life and Depression in Older People with Dementia

MARIE COOKE, WENDY MOYLE, DAVID SHUM, SCOTT HARRISON, & JENNY MURFIELD
Griffith University, Australia

ACKNOWLEDGEMENTS. This article reports on an outcome of a larger study funded by the National Health & Medical Research Council, Australia (Grant ID 481929). The authors acknowledge support and contributions by RSL Care staff, family and residents.

COMPETING INTERESTS: None declared.

ADDRESS. Correspondence should be directed to:
MARIE COOKE (RN; Dip App Sc; B App Sc; MSPD; PhD), Deputy Head of School, School of Nursing & Midwifery, Nathan, Research Centre for Clinical & Community Practice Innovation, Griffith University, Nathan, QLD, 4111, Australia. [Tel. +61 7 373 57985; Fax +61 7 373 55431; email: m.cooke@griffith.edu.au]

JHP

Journal of Health Psychology

www.sagepublications.com
Vol 15(5) 765–776
DOI: 10.1177/1359105310368188

Abstract

This randomized controlled trial investigated the effect of live music on quality of life and depression in 47 older people with dementia using the Dementia Quality of Life and Geriatric Depression Scale. The control/reading group reported higher mid-point feelings of belonging than the music group ($F(1, 45) = 6.672$, $p < .05$). Sub-analyses of ≥ 50 per cent music session attendance found improvements in self-esteem over time ($F(2, 46) = 4.471$, $p < .05$). Participants with scores that were suggestive of increased depressive symptoms had fewer depressive symptoms over time ($F(2, 22) = 8.129$, $p < .01$). Findings suggest music and reading activities can improve self-esteem, belonging and depression in some older people with dementia.

Keywords

- *dementia*
- *depression*
- *music*
- *older people*
- *quality of life*

DEMENTIA is an umbrella term used to describe a group of conditions which result in progressive decline of a person's cognitive functioning, broadly affecting memory, intellect, social skills and ability to learn. It is a degenerative condition, usually occurring in older age, but not necessarily so, and is typically characterized by the emergence of behavioural disturbances such as agitation, aggression, wandering and confusion (Goodall & Etters, 2005). Current estimates suggest that there are approximately 24.3 million people who experience dementia worldwide, with an estimated 4.6 million new cases diagnosed each year (Ferri et al., 2005). In Australia, it is estimated that there are currently 245,400 people with dementia and this is predicted to rise to 1.13 million cases by 2050 (Access Economics, 2009). Collectively, these estimates present a concerning backdrop for healthcare in Australia, and worldwide. As such, there is a pertinent need for a better understanding of the ways in which the mental health and quality of life in individuals with dementia can be reduced.

Traditionally, symptoms of dementia have been managed by pharmacological interventions and physical restraints (Robinson et al., 2007). However, recent research has suggested that many of the commonly used pharmacological agents do not offer the desired 'magic pill' solution (Sink, Holden, & Yaffe, 2005). For instance, although the benefits of some pharmacological agents, such as atypical antipsychotics (i.e. risperidone and olanzapine), in treating neuropsychiatric symptoms in those with dementia are well documented, there is also evidence which reports that some of the agents cause physical problems, such as cognitive impairment, constipation, urinary retention and an increase in falls (Leibovici, 2009). In addition to this, are growing ethical concerns regarding the use of physical restraints (Hughes, 2002), with reports showing that they can increase the risk of serious injury, falls and even death (Evans, Wood, & Lambert, 2003). In light of this, research attempts have become more focused on understanding the efficacy of non-pharmacological treatment (Goodall & Etters, 2005), albeit these studies have generally suffered from small sample sizes and weak methodologies (Cohen-Mansfield & Mintzer, 2005). The therapeutic use of music is one such intervention and has gained increasing popularity since the early 1990s (Bruer, Spitznagel, & Cloninger, 2007).

Defined as 'the specialized use of music to change maladaptive physical, emotional and social behaviour to attain maximum levels of functioning' (Goodall & Etters, 2005 p. 258), the therapeutic use of music is generally regarded as offering a means of communicating, with those with dementia (Goodall & Etters, 2005). It is thought that, as the person's ability to understand verbal language diminishes (Vink, Birks, Bruinsma, & Scholten, 2005), the ability to process music is retained by a part of the brain that is last to deteriorate (Crystal, Grober, & Masur, 1989). Individual studies and meta-analyses into the efficacy of music for managing dementia have reported it as a successful intervention, with a wide range of positive outcomes and, seemingly, a lack of side-effects (Svansdottir & Snaedal, 2006). For instance, music has been shown to improve cognitive functioning (Bruer et al., 2007; Suzuki et al., 2004; Suzuki, Kanamori, Nagasawa, Tokiko, & Takayuki, 2007) and speech and verbalization (Dileo & Bradt, 2005), and significantly reduce agitation, anxiety, aggressiveness, irritability, delusions, apathy, aberrant motor activity and night-time disturbances (Choi, Lee, Cheong, & Lee, 2009; Hicks-Moore, 2005; Raglio et al., 2008; Suzuki et al., 2004; Svansdottir & Snaedal, 2006; Tuet & Lam, 2006). Music has also been shown to produce a number of positive physiological effects for those with dementia including: increased melatonin levels, which contribute to a relaxed mood (Kumar, Tims, Xruess, & Mintester, 1999); and decreased levels of the stress indicator salivary chromogranin A (Suzuki et al., 2004, 2007). In terms of the specific effect that music has on quality of life (QOL), studies have found that music can promote greater feelings of belonging (Ebberts, 1994; Pollack & Namazi, 1992; Rio, 2002) and enable those with dementia to interact appropriately with each other in a group setting (Clair & Bernstein, 1990). In addition, music in the everyday lives of older people with dementia (i.e. not delivered though a therapeutic structure) can enhance well-being, social interaction, empowerment and control, and can encourage and support participation in activities (Sixsmith & Gibson, 2007). A small number of studies have also highlighted how music can reduce levels of depression in those with dementia. For example, Ashida (2000) found that reminiscence music significantly reduced depressive symptoms in older people with dementia. Another study (Myskja & Nord, 2008) reported that two months after music therapy was reinstated at an aged care facility following a break of a few months, depression scores significantly decreased.

Evidently, there is a growing body of research documenting the positive effect of music in managing dementia. If the true efficacy of music as a therapeutic tool is to be evaluated, greater efforts should be directed at measuring the duration of effects. Of the limited longer-term studies undertaken, most typically show the effects to be relatively short-term. For example, studies report the dissipation of positive effects at one to four weeks post-intervention (Bruer et al., 2007; Svansdottir & Snaedal, 2006; Tuet & Lam, 2006). In a yearlong study, comparing a group who received regular weekly music sessions with a group who received usual care, no significant differences were observed in terms of the severity, range and frequency of agitated behaviours over time (Ledger & Baker, 2007). Similarly, Berger et al. (2004) failed to find an effect of music on the behavioural and mental changes of those with dementia over two years. In contrast, however, some support for the longer-term effects of music is available. Improvements in behaviours such as delusions and apathy have been found one month post-intervention (Raglio et al., 2008). In another study, participants who received music therapy, once a week for two years, had significantly lower systolic blood pressure and maintained their physical and mental states better than those not receiving music (Takahashi & Matsushita, 2006).

Despite the evidence that music has a therapeutic effect on the behaviour of those with dementia, there are strong methodological concerns regarding available studies and there are calls for more rigorous research (Boso, Politi, Barale, & Emanuele, 2006). Following a 2003 Cochrane Review (Vink et al., 2005) such was the extent of these concerns that the authors felt unable to support claims about the efficacy of music therapy. Studies were criticized for failing to: randomize participants; conceal allocation of participants to treatment groups; ensure blinding of assessors; use standardized assessment tools; and establish longitudinal effects. Other reviews have criticized studies for employing insufficient sample sizes that make the findings difficult to generalize (Goodall & Etters, 2005). The study described here sought to address some of these concerns by employing a randomized controlled trial with a cross-over design, which allowed an exploration of longer-term effects and had a sample size large enough to detect significant differences. Furthermore, analysis followed an Intention-to-Treat (ITT) principle so as to avoid the overestimation of clinical effectiveness associated with analysis which omits study dropouts (Hollis & Campbell, 1999; Kruse et al., 2002; Montori & Guyatt, 2001).

This study aimed to investigate the effect of a live music programme on quality of life (QOL) and depression in older people with dementia. The study sought to answer the following questions:

1. What effect does a live music programme have on QOL and depression for older people with dementia?
2. What is the duration of any effects of a live music programme on QOL and depression for older people with dementia over a six-month period?

Methods

Design

A randomized controlled cross-over design, with a music intervention and a reading control group, was employed from October 2008 to March 2009 (see Fig. 1). This methodology was employed because it: ensured a high level of equivalence among the participants exposed to the two treatments (Polit, Beck, & Hungler, 2001); saw no participant denied a potentially beneficial treatment; and allowed an examination of longer-term effects over a six-month period (Vink et al., 2005). Ethical approval for the study was granted by the university human research ethics committee and a support statement was provided by the partner aged care organization.

Setting

Two mixed-gender aged care facilities were used to recruit participants. Site A had 164 residents and Site B had 94 residents. Both facilities were located north of Brisbane (Queensland Australia) and provided low (assisted) and high (nursing home) care.

Sample

A sample of 40–50 participants, allowing for 10 per cent attrition, was anticipated to ensure a statistical power of 0.90. This estimation was based on the effect size (Cohen's d) of 0.67 calculated from Suzuki et al. (2004) and by adopting an alpha level of 0.05 and employing the algorithm detailed in Senn (1993, p. 218). Aged care facility managers initially identified potential male and female participants, with formal enrolment based on residents having:

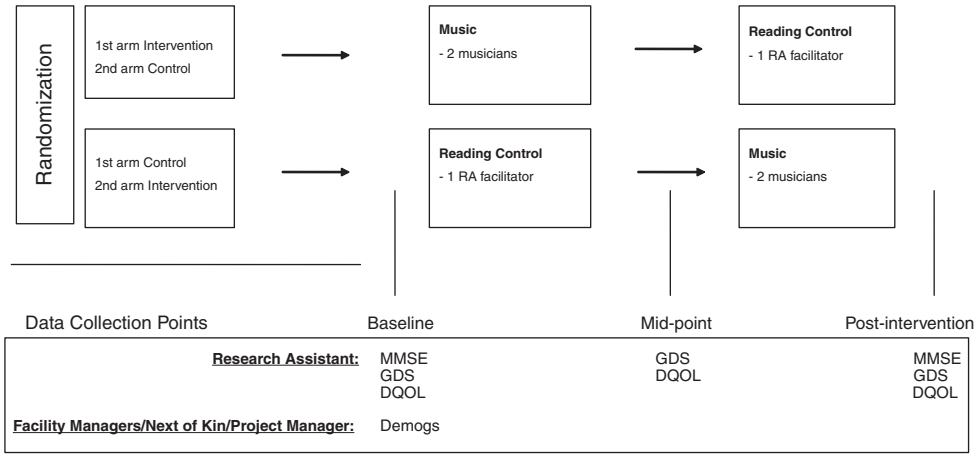


Figure 1. Study design.
Notes: MMSE – Mini-Mental State Exam; GDS – Geriatric Depression Scale; DQOL – Dementia Quality of Life

1. a confirmed diagnosis of early to mid-stage dementia, OR probable dementia (i.e. a cognitive impairment level of 12–24 on the Mini Mental State Exam—Folstein, Folstein, & McHugh, 1975), OR features consistent with dementia of Alzheimer's type as per DSM—IV (American Psychiatric Association, 1994); and
2. a documented behavioural history of agitation/aggression on nursing/medical records within the last month.

The study's biostatistician, who was blinded to the identity of potential participants, used a computer-generated program to conduct the randomization process. Informed consent was sought from next of kin and, where appropriate, participants themselves. All data collectors were blinded to group assignments.

Intervention

The music and reading groups ran for 40 minutes, three mornings a week (Monday, Wednesday and Friday) for eight weeks. Participants then 'crossed-over' into the opposite arm and the protocol was repeated for another eight weeks. A five-week 'washout' period was included between cross-over to reduce potential carryover effects (Ayalon, Gum, Feliciano, & Arean, 2006), being based on studies which have found the effects of a music intervention to dissipate at one to four weeks post-intervention (Bruer et al., 2007; Svansdottir & Snaedal, 2006; Tuet & Lam, 2006). Group music sessions were chosen over individual interventions as previous literature has shown these to be effective in providing interaction and feelings of belonging for those with dementia (Ebberts, 1994; Pollack & Namazi, 1992; Rio, 2002). The maximum size of the group attending the music and reading sessions was 16 at Site A and nine at Site B. A participant attendance register was taken at the start of each session. Treatment fidelity was addressed through: (1) development of a standardized procedures manual (Chambless & Hollon, 1998); (2) musician and reading group facilitator training in delivery of the sessions and in working with older people with dementia; (3) a practice music session conducted in an alternative aged care facility to that used for the study; and (4) four random spot checks made by the research team.

The intervention was a live group music programme delivered by two musicians. Each music session involved 30 minutes of musician-led familiar song singing (with guitar accompaniment) and 10 minutes of pre-recorded instrumental music for active listening. Live interactive music was preferred over pre-recorded music as it has been shown to be superior in the short-term treatment of apathy in participants with dementia (Holmes, Knights, Dean, Hodkinson, & Hopkins, 2006). Residents were encouraged to participate actively through singing, playing instruments and, where appropriate, movement. In addition, as research has shown that music interventions are most effective when using the personal musical preferences of participants (Dileo &

Bradt, 2005; Gerdner, 1997, 1999; Sung & Chang, 2005), the repertoire selection for the music sessions was based primarily on: participants' musical preferences; musicians' repertoire knowledge; and the findings from the practice session. A set repertoire was established for each of the three sessions and repeated for the eight weeks.

The reading control sessions were led by a trained Research Assistant (RA) and were interactive in nature so as to mirror the music intervention. A range of reading/social activities were selected for the session including reading local news stories, short stories, telling jokes and undertaking quiz activities.

Data collection

At baseline, mid-point and post-intervention participants were assessed on two primary outcome measures. Both measures were conducted by trained RAs blinded to the treatment groups at a time most convenient for the participant (i.e. any day of the week from 9 am–5 pm). The RAs took the role as interviewer, taking the participants through the measures by asking them questions to elicit their response. All participants were able to verbalize their answers:

1. *Dementia Quality of Life (DQOL)* (Brod, Stewart, Sands, & Walton, 1999): a 29-item interview questionnaire consisting of five subscales and an optional single item, which assesses overall QOL in a single score. All 29 items are rated on two five-point scales (ranging from 'not at all' to 'a lot', and 'never' to 'very often') to measure participant's QOL. A mean score is computed for each subscale, with higher scores representing better QOL. The DQOL has been found to be reliable in people with dementia, with the test–retest reliability for the five subscales being reported from 0.64–0.90 and internal consistency reliability from 0.67–0.89 (Sloane et al., 2005). In this study, the internal consistency (Cronbach's alpha) of the subscales was between 0.62–0.87.
2. *Geriatric Depression Scale (GDS)* (Yesavage et al., 1983): a 15-item interview questionnaire requiring participants to record a 'yes/no' response to statements about themselves. An overall score is computed by summing all bolded responses, which are indicative of depression and worth one point. A score > 5 is suggestive of depression and a score of ≥ 10 is almost always indicative of depression. The GDS has been tested and used extensively, being found to have 92 per cent sensitivity and 89 per cent specificity when evaluated against diagnostic criteria (Kurlowicz, 1999). It has also been recommended as a valid instrument for assessing depression (Sansoni et al., 2007). When used in this study, the internal consistency of the scale (Cronbach's alpha) was 0.79.

Participant's severity of dementia was assessed by trained and experienced RAs blinded to treatment groups at baseline and post-intervention on the Mini-Mental State Exam (MMSE) (Folstein et al., 1975): a widely used cognitive screening instrument that provides a total score ranging from 0–30, with lower scores indicative of greater cognitive impairment. A range of demographic information (i.e. age; gender; dementia diagnosis; existing medical conditions, etc.) was also collected at baseline, as was participant's musical preferences and experiences using an adapted version of the Music Preference Questionnaire (Hartsock, 1982 as cited in Bulechek & McCloskey, 1999).

Data analysis

All data were entered and analysed using the Statistical Package for the Social Sciences Version 17.0 (SPSS Inc., Chicago, IL, USA). Prior to analysis, 20 per cent of the data were double-entered, with outliers and missing values screened to establish data entry accuracy and consistency. Basic frequencies were established for all participant demographics, MMSE scores and outcome measures. Internal consistency of the measures was assessed through the computation of Cronbach's coefficient alpha. A series of *t*-tests were undertaken to ascertain whether randomization had been successful in a number of pre-test values. In addition, a paired samples *t*-test was run to compare MMSE scores over time, and two one-way ANOVAs were undertaken to compare MMSE scores between intervention and control groups at baseline and post-intervention.

Following a missing values analysis, which indicated data to be Missing at Random (MAR), an 'Intention-to-Treat' (ITT) analysis, in which all randomized participants were included in the final analysis ($n = 47$), was undertaken. A multiple imputation method was applied to missing values in the outcome

measures using NORM (Schafer, 1999). Five multiple imputed datasets and one overarching imputed dataset were computed. To verify the results, parallel analysis was undertaken on the overarching multiple imputed dataset and: an imputed dataset with missing value case mean substitution; and the original dataset with missing values. No differences were observed in analysis and, thus, the reported outcome measure *p*-values are from the overarching imputed dataset. Two sub-analyses were also undertaken on the multiple imputed dataset for participants who: attended ≥ 50 per cent of music sessions ($n = 24$—14 receiving music in the first arm and 10 in the second arm); and had scores > 5 on the GDS ($n = 12$—five receiving the first music intervention and seven the control). All reported significant differences are at the *p*-value of .05 and, where sphericity was not assumed, the Greenhouse Geisser *p*-value is given.

The Generalized Linear Method (GLM) of analysis advocated by Senn (1993) was employed to explore main effects; investigating the treatment effect after the period and carry-over effects had been tested. This saw: (1) oneway ANOVAs to test for differences in music and control group scores at baseline, mid-point and post-intervention; (2) repeated measures ANOVAs, with Bonferroni pairwise comparisons, to explore significant differences over time, regardless of group; (3) repeated measures ANOVAs to explore interaction effects of the intervention group by time-point.

Results

Sixty-nine residents were assessed for eligibility and 47 were formally enrolled into the research (see Fig. 2). Randomization proved successful as there were no significant differences between the first music and control groups in terms of: age ($p = .944$); gender ($p = .597$); length of time living in the facility ($p = .490$); dementia diagnosis ($p = .147$); use of chemical restraint to manage disruptive behaviour ($p = .645$); importance of music in life prior to living in the facility ($p = .437$); and musical experience/background ($p = .337$). Missing values analysis found that 8.7 per cent of data was Missing at Random (MAR) in the outcome measures (8.7 per cent in DQOL & 8.6 per cent in GDS).

Sample characteristics

The majority of participants were: female (70.2%); aged 75–94 (87.3%); widowed (74.5%); and educated at secondary school level (69.6%). Over half of participants had lived in the facility for more than one but less than four years (56.5%) and it was most common for participants to live in the Special Care Unit (SCU) (38.3%) or low care (34.0%). One in four had high blood pressure (45.7%) or osteoarthritis (43.5%), while one in three had coronary heart disease, depression (30.4% respectively) and/or diabetes (28.3%). The vast majority (87.0%) of participants were visually impaired and, in terms of mobility requirements, it was most common for participants to be in a wheelchair (38.3%), be mobile (36.2%) or use a wheelie-walker/frame (31.9%). Verbal agitation was noted in approximately 85 per cent of care plans (see Table 1).

At baseline, the mean MMSE score was 16.51 (SD = 6.737, middle stage dementia). There was no significant difference in MMSE scores from baseline to post-intervention ($p = .231$) or in the MMSE scores of the music and control groups at baseline ($p = .399$) or post-intervention ($p = .849$).

Participant mean scores on the DQOL and GDS suggested consistently low levels of depression and good QOL. Mean global QOL scores for all participants, at all time-points, clustered around the mid-point of the scale (3), thereby equating to 'good' overall ratings. On the GDS, although participant scores ranged from 0 to 14, overall mean scores at all time-points were below five (range: 3.38–4.47), indicating relatively low levels of depression.

Significant main effects

One significant finding emerged from the main analysis, namely that there was a significant difference in the mid-point QOL belonging scores between the music and reading groups ($F(1, 45) = 6.672$, $p < .05$). Specifically, participants who experienced the reading control first reported higher feelings of belonging (3.61) than those who experienced the music first (3.17). Means showed that when the first reading group crossed-over into the music group their scores decreased (3.61 to 3.46), whereas when the first music group crossed-over into the reading group, their scores increased (3.17 to 3.57) (see Table 2).

