

Critical Review:

In elderly individuals experiencing dementia, can music at mealtimes reduce agitation?

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This critical review examines the efficacy of music in reducing agitation during mealtimes in elderly individuals experiencing dementia. Four articles were included in this review: two single group repeated measure, one pre-posttest and one systematic review design. Overall, the results of these studies provide suggestive evidence that music therapy during mealtimes may be beneficial in reducing the agitation in elderly individuals who are experiencing dementia.

Introduction

Dementia is a global public health priority. The World Health Organization reports that 7.7 million new cases are identified each year, with an estimated 65.7 million people expected to have the condition by 2030, nearly double from 2010. Patients with dementia experience various health problems, including memory loss and agitated behaviour. Agitated behaviour has been defined as inappropriate language or actions that arise from personal needs or confusion (CohenMansfield & Billig, 1986). Agitated behaviour decreases the individual's quality of life (Kuo, Lan, Chen, & Lan, 2010) and increases caregivers burden. Medication can be used to reduce agitation but can cause undesirable side effects, including accelerated cognitive decline, cardiac effects, drowsiness, and high-risk for falls (Taiwan Alzheimer's Disease Association, 2011). Therefore, the use of soothing music has been recommended to help manage agitated behaviour.

Mealtime is not only a pleasant event to spend with family and friends but is also significant in helping to improve social interactions among nursing home residents (Hicks-Moore, 2005). Mealtime in nursing home settings provides an ideal time to promote social interaction and to capitalize on one of the few remaining pleasures for many nursing home residents (Kayser-Jones, 2000). For residents with dementia, the high sensory stimulation and demand for social interactions, often in large and noisy dining rooms may create uncertainty or anxiety, which can be expressed, in various forms of disruptive behaviour (Cohen-Mansfield & Werner, 1995; Goddaer & Abraham, 1994; Hall, 1994; Van Ort & Phillips, 1995). Because high sensory stimulation may contribute to displays of disruptive behaviour, it has been suggested that relaxing music, because of its soothing qualities, is a helpful intervention to manage agitated (Gerdner & Swanson, 1993) or disruptive behaviours (Clark, Lipe, & Bilbrey, 1998; Thomas, Heitman & Alexander, 1997).

Studies have shown that cognitive skills related to music and artistic abilities tend to stay relatively intact in individuals with

moderate and severe dementia (Beatty et al., 1994; Beatty et al., 1998; Chavin, 1991; Miller, Boone, Cummings, Read, & Mishkin, 2000). One proposed explanation is, many individuals with dementia have a disproportionate amount of damage to the left hemisphere as opposed to the right hemisphere, or artistic side, of the brain (Miller et al., 2000; Whitcomb, 1994). Music as a sound medium evokes a response through influences on the limbic system, the brain's center of emotions (Zatorre & McGill, 2005), promoting relaxation and reducing stress. Although many studies have confirmed the therapeutic effects of music on agitated behaviour, results have been inconsistent across a range of literature.

Objectives

The primary objective of this paper is to critically evaluate the existing literature regarding the implementation of music during mealtimes on a regular basis in order to reduce agitated behaviours in individuals experiencing dementia. The secondary objective is to provide a rationale for other professionals desiring to implement this intervention.

Methods

Search Strategy

Articles related to the topic of interest were found by searching the following computerized databases: PubMed, SCOPUS, and CINAHL. Keywords used for the database search were as follows: (music) AND (mealtime) AND (dementia). Reference lists of articles were manually searched for additional studies relevant to this critical review.

Selection Criteria

Studies were included if they had any mealtime intervention with music, conducted in the care home setting aimed at improving dementia-related behaviors (such as agitation, aggression, or hiding and hoarding behaviors). Studies were also limited to those that included residents in long-term care or nursing facilities with a suspected diagnosis of dementia or Alzheimer's disease. Primary research was included and no limits were set on publication date or geographical location of participants. Only studies published in English were included.

Data Collection

The literature search revealed four articles that aligned with the selection criteria. Articles consisted of two single group repeated measure designs, one pre-posttest design and one systematic review.

Results

Single group repeated measure

Denney, Ann (1997) conducted a single group repeated measure time series with baseline behaviour incidence scoring, followed by introduction, withdrawal, and reinstatement of treatment. The repeated tests were intended to add rigor to the design. Nine participants ranging in age from 65 to 84 years old ($M=74.8$, $SD=6.4$) were recruited. Two thirds of the sample were females. None evidenced hearing loss, but all had significant language impairments. All subjects had a physician-documented diagnosis of either irreversible dementia or Alzheimer's disease. Cognitive decline was assessed utilizing various standardized tests. A relaxing music was played in the meal room, with volume confirmed by the staff to be above the background noise. Researchers used modified Cohen-Mansfield Agitation Inventory (CMAI) to record agitation behaviours. Internal consistencies for modified CMAI was confirmed by Kuder-Richardson KR-20 index for dichotomously scaled instruments, with four random indices of 0.88, 0.90, 0.93 and 0.94 (Goddaer & Abraham, 1994). The modified instrument was used in this study because it facilitated scoring of the entire sample by one observer. This study was conducted over a period of four weeks: week 1 no music, week 2 with music, week 3 no music and week 4 with music.

Results indicate a 46% decrease in the behaviours from baseline to the end of the first week of music. Behaviours increased, but remained 8% below baseline incidence after a week without

music. In the fourth week (with music) a decrease in behaviours of 37% from