Sub-analyses

In the two sub-analyses undertaken, two significant findings emerged:

1. In the sub-analysis of participants attending ≥ 50 per cent of music sessions in either arm one or

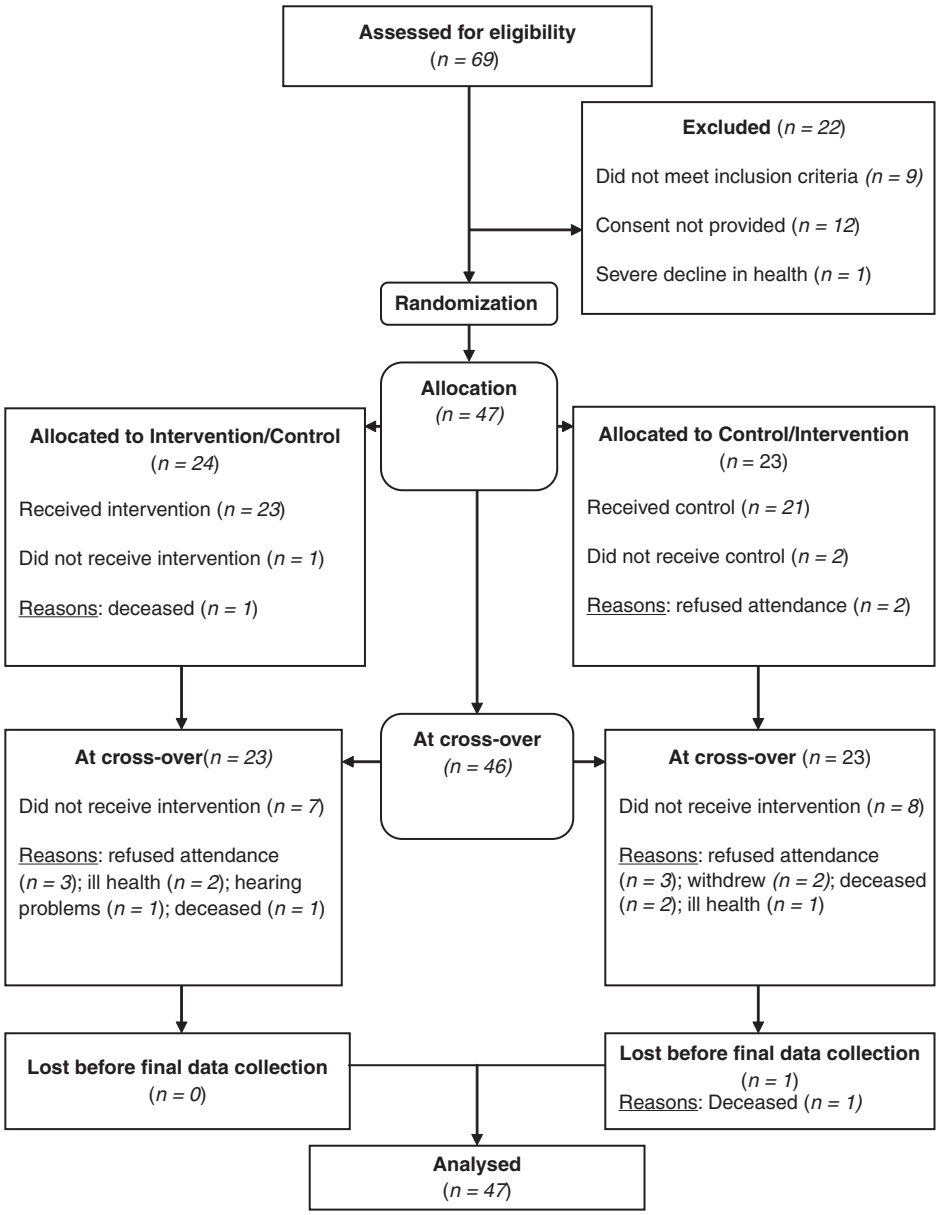


Figure 2. Flow chart of participants' progress through study.

two of the study (n = 24), there was a significant improvement in QOL self-esteem scores over time, regardless of group ($F(2, 46) = 4.471$, $p < .05$). Specifically, there was a significant improvement ($p < .05$) in scores from mid-point (3.36) to post-intervention (3.75).

2. In the sub-analysis of participants who had scores of > 5 on the GDS (n = 12), there was a significant difference in depression scores over time ($F(2, 22) = 8.129$, $p < .01$). Specifically, depression scores decreased (8.25, 6.50, 4.42 respectively), being more noticeable for those

Table 1. Sample characteristics

	(n)	(%)
Gender (n = 47)		
Female	33	70.2
Male	14	29.8
Age (n = 47)		
65–74	3	6.4
75–84	13	27.7
85–94	28	59.6
95 +	3	6.4
Marital status (n = 47)		
Single	1	2.1
Married	9	19.1
Divorced	2	4.3
Widowed	35	74.5
Highest level of education (n = 46)		
Primary	6	13.0
Secondary	32	69.6
Vocational	7	15.2
University	1	2.3
Time lived in facility (n = 46)		
<3 months	1	2.2
3 months–less 1 yr	9	19.6
1 yr–less 4 yrs	26	56.5
4 yrs– less 7 yrs	7	15.2
7 yrs–less 10 yr	3	6.5
Level of care in facility (n = 47)		
Low (Assistive)	16	34.0
High (Nursing Home)	13	27.7
SCU	18	38.3
Comorbidities (n = 46)		
Arthritis	4	8.7
Coronary Heart Disease	14	30.4
COPD	10	21.7
Osteoarthritis	20	43.5
High blood pressure	21	45.7
Diabetes	13	28.3
Stroke	10	21.7
Depression	14	30.4
Sensory deficit (n = 46)		
Vision	40	87.0
Hearing	29	63.0
Touch	2	4.3
Tingling	1	2.2
Numbness	1	2.2
Pain	20	43.5
Mobility requirements (n = 47)		
Mobile	17	36.2
Walking stick	3	6.4
Wheelie walker/frame	15	31.9
Wheelchair	18	38.3
Chairfast	2	4.3
Disruptive behaviours (n = 46)		
Physical aggression	9	19.6
Verbal aggression	17	37.0
Physical agitation	27	58.7
Verbal agitation	39	84.8
Regular medication (n = 46)		
Antipsychotic	9	19.6
Antianxiety	5	10.9
SSRIs/SNRIs	9	19.6
Antidepressant	4	8.7
Antiepileptic	1	2.2
Analgesic	29	63.0

experiencing the music sessions (9.00, 6.20, 4.40) compared to the reading group (7.71, 6.71, 4.43). GLM analysis indicated the findings to be independent of carry-over effects as there was a non-significant order by treatment interaction (p = .649).

Discussion

In understanding the overarching non-significant findings, a number of explanations may be postulated. First, it may be that music does not have a greater therapeutic effect than other group activities. Previous research has shown that the well-being of aged care residents can be improved through a range of stimulating and enjoyable activities (Cohen-Mansfield & Werner, 1997), and so it may be that both the music and reading groups offered greater engagement than normal, routine activities. That said, however, the specific positive benefits of music have been consistently reported in a growing body of evidence (Brotons, Koger, & Pickett-Cooper, 1997; Bruer et al., 2007; Choi et al., 2009; Dileo & Bradt, 2005; Goodall & Etters, 2005; Hicks-Moore, 2005; Kumar et al., 1999; Raglio et al., 2008; Suzuki et al., 2004, 2007; Svansdottir & Snaedal, 2006; Tuet & Lam, 2006). It was also visibly tangible in the observations we made during the music sessions how much the participants specifically enjoyed this activity. It may be beneficial, therefore, for future studies to include a third group of participants undergoing usual care. Second, it may be that any positive effects of the music intervention were short-term and dissipated soon after

Table 2. Mean and 95 per cent confidence intervals (95% CI) of baseline, mid-point and post-intervention DQOL and GDS scores by music intervention and control groups

	Baseline		*Mid-point*		*Post-intervention*	
	Mean	*(95% CI)*	*Mean*	*(95% CI)*	*Mean*	*(95% CI)*
DQOL: Overall						
Music	3.29	(2.95, 3.63)	3.38	(2.93, 3.82)	3.25	(2.85, 3.65)
Control	3.57	(3.22, 3.91)	3.09	(2.74, 3.43)	3.22	(2.85, 3.59)
DQOL: Self-esteem						
Music	3.52	(3.20, 3.84)	3.45	(3.14, 3.75)	3.52	(3.20, 3.85)
Control	3.37	(3.12, 3.62)	3.21	(2.97, 3.45)	3.46	(3.13, 3.78)
DQOL: Positive affect						
Music	3.61	(3.31, 3.91)	3.35	(3.06, 3.64)	3.51	(3.15, 3.86)
Control	3.52	(3.29, 3.75)	3.50	(3.23, 3.77)	3.39	(3.12, 3.67)
DQOL: Absence of negative affect						
Music	4.00	(3.75, 4.26)	3.96	(3.70, 4.23)	4.15	(3.88, 4.42)
Control	3.76	(3.40, 4.12)	3.85	(3.57, 4.14)	4.11	(3.86, 4.37)
DQOL: Feelings of belonging						
Music	3.47	(3.23, 3.71)	3.17	(2.92, 3.41)	3.57	(3.26, 3.88)
Control	3.62	(3.38, 3.86)	3.61	(3.35, 3.87)	3.46	(3.23, 3.69)
DQOL: Sense of aesthetics						
Music	3.87	(3.58, 4.17)	4.12	(3.86, 4.38)	3.78	(3.46, 4.09)
Control	4.00	(3.72, 4.28)	3.80	(3.44, 4.16)	3.83	(3.54, 4.11)
GDS						
Music	3.63	(2.25, 5.00)	4.38	(3.30, 5.45)	3.50	(2.09, 4.91)
Control	3.96	(2.61, 5.30)	4.57	(3.32, 5.81)	3.26	(2.27, 4.25)

Notes: Intention to treat analysis with a multiple imputation method (n = 47)

the sessions ended. This idea is in line with previous research that has typically shown the immediate effects of music for people with dementia (Bruer et al., 2007; Svansdottir & Snaedal, 2006; Tuet & Lam, 2006). Finally, the results may be a product of the low baseline scores on the outcome measures. For instance, in our study the proportion of participants with scores suggestive of increased depressive symptoms on the GDS (25.5%) was much lower than prevalence rates reported in a large Australian survey of 1250 participants who were able to respond cognitively (41.1%) (Snowdon & Fleming, 2008). Previous researchers have identified low scoring of behaviours as possible reasons for non-significant findings, advocating that future research would benefit from greater screening of participants (Ledger & Baker, 2007; Nugent, 2000). We fully endorse these views and urge future researchers to consider greater screening methods to assess baseline levels for measures such as agitation and depression, prior to study commencement.

The finding that, at midpoint, participants in the reading group reported higher feelings of belonging than those in the music group may be due to differences in the delivery of the sessions. The music intervention was very structured and followed a set pattern each time; a point considered important to ensure treatment fidelity. As such, the music sessions were very much musician-led. The reading sessions, in contrast, were more organic in structure and could include a range of activities such as quizzes and discussions about the past. In this sense, the facilitator of the reading sessions may have stimulated greater individual involvement and created greater feelings of group coherence and belonging. This finding, that a reading activity created greater feelings of belonging than a music activity, should be investigated further. Such studies should employ a similar control group so as to determine if our results are replicable.

The finding that self-esteem scores significantly increased over time for participants who attended ≥ 50 per cent of music sessions in either arm of the study, regardless of group, arguably makes intuitive sense. It seems plausible that the more sessions a participant attended, the more familiar they became with

the format and structure, thus contributing to greater feelings of mastery, control and self-esteem. Previous research from a number of studies offers support for this notion. For instance, music in the everyday lives of older people with dementia has been shown to enhance empowerment and control (Sixsmith & Gibson, 2007) and regular, one to three-weekly music therapy sessions have been found to affect levels of agitation (Brotons et al., 1997; Clair & Bernstein, 1990; Ebberts, 1994; Suzuki et al., 2004). More research is needed to determine if improvements in indicators, such as QOL, can also be specifically improved through regular group activities, and not just those involving music.

Finally, the finding that depression scores, for those participants with scores on the GDS that were suggestive of depressive symptoms, decreased significantly over time, most noticeably for the music group, is perhaps of most interest. First, it suggests that both music and reading group activities can do much to alleviate depressive symptoms in those individuals with likely depression. However, as only a few studies have previously highlighted how music can reduce levels of depression in those with dementia (Ashida, 2000; Myskja & Nord, 2008), it is difficult to make an evaluation of efficacy. Finally, the results provide further support for greater screening of participants prior to study commencement. When scores on the GDS were suggestive of depression, although based on a smaller sample size ($n = 12$), a statistically significant result emerged. This provides some evidence that low scores on outcome measures may have influenced the lack of overall non-significant results.

Conclusion

Participation in a 40-minute live music intervention, three times a week for eight weeks, did not significantly affect levels of depression and QOL in older people with dementia. There was also no evidence to indicate that the therapeutic use of live music was more effective than a group reading activity. That said, however, results did suggest that both the music and reading group activities offered opportunities to improve sense of belonging, self-esteem and depressive symptoms in some older people with dementia. Furthermore, there was no evidence of adverse effects after involvement in either activity for participants. Further research into the specific benefits of regular, facilitation-based group engagement approaches with older people with dementia, particularly those demonstrating greater depressive symptoms, is needed to understand these findings further and determine their practical application.

References

Access Economics. (2009). *Keeping dementia front of mind: Incidence and prevalence 2009–2050*. Canberra: Alzheimer's Australia.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders*, 4th edn. Washington, DC: American Psychiatric Association.

Ashida, S. (2000). The effect of reminiscence music therapy sessions on changes in depressive symptoms in elderly persons with dementia. *Journal of Music Therapy*, *37*, 170–182.

Ayalon, L., Gum, A. M., Feliciano, L., & Arean, P. A. (2006). Effectiveness of non-pharmacological interventions for the management of neuropsychiatric symptoms in patients with dementia. *Archives of International Medicine*, *166*, 2182–2188.

Berger, G., Bernhardt, T., Schramm, U., Müller, R., Landsiedel-Anders, S., Peters, J. ... Frolich, L. (2004). No effects of a combination of caregivers support group and memory training/music therapy in dementia patients from a memory clinic population. *International Journal of Geriatric Psychiatry*, *19*, 223–231.

Boso, M., Politi, P., Barale, F., & Emanuele, E. (2006). Neurophysiology and neurobiology of the musical experience. *Functional Neurology*, *21*, 187–191.

Brod, B., Stewart, A., Sands, L., & Walton, P. (1999). Conceptualization and measurement of quality of life in dementia: Dementia quality of life instrument (DQoL). *The Gerontologist*, *39*, 25–35.

Brotons, M., Koger, S. M., & Pickett-Cooper, P. (1997). Music and dementias: A review of the literature. *Journal of Music Therapy*, *34*, 204–245.

Bruer, R. A., Spitznagel, E., & Cloninger, C. R. (2007). The temporal limits of cognitive change from music therapy in elderly persons with dementia or dementia-like cognitive impairment: A randomized controlled trial. *Journal of Music Therapy*, *44*, 308–328.

Bulechek, G. M., & McCloskey, J. C. (1999). *Nursing interventions: Effective nursing treatments*, 3rd edn. Philadelphia, PA: W. B. Saunders Company.

Chambless, D., & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology*, *66*, 7–18.

Choi, A., Lee, M. S., Cheong, W., & Lee, J. (2009). Effects of group music intervention on behavioural and psychological symptoms in patients with dementia: A pilot-controlled trial. *International Journal of Neuroscience*, *119*, 471–481.

Clair, A. A., & Bernstein, B. (1990). A preliminary study of music therapy programming for severely regressed

persons with Alzheimer's-type dementia. *Journal of Applied Gerontology*, *9*, 299–311.

Cohen-Mansfield, J., & Mintzer, J. E. (2005). Time for change: The role of nonpharmacological interventions in treating behaviour problems in nursing home residents with dementia. *Alzheimer Disease and Associated Disorders*, *19*, 37–40.

Cohen-Mansfield, J., & Werner, P. (1997). Management of verbally disruptive behaviours in nursing home residents. *Journal of Gerontology: Medical Sciences*, *52A*, 369–377.

Crystal, H. A., Grober, E., & Masur, D. (1989). Preservation of musical memory in Alzheimer's disease. *Journal of Neurology, Neurosurgery, and Psychiatry*, *52*, 1415–1416.

Dileo, C., & Bradt, J. (2005). *Medical music therapy: A meta-analysis and agenda for future research*. New Jersey: Jeffrey Books.

Ebberts, A. G. (1994). The effectiveness of three types of music therapy interventions with persons diagnosed with probable dementia of the Alzheimer's type who display agitated behaviours. Unpublished master's thesis, University of Kansas.

Evans, D., Wood, J., & Lambert, L. (2003). Patient injury and physical restraint devices: A systematic review. *Journal of Advanced Nursing*, *41*, 274–282.

Ferri, C. P., Prince, M., Brayne, C., Brodaty, H., Fratiglioni, L., Ganguli, M., ... Scazufca, M. (2005). Global prevalence of dementia: A Delphi consensus study. *Lancet*, *366*, 2112–2117.

Folstein, M., Folstein, S., & McHugh, P. (1975). Mini-mental state. *Journal of Psychiatric Research*, *12*, 189–198.

Gerdner, L. (1997). An individualized music intervention for agitation. *Journal of the American Psychiatric Nurses Association*, *3*, 177–184.

Gerdner, L. A. (1999). Individualized music intervention protocol. *Journal of Gerontological Nursing*, *25*, 10–16.

Goodall, D., & Etters, L. (2005). The therapeutic use of music on agitated behaviour in those with dementia. *Holistic Nursing Practice*, *19*, 258–262.

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

Hollis, S., & Campbell, F. (1999). What is meant by intention to treat analysis? Survey of published randomized controlled trials. *British Medical Journal*, *319*, 670–674.

Holmes, C., Knights, A., Dean, C., Hodkinson, S., & Hopkins, V. (2006). Keep music live: Music and the alleviation of apathy in dementia subjects. *International Psychogeriatrics*, *18*, 623–630.

Hughes, J. C. (2002). Ethics and the psychiatry of old age. In R. Jacoby & C. Oppenheimer (Eds.), *Psychiatry in the elderly* (pp. 863–895). Oxford: Oxford University Press.

Kruse, R. L., Alper, B. S., Reust, C., Stevermer, J. J., Shannon, S., & Williams, R. (2002). Intention-to-treat analysis: Who is in? Who is out? *Journal of Family Practice*, *51*(11), 969–971.

Kumar, A., Tims, F., Xruess, D. G., & Mintester, M. J. (1999). Music therapy increases serum melatonin levels in patients with Alzheimer's disease. *Alternative Therapies in Health Medicine*, *5*, 49–57.

Kurlowicz, L. (1999). *The Geriatric Depression Scale (GDS)*. The Hartford Institute for Geriatric Nursing, Division of Nursing, New York University. http://consultgerirn.org/topics/depression/want_to_know_more

Ledger, A. J., & Baker, F. A. (2007). An investigation of long-term effects of group music therapy on agitation levels of people with Alzheimer's Disease. *Aging & Mental Health*, *11*, 330–338.

Leibovici, A. (2009). Principles of geriatric psychopharmacology. In W. E. Reichman & P. R. Katz (Eds.), *Psychiatry in long-term care* (pp. 289–310). New York: Oxford University Press.

Montori, V. M., & Guyatt, G. H. (2001). Intention-to-treat principle. *Canadian Medical Association*, *165*, 1339–1341.

Myskja, A., & Nord, P. G. (2008). 'The day the music died': A pilot study on music and depression in a nursing home. *Nordic Journal of Music Therapy*, *17*, 30–41.

Nugent, N. (2000). The effects of live versus taped preferred songs on individuals with dementia of the Alzheimer's type displaying agitated behaviours. Unpublished master's thesis, University of Melbourne, Australia.

Polit, D., Beck, D., & Hungler, B. (2001). *Essentials of nursing research: Methods, appraisal, and utilization*, 5th edn. Philadelphia, PA: Lippincott Williams & Wilkins.

Pollack, N. J., & Namazi, K. H. (1992). The effect of music participation on the social behaviour of Alzheimer's disease patients. *Journal of Music Therapy*, *29*, 54–67.

Raglio, A., Bellelli, G., Traficante, D., Gianotti, M., Ubezio, M. C., Villani, D., & Trabucchi, M. (2008). Efficacy of music therapy in the treatment of behavioural and psychiatric symptoms of dementia. *Alzheimer's Disease and Associated Disorders*, *22*, 158–162.

Rio, R. (2002). Improvisation with the elderly: Moving from creative activities to process-oriented therapy. *The Arts in Psychotherapy*, *29*, 191–201.

Robinson, L., Hutchings, D., Dickinson, H. O., Corner, L., Beyer, F., Finch, F., ... Bond, J. (2007). Effectiveness and acceptability of non-pharmacological interventions to reduce wandering in dementia: A systematic review. *International Journal of Geriatric Psychiatry*, *22*, 9–22.

Sansoni, J., Marosszeky, N., Jeon, Y.-H., Chenoweth, L., Hawthorne, G., King, M., ... Low, L. (2007). *Final report: Dementia outcomes measurement suite project*. Australia: Centre for Health Service Development, University of Wollongong.

Schafer, J. L. (1999). NORM: Multiple imputation of incomplete multivariate data under a normal model, version 2.

Senn, S. (1993). *Cross-over trials in clinical research*. Chichester: Wiley.

Sink, K. M., Holden, K. F., & Yaffe, K. (2005). Pharmacological treatment of neuropsychiatric symptoms of dementia: A review of the evidence. *Journal of the American Medical Association*, *293*, 596–608.

Sixsmith, A., & Gibson, G. (2007). Music and the wellbeing of people with dementia. *Ageing and Society*, *27*, 127–145.

Sloane, P., Zimmerman, S., Williams, C., Reed, P., Gill, K., & Preisser, J. (2005). Evaluating the quality of life of long-term care residents with dementia. *The Gerontologist*, *45*, 37–49.

Snowdon, J., & Fleming, R. (2008). Recognising depression in residential facilities: An Australian challenge. *International Journal of Geriatric Psychiatry*, *23*, 295–300.

Sung, H., & Chang, A. M. (2005). Use of preferred music to decrease agitated behaviours in older people with dementia: A review of the literature. *Journal of Clinical Nursing*, *14*, 1133–1140.

Suzuki, M., Kanamori, M., Nagasawa, S., Tokiko, I., & Takayuki, S. (2007). Music therapy-induced changes in behavioural evaluations, and saliva chromogranin A and immunoglobulin A concentrations in elderly patients with senile dementia. *Geriatrics and Gerontology International*, *7*, 61–71.

Suzuki, M., Kanamori, M., Watanabe, M., Nagasawa, S., Kojima, E., Ooshiro, H., & Nakahara, D. (2004). Behavioural and endocrinological evaluation of music therapy for elderly patients with dementia. *Nursing and Health Sciences*, *6*, 11–18.

Svansdottir, H. B., & Snaedal, J. (2006). Music therapy in moderate and severe dementia of Alzheimer's type: A case-control study. *International Psychogeriatrics*, *18*, 613–621.

Takahashi, T., & Matsushita, H. (2006). Long-term effects of music therapy on elderly with moderate/severe dementia. *Journal of Music Therapy*, *43*, 317–333.

Tuet, R. W. K., & Lam, L. C. W. (2006). A preliminary study of the effects of music therapy on agitation in Chinese patients with dementia. *Hong Kong Journal of Psychiatry*, *16*(3), 87–89.

Vink, V., Birks, J., Bruinsma, M., & Scholten, R. (reprint 2005). Music therapy for people with dementia. This is a reprint of a Cochrane Review, prepared and maintained by The Cochrane Collaboration and published in The Cochrane Library 2005, Issue 3.

Yesavage, J. A., Brink, T. L., Rose, T. L., Lum, O., Huang, V., Adey, M. B., & Leirer, V. O. (1983). Development and validation of a geriatric depression screening scale: A preliminary report. *Journal of Psychiatric Research*, *17*, 37–49.

Author biographies

MARIE COOKE is the Deputy Head of School, School of Nursing & Midwifery, Griffith University. She has research strength in complementary therapies and has undertaken research investigating the effects of music and massage on anxiety/stress in a range of clinical settings.

WENDY MOYLE is Deputy Director, Research Centre for Clinical and Community Practice Innovation, Griffith University. She has research strength in dementia care and management of disruptive behaviours.

DAVID SHUM is the Deputy Director of the Griffith Institute of Health and Medical Research. He is a neuropsychologist who has a background and experience in understanding the effects of brain injury in children and adults.

SCOTT HARRISON is a Lecturer in Music and Music Education at Griffith University. His research focuses on music, gender, well-being and education. He has published extensively in the field of masculinities and music.

JENNY MURFIELD is a Senior Research Assistant at Griffith University's School of Nursing & Midwifery. She has worked on a number of educational and health-related research projects both in Australia and the UK.

International Psychogeriatrics (2006), 18:4, 623–630 © 2006 International Psychogeriatric Association
doi:10.1017/S1041610206003887 Printed in the United Kingdom

Keep music live: music and the alleviation of apathy in dementia subjects

Clive Holmes,[1] Andrew Knights,[2] Christine Dean,[1] Sarah Hodkinson[2] and Vivienne Hopkins[1]

[1] *School of Medicine, University of Southampton, U.K.*
[2] *School of Music, University of Southampton, U.K.*

ABSTRACT

Background: A recent Cochrane report concluded that more and better quality research is required to investigate the effectiveness of music therapy in reducing problems in behavioral, social, emotional and cognitive domains in patients with dementia. This randomized placebo-controlled trial with blinded observer rater aimed to explore whether music, live or pre-recorded, is effective in the treatment of apathy in subjects with moderate to severe dementia.

Methods: Thirty-two subjects meeting ICD-10 diagnostic criteria for moderate to severe dementia and fulfilling diagnostic criteria for apathy were exposed to live interactive music, passive pre-recorded music or silence for 30 minutes. Each subject was randomized to 30-minute music or silent periods and was video recorded and the muted recording analyzed every 3 minutes using dementia care mapping to assess the quality of engagement to the blinded music intervention.

Results: Compared to low baseline levels of positive engagement (12.5%) in the silent placebo period, the majority of subjects (69%), regardless of dementia severity, showed a significant and positive engagement to live music. Engagement to pre-recorded music was non-significant, with just 25% of all subjects showing positive engagement. No subjects showed any evidence of experiencing a state of ill-being during either the live or pre-recorded music sessions.

Conclusions: During the intervention, live interactive music has immediate and positive engagement effects in dementia subjects with apathy, regardless of the severity of their dementia. Pre-recorded music is non-harmful but less clearly beneficial.

Key words: music therapy, behavioral and psychological symptoms of dementia

Correspondence should be addressed to: Professor Clive Holmes, University of Southampton, School of Medicine, Clinical Neurosciences Division, Memory Assessment and Research Centre, Moorgreen Hospital, Botley Rd, West End, Southampton SO30 3JB, U.K. Phone: +44 023 8047 5216; Fax: +44 023 8046 3022. Email: ch4@soton.ac.uk. Received 9 Jan 2006; returned for revision 21 Mar 2006; revised version received 1 May 2006; accepted 2 May 2006. First published online 29 June 2006.

Background

Five percent of people over 65 and 20% of those over 80 have dementia, with 700 000 people with dementia in the U.K. alone, a number that will continue to rise as the age of the population increases. More than 50% of people with dementia experience apathetic or socially withdrawn behaviors. Apathetic behaviors are distressing for patients and problematic for carers (Howawitz and Schindelman, 1983; Rabins *et al*., 1982). Pharmacological treatment with antidepressant agents is often the first-line treatment for these disorders, despite there being only weak evidence for their effectiveness in dementia (Bains *et al*., 2002). Over-prescribing has become a major problem, especially in nursing- and rest-home environments, where more than 40% of people with dementia are taking psychotropic drugs, often inappropriately and usually with little subsequent monitoring (Furniss *et al*., 1998). In addition, psychotropic drugs have substantial adverse effects. Alternative treatments with few side-effects are urgently needed.

Music/music therapy is based on a possible beneficial effect on symptoms, including social, emotional and cognitive skills, and for decreasing behavioral problems of individuals with dementia. Thus, there are clear implications for the quality of life of both patients and caregivers. Moreover, it is clear that quantification and documentation of the evidence of this effect is necessary. Thus, a recent Cochrane report (Vink *et al*., 2004) concluded that research into music therapy to date has lacked methodological design rigor.

The majority of studies to date have focused on the impact of music to reduce symptoms of agitation in dementia (Gerdner, 2000). However, it is clear that music can have stimulatory as well as sedative effects. This study aimed to explore the effects of different types of music (live interactive and passive pre-recorded music) on behavior, using a dementia care mapping (DCM) approach (Kitwood, 1997), in apathetic patients with moderate to severe dementia.

Method

Patients

Patients were recruited from residential and nursing homes in the south of England. Of 112 patients screened, 32 fulfilled both the ICD-10 diagnostic criteria (World Health Organization, 1992) for moderate or severe dementia and the diagnostic criteria for the presence of apathy in dementia (Sergio *et al*., 2001). Subjects with severe hearing impairment were excluded from the study. Ethical approval for the study was granted by the Southampton and South West Hants Local Research Ethics Committee (019/04/w).

Study design and measures

Two methods of presenting music were compared with each other and with silence in a randomized design, using DCM (Kitwood, 1997). Music periods comprised three different activities, each of 30 minutes' duration. One 30-minute period consisted of silence alone, one 30-minute period consisted of the playing of background pre-recorded music and one 30-minute period consisted of the playing of live music from session musicians. Music played during the live interactive and pre-recorded period was the same and consisted of a mixture of favorite songs appropriate to the age group, including music from the swing era, popular classics and Scottish dances.

The order of the musical periods was randomized. Individual subjects were filmed on one occasion for each of the three musical periods in the same music session of 1.5 hours. The 30-minute video recordings of subjects were randomly assigned code numbers and the sound muted for visual observation. These video recordings were then rated every 3 minutes for the 30-minute musical period by an independent fully trained DCM rater, who assessed the quality of engagement of the subject to the unknown blinded therapy. The recording was muted and the activity of the musicians was not viewable on the video recording.

DCM is a validated observational instrument with high inter-rater and test–retest reliability (Kitwood, 1997). DCM examines 26 activities with each individual's interaction with that activity being rated on a six-point Likert scale (+5, +3, +1, −1, −3, −5) ranging from a positive +5 score, indicating that the subject is experiencing a high level of engagement, self-expression or social interaction with that activity (termed exceptional well-being), to a negative −5 score, indicating that the subject appears to experiencing extremes of apathy, withdrawal, rage, grief or despair (termed exceptional ill-being). We examined one of these categories (Category E), which measures the engagement of a subject in an expressive or creative activity. Category E scores vary from +5 points (being very highly involved in an expressive activity) to −5 points (in a state of severe ill-being while engaging in an expressive activity).

Study procedures

The communal area of the residential-care or nursing-home facility was used for the music intervention. To minimize the potential confounding effects of the different levels of auditory and visual activity, the musicians were asked to play at a similar volume, to display a similar level of physical activity, and to have their musical instruments visible, in all periods, including the silent period. All procedures and measurements were the same when using live music, recorded music or silence.

Analysis

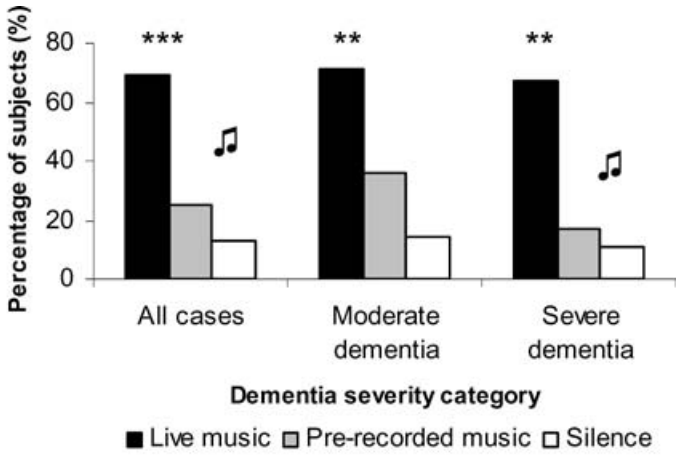
The null hypothesis was that there would be no statistical difference between the average observed Category E score on the DCM between all of the subjects exposed to live music, pre-recorded music and silence (placebo) group. Twenty-seven subjects gave 80% power ($\alpha = 0.005$) to show a significant (two-sided) difference of one standard deviation in the Category E item at the 5% level. The low α score reflected the need to correct for nine comparisons: three levels of dementia impairment (all cases, moderate cases and severe cases) and three conditions (recorded music, live music and silence). Allowing for a 10% drop-out rate, we estimated that around a total of 30 subjects would be required to enter the study.

For each subject a total of 10 Category E scores were determined for each music period (silence, pre-recorded music and live music). A median Category E score during the live music session, the pre-recorded music session and the silent (placebo) session was calculated, which represented the average level of engagement for that subject during the 30-minute music period. The median Category E scores for subjects in all music periods were found to be non-normally distributed (Kolgomorov–Smirnov $p < 0.05$); thus a median Category E score for the entire group of 32 subjects was then calculated from the individual median period scores. The number of subjects scoring positively [being involved in a positive way with the activity (i.e. +1, +3, +5) on the Category E score] and those with negative involvement (i.e. –1, –3, –5) were compared across musical periods using χ^2 statistic. The median Category E score was compared between the different musical periods using the paired non-parametric Wilcoxon signed rank statistic. An identical subanalysis was performed for subjects with moderate or severe dementia. All results were corrected for multiple testing using the Bonferroni correction for multiple comparisons.

Results

Thirty-two subjects consented and/or their carers assented for the subjects to take part in the study. All subjects completed the study. The mean age of the group was 84.9 (S.D. 4.7) years and 28 (88%) of subjects were women. Fourteen (44%) subjects were classified as having dementia of moderate severity and 18 (56%) severe dementia.

No subjects showed any evidence of experiencing a state of ill-being during the live or pre-recorded music sessions (i.e. none scored –1 to –5 on Category E). The percentage of subjects showing positive engagement to music for all cases and by dementia severity is shown in Figure 1. In all cases, including the subcategories moderate and severe dementia, live music was associated with a



Live music *vs.* silence *** χ^2 $p < 0.0001$; ** χ^2 $p < 0.01$.

Live music *vs.* pre-recorded music ♫ χ^2 $p < 0.01$.

Figure 1. The percentage of subjects showing positive engagement to music by dementia severity.

Table 1. A comparison of the average Category E scores in the three musical sessions by dementia severity

		MUSIC SESSION		
DEMENTIA SEVERITY		LIVE MUSIC	PRE-RECORDED MUSIC	SILENCE
All cases ($n = 32$)	median (range)	+1 (0–3)[a,b]	0 (0–3)	0 (0–1)
	mean (S.D.)	1.4 (1.1)	0.3 (0.6)	0.2 (0.4)
Moderate dementia ($n = 14$)	median (range)	+1 (0–3)[c,d]	0 (0–3)	0 (0–1)
	mean (S.D.)	1.6 (1.3)	0.6 (0.8)	0.2 (0.6)
Severe dementia ($n = 18$)	median (range)	+1 (0–3)[e,f]	0 (0–1)	0 (0–1)
	mean (S.D.)	1.2 (0.9)	0.2 (0.3)	0.2 (0.4)

[a] Live music *vs.* silence. Wilcoxon signed rank statistic $p < 0.001$.
[b] Live music *vs.* pre-recorded music. Wilcoxon signed rank statistic $p < 0.001$.
[c] Live music *vs.* silence. Wilcoxon signed rank statistic $p = 0.04$.
[d] Live music *vs.* pre-recorded music. Wilcoxon signed rank statistic $p = 0.09$.
[e] Live music *vs.* silence. Wilcoxon signed rank statistic $p = 0.04$.
[f] Live music *vs.* pre-recorded music. Wilcoxon signed rank statistic $p = 0.04$

greater number of subjects showing positive engagement compared with silence. However, in all cases, including the subcategories moderate and severe dementia, the numbers of subjects showing positive engagement to pre-recorded music was not significantly greater than when exposed to silence (all $\chi^2 p > 0.1$). For all

cases, and for the subcategory of severe dementia, live music was also associated with a significantly greater number of subjects showing positive engagement compared with those exposed to pre-recorded music. In the moderate dementia group, the number of subjects showing positive engagement was also greater in the live compared with the pre-recorded music session (71% *vs*. 36%); however, this was not statistically significant ($\chi^2 p = 0.12$).

An examination of the median Category E scores shows similar findings (Table 1). Thus, the median level of engagement when exposed to live music was +1 point for all cases (including the subcategories moderate and severe dementia) but 0 points in the pre-recorded and silent sessions.

Discussion

Although the use of music has been advocated in the treatment of patients with dementia with behavioral problems, including apathy (Koger and Brotons, 2000), few placebo-controlled studies have been published. Given the large placebo effect found in treatment studies of behavior in patients with dementia (Schneider *et al*., 1990), it is clear that case studies cannot be taken as evidence in favor of any treatment intervention. This placebo-controlled trial shows evidence that music is of benefit in the short-term treatment of apathy in subjects with moderate or severe dementia.

Compared to the level of engagement found during periods of silence, the increased level of positive engagement was greatest when the subjects were exposed to live music compared to those exposed to pre-recorded music. Indeed, after applying the Bonferonni correction, pre-recorded music could be said to be of no additional benefit compared with the level of engagement found in the silent session. Neither live interactive nor pre-recorded music appears to do any harm. However, the benefits of pre-recorded music, in terms of the positive engagement of these subjects, would appear to be of limited value, particularly when the subjects have severe dementia. However, it is clear that all patients, regardless of the severity of their dementia, appear to engage positively and, presumably, appreciate a live music session.

This study has a number of limitations. First, although anecdotally both the live and pre-recorded music elicited positive verbal responses in these patients, an objective assessment was not possible because muting the sound to blind the rater to the intervention also prevented the rater from evaluating the patients' verbal response to the music. Second, this study only examined the immediate effects of music on symptoms of apathy and any longer-term consequences cannot be inferred. Third, although we tried to minimize the differences between the live and recorded music performances as much as possible, it is clear that the visual imagery of seeing someone play an instrument is different to the visual imagery

of seeing someone with their instrument but not playing it. This qualitative difference is probably one of the reasons why live music has superiority in this and other settings. However, we believe that this study adds strength to what has often been advocated; that music, and in particular live music, has an important role to play in improving apathy in patients with dementia.

Key points

- Live interactive music shows good efficacy in the short-term treatment of apathy in patients with moderate and severe dementia.
- Pre-recorded music is more limited, particularly in subjects with severe dementia, and shows no significant efficacy in the short-term treatment of apathy in subjects with dementia.
- Live interactive music is superior to pre-recorded music in the short-term treatment of apathy in patients with severe dementia.

Conflict of interest

None.

Description of authors' roles

Clive Holmes designed the study, analyzed the data and wrote the paper. Andrew Knights formulated the research question, designed the study and supervised the data collection. Christine Dean supervised the data collection and helped to write the paper. Sarah Hodkinson supervised the data collection. Vivienne Hopkins analyzed the data.

Acknowledgments

We acknowledge the cooperation and help of Katherine Legg and all staff involved in the study at the following care homes in Hampshire: Nightingale Lodge, The White House, Stoneham House and Cranleigh Paddock. This project was supported by the Active Community Fund Project, University of Southampton.

References

Bains, J., Birks, J. S. and Dening, T. R. (2002). The efficacy of antidepressants in the treatment of depression in dementia. *Cochrane Database of Systematic Reviews (Online)*, 4, CD003944.

Furniss, L., Lloyd-Cray, S. K. and Burns, A. (1998). Medication use in nursing homes for elderly people. *International Journal of Geriatric Psychiatry*, 13, 433–439.

Gerdner, L. A. (2000). Music, art and recreational therapies in the treatment of behavioural and psychological symptoms of dementia. *International Psychogeriatrics*, 12, 359–366.

Howawitz, A. and Schindelman, L. W. (1983). Reciprocity and affection: past influences on current caregiving. *Journal of Gerontological Social Work*, 5, 5–20.

Kitwood, T. (1997). *Dementia Care Mapping: the DCM method.* (7th ed.). Bradford: Bradford Dementia Group, University of Bradford.

Koger, S. M. and Brotons, M. (2000). Music therapy for dementia symptoms. *Cochrane Database of Systematic Reviews (Online)*, 3, CD001121.

Rabins, P. V., Mace, N. L. and Lucas, M. J. (1982). The impact of dementia on the family. *JAMA*, 248, 333–335.

Schneider, L. S., Pollock, V. E. and Lyness, S. A. (1990). A meta-analysis of controlled trials of neuroleptic treatment in dementia. *Journal of the American Geriatrics Society*, 38, 553–563.

Sergio, E., Starkstein, M. D., Petracca, G., Chemerinski, E. and Kremer, J. (2001). Syndromic validity of apathy in Alzheimer's disease. *American Journal of Psychiatry*, 158, 872–877.

Vink, A. C., Birks, J. K., Bruinsma, M. S. and Scholten, R. J. (2004). Music therapy for people with dementia. *Cochrane Database of Systematic Reviews (Online)*, 3: CD003477.

World Health Organization (1992). *The ICD-10 Classification of Mental and Behavioral Disorders*. Geneva: World Health Organization.

Title:
Different Pattern of Emotional Benefits Induced by Regular Singing and Music Listening in Dementia

Author:
Särkämö, Teppo, Institute of Behavioural Sciences
Laitinen, Sari, Miina Sillanpää Foundation
Numminen, Ava, KeyToSong Singing School
Kurki, Merja, Miina Sillanpää Foundation
Johnson, Julene K, Institute for Health & Aging
Rantanen, Pekka, Finnish Association of People with Physical Disabilities

Publication Date:
01-08-2016

Series:
Recent Work

Permalink:
http://escholarship.org/uc/item/29r147dh

Different Pattern of Emotional Benefits Induced by Regular Singing and Music Listening in Dementia

Teppo Särkämö, PhD,[1] Sari Laitinen, LicPhil,[2] Ava Numminen, PhD,[3] Merja Kurki, PhD,[2] Julene K. Johnson, PhD,[4] and Pekka Rantanen, MD, PhD[5]

[1]Cognitive Brain Research Unit, Institute of Behavioural Sciences, University of Helsinki, Helsinki, Finland

[2]Miina Sillanpää Foundation, Helsinki, Finland

[3]KeyToSong Singing School, Helsinki, Finland

[4]Institute for Health & Aging, University of California, San Francisco, USA

[5]Finnish Association of People with Physical Disabilities, Validia Rehabilitation Helsinki, Helsinki, Finland

To the Editor: Behavioral and psychological symptoms of dementia (BPSD), such as depression and anxiety are highly prevalent symptoms in persons with dementia (PWDs) and represent one of the most complex, stressful, and costly aspects of dementia care[1]. Previous studies have demonstrated that the capacity of music to evoke emotions and memories is often preserved even in severe Alzheimer's disease (AD)[2] and that music therapy or musical activities can enhance mood and social interaction in PWDs, although more evidence is still needed[3-5]. In a recent randomized controlled trial (RCT)[6], we compared the cognitive and emotional effectiveness of two types of caregiver-implemented musical activities, singing and music listening, to standard care in mild-moderate dementia. Both singing and music listening improved performance on the MMSE and attention and executive function tests as well as reduced depression symptoms indexed by the Cornell-Brown Scale for Quality of Life in Dementia (CBS) total score[6]. Extending this study, our aim was to determine whether singing and music listening, which differ motorically, cognitively, and emotionally, would show a distinct pattern of emotional benefits on the subscales of the CBS.

METHODS

In the RCT[6], 89 PWD-caregiver dyads were randomized to a Singing Group (SG), Music Listening Group (MLG), or Control Group (CG). Inclusion criteria were mild-moderate dementia, no prior severe psychiatric illness or substance abuse, stable medication, and physically able to participate. In the SG and MLG, the dyads participated in a 10-week intervention involving weekly small-group sessions (1.5 h per session) and home training, with a focus on coaching the caregivers to use either singing (SG) or listening (MLG) of familiar songs together with the PWD as a part of everyday care. The CG received standard care and continued with normal daily activities. All PWDs underwent neuropsychological testing, which included assessment of depression and quality of life (QoL), before (baseline) and after (follow-up 1) the intervention and six months post-intervention (follow-up 2). Eighty-four PWDs completed the study up to follow-up 1 and 74 up to follow-up 2.

Depression was assessed with the CBS[7] based on PWD interviews and informant reports. The CBS comprises 19 bipolar (rated from -2 to 2) items and five subscales measuring different depression symptoms: Mood-related signs (e.g., sadness – happiness), Ideational disturbances (e.g., self-deprecation – self-esteem), Behavioral disturbances (e.g., agitation – serenity), Physical signs (e.g., fatigue – energy), and Cyclic functions (e.g., difficulty falling asleep – falling asleep easily)[7]. The data were analyzed using General Linear Models (GLM) with follow-up score as a dependent variable, group as a factor, and baseline score as a covariate. Post hoc testing was performed on the change scores using Tukey's HSD.

RESULTS

Table 1 shows the CBS subscale scores for the PWDs in the three groups. At follow-up 1, there were significant group effects in two of the five domains: Behavioural disturbances [$F(1, 79) = 3.46$, $P = 0.036$] and Physical signs [$F(1, 79) = 5.20$, $P = 0.008$]. In Behavioural disturbances, the MLG improved more than the CG ($P = 0.005$) whereas the MLG and SG did not differ. In Physical signs, especially the SG ($P = 0.001$) but also the MLG ($P = 0.024$) improved more than the CG. The proportional gain of Physical signs from the CBS total score was clearly higher in the SG (38%) than in the MLG (10%) whereas for Behavioural disturbances this was more similar (18% vs. 26%). At the longitudinal follow-up 2, no significant group effects were observed on any of the subscales.

DISCUSSION

Previous studies that have included both active (singing or music therapy) and passive (listening-based) music interventions have reported short-term emotional benefits for both interventions but slightly larger positive effects on BPSD and arousal for active interventions in PWDs[8,9] and other neurological groups[10]. Our results extend these findings by showing that singing and music listening

can target different domains of depression symptoms in mild-moderate dementia. Although both music intervention groups showed some benefits for negative affect and ideation (e.g., anxiety, pessimism, self-esteem) compared to the CG, the largest gains in the MLG were observed for the different behavioral disturbances of depression, such as agitation and loss of interest, whereas the SG showed pronounced gains in the physical signs of depression, including lack of energy and weight loss. This pattern of results is likely related to different nature of the interventions in terms of emotional valence and arousal: while both musical activities are highly pleasant and rewarding, listening to music and the associated reminiscence can be more calming and relaxing, whereas engaging in joint singing can be more energizing, refreshing, and stress-reducing.

ACKNOWLEDGMENTS

We kindly thank the PWDs and their caregivers and nurses for participation in this study. Special thanks to Mari Tervaniemi, Jennie Lilland, Milla Holma, Ilona Kiesilä, Hanna Clutterbuck, Tarja Lampinen, Raisa Saloheimo, Eija Sorvari, Marja Hietanen, Timo Erkinjuntti, and Laura Hokkanen for their valuable assistance and expertise in planning and implementing the study. The generous collaboration of the Miina Sillanpää Foundation, the Helsinki Alzheimer Association, the Tapiola Service Centre, the Helsinki Senior Citizens Foundation, and the Kustaankartano Centre for the Elderly is gratefully acknowledged.

Conflict of Interest: The editor in chief has reviewed the conflict of interest checklist provided by the authors and has determined that the authors have no financial or any other kind of personal conflicts with this paper. This work was supported by grants from the Miina Sillanpää Foundation (Helsinki, Finland), Finland's Slot Machine Association (grant no. C28), and Academy of Finland (projects 141106 and 257077).

Author Contributions: Särkämö: study concept and design, data collection and analysis, interpretation of results, and preparation of manuscript. Laitinen and Numminen: study concept and design, implementation of interventions, and interpretation of results. Kurki, Johnson, and Rantanen: study concept and design and interpretation of results.

Sponsor's Role: None.

REFERENCES

1. Kales HC, Gitlin LN, Lyketsos CG. Assessment and management of behavioral and psychological symptoms of dementia. BMJ 2015;350:h369.
2. Cuddy LL, Sikka R, Vanstone A. Preservation of musical memory and engagement in healthy aging and Alzheimer's disease. Ann N Y Acad Sci 2015;1337:223–231.
3. Petrovsky D, Cacchione PZ, George M. Review of the effect of music interventions on symptoms of anxiety and depression in older adults with mild dementia. Int Psychogeriatr 2015;doi:10.1017/S1041610215000393.
4. Vink AC, Birks JS, Bruinsma MS et al. Music therapy for people with dementia. Cochrane Database Syst Rev 2011;3:CD003477.
5. Holmes C, Knights A, Dean C et al. Keep music live: music and the alleviation of apathy in dementia subjects. Int Psychogeriatr 2006;18:623–630.
6. Särkämö T, Tervaniemi M, Laitinen S et al. Cognitive, emotional, and social benefits of regular musical activities in early dementia: randomized controlled study. Gerontologist 2014;54:634–650.
7. Ready RE, Ott BR, Grace J et al. The Cornell-Brown Scale for Quality of Life in dementia. Alzheimer Dis Assoc Disord 2002;16:109–115.
8. Sakamoto M, Ando H, Tsutou A. Comparing the effects of different individualized music interventions for elderly individuals with severe dementia. Int Psychogeriatr 2013;25:775–784.
9. Raglio A, Bellandi D, Baiardi P et al. Listening to music and active music therapy in behavioral disturbances in dementia: a crossover study. J Am Geriatr Soc 2013;61:645–647.
10. Tamplin J, Baker FA, Grocke D et al. Effect of singing on respiratory function, voice, and mood after quadriplegia: a randomized controlled trial. Arch Phys Med Rehabil 2013;94:426–434.

Table 1. Cornell-Brown Scale for Quality of Life Subscale Scores in the Intervention and Control Groups

		Singing Group (N = 27/23[a])	Music Listening Group (N = 29/28[a])	Control Group (N = 27/22[a])	
CBS Subscale	**Time**	**Mean ± Standard Deviation**			***P*-Value[b]**
Mood-Related Signs (range -8 to 8)	Baseline	1.8 ± 3.3	0.9 ± 3.5	2.4 ± 2.5	
	Follow-Up 1	2.3 ± 2.7	2.3 ± 3.6	2.0 ± 2.9	0.216
	Follow-Up 2	1.4 ± 2.6	2.1 ± 2.8	1.7 ± 2.6	0.128
Ideational Disturbances (range -8 to 8)	Baseline	1.8 ± 2.9	0.7 ± 3.0	2.1 ± 2.7	
	Follow-Up 1	1.9 ± 2.6	1.9 ± 2.4	1.7 ± 2.3	0.215
	Follow-Up 2	1.4 ± 2.3	1.5 ± 2.6	2.3 ± 2.3	0.589
Behavioral Disturbances (range -8 to 8)	Baseline	0.3 ± 2.8	-1.2 ± 3.1	0.2 ± 2.4	
	Follow-Up 1	0.9 ± 2.7	0.4 ± 2.2	-0.1 ± 2.5	**0.036**
	Follow-Up 2	0.1 ± 2.5	-0.2 ± 2.3	0.1 ± 2.5	0.873
Physical Signs (range -6 to 6)	Baseline	0.3 ± 1.8	0.2 ± 2.2	1.4 ± 1.5	
	Follow-Up 1	1.4 ± 2.2	0.8 ± 1.9	0.8 ± 2.3	**0.008**
	Follow-Up 2	0.1 ± 1.8	0.8 ± 1.6	1.4 ± 1.4	0.150
Cyclic Functions (range -8 to 8)	Baseline	0.8 ± 2.3	0.0 ± 2.8	1.9 ± 3.0	
	Follow-Up 1	1.5 ± 2.2	1.3 ± 3.0	1.5 ± 2.5	0.410
	Follow-Up 2	1.7 ± 1.9	0.9 ± 2.4	1.8 ± 2.1	0.803

[a]At Follow-up 2

[b]From GLM with follow-up score as a dependent variable, group as a factor, and baseline score as a covariate

Aging & Mental Health

ISSN: 1360-7863 (Print) 1364-6915 (Online) Journal homepage: http://www.tandfonline.com/loi/camh20

Emotional and behavioural responses to music in people with dementia: an observational study

K. Sherratt , A. Thornton & C. Hatton

To cite this article: K. Sherratt , A. Thornton & C. Hatton (2004) Emotional and behavioural responses to music in people with dementia: an observational study, Aging & Mental Health, 8:3, 233-241, DOI: 10.1080/13607860410001669769

To link to this article: http://dx.doi.org/10.1080/13607860410001669769

Published online: 19 Oct 2010.

Aging & Mental Health, May 2004; 8(3): 233–241

BrunnerRoutledge Taylor & Francis healthsciences

ORIGINAL ARTICLE

Emotional and behavioural responses to music in people with dementia: an observational study

K. SHERRATT[1], A. THORNTON[2] & C. HATTON[3]

[1]*Gloucestershire Partnership NHS Trust,* [2]*Bolton, Salford and Trafford Mental Health Partnership &* [3]*Institute for Health Research, Lancaster University*

Abstract

Using continuous time sampling and direct observation methodology, this study examined the impact of social interaction in music listening on behavioural responses of people with moderate-to-severe dementia ($n = 24$). Using Kitwood's theory of personhood as a framework, it was hypothesized that levels of well-being and engagement would be greatest during a live music condition compared with recorded and no music conditions and that levels of challenging behaviour would decrease most in the live music conditions compared with the other music conditions. The relationship between severity of cognitive impairment and well-being, engagement and challenging behaviours across conditions was also examined. The findings suggest that live music was significantly more effective in increasing levels of engagement and well-being regardless of level of cognitive impairment. No significant differences across conditions were found for challenging behaviours, but the correlation between these and cognitive impairment revealed mixed results. Clinical implications regarding the use of live music in dementia care settings are highlighted and recommendations for future research of interventions aimed at reducing challenging behaviours are discussed.

Introduction

Numerous studies have reported the beneficial effects of music interventions for people with dementia (Brotons, Koger & Pickett-Cooper, 1997; Koger, Chapin & Brotons, 1999). A variety of music interventions have been shown to reduce the incidence of challenging behaviour (Gerdner, 2000; Gerdner & Swanson, 1993) and increase levels of engagement (Clair, 1996; Clair, Bernstein & Johnson, 1995). The term 'challenging behaviour' has recently been adopted in older adult work from the learning disability field to refer to the behavioural symptoms associated with dementia (Stokes, 1996). The use of the term music throughout this paper refers primarily to music listening, as music therapy refers to the provision of musical activities provided by trained music therapists. Music interventions appear to have the potential to address these issues with the added benefits of being low cost, non-invasive, accessible and easily implemented. The potential of music is therefore very relevant to a clinical setting. However, in a meta-analysis of 21 clinical empirical studies Koger *et al.* (1999) were unable to specify which variables (e.g., treatment components, therapist factors, type of music activity) accounted for these effects.

Many researchers have explained the effects of music by placing their findings within the context of a theoretical framework such as the progressively lowered stress threshold model (PLST) (Hall & Buckwalter, 1987) or the more generic theory and philosophy of music therapy. This study has incorporated Kitwood's (1999) theory of personhood (ToP) as a theoretical framework. The theory aims to integrate neurological findings with social psychological principles and theories of interpersonal processes, moving away from the traditional medical view of dementing illness. The subjective experience and well-being of the person with dementia (i.e., personhood) assumes a greater importance within the ToP framework. Maintaining personhood involves providing a high standard of care and finding positive and meaningful ways in which to interact with the person with dementia. Listening to music has the potential to maintain personhood, even in those with severe

Correspondence to: Kirsty Sherratt, Older Adult Clinical Psychology Service, Weavers Croft, Field Road, Stroud, Gloucestershire, GL5 2HZ, UK. Tel: +44 (0) 1453 562160. Fax: +44 (0) 1453 562161. E-mail: kirsty.sherratt@glospart.nhs.uk

Received for publication 27th September 2002. Accepted 4th June 2003.

cognitive impairment. One reason may be because language abilities, which may have deteriorated, are not necessarily required. However, there is a danger that by listening to recorded music, the social and interactive qualities of live music (which are essential if personhood is to be maintained) are lost.

The theory of personhood may have a number of advantages over other frameworks and models. The PLST model focuses largely on anxious/agitated behaviours. What is less clear is how it accounts for individual engagement and participation processes that do not involve aggression or agitation. The ToP attempts to account for behaviours indicative of well-being, in addition to more problematic behaviours. Key components in ToP such as social interaction and well-being are overt behaviours and are therefore observable. Research implications are that outwardly observable behaviours and events are measurable, which should improve the validity of the results, particularly in terms of construct validity (i.e., the extent to which the researchers are testing their hypotheses at the appropriate conceptual level). The key factor in the PLST model of stress threshold (as determined by organic neuropathology) is an internal process, which is unobservable and thus harder to assess, measure and validate. By contrast, music therapy philosophy shares similarities with ToP. Both integrate neurological and psychological findings in their understanding of dementia and emphasize the importance of interpersonal processes. However, the ToP framework is broader and more elaborated by comparison, encompassing all aspects of dementia care.

Purpose of study

The aim of this study was to examine the impact of social interaction in music listening, building on the recommendations of previous authors who suggested that future research should focus on direct, experimental comparisons of potential moderating variables (e.g., the efficacy of listening to live versus taped music) and on the relationship between disease severity and treatment efficacy (Koger *et al.*, 1999).

To assess the impact of social interaction on the behaviour of participants, background music with social interaction (live music) and without social interaction (taped music) was compared. Participants' responses in terms of engagement, well-being and problem behaviours were directly observed. Unlike previous research, the duration and frequency of target behaviours were recorded using a more sophisticated form of observational methodology, continuous time sampling (CTS). Furthermore, sufficient numbers of participants were recruited so that conclusions might be more generalizable to other groups of people with dementia.

Many previous studies measured individual participant behaviour without regard to staff participant interaction, despite the fact that it may have been these interactions affecting participants' behaviour rather than the music per se. The current study recorded participant contact with staff to address this issue. It was hypothesized that:

1. Responses to music would be significantly greater during the live music condition, compared with the recorded music conditions.
2. Participants would spend significantly more time engaged in meaningful activity during the live music condition, compared with the recorded music conditions and the no music condition.
3. Levels of observed well-being would be significantly higher during the live music condition, compared with the recorded music conditions and the no music condition.
4. Levels of observed individually defined challenging behaviours would be lower during the live music condition, compared with the recorded music conditions and the no music condition.
5. There would be no significant correlations between observable signs of well-being, engagement in meaningful activity, responses to music, challenging behaviour and scores on the Mini Mental State Examination during the live music condition.

Methods

Setting and sample

Twenty-nine people were initially recruited from an NHS dementia service; two people died, two were discharged from the service and one person stopped attending the day hospital of their own volition. Of the 24 participants who took part, 16 participants were resident on a continuing care ward and seven attended a day hospital. One service user was observed across both settings. Fourteen of the participants were male and 10 were female. Ages ranged from 53–89 years ($M = 74.7$ years; $SD = 8.8$). Inclusion criteria for the observations were: a formal diagnosis of dementia, a moderate-to-severe level of cognitive impairment as measured by the Mini Mental State Examination (MMSE) (Folstein, Folstein & McHugh, 1975), a history of challenging behaviour and/or signs of social withdrawal and minimal engagement. People were excluded if they had an auditory or visual impairment in excess of that associated with normal ageing as this may have affected their ability to interact with the music source. Seven participants obtained MMSE scores indicating moderate cognitive impairment and seven obtained scores indicating severe impairment. One participant obtained a zero score (indicating very severe impairment) and another nine participants were considered to be so severely impaired as to be

Design

An experimental, within-participants, repeated measures design was used with counter-balancing of four conditions (no music, taped commercial music, taped music played by a musician and live music). Each participant acted as their own control and was observed across all four conditions.

The independent variable was the level of interaction and engagement provided by different music modalities which varied across four conditions: no music (for baseline and control purposes); a taped selection of commercially recorded music; a taped selection of the same music, recorded by a musician (to control for potential confounding variables regarding the voice and style of the musician) and a live performance of the same selection of music by the same musician. Dependent variables were the emotional and behavioural responses of participants in terms of engagement, types of response to the music (e.g., clapping, singing or no response at all), levels of individually defined challenging behaviours and levels of well-being and ill-being.

Measures and materials

Musical preference questionnaire A questionnaire for completion with participants was devised to facilitate the appropriate selection of individualized music, as recommended by previous researchers (Casby & Holm, 1994; Clair & Bernstein, 1994; Gerdner & Swanson, 1993). The questionnaire was very brief and a tick-box format was used. Respondents were asked to choose two preferred types of music from the lists provided (e.g., classical or pop), and three favourite artists. If personal preferences were not listed, respondents were asked to provide this information. If individuals were unable to give this information themselves, carers/relatives were asked to complete a similar form. If neither of these options was possible, age-appropriate music was selected by the musician on the person's behalf. Favourite artists rather than specific titles were requested to allow more flexibility in matching chosen titles to those in the musician's repertoire and in matching these songs to commercial recordings of a similar duration.

Mini Mental State Examination The MMSE (Folstein *et al.*, 1975) is a brief cognitive screening tool, which provides a reliable and valid indication of moderate and severe dementia (Lezak, 1995). Individual participants' levels of cognitive impairment were classified as moderate, indicated by a score of 10–19; severe, indicated by a score of 1–9; or very severe dementia, indicated by a score of 0 (Tiraboschi *et al.*, 2000).

Continuous time sampling Non-participant observational data were collected using Psion Workabout hand-held computers using software developed for real-time multiple event recording (McGill, Hewson & Emerson, 1994). The Psion is a portable and relatively simple 'electronic event recorder' which, via the CTS software, preserves information about the sequence of events and provides information about the actual occurrence of different behaviours, rather than an estimate of their occurrence (as provided by other time sampling measures). Hence the duration and frequency of up to 26 different events or activities can be recorded as they occur on a second by second basis.

Continuous time sampling codes The code definitions for well/ill-being were based on those outlined in Kitwood's Dementia Care Mapping (DCM) method (Kitwood, 1997). Dementia Care Mapping is an observational system for measuring quality of life in dementia care settings and necessitates specialist training for observers. The decision to use certain aspects of the DCM as a guide for the coding system in this study was made for two reasons. Firstly, the main researcher did not have specialist training in DCM. Secondly, DCM addresses all aspects of dementia care and it was felt the codes were too general to be able to capture the nuances of behaviours relating specifically to music listening. Individually defined challenging behaviours were defined following discussions with senior care staff as to the nature of each behaviour. Engagement behaviour definitions were based on previous music therapy research studies and those outlined by McFadyen (1984). The researcher recorded participant behaviour across six dimensions: levels of well-being or ill-being; the level and type of activity; physical location; response to music; interaction with staff or the researcher(s); individually-defined challenging behaviours which the participant might engage in (e.g., wandering or shouting). For codes and brief definitions refer to Table 1. Different keys recorded behaviours in different ways. For example keys A–D were mutually exclusive: pressing any key in this set would automatically replace the key in this set pressed previously. Keys M–R were independent of each other: one or all of them could be pressed at the same time. Each key had to be pressed on and off again. Event frequency keys (U–X) were also independent of each other: each one was pressed once when the specified behaviour for that key occurred.

Inter-observer reliability of CTS codes Levels of inter-observer agreement for each of the codes were determined prior to collecting the data for the main part of the study. Two observers independently but simultaneously recorded the same resident's activity using the CTS methodology. Twelve participants were observed in total over a period of nine hours and fifty minutes (this was equivalent to 10% of the

TABLE 1. Summary of inter-observer agreement achieved on the behaviour categories using continuous time sampling methodology

Key type	Key	Brief description of behaviour	Inter-observer agreement κ
Mutually exclusive	a	No meaningful activity	0.86
	b	Meaningful activity	0.84
	c	Engaging with music source	0.90
	d	Sleeping	0.98
Mutually exclusive	i	Walking	0.90
	j	Standing	0.79
	k	Sitting	0.96
	l	Client unobservable	0.95
Independent duration	m	Movement to music	0.85
	n	Any Interaction with music source	0.91
	o	Singing	0.87
	p	Humming/whistling	0.88
	q	No observable response to music	0.92
	r	No music condition	0.99
Event frequency	u	Individually-defined challenging behaviours e.g. repetitive conversational themes	0.0
	v	Physical aggression	behaviour not observed
	w	Loud repetitive vocalizations/verbal aggression	0.10
	x	Inappropriate (sexual) behaviour	0.0
Independent duration	t	Perseveration/talking to oneself	0.89
	y	Wandering	0.79
	z	Individually-defined challenging behaviours e.g. moving furniture	0.95
Independent duration	s	Staff interaction	0.92
Mutually exclusive	1	Extreme ill-being	0.0
	2	Ill-being	0.77
	3	Neutral/passive	0.79
	4	Well-being	0.90
	5	Extreme well-being	0.82

observations, the normal ward or day unit routine prevailed. Sometimes music was played, at other times the radio or television was switched on. Levels of agreement on the presence of behaviours (frequencies and durations) observed on a second by second basis were calculated using a form of Cohen's kappa for each code, modified to allow for differences in reaction time of up to three seconds (Reeves, 1994a, cited in Emerson *et al.*, 1999). Table 1 shows the concordance rates for the behaviour categories used. Kappa (κ) scores of between 0.4 and 0.6 reflect fair inter-observer reliability and good reliability is demonstrated when κ = between 0.6 and 0.75. An excellent level of reliability is indicated when κ = 0.75 or above (Hartmann, 1977). The majority of the codes in this study achieved an excellent level of inter-observer reliability, but those not achieving a minimum kappa score of 0.6 were not included in any further analysis.

Music materials Music preferences were diverse ranging from songs by Glenn Miller to Neil Diamond. Participants with similar preferences were divided into five groups of no more than eight people. Music selections lasting one hour were put together for each group. A total of 10 audiocassette tapes were recorded (five with commercial music, five with music recorded by the musician). The tapes were played on stereo systems already present in the main seating areas of the day unit and ward. For the live performances, the same musician (semi-professional) sang and played a guitar, using a microphone and amplifier, sitting next to where the stereo equipment was positioned. The level of sound for both recorded and live music was adjusted to just above background noise.

Procedure

Local health authority ethics committee approval was obtained for the study, as was support from key members of staff within the dementia service. Consent for inclusion from service users was obtained and where this was not possible, written assent was sought from relatives/care staff.

Potential participants were identified and information regarding the nature of the project, consent, assent and a musical preference questionnaire were disseminated. Staff were requested to keep contact with participants to a minimum during that individual's periods of observation. Exceptions to this were when staff needed to carry out routine care duties or intervene due to an emergency or if the participant

standards in keeping with the ethical observation of participants were to discontinue observations if the participant went to their bedroom, bathroom, toilet or other private areas. A further aim was to arrange observations at a time when participants would not be engaged in some form of scheduled activity (e.g., a regular group activity).

The position of observer(s) was in the general area where the participant would usually sit or be and was intended to be as unobtrusive as possible, to reduce the potential for clients and staff to react differently (due to the presence of the observer) (Beasley, Hewson & Mansell, 1989). Sykes (1978) also recommended interacting with staff/clients if approached. During the live performances, the musician would encourage people to join in if they wished, make eye contact with participants where possible and comment briefly on the music in between each song.

The ratio of observer to participant was 1:1. Observation periods took place between 10.30 am and 12.30 pm and between 1.30 pm and 3.30 pm. The main author carried out most observations with only one participant being observed per observation period. A small percentage of observations were carried out by members of the care team where the research was being carried out, each of whom had been trained in using the Psion computers together with the observational criteria. Each participant was observed for one hour during each of the four conditions. In order to take account of diurnal variations in behaviour, two observations were carried out in the morning and two in the afternoon. The total number of observations was 96, carried out over a three-month period.

Analysis

Using the HARCLAG program (Reeves, 1995), which facilitates analysis of time sequenced data, the percentage durations and frequencies for 96 hours of direct observations were obtained for each behaviour code. Any data pertaining to a target behaviour recorded whilst the client was rated as 'unobservable' (code L) were removed from the data sets before the analysis was computed. Data were then transferred for further analysis to the Statistical Package for Social Scientists (SPSS) version 10.1 for Windows.

The Friedman chi square test for related samples was used to analyze differences in the duration and frequency of participants' behaviour across each of the four conditions: no music (A), taped music (commercially recorded, B), taped music (recorded by musician, C) and live music (D). Data that reached the 5% level of significance were further analysed using Wilcoxon signed ranks to examine levels of difference between each pair of conditions. To explore the relationship between participants' MMSE scores [illegible] correlation co-efficient tests were used. Non-parametric statistics were chosen because the data were skewed, with some behaviours occurring at a high rate and others occurring at a low rate.

Results

Of the results comparing frequency of behaviours across conditions only two codes reached significance. The first related to staff-participant interaction and is discussed towards the end of this section. The second related to extreme well-being which was found to occur most frequently during the live music condition. By contrast, the difference in the duration of behaviours across conditions provided much richer data.

Table 2 shows the mean percentage of observed time for all observed participant behaviours in each of the conditions. Participants spent significantly longer responding to the music during the live music condition than the other music conditions. Both recorded and live music appear to be effective in decreasing the amount of time spent engaged in meaningless activity or sleeping, although to maximize the benefit of music, live music is preferable. Overall these results support the first and second hypotheses that levels of engagement in meaningful activity and responses to the music increase most during the live music condition.

Levels of well-being/extreme well-being were observed for longer during the live music condition, followed by the recorded music conditions, and observed least during the no music condition. These findings support the hypothesis that levels of well-being would be significantly higher during the live music condition compared with the other three conditions. Both recorded and live music seem to be effective in increasing levels of well-being when compared to the no music condition, with live music being the most effective method.

No significant differences across conditions in the duration of any of the observed challenging behaviours (perseverative speech, talking to oneself, wandering, moving furniture and walking repeatedly around the same object). Therefore the null hypothesis was retained. There was however, considerable variability between individuals as to how often or how long they engaged in these observed challenging behaviours.

With regard to the prediction that there would be no significant correlations between MMSE score and any of the observed behaviours during the live music condition, the null hypothesis was rejected. Greater cognitive impairment as measured by MMSE score appeared to be related to the frequency and duration of moving furniture during the live music condition (see Table 3). Wandering behaviour was not correlated with MMSE score during any of the conditions. [illegible]

TABLE 2. Differences in duration of observed behaviours (percentage of observed time) across conditions ($n = 24$)

Keys	Definitions of behaviours	A		B		C		D		Tests of difference (Friedman[a])	
		M	(SD)	M	(SD)	M	(SD)	M	(SD)	χ^2	df
d	No meaningful activity/sleeping	71.64	(34.51)	50.69	(35.03)	51.46	(31.02)	35.51	(33.57)	26.650** D<A+B+C	3
	Meaningful activity	28.66	(34.53)	15.68	(14.71)	15.82	(18.48)	8.30	(11.80)	5.0	3
	Engagement with music source	–	–	34.25	(31.16)	33.45	(33.40)	56.73	(34.85)	13.303** D>B+C	2
	Interaction with music source	–	–	30.78	(29.64)	33.53	(34.16)	52.80	(35.45)	14.022** D>B+C	2
nop	Specific responses to music	–	–	25.93	(32.99)	22.35	(34.41)	37.22	(41.78)	12.900** D>B+C	2
	No observable response to music	–	–	65.65	(30.99)	61.90	(35.76)	43.89	(35.07)	14.21** D<B+C	2
	Staff interaction	8.34	(8.35)	9.08	(16.63)	6.70	(7.24)	6.97	(10.70)	2.74	3
	Perseveration/talking to oneself	2.28	(9.15)	0.05	(0.22)	0.36	(1.38)	0.23	(0.94)	1.62	3
	Wandering	12.61	(26.59)	6.16	(18.5)	11.60	(19.14)	7.96	(16.93)	4.82	3
	Other challenging behaviours	0.75	(3.39)	0.15	(0.55)	0.90	(3.23)	1.37	(5.02)	2.33	3
3	Ill-being/neutral, passive	51.97	(32.78)	50.50	(39.47)	47.58	(39.91)	38.31	(35.93)	7.95*A>D	3
5	Well-being/extreme well-being	44.95	(32.17)	49.82	(39.34)	52.87	(39.62)	62.03	(35.75)	8.55*D>A	3
	Well-being	43.05	(30.78)	49.78	(39.32)	52.64	(39.48)	56.74	(35.23)	4.25	3
	Extreme well-being	1.90	(7.22)	0.04	(0.13)	0.23	(0.66)	5.29	(18.87)	14.92**D>B+C	3

All Wilcoxon Signed Ranks Tests are in Appendix J. $^{**}p < 0.01$. $^{*}p < 0.05$. A, no music condition; B, commercially-recorded music condition; C, recorded music (by musician) condition; D, live music condition. Dashes indicate that the χ^2 was not applicable and therefore not computed.

TABLE 3. Correlation between Mini Mental State Examination (MMSE) scores and duration of observed behaviours across conditions ($n = 24$)

Keys	Definitions of behaviours	A r_s	B r_s	C r_s	D r_s
ad	No meaningful activity/sleeping	−0.220	−0.420*	−0.461*	−0.313
b	Meaningful activity	0.233	0.311	0.148	−0.016
c	Engagement with music source	–	0.353	0.330	0.222
n	Interaction with music source	–	0.238	0.335	0.219
mop	Specific responses to music	–	0.294	0.276	0.311
q	No observable response to music	–	−0.374	−0.392	−0.247
s	Staff interaction	0.000	−0.258	−0.007	0.009
t	Perseveration/talking to oneself	−0.396	−0.613	−0.467*	−0.243
y	Wandering	−0.128	0.034	−0.044	−0.263
z	Individually-defined challenging	−0.396	−0.534**	−0.534**	−0.534**
23	Ill-being/neutral, passive	−0.295	−0.319	−0.429*	−0.377
45	Well-being/extreme well-being	0.407*	0.333	0.392	0.377
4	Well-being	0.391	0.333	0.392	0.222
5	Extreme well-being	0.105	0.438*	0.528**	0.196

A, no music condition; B, commercially-recorded music condition; C, recorded music (by musician) condition; D, live music condition; Dashes indicate that the r_s was not applicable and therefore not computed. *Correlation is significant at the 0.05 level (two-tailed). **Correlation is significant at the 0.01 level (two-tailed).

types of observed behaviours and MMSE score, only three were found to be significant during the live music condition.

Cognitive ability did however appear to be related to levels of well-being and activity. The higher the participants' MMSE scores, the more likely they were to spend time interacting socially, demonstrating extreme well-being. Also, during the no music condition, those with a higher MMSE score displayed well-being/extreme well-being for longer periods of time. The lower a participant's MMSE score, the more likely they were to spend time sleeping or not engaged in any meaningful activity during both the recorded music conditions. It would appear that participants with a higher level of cognitive ability may be able to engage more with their environment not only when there is no music but also just by listening to recorded music, but that those with more severe cognitive impairment may not. Nonetheless, all participants regardless of level of cognitive ability were able to benefit from the engagement and social interaction that live music offered.

The frequency of staff interaction with participants was significant and occurred most frequently during condition C (taped music recorded by the musician) ($n = 24$, $\chi^2 = 8.68$, $df = 3$). The overall duration of staff-participant contact showed no significant differences across conditions, indicating that contact may have been frequent but also brief.

Discussion

The purpose of this study was to examine the impact of social interaction in music listening on the engagement, well-being and challenging behaviour of people with dementia, using Kitwood's theory of personhood as a framework. Responses to music

engagement in meaningful activity increased most during the live music condition as did levels of well-being. With regard to observed challenging behaviours, there was no evidence that any of the music conditions had an impact on either their frequency or duration. Correlations between MMSE scores well-being, engagement and these observed challenging behaviours yielded mixed results.

Engagement, well-being and cognitive ability

Listening to music appears to increase engagement and well-being, with live music being the most effective method. Previous studies have reported similar results (Clair, 1996; Clair *et al.*, 1995; Lord & Garner, 1993; Olderog-Millard & Smith, 1989; Pollack & Namazi, 1992). The findings from this study could be applicable to other groups of people with moderate to severe dementia in formal care settings. The findings also suggest that the combination of social interaction and non-verbal activity (live music) allowed participation in meaningful activity whatever the person's level of cognitive ability. This account is consistent with the underlying assumptions of ToP, which emphasizes the importance of positive social interaction in maintaining personhood. Proctor *et al.*, (1998) discussed how institutional demands often take up the majority of staff time leaving few resources to meet the interpersonal and psychological needs of clients. Although it is not a panacea, this study has demonstrated that the provision of live music goes some way to meeting this type of client need.

Challenging behaviour

Levels observed challenging behaviours did not

findings which are contrary to those reported by previous researchers (Brotons & Pickett-Cooper, 1996; Casby & Holm, 1994; Clair & Bernstein, 1994; Clarke, Lipe & Bilbrey, 1998; Denney, 1997; Gerdner, 2000; Gerdner & Swanson, 1993; Goddaer & Abraham, 1994; Tabloski, McKinnon-Howe & Remington, 1995). However, closer inspection of several of these studies reveals a mixed pattern of results as not all types of behaviours decreased. The results of this study revealed individual variability in patterns of observed challenging behaviour, a finding which is supported by Clarke *et al.* (1998) and Groene (1993), suggesting that the aetiology of challenging behaviour in general may be different for each individual.

The ToP is a broad theoretical framework and as such is unable to provide a detailed account of the aetiology of this type of behaviour. However, using the PLST model as a framework does not account for the findings of this study either. For example, the PLST model might have predicted a significant decrease in levels of wandering behaviour, for example, during the commercially recorded music condition compared to the no music condition. It might also have predicted a significant increase in moving furniture during the live music condition, due to over-stimulation (i.e., visual as well as auditory stimuli). However, no such differences were found.

In the context of a wider discussion of all types of challenging behaviour encountered in dementia care, Stokes (1996) and Moniz-Cook, Woods & Richards (2001) report that the causes of such behaviour are multifactorial. Moniz-Cook *et al.* (2001) also suggest that the limited success of some non-pharmacological interventions may be due to the simplicity of the traditional behaviour modification model, which does not take into account neurological or biographical factors. Devising one form of intervention to explain and alter behaviour is inadequate as behaviours such as wandering and agitation are highly complex phenomena. The reason why one person 'wanders' around a day centre for two hours may be entirely different from someone else displaying the same behaviour.

Applied behaviour analysis, based on behavioural approaches, has been used extensively in recent years with people with severe intellectual disabilities who display challenging behaviour (Emerson, 2001). Understanding a person's behaviour involves identifying its function(s) to guide subsequent intervention. This approach could provide a framework for research as well as clinical intervention when combined with a single case experimental design (Clarke, Hatton & Thornton, submitted; Moniz-Cook, Stokes & Agar, in press; Moniz-Cook *et al.*, 2001). It could also be used in future research to explore the effects of music on challenging behaviours, thus overcoming the limitations of frameworks such as

Limitations

The findings suggest that staff-participant contact was kept to a minimum although it is not possible to rule this out as a potential explanatory variable as the coding for this event was not mutually exclusive from other codes. No record was made of whether changes in behaviour were precipitated by staff interaction. It would be possible using CTS to overcome this problem by devising a coding system with mutually exclusive categories for behaviour involving staff interaction, which could be a focus for future research.

The findings relating to certain challenging behaviours, which were observed yielded mixed results, in part due to the difficulties in observing and recording low frequency behaviours. Four categories of challenging behaviour were excluded due to unacceptably low levels of inter-observer reliability. One disadvantage of CTS is that low frequency behaviours are difficult to assess, although this is also the case with other observational methods (Emerson, 2001). The unpredictability and short duration of these behaviours (e.g., shouting verbally abusive comments) made the task of operationally defining them very difficult. More stringent definitions of behaviour onset and offset combined with more inter-observer data may yield improved reliability of codes for low frequency behaviours.

Conclusions

The findings of this study support the use of music—specifically live music—as a way of increasing levels of engagement and well-being for people with moderate to severe levels of dementia. The added benefit of live music seems to be the opportunity for social interaction and participation in non-verbal activity. Kitwood's theory of personhood emphasizes the importance of positive social interaction in the process of good psychological care in dementia care settings. Music therapy philosophy has similar underlying assumptions, although it is not a resource that is readily available in all care settings. Provision of live music by trained musicians is, by comparison, much more accessible and easily implemented.

Recommendations for future research are firstly to focus more specifically on the impact of staff interaction in music listening and secondly to explore the use of music in reducing challenging behaviours. With regard to observational methods, CTS combined with Psion hand-held computers would lend itself to both these areas of study. This study has also suggested that challenging behaviour is individual, complex and multifactorial in nature. The merits of applying a functional analytic framework using a single case experimental design are also

References

Beasley, F., Hewson, S. & Mansell, J. (1989). *MTS: Handbook for observers*. Canterbury: Centre for the Applied Psychology of Social Care, University of Kent.

Brotons, M., Koger, S.M. & Pickett-Cooper, P. (1997). Music and dementias: a review of literature. *Journal of Music Therapy*, *XXXIV* (4), 204–245.

Brotons, M. & Pickett-Cooper, P.K. (1996). The effects of music therapy intervention on agitation behaviours of Alzheimer's disease patients. *Journal of Music Therapy*, *33* (1), 2–18.

Casby, J.A. & Holm, M.B. (1994). The effect of music on repetitive disruptive vocalisations of persons with dementia. *American Journal of Occupational Therapy*, *48* (10), 883–889.

Clair, A.A. (1996). The effect of singing on alert responses in persons with late stage dementia. *Journal of Music Therapy*, *XXXIII* (4), 234–247.

Clair, A.A. & Bernstein, B. (1994). The effect of no music, stimulative background music and sedative background music on agitated behaviours in persons with severe dementia. *Activities, Adaptation and Aging*, *19* (1), 61–70.

Clair, A.A., Bernstein, B. & Johnson, G. (1995). Rhythm playing characteristics in persons with severe dementia including those with probable Alzheimer's type. *Journal of Music Therapy*, *XXXII* (2), 113–131.

Clarke, Z., Hatton, C. & Thornton, A. (submitted). An investigation into the functions of challenging behaviours shown by people with dementia, using direct observations. *International Journal of Geriatric Psychiatry*.

Clarke, M.E., Lipe, A.W. & Bilbrey, M. (1998). Use of music to decrease aggressive behaviours in people with dementia. *Journal of Gerontological Nursing*, *24* (7), 10–17.

Denney, A. (1997). Quiet music: an intervention for mealtime agitation? *Journal of Gerontological Nursing*, *23* (7), 16–23.

Emerson, E. (2001). Challenging behaviour. *Analysis and intervention in people with severe intellectual disabilities* (2nd edition). Cambridge: Cambridge University Press.

Emerson, E., Hatton, C., Robertson, J., Henderson, D. & Cooper, J. (1999). A descriptive analysis of the relationships between social context, engagement and stereotypy in residential services for people with severe and complex disabilities. *Journal of Applied Research in Intellectual Disabilities*, *12* (1), 11–29.

Folstein, M.F., Folstein, S.E. & McHugh, P.R. (1975). 'Mini-Mental State': a practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*, *12*, 196–198.

Gerdner, L. A. (2000). Effects of 'individualised' versus 'relaxation' music on the frequency of agitation in elderly persons with Alzheimer's disease and related disorders. *International Psychogeriatrics*, *12* (1), 49–65.

Gerdner, L.A. & Swanson, E.A. (1993). Effects of individualised music on confused and agitated elderly patients. *Archives of Psychiatric Nursing*, *7* (5), 284–291.

Goddaer, J. & Abraham, I.L. (1994). Effects of relaxing music on agitation during meals among nursing home residents with severe cognitive impairment. *Archives of Psychiatric Nursing*, *8* (3), 150–158.

Groene, R.W. (1993). Effectiveness of music therapy 1:1 intervention with individuals having senile dementia of the Alzheimer's type. *Journal of Music Therapy*, *XXX* (3), 138–157.

Hall, G.R. & Buckwalter, K.C. (1987). Progressively lowered stress threshold: a conceptual model for care of adults with Alzheimer's disease. *Archives of Psychiatric Nursing*, *1* (6), 399–406.

Hartmann, D.P. (1977). Considerations in the choice of inter-observer reliability estimates. *Journal of Applied Behaviour Analysis*, *10*, 103–116.

Kitwood, T. (1999). *Dementia reconsidered: the person comes first* (3rd edition). Buckingham: Open University Press.

Kitwood, T. (1997). *Evaluating dementia care: the DCM method* (7th edition). Bradford: Bradford Dementia Care Group, University of Bradford.

Koger, S.M., Chapin, K. & Brotons, M. (1999). Is music therapy an effective intervention for dementia? A meta-analytic review of literature. *Journal of Music Therapy*, *XXXVI* (1), 2–15.

Lezak, M.D. (1995). *Neuropsychological assessment* (3rd edition). New York: Oxford University Press.

Lord, T.R. & Garner, J.E. (1993). Effects of music on Alzheimer patients. *Perceptual and Motor Skills*, *76*, 451–455.

McFadyen, M. (1984). The measurement of engagement in the institutional elderly. In: I. Hanley, & J. Hodges. (Eds.), *Psychological approaches to the care of the elderly*. London: Croom Helm.

McGill, P., Hewson, S. & Emerson, E. (1994). *CTS: a software package for the collection of observational data on Psion organisers*. Canterbury: CAPSC, University of Kent.

Moniz-Cook, E.D., Woods, R.T. & Richards, K. (2001). Functional analysis of challenging behaviour in dementia: the role of superstition. *International Journal of Geriatric Psychiatry*, *16*, 45–56.

Moniz-Cook, E.D., Stokes, G. & Agar, S. (in press). Difficult behaviour and dementia in nursing homes: five cases of psychosocial intervention. *International Journal of Clinical Psychology and Psychotherapy*.

Olderog-Millard, K.A. & Smith, J.M. (1989). The influence of group singing therapy on the behaviour of Alzheimer's Disease patients. *Journal of Music Therapy*, *XXVI* (2), 58–70.

Pollack, N.J. & Namazi, K.H. (1992). The effect of music participation on the social behaviour of Alzheimer's disease patients. *Journal of Music Therapy*, *XXIX* (1), 54–67.

Proctor, R., Stratton-Powell, H., Burns, A., Tarrier, N., Reeves, D., Emerson, E. & Hatton, C. (1998). An observational study to evaluate the impact of a specialist outreach team on the quality of care in nursing and residential homes. *Aging and Mental Health*, *2*, 232–238.

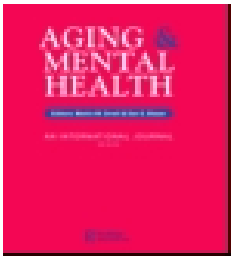
Reeves, D. (1995). *HARCLAG Version 3.2. A programme for the analysis of observational data*. Manchester: Hester Adrian Research Centre, University of Manchester.

Stokes, G. (1996). Challenging behaviour in dementia: a psychosocial approach. In R.T. Woods (Ed.), *Handbook of clinical psychology and ageing* (pp. 601–628). Chichester: Wiley.

Sykes, R.E. (1978). Toward a theory of observer effect in systematic field observation. *Human Organisation*, *37* (2), 148–156.

Tabloski, P.A., McKinnon-Howe, L. & Remington, R. (1995). Effects of calming music on the level of agitation in cognitively impaired nursing home residents. *The American Journal of Alzheimer's Care and Related Disorders & Research 10*, 10–15.

Tiraboschi, P., Hansen, L.A., Alford, M., Masliah, E., Thal, L.J. & Corey-Bloom, J. (2000). The decline in synapses and cholinergic activity is asynchronous in Alzheimer's disease. *Neurology*, *55* (9), 1278–1283.



Aging & Mental Health

ISSN: 1360-7863 (Print) 1364-6915 (Online) Journal homepage: http://www.tandfonline.com/loi/camh20

Exploring the impact of music concerts in promoting well-being in dementia care

Kagari Shibazaki & Nigel A. Marshall

To cite this article: Kagari Shibazaki & Nigel A. Marshall (2015): Exploring the impact of music concerts in promoting well-being in dementia care, Aging & Mental Health, DOI: 10.1080/13607863.2015.1114589

To link to this article: http://dx.doi.org/10.1080/13607863.2015.1114589

AGING & MENTAL HEALTH, 2015
http://dx.doi.org/10.1080/13607863.2015.1114589

Taylor & Francis Group

Exploring the impact of music concerts in promoting well-being in dementia care

Kagari Shibazaki[a] and Nigel A. Marshall[b]

[a]Department of Social Work, Seirei Christopher University, Hamamatsu, Japan; [b]School of Education and Social Work, University of Sussex, Falmer, UK

ABSTRACT

Objectives: This study explores the specific effects of live music concerts on the clients with dementia, their families and nursing staff/caregivers.

Methods: Researchers attended 22 concerts in care facilities in England and Japan. Interviews were carried out with clients with dementia, nursing staff and family members. Observations were also carried out before, during and after the concerts. All observations were recorded in field notes.

Results: The effect of the concerts in both countries was seen to be beneficial to all clients and nursing staff, whether or not they attended the concert. Interviews with clients with mild to mid-stage dementia noted increased levels of cooperation, interaction and conversation. Those with more advanced forms of dementia exhibited decreased levels of agitation and anti-social behaviour. Staff members reported increased levels of care, cooperation and opportunities for assessment. Family members noted an increase in the levels of well-being in their partner/parent as well as in themselves. The study also suggested that the knowledge of musical components, an awareness of the rules of music and specific musical preferences appear to remain well beyond the time when other cognitive skills and abilities have disappeared.

Conclusions: This initial study provided some further indication in terms of the uses of music as a non-pharmacological intervention for those living with all stages of dementia. These included opportunities for assessment of physical abilities as well as facilitating an increasing level of care.

ARTICLE HISTORY
Received 18 August 2015
Accepted 22 October 2015

KEYWORDS
Dementia; music; care giving; families; nursing staff

Introduction

Currently, in the UK, estimated 850,000 people have been diagnosed as having some form of dementia, a figure which represents 1 in every 14 people over the age of 65 years (Alzheimers Society, 2015). Similarly, in Japan, over four and a half million people (3.6% of the population) have been diagnosed with dementia with the Japanese Ministry of Health, Labour and Welfare recently projecting an increase in this figure to an estimated seven million by 2025. Worldwide, estimates range from 35 to 48 million people having some form of dementia with one new diagnosis occurring every 4 seconds (Hunt, 2013) with the global costs of dementia estimated to be around US$ 650 billion or 1.0% of the worldwide gross domestic product (Department for Health, 2013).

The challenge of dementia is well documented (Arai, Arai, & Mizuno, 2010; Banerjee, 2010) and the financial cost to society is not in doubt but the human cost on those living with dementia, on those who care for them, on those who work with them and on their family members, is equally high (Cuijpers, 2005; Pinquart & Sorenson, 2003). As dementia develops, a wide range of mental abilities gradually diminish and memory loss, inability to carry out basic tasks, changes in personality and behaviour, increased levels of agitation and sometimes aggression often become more apparent. However, as a result of previous studies, we know that a number of musical skills are amongst the last to disappear. Musical memories, words to songs and associated feelings and emotions appear to remain for significant periods of time after other skills have disappeared (Crystal, Grober, & Massur, 1989; Nuki, 2009; Yamada & Baba, 2008). Okabe and Kobayashi (2006) demonstrated that two regular weekly sessions of musical activity positively affected levels of communication, interaction, eye contact and concentration in persons with dementia and numerous additional studies have demonstrated how engagement with music can significantly reduce levels of anxiety and agitation (see Cooke, Moyle, Shun, Harrison, & Murfield, 2010; Lai, 2004; Ledger & Baker, 2007; Lin et al., 2011; Sung, Lee, Li, & Watson, 2012; Vink et al., 2013), reduce levels of depression, (Ballard, Bannister, Solis, Oyebode, & Wilcock, 1996; Butters et al., 2008; Chou & Lin, 2012; Jorm, 2001), reduce wandering, (Robinson et al., 2007) and assist transition into long-term care (Kydd, 2001).

As well as exploring the impact of music on specific behaviours, the improvement in the overall well-being of those living with dementia is similarly well documented (Brotons, 2000; McDermott, Crellin, Ridder, & Orrell, 2013; Sherratt, Thornton, & Hatton, 2004; Sixsmith & Gibson, 2007; Sung et al., 2012), with further studies exploring the benefits of music on caregivers (Brotons & Marti, 2003; Davidson & Faulkner, 2010; Hammar, Emami, Engstrom, & Gotell, 2010; McDermott, Orrell, & Ridder, 2014). In particular, music therapy has a long history and association with dementia research (Aldridge, 2000; Kadouchi, 2001; Moroi, 2007; Ridder & Aldridge, 2005; Spiro, 2010) and further work has demonstrated a number of innovative ways of using music in order to enhance the care of individuals with dementia (e.g. Yasuda et al., 2006).

In part, as a result of the work carried out in a variety of academic disciplines, music is becoming an increasingly important non-pharmacological part of dementia care. There

CONTACT Kagari Shibazaki kagari-s@seirei.ac.jp

is a growing body of evidence to suggest that taking part in, or experiencing music is highly inclusive and produces significantly increased levels of well-being relative to other activities (Hicks-Moore & Robinson, 2008). Responses from those individuals who live with dementia, their caregivers and their families suggest that engagement with a wide range of musical activities continues to be rated highly amongst the various activities enjoyed by residents in most care facilities and the reported evidence strongly suggests that the ability to enjoy and engage with musical elements in a meaningful way, remains strong even after other cognitive abilities (e.g. language and social skills) have all but disappeared (Davidson & Almeida, 2014; Gold, 2014; Osman, Tischler, & Schneider, 2014; Sixsmith & Gibson, 2007). Partly as a result of this, within the UK, there is an increasing number of organisations and charities providing high levels of support in order that individuals in hospitals and care facilities can benefit from musical experiences. (See for example '*Music in Hospitals*' [www.musicinhospitals.org.uk] and '*Singing for the Brain*' [www.alzheimers.org.uk/site/scripts/documents_info.php?documentID=760].)

Therefore, as previous studies suggest, the use of music, and in particular live music (Camic, Williams, & Meeten, 2011; Holmes, Knights, Dean, Hodkinson, & Hopkins, 2006; Sherratt et al., 2004), can be a beneficial and effective non-pharmacological intervention that increases both the quality of nursing care, as well as the overall well-being of those living with dementia. However, McDermott et al. (2014) point to the relatively limited number of studies that have been carried out from the perspective of all those involved in the care of individuals with dementia and highlight the value of '*sustaining the musical and interpersonal connectedness particularly when the progress of dementia becomes more prominent*…' (p. 716). Therefore, the case for further research is well made. However, we would also add that the number of studies carried out from the perspective of music psychology, rather than music therapy, is equally limited. One of the main differences in approach between these two disciplines is that music therapy tends to be specifically designed to be person centred and is often carried out in small groups with the exclusive aim of producing a beneficial/positive outcome in the individual. In contrast, music psychology tends to focus on the impact of music on people, either as individuals or in large populations, with negative responses being seen to be equally important and interesting as positive responses (see for example Ballard & Coates, 1995; Johnson, Jackson, & Gatto, 1995; Litman & Farberow, 1994; Rustad, Small, Jobes, Safer, & Peterson, 2003; Wingood et al., 2003).

In our current study, our key research question asked in what ways can live music concerts influence clients living with dementia, their caregivers and their family members. The research explored the impact that a series of music concerts taking place in care facilities in UK and Japan had on clients with dementia, their nursing and care staff and their families and further work also investigated the effects of the concerts from the perspective of the musicians and performers.

Method and participants

A series of music concerts were arranged in both UK and Japan. In the UK, the concerts were arranged by a national facilities themselves. A series of interviews were carried out with individual clients living with dementia, their families, volunteer caregivers, nursing staff and care home managers. Interviews were carried out within the care facility immediately following a one hour musical concert. The research team attended a total of 22 concerts, carried out between January 2014 and July 2015. 11 concerts took place in UK and 11 in Japan. A total of six care facilities were used (three in UK and three in Japan). Attendance at concerts was voluntary and all took place within a communal space within the facility.

In the UK, it was not possible to have the same musicians performing throughout the whole series of 11 concerts; therefore, performers were arranged on the basis of availability. However, some degree of repetition and therefore familiarity was possible with 5 pairs of performers doing two of the 11 concerts, but not consecutively. Some degree of control was also possible over a number of other independent variables. First, in terms of musicians, all performers were professional musicians performing as a duet. All performances were sponsored by the same charity and all performers had considerable experience of performing in hospitals, care facilities and engaging with those with dementia. As a result of this commonality, all concerts contained a similar style of repertoire, including instrumental music for listening as well as familiar songs/pieces which residents could join in with and sing, if they so wished. Individual programmes varied in relation to the precise pieces of music but all concerts contained a similar mix of styles with examples from similar genres namely; songs from shows, music from popular films, well known traditional songs and popular items for the western classical tradition.

Second, all concerts lasted for approximately one hour and took place between 2:30 and 3:30 in the afternoon. The one hour duration was adopted in order to both fit in with the natural timetable of the care facility and in order to avoid any issues of fatigue. The early afternoon period was adopted in order to avoid any behavioural issues which can sometimes arise as a result a 'sundowning' (Bliwise, 1994; Gallagher-Thompson, Brooks et al., 1992; Staedt & Stoppe, 2005).

In Japan, controls were possible with relation to time, duration and musical repertoire; the one exception being that the same musicians were responsible for all concerts. However, given the number of care facilities involved and the timetabling of concerts, there was no corresponding increase in levels of familiarity. Concerts in Japan also featured professional musicians with experience of performing in care facilities and working with individuals living with varying stages of dementia. Concerts again took place between 2:30 and 3:30 (local time) and lasted for one hour. The repertoire similarly included songs from the time of the Second World War, classical piano pieces, traditional, community and popular songs/pieces from the culture.

All facilities included musical events as part of their regular activities and therefore the concerts were not necessarily regarded as a novelty. Typical audiences ranged in size from 30 to 47 clients.

All interviews were semi structured and lasted for approximately 20 minutes and all took place within a communal area within the care facility. A total of 53 participants were interviewed, namely: 27 clients (UK-16/JP-11), 13 family members (UK-8/JP-5), 9 members of nursing/volunteer staff and four care/activities managers (UK-5/JP-4). Interview questions cov-

preferences, impact of the music and reasons for attending the concert. The age of clients interviewed ranged from 71 through to 97 years ($M = 87.3$). All data from interviews were digitally recorded. Data were analysed in accordance with standard qualitative procedures in that keywords, concepts and ideas from participant responses were first recorded on general summative sheets which then enabled the generation of appropriate themes into which responses could be categorised (Robson, 2011; Cresswell, 2013). Ethical approval for the research was given by the UK university. Information sheets outlining the details of the research were provided to all participants along with a request for written consent. Prior consent was obtained from all care facility managers, family members, caregivers, musicians and all nursing staff who were interviewed. All participant clients were classed as having early to mid-stage dementia and therefore gave either verbal or written consent as appropriate to their physical ability.

Clients were mostly able to talk about the concerts relative to other events or activities as well as describing meaningful life events and memories evoked by a particular song, their personal musical preferences and their own musical life. Family members were able to visit and experience the concert alongside the client and were interviewed following the concert. Family members were able to talk about both the differences they observed in their family member resulting from the concert as well as commenting on their own perspective of the concert. Nursing and volunteer staff and managers were able to comment both on the relative changes in behaviour of the clients as well as comment on their own perspectives.

Our results are therefore reported in five themes detailing the benefits (or not) of the concerts to clients, to care staff of the facility and to family members.

In addition to the interviews, open observations were carried out throughout the duration of the concert and recorded as field notes. All recorded observations of behaviours were reported and discussed with either individual client members, nursing staff or family members in order to further explore the context of specific behaviour. In this respect, we were able to establish a degree of reliability in terms of how unique the behaviour was or how frequently it occurred.

Results are subsequently reported within each of the five themes. Themes 1, 2 and 3 relate to responses from clients, Theme 4 relates to responses from care home staff (health workers, nursing staff, volunteers) and Theme 5 relates to responses from families.

Results

In order to protect their identity, all clients were assigned a number and their comments are reported accordingly. That is, client responses are acknowledged according to their country and unique participant number (e.g. UK5 or JP7). Family members are reported in a similar way (e.g. FM3UK or FM2JP); however, quotes from staff are reported according to their more specific role within the care facility.

Theme 1: client preferences and behaviours

In common with previous studies (e.g. Brotons, 2000; Crystal et al., 1989), residents in both countries were able to remember musical content and the words of songs chosen from a wide range of styles and decades, whereas according to nurs- routines were remembered less well as a result of the level of dementia. In terms of musical 'preferences', clients did not appear to be significantly selective when joining in with songs and were just as likely to sing, hum or whistle along with melodies and songs from the early 1900s through to the Beatles and ABBA, and with equal enjoyment. However, when responding to questions relating to their musical preferences, their comments suggested that individuals still had clear preferences for both musical styles and individual songs.

> UK: 6 – '*Those songs from the National Songbook – reminds me of being back with my friends at school – we used to think they were old fashioned but we like them now*'

and

> UK: 14 – '*I am working class and I like working class music*'.

This observation suggests that clients are able to distinguish between '*liking for*' and '*tolerance of*' musical pieces, as differentiated by LeBlanc (1991), who defined musical tolerance as a willingness to engage with and enjoy a musical event that may not be a musical preference. He further suggested that musical 'tolerance' declined with age, something which findings from this current study may not necessarily support. Certainly, this observation has implications for future studies in terms of how research on musical preferences is operationalised.

Twenty one of the 27 clients expressed a total of 46 preferences for individual songs or pieces of music. These were presented as either direct requests to the performers or stated during the interviews. Of the 46 preferences, 6 related to classical music, that is either to an individual piece, composer or simply using the term 'classical music' and 19 related to 'critical period music' (LeBlanc, Sims, Siivola, & Obert 1996), i.e. preferences for songs or music that was popular during their time as an adolescent. Fifteen related to an individual film or show from any decade, three related to an individual life event or family member, two suggested a song they had heard within the concert and one response referred to a particular instrument and composer. These very specific requests, including the names of films, songs and specific musical instruments, were an unexpected and interesting finding suggesting that musical events experienced during formative years appeared to maintain the same importance amongst individuals with cognitive impairment as they do for healthy individuals.

Compared to clients in the UK, Japanese clients appeared to be more focussed on their choices and preferences and particularly preferred songs which they sang in their late teens or early 20's. The musicians tended to bring a wide variety of music and songs which are well-known generally amongst old people, but requests and more enthusiastic responses tended to be for older songs from their teenage years or early 20s (see also Toritsuka, Suzuki, Hashimoto, Uehira, & Jikumaru, 2014).

> JP11 – *'I like listening music which I sang in my early 20's when I was working at factory'*

and

> JP3 – *'When I started working in Tokyo coming from other area, I used to listen music by radio which I sang in my hometown, and I am happy today as I could listen again the song … I did not think I could listen these old songs again in my life … I just remembered my*

In relation to reminiscences, family members reported that music, more than other activities, appeared to have the effect of promoting past memories of life events, many of which had not been heard before. In common with previous studies (Okabe & Kobayashi, 2006), family members reported that clients often became more lucid, vocal and animated with an increased motivation to talk and interact, not only with members of the family but with other residents. Two nursing staff reported an increased level of talk and interaction following the concert and field notes taken independently by all researchers in both countries recorded an increase in the level of conversation and especially with client initiated conversations.

With specific reference to enhanced communication, one activities manager reported that a major benefit of the music related to the relative difficulty which many men found in communicating with each other. However, increased levels of communication were observed to take place following each performance, an effect that appeared to last for a number of days.

> It is particularly good for the men – if we put the women together they will always chat – but the men can find it more difficult – but after the concerts they seem to have more to talk about – it really does help. (UK Staff)

In contrast, three residents were observed demonstrating increased levels of agitation or loss of interest. In each case, nursing staff reported this as being normal behaviour with respect to that individual, however, in one instance, this comment was qualified:

> You have to remember that these concerts are at least an hour and that is quite a long time for them – they do very well compared to other activities. (UK Activity Manager)

Behaviours expressing negative preferences for individual pieces included giving a 'thumbs down' to a neighbour or the musician, banging a book, trying to leave the performance space and shouting. On four occasions in the UK, we witnessed individuals covering their ears but on each occasion this related to the choice of instrument and not the musical style or piece, in this case, an African Drum.

One further effect of the music on those with dementia related to the absence of, or decrease in levels of unsocial or anxious behaviour. That is, whilst it is customary to look for particular visible responses or behaviours in order to better understand the effect of the music on the individual (e.g. tapping, singing or asking to leave) in three observed instances, the most important indicator of a positive response was a neutral response, more specifically through the absence of an unusual, agitated or antisocial behaviour. For example, the following statement was made by one UK volunteer:

> That lady there – she just sits in her room and shouts all day – she can be quite aggressive but when she comes to the concert – look –you would never know.

A further response given by a family member was:

> UK: 4 FM – *'Sometimes I dread coming to visit because they can be so difficult but the music concerts are like pressing a 're-set' button and they tell me more – they don't argue – they are just much calmer'.*

Similarly, one care worker in Japan noted that prior to the concert, clients would often argue about where they would sit. However, the concert they were far more amenable, com-

anxiety also and corresponding levels of negative/antisocial behavior, were also observed to increase during the time between songs. Negative behaviours in this category included shouting, standing, reaching out to touch others, rocking or trying to leave.

Nursing staff reported that some clients were very selective in the activities they attended, however in some instances, the music concerts were the one activity which some residents would volunteer to attend. Neither researcher had consent to interview clients who chose not to attend concerts and, therefore, this data was not available to us. However, nursing staff did report that a high percentage of those who were able to attend, did so on a regular basis.

> UK: 9 – *'Some people in here they love it – the bingo – the quiz – they do all kinds of things but I never used to do that at home so why should I do it in here - but I love all of this music'.*

In common with MacDermott, (2014), we experienced that music was often an integral part of an individual musical identity. In addition to showing clear individual preferences, individuals made requests which were directly linked to life events or to individual people and more significantly, these musical experiences remained as a major part of what McDermott has termed, '*Who you are now*' (2014, p. 711). For example,

> UK: 2 – *'I always sang in the choir and we were always taught that every time you sing – it's a performance – no matter where you are – so I do'.*

and

> JP: 7 – *'Those songs – we sang in the war to cheer up and we all sang them and we all enjoyed them – and it's the same in here'.*

Theme 2: music and disability

In addition to living with dementia, a number of individuals attending the concerts in our populations were also disabled, blind or physically challenged in ways that limited their movement and coordination. These residents were therefore limited in terms of their ability and opportunity to join in other activities. For these individuals, music was the one unique activity in which they could all take part and both feel and be 100% included. Individuals who were blind or suffered from visual impairment made up around 26% of our population. These individuals were frequently unable to take part in many of the activities arranged for clients by the care facility. Staff members pointed out that they would often try to involve their blind clients by making special provisions however, many residents felt uncomfortable in being singled out and felt they were affecting the enjoyment of others:

> UK: 12 – *'Sometimes – I can join in the other activities a little bit but I don't enjoy them because I just feel I hold everybody up because I cannot see, but this music is for all of us'.*

(Blind resident) Similarly, many of the clients in our sample had limited mobility

> UK: 16 – *'Some people can go out but I can't, because I can't walk – so I love all of this music, you can just relax and enjoy it and be in your own world – I feel like I have been out for the evening'.*

Two participants suffered from deafness but this did not prevent them wishing to attend or in any way diminish the enjoyment they experienced during the performance. Care

the performers in order that they could both observe the movements of the musicians but also see the reactions from other members of the audience and when it occurred, they were able to join in physical responses to the music such as hand holding and arm movements with neighbours or staff members.

One additional benefit was observed with two residents recovering from stroke where mobility or movement had been severely restricted. In situations where regular exercise was required in order to prevent muscle atrophy, music proved to be an ideal motivation. That is, in cases of individuals with dementia, some were unwilling to work with a physiotherapist and exercise arms or hands for any significant amount of time. Often, attempts to motivate individuals in this category resulted in increased levels of agitation and in some cases aggression. However, within the context of the concerts, it was possible to see these participants continually moving along with the music and always unprompted. In one instance, one client was limited to movement solely in one arm, and yet 'exercising' that one arm in time to the music was kept up for over one hour – the entire duration of the concert and beyond.

Theme 3: musical knowledge – evidence of cognitive activity

Along with previous work, clients were able to remember the words to songs and join in or would indicate knowledge of the words by smiling at humorous statements in the song. In the case of those clients who chose not to join in with the singing or were physically unable to respond in anything other than a limited way, some evidence of processing musical material could still be observed in what initially appeared to be insignificant movements.

> JP: 1FM – *'I can just tell he knows what is going on – he watches every move and you can just – I – can just tell, he is taking it in'.*
>
> UK: 4FM – *'Just watch the hand, she will stroke her arm in time to the music without thinking, just watch – she just does it'.*

The music also provided an ideal opportunity to explore a number of physical and cognitive functions in those living with relatively advanced dementia who had limited verbal ability. Our observations of individuals with very limited communication demonstrated that music can provide evidence of substantial musical memory and processing which goes well beyond recall of words to songs. Our observation provided evidence that even clients living with the quite advanced stages of dementia were still able to:

- identify and predict patterns in musical pieces,
  - for example, through waving or 'conducting' according to the phrasing of the music and predicting when this will change;
- anticipate endings according to the accepted rules of music,
  - for example, through predicting and reacting to the increase in speed and dynamic towards the end of the piece;
- anticipate and expect changes in tempo,
  - for example, predicting and portraying the pause or variable tempo in the middle of a piece;
- anticipate and expect changes in dynamics,
  - demonstrated by increased vigour or range of hand
- discriminate between a rhythm and a beat – whichever is prominent in the music
  - for example, by tapping or clapping three beats in a bar but then changing to tap out the rhythm of the words, but without singing them;
- recognise the humour or the actions as portrayed in songs
  - for example, portraying the movement suggested by the words (bird flying up into a tree) without having the ability to sing them;
- demonstrate an awareness of how one performance varies from another with which they are more familiar,
  - for example, by predicting an expected, logical and more usual pattern in the music which varies unexpectedly in this individual performance and
- exhibit musical preferences for individual songs and styles,
  - for example, through the increased level of positive reactions and the decreased level of negative responses as well as the level of energy and motivation to join in with preferred songs.

Theme 4: staff perspectives

Interviews were held with a variety of staff/caregivers. Although not all staff were able to attend the performances as a result of their other duties, interviews were still carried out with those who were not at the performance but remained present in the building.

The first common response from caregivers was that unlike other activities for clients, musical performance spread throughout the building in a way that no other activity could and therefore all staff reported experiencing benefits from the performances. Staff working in other areas of the building was frequently seen responding to the music, although they were not directly included in it (e.g. in corridors walking in time to the beat or joining in with songs they knew as they passed through). Comments from UK staff included:

> The staff here end up most of their day cleaning up after old people – they get ill – they pass away – it is not the most glamorous job in the world but the music spreads all through the home – they hear it and they hear the residents singing along and it 'lifts' the whole place and I hear them going round humming bits and pieces for the rest of the day.

Staff comments also indicated the strength of music in providing emotional and psychological support, for example:

> Many of our clients pass away and if I have to sort through their possessions, I quite often save that job until the musicians are here – because then I can do the job better – emotionally, it affects me less.

With reference to nursing care, the study suggested a number of key benefits which could be gained from the presence of music within the care facility.

First, nursing staff both in UK and in Japan reported on the 'cycle of improved care' that the musicians facilitated:

> They talk more after concert, they more content with each other in common room, they respond more to you so you are not so tired and you give some more and they respond more – it goes on, in a circle. (JP Staff nurse)

Almost all staff, nurses and volunteers reported that clients

generally calmer and more responsive following the visit by the musicians. This had the corresponding effect that staff reported feeling less stressful, more cooperative, more caring and overall they also experienced increased levels of motivation, energy and job satisfaction.

Second, music enabled staff in both countries to make different but more importantly, more accurate and more detailed levels of assessment of a number of medical conditions. For example, in the case of one client with respiratory problems and a recurring throat infection, staff were more able to identify her breathing capacity and the extent to which the client was able to use fine motor skills through singing. Simple and non-invasive observations, such as whether or not the client could sing an entire line of the song or if the client could keep in time with the singer, gave key indications as to the current level of muscle control available to the individual. Similarly, for clients recovering from stroke, joining in with musical pieces through the movement of their hands and fingers often gave far more natural and non-intrusive measure of the level of physical activity and motor coordination that the client was able to engage in than other more formal, clinical measures which could frequently be accompanied by increased levels of distress. In this respect, this study supports work done by Yamada and Shimizu (2013) who also commented on the usefulness of using music as an assessment tool.

Staff in both countries also commented on the differences in behaviour between clients attending the concerts and when attending other activities, particularly in terms of attention and concentration span.

> In other activities, clients often want to go to toilet but during music concerts they tend to sit quietly and focus more on music concerts compared to other activities. (JP Staff member)

and

> The first thing I was told in my training was never to do any activity for longer than 30 minutes and this is true but in the music, they sit here for over an hour. (UK Staff member)

Preti and Welch (2012) noted contradictory comments from nursing staff in their study of music in hospitals; however, within the context of the care facility, we received only positive comments with nursing, administrative and managerial staff all reporting high levels of enjoyment. Certainly, hospitals and care facilities can be very different places and this contrasting result suggests that further research into the nature of musical content could be of interest.

Theme 5: visitors and families

The musical performances provide some of the most lasting and significant memories and experiences for the families of clients who attend. According to comments made by families, the music stimulated new memories, extended conversations and created/facilitated increased quality visitor experiences and partially restored lost or diminished aspects of personality.

> UK: 3 – *'The visits with the music are the best – it gives you new things to talk about – my dad is happier and more communicative – he tells me memories, some I have never even heard before' – it's like getting him back as he was'*

> UK: 15 – *'I travel up here about once each month and when I go, I always think this might be the last time I see them and when you see the happiness the music brings and you see them joining in with what they love, that is the memory you take away and if that is the last one you have of them, that is wonderful'*

and

> JP: 1 – *'My dad always talked to me a lot – then he stopped but after music – he talks again'*.

Previous studies have highlighted the difficulties often experienced by family members when parents or partners are admitted to full time care with feelings of guilt, depression, self-blame and regret often featuring in significant ways (Arai et al., 2004; Arai, Kumamoto, Mizuno, & Washio, 2014; Chang, Kraenzle Schneider, & Sessanna, 2011; Paun & Farran, 2006; Strang, Koop, Dupuis-Blanchard, Nordstrom, & Thompson, 2006). Keefe and Fancey (2000) reported on how family members often continued to carry out caring for relatives for a significant period of time after their admission to long term care. Levesque, Ducharme, and Lachance (2000) reported similar findings but included high levels of guilt in relatives resulting from feelings of failure, whilst Schulz et al. (2004) noted the high incidence of illness amongst individual caregivers following admission to long term care of a loved one. In this study, family members voiced high levels of appreciation for the music concerts due to the fact that these were seen as 'special' and levels of guilt decreased as relatives were seen to be experiencing something they could not have been given at home.

Statements from family carers such as

> UK: 8 – *'I could never arrange anything like this at home so I would never really see them THIS happy'*

and

> JP: 1 – *'I can go home from this feeling good and knowing I have done right thing…it's better than anything I could provide them with and it's also the fact that you are in a social group so it seems to affect everybody more'*.

Connected with a previous point, several family members also commented on the knowledge and information they received as a result of seeing their partner or parent involved with the music:

> UK:16 – *'My father has not been well but today he was clapping and moved around, he couldn't do that two weeks ago so I can see better how much he has improved'*.

Only in two instances over the period of 22 weeks was it noted that clients were removed from the concerts due to a request from family members who, having travelled some distance to see their family member, wished to talk with them away from the community area. Both families, in this instance, viewed the concerts as an inconvenience.

Conclusion

In conclusion, we would argue that the findings from this qualitative study of musical performances taking place within care facilities, provides further evidence to suggest that experiencing live music concerts provides numerous benefits to all those involved with the care of the elderly living with dementia.

An increasing number of those with people living with

(Jones, 2007). For these individuals, visual stimulus is not appropriate and many activities, such as playing games or craft activities, are not always possible and yet full engagement in musical activity through listening, singing or playing percussion instruments is absolutely possible. In many cases, engagement with music is one of the very few activities that visually impaired individuals can take part in. We would also argue that musical performance is the only activity to provide significant benefits across the whole range of individuals involved in caring for those people living with dementia.

We argue that this paper contributes to the current body of knowledge by both confirming and extending what is currently known about the effects of music on those living with dementia. First, many of our findings echo those resulting from previous studies (e.g. Gold, 2014; MacDermott et al., 2014; Sakamoto, Ando, & Tsutou, 2013; Sixsmith & Gibson, 2007; Sung et al., 2012), which, in the main, were carried out within the discipline of music therapy. The authors of this paper have no training in music therapy and the interventions were not designed with any therapeutic benefit in mind. Concerts took place and data on their impact was collected whether positive or negative. Our agreement with many of the findings from studies, such as those with more controlled interventions (e.g. Davidson & Almeida, 2014), might suggest that musical events in a variety of guises still appears to produce similar impacts on those involved. Second, we argue that the inclusion of interviews with family members, clients and nursing staff, all within the context of the same series of performances has enabled this study to address a number of the limitations expressed earlier by McDermott et al. (2014).

However, we also acknowledge a number of limitations within the current work which could be addressed in future research. First, all concerts were voluntary and, therefore, the resulting population was to some extent, composed of individuals already pre-disposed to the enjoyment of musical activity. No option was available to us to explore the attitudes of those who did not attend. Second, the interviews took place immediately following each of the concerts and therefore it could be argued that participants were still enjoying temporary increased levels of arousal. We have no direct evidence as to if, or for how long this effect lasted although nursing staff did comment that – *'they do talk about this for days after – it does give them a lift'* (UK Activity Manager).

Third, although the researchers did become increasingly familiar to clients and care facility staff, it has to be acknowledged that as relative outsiders, it could be difficult for participants to feel sufficiently comfortable to voice any serious negative concerns.

However, Bellelli, Raglio, and Trabucchi (2012) have argued that the cost of musical interventions amount to as little as 1/70th of the costs of daily care, which in many cases is far cheaper than many of the medications from which perhaps one individual may or may not benefit. Certainly, a number of authors have cast doubt on the value and effectiveness of, for example, the use of anti-depressant medication on individuals with dementia (Banerjee, 2013; O'Neill, Freeman, & Portland, 2011), whilst other studies have demonstrated the limited effects available through anxiety controlling medication (Press & Alexander, 2013). Given the findings of this and previous studies, the increasing costs of dementia care to society and the need to consider further the ways in which non-pharmacological interventions can contribute to the process of Iwanaga, 2014), we suggest that future research in this area could be of significant benefit to all those involved in the care of the elderly.

Acknowledgements

The authors would like to thank the many individuals, organisations and care facilities without whose help and support, this research could not have been carried out. We would like to thank Steve Rowland-Jones and all the staff at 'Music in Hospitals' for their help in accessing the musical events. Thanks also go to Keiko Yamaura and all the care staff, musicians, clients and families at the participating care facilities.

Disclosure Statement

No potential conflict of interest was reported by the authors.

References

Aldridge, D. (Ed.) (2000). *Music therapy in dementia care: More new voices*. London and Philadelphia: Jessica Kingsley Publishers.

Alzheimers Society. (2015). Dementia UK. Retrieved August, 2015, from www.alzheimers.org.uk/dementiauk

Arai, Y., Arai, A., & Mizuno, Y. (2010). The national dementia strategy in Japan. *International Journal of Geriatric Psychiatry, 25*, 896–899.

Arai, Y., Kumamoto, K., Mizuno, Y., & Washio, M. (2014). Depression among family caregivers of community – dwelling older people who used services under the Long-Term Care Insurance program: A large scale population-based study in Japan. *Aging and Mental Health, 18*, 81–91. doi:10.1080/13607863.2013.787045

Arai, Y., Kumamoto, K., Washio, M., Ueda, T., Miura, H., & Kudo, K. (2004). Factors related to feelings of burden among caregivers looking after impaired elderly in Japan under the Long-Term Care Insurance system. *Psychiatry and Clinical Neurosciences, 58*, 396–402.

Ballard, C., Bannister, C., Solis, M., Oyebode, F., & Wilcock, G. (1996). The prevalence, associations and symptoms of depression amongst dementia sufferers. *Journal of Affective Disorders, 36*, 135–144.

Ballard, M.E., & Coates, S. (1995). The immediate effect of homicidal, suicidal, and non violent heavy metal and rap songs on the moods of college students. *Youth and Society, 27*, 148–168.

Banerjee, S. (2010). Living well with dementia-development of the national dementia strategy for England. *International Journal of Geriatric Psychiatry, 25*, 917–922.

Banerjee, S. (2013). Study of the use of antidepressants for depression in dementia: The HTA-SADD trial-a-multicentre, randomised, double blind, placebo-controlled trial of the clinical effectiveness and cost effectiveness of sertraline and mirtazapine. *Health Technology Assessment, 17*, 1–166.

Bellelli, G., Raglio, A., & Trabucchi, M. (2012). Music interventions against agitated behaviour in elderly persons with dementia: A cost-effective perspective. *International Journal of Geriatric Psychiatry, 27*, 327. doi:10.1002/gps.2775

Bliwise, D.L. (1994). What is sundowning? *Journal of American Geriatric Society, 42*, 1009–1011.

Brotons, M. (2000). An overview of music therapy literature relating to elderly people. In D. Aldridge (Ed.), *Music therapy in dementia care* (pp. 33–62). Oxfordshire: Jessica Kingsley.

Brotons, M., & Marti, P. (2003). Music therapy with Alzheimer's patients and their family caregivers: A pilot project. *Journal of Music Therapy, 40*, 138–150.

Butters, M.A., Young, J.B., Lopez, O., Aizenstein, H.J., Mulsant, b.H., Reynolds, C.F., … Becker, J.T. (2008). Pathways linking late – life depression in older people with dementia. *Journal of Health Psychology, 15*, 765–776.

Camic, P.M., Williams, C.M., & Meeten, F. (2011). Does a 'Singing Together Group' improve the quality of life of people with a dementia and their carers? A pilot evaluation study. *Dementia, 12*, 157–176.

Chang, Y.-P., Kraenzle Schneider, J., & Sessanna, L. (2011). Decisional conflict among Chinese family caregivers regarding nursing home placement of older adults with dementia. *Journal of Aging Studies, 25*

Chou, K.R., & Lin, Y. (2012). The effectiveness of group music therapy to improve depression and cognition status in elderly persons with dementia. *European Psychiatry, 27*(Suppl. 1), 1. doi:10.1016/S0924-9338(12)74611-4.

Cooke, M.L., Moyle, W., Shun, D.H.K., Harrison, S.D., & Murfield, J.E. (2010). A randomised controlled trial exploring the effect of music on agitated behaviours and anxiety in older people with dementia. *Ageing and Mental Health, 14*, 905−916.

Cresswell, J.W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). London: SAGE.

Crystal, H.A., Grober, E., & Massur, D. (1989). Preservation of musical ability in Alzheimer's disease. *Journal of Neurology, Neurosurgery and Psychiatry, 52*, 1415−1416.

Cuijpers, P. (2005). Depressive disorders in caregivers of dementia patients: A systematic review. *Aging & Mental Health, 9*, 325−330.

Davidson, J.W., & Almeida, R.A. (2014). An exploratory study of the impact of group singing activities on lucidity, energy, focus, mood and relaxation for persons with dementia and their caregivers. *Psychology of Well-Being: Theory, Research and Practice, 4*, 1−13.

Davidson, J.W., & Faulkner, R. (2010). Meeting in music: The role of singing to harmonise carer and cared for. *Arts and Health: An International Journal for Research, Policy and Practice, 2*, 164−170. doi:10.1080/17533010903488608

Department for Health. (2013). UK Government. Retrieved from https://www.gov.uk/government/policies/dementia

Gallagher-Thompson, D., Brooks, J.O., Bliwise, D., Leader, J., & Yesavage, J. A. (1992). The relations among caregiver stress, 'sundowning' symptoms, and cognitive decline in Alzheimer's disease. *Journal of American Geriatric Society, 40*, 807−810.

Gold, K. (2014). But does it do any good? Measuring the impact of music therapy on people with advanced dementia: (Innovative practice). *Dementia, 13*, 258−264.

Hammar, L.M., Emami, A., Engstrom, G., & Gotell, E. (2010). Finding the key to communion − Caregivers' experience of 'music therapeutic caregiving' in dementia care: A qualitative analysis. *Dementia, 10*, 98−111.

Hicks-Moore, S.L., & Robinson, B.A. (2008). Favourite music and hand massage: Two interventions to decrease agitation in residents with dementia. *Dementia, 7*, 95−108.

Holmes, C., Knights, A., Dean, C., Hodkinson, S., & Hopkins, V. (2006). Keep music live: Music and the alleviation of apathy in dementia subjects. *International Psychogeriatrics, 18*, 623−630.

Hunt, J. (2013). *The world-wide challenge of dementia*. UK Government Report. Retrieved from https://www.gov.uk/government/speeches/the-world-wide-challenge-of-dementia

Johnson, J.D., Jackson, L.A., & Gatto, L. (1995). Violent attitudes and deferred academic aspirations: Deleterious effects of exposure to rap music. *Basic and Applied social Psychology, 16*, 27−41.

Jones, R. (2007). *Dementia and serious sight loss* (Occasional Paper Nos. 11). Retrieved from http://www.pocklingtontrust.org.uk/researchandknowledge/publications/Dementia.htm

Jorm, A.F. (2001). History of depression as a risk factor for dementia: An updated review. *Australian and New Zealand Journal of Psychiatry, 35*, 776−781.

Kadouchi, K. (2001). アルツハイマー病による重度痴呆患者への音楽療法 [Music therapy for patients with severe dementia]. 滋賀県音楽療法研究学会誌, *5*, 28−32.

Keefe, J., & Fancey, P. (2000). The care continues: Responsibility for elderly relatives before and after admission to a long term care facility. *Family Relations, 49*, 235−244.

Kydd, P. (2001). Using music therapy to help a client with Alzheimer's disease adapt to long-term care. *American Journal of Alzheimer's Disease and Other Dementias, 16*, 103−108.

Lai, H.-L. (2004). Music preference and relaxation in Taiwanese elderly people. *Geriatric Nursing, 25*, 286−291.

LeBlanc, A. (1991). *Effect of maturation/aging on music listening preference: A review of the literature*. Paper presented at the Ninth National Symposium on Research in Music Behavior, Canon Beach, OR.

LeBlanc, A., Sims, W.L., Siivola, C., & Obert, M. (1996). Music style preferences of different age listeners. *Journal of Research in Music Education, 44*, 49−59.

Ledger, A., & Baker, F. (2007). An investigation of long-term effects of group music therapy on agitation levels of people with Alzheimer's disease. *Aging & Mental Health, 11*, 330−338.

Levesque, L., Ducharme, F., & Lachance, L. (2000). A one-year follow up study of family caregivers of institutionalised elders with dementia. *American Journal of Alzheimer's Disease and Other Dementias, 15*, 229−238.

Lin, Y., Chu, H., Yang, C.Y., Chen, S.G., Chang, H.J., Hsieh, C.J., & Chou, K.R. (2011). Effectiveness of group music intervention against agitated behaviour in elderly persons with dementia. *International Journal of Geriatric Psychiatry, 26*, 670−678.

Litman, R.E., & Farberow, N.L. (1994). Pop-rock music as precipitating cause in youth suicide. *Journal of Forensic Sciences, 39*, 494−499.

McDermott, O., Orrell, M., & Ridder, H. M. (2014). The importance of music for people with dementia: The perspectives of people with dementia, family carers, staff and music therapists. *Aging & Mental Health, 18*, 706−716.

McDermott, O., Crellin, N., Ridder, H. M., & Orrell, M. (2013). Music therapy in dementia: A narrative synthesis systematic review. *International Journal of Geriatric Psychiatry, 28*, 781−794.

Moroi, K. (2007). 軽度認知症高齢者への音楽療法の効果検討 [Investigating the effectiveness of music therapy for old people with mild mentia]. 東海大学健康科学部紀要, *13*, 7−14.

Nuki, Y. (2009). 齢者の音楽療法 [*Music therapy for the aged*]. Tokyo: Ongaku-no-tomosha.

Okabe, T., & Kobayashi, T. (2006). アルツハイマー型認知症の音楽療法 [Music therapy for Alzheimer's dementia]. バイオメカニズム学会誌, *30*, 71−76.

O'Neill, M.E., Freeman, M., & Portland, V.A. (2011). *A systematic evidence review of non-pharmacological interventions for behavioural symptoms of dementia*. Washington, DC: Department of Veterans Affairs. Retrieved from http://www.ncbi.nlm.nih.gov/books/NBK54971/

Osman, S.E., Tischler, V., & Schneider, J. (2014). 'Singing for the brain': A qualitative study exploring the health and well-being benefits of singing for people with dementia and their carers. *Dementia*. Advanced online publication. doi:10.1177/1471301214556291

Paun, O., & Farran, C. J. (2006). Hearing and healing the hurts of dementia, part 1: Nursing home placement of persons with Alzheimer's disease. *Alzheimer's Care Quarterly*, *7*, 104−114.

Petrovsky, D., Cacchione, P.Z., & George, M. (2015). Review of the effect of music interventions on symptoms of anxiety and depression in older adults with mild dementia. *International Psychogeriatrics*, *27*, 1661−1670. doi:10.1017/S1041610215000393

Pinquart, M., & Sorensen, S. (2003). Differences between caregivers and non caregivers in psychological health and physical health: A meta analysis. *Psychology and Aging, 18*, 250−267.

Press, D., & Alexander, M. (2013). Treatment of behavioural symptoms related to dementia. In S. DeKosky (Ed.). *Up To Date*. Retrieved from http://www.uptodate.com/contents/treatment-of-behavioural

Preti, C., & Welch, G.F. (2012). The incidental impact of music on hospital staff: An Italian case study. *Arts and Health: An International Journal for Research, Policy and Practice, 4*, 135−147.

Ridder, H.M., & Aldridge, D. (2005). Individual music therapy with persons with frontotemporal dementia. *Nordic Journal of Music Therapy, 14*, 91−106.

Robinson, L., Hutchings, D., Dickinson, H.O., Corner, L., Beyer, F., Finch, T., … Bond, J. (2007). Effectiveness and acceptability of non-pharmacological interventions to reduce wandering in dementia: A systematic review. *International Journal of Geriatric Psychiatry, 22*, 9−22

Robson, C. (2011). *Real world research* (3rd ed.). Paris and London: John Wiley & Sons.

Rustad, R.A., Small, J.E., Jobes, D.A., Safer, M.A., & Peterson, R.J. (2003). The impact of rock videos and music with suicidal content on thoughts and attitudes about suicide. *Suicide and Life- Threatening Behaviour, 33*, 129−131.

Sakamoto, M., Ando, H., & Tsutou, A. (2013). Comparing the effects of different individualised music intervemtions for elderly individuals with severe dementia. *International Psychogeriatrics, 25*, 775−784.

Schulz, R., Belle, S.H., Czaja, S.J., McGinnis, K.A., Stevens, A., & Zhang, S. (2004). Long term care placement of dementia patient and care giver health and well-being. *Journal of American Medical Association, 292*, 961−967.

Sherratt, K., Thornton, A., & Hatton, C. (2004). Music interventions for people with dementia: A review of the literature. *Aging &Mental Health, 8*, 3−12.

Sixsmith, A., & Gibson, G. (2007). Music and the wellbeing of people with dementia. *Ageing and Society, 27*, 127−145.

Strang, V.R., Koop, P.M., Dupuis-Blanchard, S., Nordstrom, M., & Thompson, B. (2006). Family caregivers and transition to long-term care. *Clinical Nursing Research, 15*, 27−45.

Spiro, N. (2010). Music and dementia: Observing an effect and searching for underlying theory. *Aging and Mental Health, 14*, 891−899.

Staedt, J., & Stoppe, G. (2005). Treatment of rest-activity disorders in dementia and special focus on sundowning. *International Journal of Geriatric Psychiatry, 20*, 507−511.

Sung, H.C., Lee, W.L., Li, T.L., & Watson, R. (2012). A group music intervention using percussion instruments with familiar music to reduce anxiety and agitation of institutionalised older adults with dementia. *International Journal of Geriatric Psychology, 27*, 621−627.

Takata, T., & Iwanaga, M. (2014). Effects of music therapy as complementary and alternative medicine on dementia. *Japanese Journal of Complementary and Alternative Medicine, 2*, 49−55.

Toritsuka, A., Suzuki, Y., Hashimoto, A., Uehira, E., & Jikumaru, K. (2014). 認知機能が低下傾向にある地域在住高齢者への懐メロを用いた回想法の効果の評価 [Effect of reminiscence using nostalgic songs for community-dwelling elderly with declining cognitive function]. 日本看護科学学会誌, *34*, 371−377.

Vink, A.C., Zuidersma, M., Boersma, F., de Jong, P., Zuidema, S.U., & Slaets, J.P.J. (2013). The effect of music therapy compared with general recreational activities in reducing agitation in people with dementia: A randomised controlled trial. *International Journal of Geriatric Psychiatry, 28*, 1031−1038.

Wingood, G.M., DiClemente, R.J., Bernhardt, J.M. Harringtron, K., Davis, S.L., Robillard, A., & Hook, E.W. (2003). A prospective study of exposure to rap music videos and African American female adolescents' health. *American Journal of Public Health*, *93*, 437−439.

Yamada, T., & Baba, K. (2008). アルツハイマー型認知症高齢者の音楽能力に関する予備的研究 [Musical skills in elderly patients with Alzheimer's dementia]. 保健医療技術学部論集, *2*, 1−9.

Yamada, K., & Shimizu, H. (2013). アルツハイマー型認知症高齢者の重症度と残存音楽能力との関連性についての研究 [A study about the relevance of the remaining music skills and the disease severity in elderly patients with Alzheimer dementia]. 作業療法ジャーナル *47*, 1397−1402.

Yasuda, K., Beckman, B., Yoneda, M., Yoneda, H., Iwamoto, A., & Nakamura, T. (2006). Successful guidance by automatic output of music and verbal messages for daily behavioural disturbances of three individuals with dementia. *Neuropsychological Rehabilitation: An International Journal, 16*, 66−82.

Patient Education and Counseling 89 (2012) 484–488

Contents lists available at SciVerse ScienceDirect

Patient Education and Counseling

journal homepage: www.elsevier.com/locate/pateducou

The contribution of intimate live music performances to the quality of life for persons with dementia

Maaike van der Vleuten [a], Adriaan Visser [b], Ludwien Meeuwesen [a,*]

[a] Utrecht University, Interdisciplinary Social Science, The Netherlands
[b] Rotterdam University, Centre for Innovation in Health Care, Transition in Care, Rotterdam, The Netherlands

ARTICLE INFO

Article history:
Received 29 November 2011
Received in revised form 12 April 2012
Accepted 18 May 2012

Keywords:
Live music performance
Intimate contact
Quality of life
Dementia
Nursing homes
Complementary care

ABSTRACT

Objective: The aim of this study was to assess the effect of intimate live music performances delivered by professional singers on the quality of life of persons with mild and severe dementia in nursing homes.
Methods: A sample of 54 persons with varying degrees of dementia participated in the study. Complete data sets are available for 45 persons. Using a quasi-experimental design, quality of life was assessed on the dimensions of participation (human contact, care relationship and communication) and mental well-being (positive emotions, negative emotions and communication). Observational rating scales were completed by caregivers and family after the performance.
Results: Intimate live music performances have a positive effect on human contact, care relationships, positive emotions and negative emotions, especially for the mild dementia group. They lead to improved human contact, better communication, more positive and less negative emotions, and an improved relationship between caregiver and receiver.
Conclusion: Intimate live music performances are an inexpensive, non-invasive, feasible way to improve a deteriorating quality of life for persons suffering from dementia. This form of supplementary care may also alleviate the task of caregivers.
Practice implications: Nursing homes should make more use of intimate live music performances as forms of complementary care.

1. Introduction

Several studies have reported the beneficial effect of music interventions for persons with dementia [1–3]. The effect of live music performances however has been relatively poorly studied. This article reports the effects of live music performances on the quality of life of persons with dementia in nursing homes. The relevance of this study is not only the contribution of knowledge about the effect of live music performances on persons with dementia, but also in the importance of improving quality of life for this important group of patients. The quality of life for persons with dementia is of a deteriorating nature [4], and if live music performances contribute to improve this quality, it may turn out to be an inexpensive, non-invasive and feasible strategy. In that sense, such performances might be regarded as a form of complementary care in elderly homes [5,6].

Music in general can have a positive effect on persons with dementia, improving self-esteem, communication, independence, social interaction, participation in meaningful activities, general well-being, memory, expression of emotions and alleviation of apathy [1,7–10]. According to various studies, four types of music have different effects on persons with dementia: music therapy, singing caregivers, background music and live music.

The effect of music therapy – client-oriented and goal-directed use of music in a therapeutic relationship – varies according to the aim set by the therapist. This type of music can have a considerable effect on persons with dementia. It can alleviate pain and improve memory, health, communication and the expression of emotions, and reduce negative emotions, including stress, fear and depression [3,11]. The second type of music is 'singing caregivers'. Götell et al. [9] conducted research that reveals that caregivers who sing might help improve patients' ability to express positive emotions and moods. This also contributes to improve the intimacy and sincerity in the interaction and elicits some vitality in persons with severe dementia. The third type is background music. Götell et al. [9] show that background music increases playfulness and enhances positive emotions. The last type is live music, which appears to have a more intense effect on persons with dementia

* Corresponding author at: Utrecht University, Interdisciplinary Social Science, P.O. Box 80.140, 3508 TC Utrecht, The Netherlands. Tel.: +31 30 2536729; fax: +31 30 253 4733.
E-mail address: l.meeuwesen@uu.nl (L. Meeuwesen).

0738-3991/$ – see front matter © 2012 Elsevier Ireland Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.pec.2012.05.012

than other forms of music. Sherratt et al. [12] reviewed a number of studies, testing the hypothesis that levels of well-being and engagement would be stronger for live music conditions compared with recorded and no music conditions. Regardless of the level of cognitive impairment, analyses revealed that live music was significantly more effective in increasing levels of engagement and well-being. This was due to the participation and social interaction, which are intrinsic parts of live music performances. Live performance and its effect on quality of life in general have not been studied and will therefore be the focus of this study.

Quality of life of elderly persons under care has been researched and characterised along four dimensions: participation, mental well-being, physical well-being and residential conditions [13,14]. Human contact is an intrinsic part of participation [13,14]. Music can increase contact between persons with dementia and caregivers (also with friends and family) [1,3,7–12,15–17]. This effect can be caused by the following facts: people are more calm, more open, less agitated, less aggressive, more accommodating and easier to take care of [8,9]. Music may improve mental alertness (and thus alleviate apathy), which stimulates a person's realisation of the one with whom she has contact [8,9]. Music can also improve communication, which contributes to a person's ability to make contact [1,7–9,15]. Because music can make people more calm and open, less agitated and aggressive, and easier to take care of [8,9], the relationship between persons with dementia and caregivers (care relationship) may improve.

For the dimension of *mental well-being* we defined three concepts on which music can have an effect: *positive emotions, negative emotions* and *communication*. Mental well-being is associated with the way a person is experiencing life [13,14], especially the emotions being experienced and the way these are communicated. Music can improve positive emotions and reduce negative ones. As an illustration, a person can be happier, more independent and self-confident, laugh more and express her feelings better [1,9,16]. Music can also reduce anxiety, loneliness and depression [9,16].

Participation and mental well-being seem the most relevant for the effects of live music. Social interaction and participation are an intrinsic part of live music performances and most effects are related to emotions, which are important for mental well-being. Participation and mental well-being are therefore chosen as the indicators of quality of life. Music can have different effects on these two indicators.

The research question in this study is: What are the effects of intimate live music performances on the dimensions of participation and mental well-being of the quality of life of persons with dementia? Attention will also be paid to the role of the severity of the dementia as possible moderating factor.

2. Methods

We used a quasi-experimental design of observational rating scales completed by caregivers or family after a live music performance for persons with varying degrees of dementia.

2.1. Intimate live music performance

Intimate live music performance was given by a Dutch foundation called 'Diva Dichtbij' (Diva in Proximity). Diva Dichtbij was founded in 2007 and has grown out to be a well-known and recognised organisation for complementary care for the chronically ill (psychiatric, somatic and mentally retarded). Nine professional singers, selected on level of sensitivity for nonverbal communication and additionally trained in making non-verbal contact, give about 200 performances each year at locations across the Netherlands. The organisation receives private donations and is sponsored by health insurance companies.

The foundation's goal is to establish a positive effect on people through singing and establishing authentic human contact [18]. Each performance lasts about 45 min and is given for a small group (10 people on average) in the living rooms of the nursing homes. If a person cannot attend the performance in the living room, often because of a physical impairment, a personal performance in the individual's room will be given. This performance is shorter and will consist of one or a few songs.

At the beginning of each performance the singers (named Diva or Divo) give everyone in the audience a hand and introduce themselves. During this introduction as well as during the performance, the singers try to establish eye contact, promote interaction, and be physically close to the audience to get a positive reaction. Experience and intuition of the Divas make sure that these elements are well balanced so a positive reaction can occur without people feeling invaded in their personal space. The repertoire of the singers match the age of the listeners and during the performance the Divas often ask what genre or songs the audience wants to hear. During the last song of the performance the singer asks members of the audience to dance and asks if more people want to join. Matching both repertoire and dance at the end of the performance are elements also used to promote positive interaction.

All the Divas are dressed up in a fairytale-like outfit and some singers also use poetry or other stimulating objects (plastic animals, lights, etc.) to establish a positive reaction. While there are many kinds of live music in nursing homes, the performances of Diva Dichtbij are unique because they offer a special combination of singing and making authentic human contact. All the devices described are aimed at establishing intimate human contact, which might be best approached in terms of Buber's view of an encounter between two human beings [19]. The essence of such a contact is that it is unconditional and does not have an external function. It is exclusively meant to establish personal contact on an existential level.

2.2. Subjects

Subjects were 54 individuals with varying degrees of dementia in six nursing homes in the Netherlands. The selection of nursing homes, which were spread out all over country, was fixed to the predetermined bookings of 17 performances by Diva Dichtbij. These participants were directly selected at the institution where Diva Dichtbij performed. The response rate of completed observation lists was 83%. We will report data of 45 respondents. To select a varied and representative group we balanced both gender and dementia severity as representatives of the sample. Severity of dementia was assessed by the researcher with a criteria list made by Poortvliet et al. [14]. The sample included 15 men and 30 women, 29 with dementia and 16 with severe dementia.

2.3. Dependent variables

A number of background variables were recorded, including age of participant, background of observer (family/caretaker) and singer identity. The dependent variables were *participation* and *mental well-being* as measured by observation rating scales, which were developed specifically for this study. In addition, two items on *overall satisfaction* with the live music performance were incorporated.

2.3.1. Observation instrument

For the *participation* dimension we used three concepts from the literature on which music may have an effect: *human contact*, *care relationship* and *communication*. For the dimension of *mental well-being*, three concepts were used on which music can have an

Table 1
Reliability of observation lists, split out by dementia degree.

Dimension	Subscales	Cronbach's α		Examples of scale items
		Mild	Severe	
Participation	Human contact	α = .90	α = .77	Contact with other people
	Care relationship	α = .96	α = .61	Feasibility of care giving
Mental well-being	Positive emotions	α = .84	α = .85	Enthusiasm
	Negative emotions	α = .80	–	Anxiety
Both	Communication	α = .95	α = .75	Body language

effect: *positive emotions, negative emotions* and *communication*. Most items were selected from an existing instrument [13,14] and additional items were generated from the literature [1,3,7–11,15–17]. Each item had a three-point scale and pointed to whether the behaviour mentioned in the item decreased/worsened (1), did not change (2), or increased/improved (3).

Two observation lists were developed, tailored to the severity of dementia (mild and severe). The difference was that the severe observation list excluded some items that were not valid for this group (e.g. 'The person speaks more' because people with severe dementia often can no longer speak). All other items were identical. These lists were filled in by caregivers and family, as these people know the participants best and will recognise the effect of the performance.

Table 1 provides an overview of the subscales and the Cronbach's alpha. Eight items were eliminated to improve the homogeneity of the scales. Overall, the mild dementia list consisted of 45 items and the severe dementia list of 30 items [20]. Appendix A contains the quality-of-life items of the observation list.

The items to assess *overall satisfaction were*: 'Did the person enjoy Diva Dichtbij?', and 'Does the person want to see Diva Dichtbij again? (*Yes/no answer choices*).

2.4. Procedure

Informed consent for participating in this study was obtained from all institutions, based on written instructions about the goal of the research. The research goal was explained to family and caregivers and their cooperation was requested. Prior to the performance the severity of dementia was measured by the researcher with a criteria list made by Poortvliet et al. [14], if needed with help from the caregivers. After the performance appropriate observation lists were distributed to family and caregivers. They were asked to complete one or more observation lists one day after the performance, each for an individual resident. A time interval of one day was considered appropriate for assessing a more enduring effect of the performance, thereby avoiding a short-term immediate effect. The time to complete a single observation list was approximately 7–10 min, depending on the type of list. Stamped envelopes were provided to mail all completed lists.

2.5. Statistical analysis

Sum scores were calculated by averaging across all scales and across all dimensions. Descriptive statistics were performed for all scales. Due to the nature of the rating scale, no effect was associated with an average score of 2. One sample *t*-tests were performed to analyse whether an effect was significantly different from no effect. Regression analysis was carried out to check the confounding role of background variables. For the two overall satisfaction items proportion tests were used to estimate the significance of the effect (>50%). All analyses were done for the total group and separately for people with mild and severe dementia.

3. Results

3.1. Participation and well-being

Table 2 shows a significant positive ($M > 2$) effect of intimate live music performances on both participation and mental well-being for persons with dementia.

There was a difference between the mild and the severe dementia group (Table 3). For those with mild dementia both dimensions changed significantly. For persons with severe dementia only participation was significant, although mental well-being was near-significant.

Table 4 shows the positive effect of the performances on all concepts of participation and mental well-being for the total group. This was also found for the mild dementia group, but not for the severe dementia group. For the latter only the positive affect is significant. Human contact ($p = .068$) and communication ($p = .072$) are significant at the 10% level.

3.2. Satisfaction

Caregivers affirmed that 80% of all audience members with dementia enjoyed the performance of Diva Dichtbij and 7% did not enjoy it; for 13% the caregivers did not know if they had enjoyed it. Caregivers also affirmed that 78% of all audience members with dementia would like to see Diva Dichtbij again and 7% would not; caregivers were not sure about 15%. Proportion tests confirmed that all effects are highly significant and occurred across both groups of dementia severity.

3.3. Background variables

A regression analysis showed that none of the background variables had an effect on the quality of life or satisfa-

Table 2
Effects of intimate live music performances on people with dementia ($n = 45$).

Quality of life dimension	Mean (Std)	t^a	*P*
Participation	2.20 (0.233)	5.77	.000
Mental well-being	2.18 (0.273)	4.17	.000

Participation score: 1 = decrease; 2 = no change; and 3 = increase.
Mental well-being score: 1 = decrease; 2 = no change; and 3 = increase.
[a] One sample *t*-tests: mean score compared with baseline score (M = 2).

Table 3
Effects for the mild ($n = 29$ and severe ($n = 16$) dementia group.

Dimension	Mild dementia group			Severe dementia group		
	Mean	t^a	*P*	Mean	t^a	*P*
Participation	2.24	5.14	.000	2.13	2.85	.012
Mental well-being	2.23	6.76	.001	2.10	1.94	.071

Participation score: 1 = decrease; 2 = no change; and 3 = increase.
Mental well-being score: 1 = decrease; 2 = no change; and 3 = increase.
[a] One sample *t*-tests: mean score compared with baseline score ($M = 2$).

Table 4
Effects of the subscales of participation and mental well-being, for the mild ($n = 29$) and severe ($n = 16$) dementia group.

Concepts	Mild dementia group			Severe dementia group			Total		
	Mean	t^a	P	Mean	t^a	P	Mean	t^a	P
Human contact	2.27	4.48	.000	2.11	1.96	.068	2.21	4.76	.000
Care relation	2.17	2.46	.002	2.09	1.57	.138	2.14	2.92	.006
Communication	2.23	3.85	.001	2.10	1.94	.072	2.18	4.25	.000
Positive affect	2.39	6.01	.000	2.24	2.19	.045	2.34	5.88	.000
Negative affect	2.10	2.44	.022	2.05	1.38	.188	2.08	2.78	.008

Mean score: 1 = decrease; 2 = no change; and 3 = increase.
[a] One sample t-tests: mean score compared with baseline score ($M = 2$).

ction measures that turned out to be significant (results not reported).

4. Discussion and conclusion

4.1. Discussion

In summary, the results of the present study reveal that most participants enjoyed the intimate live music performance and would like to see it again. The performances also seem to have a positive effect on participation and mental well-being aspects of quality of life for persons with mild and severe dementia. The effect on participation is present for both groups, the effect on mental well-being only for individuals with mild dementia. If we study the different concepts of participation and mental well-being, the performances have a positive effect on persons with mild dementia, but for those with severe dementia only the concept 'positive emotions' is significant.

The results show that these performances can be seen as meaningful and personally stimulating, which may improve quality of life [1,12–14,17]. The results are in line with other studies, which report that live music performances increase human contact and thus increase participation [1,3,7–12,15,16]. This study also confirms that music can improve communication, which contributes to a person's ability to make contact [1,2,7–9] and thus improves participation. These findings are only present for persons with mild dementia. A potential explanation for the differential effect for the level of dementia is that persons with severe dementia, due to their cognitive and physical impairments [21], cannot focus their attention on the performance and do not realise what is happening.

The data supports that intimate live music performances improve positive emotions and reduce negative emotions, and resonates with findings from studies on other types of music interventions [1,9,16]. The improvement of positive emotions is present for both types of dementia. The reduction of negative emotions is only present for persons with mild dementia. The fact that communication has improved is also important for mental well-being, because it implies that people can express their emotions better [15,17]. These findings are again only present for persons with mild dementia.

The relationship between caregiver and the demented person also improves through intimate live music. This improved relationship is not only important for a better quality of life for persons with dementia, but may also contribute to improving the working conditions of caregivers. If nursing home residents are more communicative and more positive, this might alleviate caregivers' duties [8,9].

4.1.1. Methodological reflections

The observation lists were based on theoretical concepts [8–10] and are internally consistent [13,14]. The selection of participants and the distribution of the observation lists was done systematically. The application of a quasi-experimental design with a sample of $n = 45$ instead of a full experimental design that included pre-, post- and follow-up measures and a control group set limitations to the generalisation of the findings. A next study could be based on a larger sample, more measures (pre-, post- and follow-up) and a control group. A control group needs careful thought. A 'no intervention control group' delivers an unfair comparison. A control treatment seems more appropriate and could consist of live music without intimate contact, an alternate music treatment, or any other non-musical intervention to improve quality of life. Retention measures would allow establishing the endurance of the effect.

Finally, although the results are statistically significant and theoretically solid, one might question at which level these results are also clinically relevant in terms of quality of life. For example, an average quality-of-life improvement from 2.00 towards 2.20, as observed, is not very large. It is also not known how long this effect will endure. On the other hand, the results resonate with the effects reported in literature.

More research into *why* these effects occur would enhance our understanding of what elements in intimate live music performances cause positive effects. Performances could then be altered to establish an optimal effect. With more understanding of which element leads to which effect, it may be possible to serve people with severe dementia better. Because this group cannot hold their attention during a performance, interventions probably need to be tailored to this element. For example, smaller groups and more physical proximity might be part of such an approach.

4.1.2. Implementation

Given that the intimate music performances, as described here, seem to have a positive effect on patients' well-being, the question is how to implement these forms of complementary care in nursing homes. The uniqueness lies in the combination of singing and making authentic contact. The latter is the most difficult: how to fine-tune making contact with a person having dementia? One suggestion is to train larger groups of professional singers intensively to master this unique combination of singing and making intimate contact with persons in nursing homes. These performances are not just suited for individuals with dementia, but in general all seniors living in nursing homes might benefit. Another issue is to motivate health insurance companies to facilitate these forms of complementary care, as they have positive effects on residents. Indirectly, they may also benefit the health care providers: if residents feel more relaxed, this might offer some relief in the nurses' duties.

4.2. Conclusion

Intimate live music performances may improve the participation and mental well-being of persons with dementia residing in nursing homes, and therefore have the potential to better a deteriorating quality of life for a substantial group of individuals. These performances can be regarded as an inexpensive, non-invasive, feasible modality of complimentary care in elderly

homes. It may lead to improved human contact, better communication, more positive and less negative emotions, and an improved relationship between caregiver and receiver. Most effects are stronger for people with mild dementia. Importantly, intimate live music performance may alleviate the task of the caregiver. These are all important reasons to further study the effects of intimate live music performance on the quality of life of persons with dementia.

4.3. Practice implications

The provision of complementary care in the form of intimate live music performances on a small scale, as described here, is recommended for nursing homes and elderly care facilities. It will contribute to a better quality of life of the residents, and therefore to some alleviation of the caregivers' work.

Funding

No funding source.

Conflict of interest

None of the authors have actual or potential conflicting interests.

Acknowledgements

We would like to thank all nursing home residents, their family members and health care workers for their participation in this study. We also thank the foundation 'Diva Dichtbij' for their responsive cooperation.

Appendix A. Items of observation list on quality of life (filled out by caretakers)

Change in behaviour of the client after the performance in terms of (1) deteriorated/declined, (2) no change, and (3) improved/increased.

1. Contact with other residents*
2. Contact between you and client*
3. Feeling at ease in company with others
4. Reaction when approaching*
5. Submissiveness (in care taking or participation in activities)*
6. Body language*
7. Verbal communication
8. Reaction when speaking to him/her*
9. Expression of feelings*
10. Mood*
11. Memory*
12. Feeling content*
13. Caretaking*
14. Communication during caretaking*
15. Involvement in nursing home department
16. Involvement with other people
17. Presence of humor
18. Touching people*
19. Allowance of being touched*
20. Disconnected from surrounding*
21. Happiness
22. Smiling*
23. Enthusiasm
24. Relaxation*
25. Confused*
26. Awareness of time/space
27. Independence
28. Confidence
29. Loneliness
30. Openness*
31. Affection*
32. Acceptance of help*
33. Appreciation of help
34. Calmness during caretaking*
35. Communication during caretaking
36. Fear*
37. Gloominess
38. Sadness
39. Crying*
40. Peaceful
41. Nervousness*
42. Irritability*
43. Aggressiveness

Participation items:
Human contact: 1–5, 8, 15, 16, 18–20
Communication: 6–9, 14, 30, 35
Care relationship: 13, 14, 32–35
Mental well-being items:
Positive affect: 12, 17, 21–24, 27, 28, 31, 40
Negative affect: 29, 36–39, 41–43
Communication: 6–9, 14, 30, 35
Overall mental well-being: 9–11, 25, 26
* Items used in both dementia groups.

References

[1] Sixsmith A, Gibson G. Music and the wellbeing of people with dementia. Ageing Soc 2007;27:127–45.
[2] Brotons M, Koger SM, Pickett-Cooper P. Music and dementias: a review of literature. J Music Ther 1997;34:204–45.
[3] Koger SM, Chapin K, Brotons M. Is music therapy an effective intervention for dementia? A meta-analytic review of literature. J Music Ther 1999;36:2–15.
[4] Kitwood T. Dementia reconsidered: the person comes first. Buckingham: Open University Press; 1997.
[5] Thomas KJ, Nicholl JP, Coleman P. Use and expenditure on complementary medicine in England: a population based survey. Compl Ther Med 2001;9:2–11.
[6] Sampson F, Visser A. Creative writing in health care: a branch of complementary medicine. Patient Educ Couns 2005;57:1–4.
[7] Clair AA. The effect of singing on alert responses in persons with late stage dementia. J Music Ther 1996;33:234–47.
[8] Götell E, Brown S, Ekman SL. Influence of caregiver singing and background music on posture, movement, and sensory awareness in dementia care. Int Psychogeriatr 2003;15:411–30.
[9] Götell E, Brown S, Ekman SL. The influence of caregiver singing and background music on vocally expressed emotions and moods in dementia care. Int J Nurs Stud 2009;46:422–30.
[10] Holmes C, Knights A, Dean C, Hodkinson S, Hopkins V. Keep music live: music and the alleviation of apathy in dementia subjects. Int Psychogeriatr 2006;18:623–30.
[11] Jones G, Miesen B. Care-giving in dementia: research and reflections. London: Tavistock/Routledge; 1992.
[12] Sherratt K, Thornton A, Hatton C. Music interventions for people with dementia: a review of the literature. Aging Ment Health 2004;8:3–12.
[13] Arcares AVVV. LOC, Sting. Op weg naar normen voor verantwoorde zorg: een ontwikkelingsmodel voor verpleeg- en verzorgingstehuizen opgesteld door organisaties van cliënten, aanbieders, beroepsgroepen. Towards norms for responsive care, Utrecht: Organisatie; 2005.
[14] Poortvliet MC, van Beek APA, de Boer ME, Gerritsen DL, Wagner C. Het vaststellen. van kwaliteit van leven bij cliënten in de ouderenzorg. Assessment of quality of life of clients in elderly care Utrecht: Nivel; 2006.
[15] Brotons M, Koger SM. The impact of music therapy on language functioning in dementia. J Music Ther 2000;37:183–95.
[16] Guètin S, Portret F, Picot MC, Pommie C, Messaoudi M, Djabelkir L, et al. Effect of music therapy on anxiety and depression in patients with alzheimer's type dementia: randomised, controlled study. Dement Geriatr Cogn Disord 2009;28:36–46.
[17] Sherratt K, Thornton A, Hatton C. Emotional and behavioural responses to music in people with dementia: an observational study. Aging Ment Health 2004;8:233–41.
[18] www.divadichtbij.nl.
[19] Buber M. Ich und Du. Me and you Stuttgart: Reclam; 1995.
[20] van der Vleuten M. Het effect van de muziek optredens van stichting Diva Dichtbij op de dimensies participatie en mentaal welbevinden van kwaliteit van leven van dementerenden [The effect of music performances on the quality of life of people with dementia]. Faculty of Social Sciences, Utrecht, 2010.
[21] Dautsenberg P, Braam W. Ik ben het steeds meer kwijt: Over Alzheimer enandere vormen van dementia. About Alzheimer and other forms of dementia Wormer: Inmerc; 2007.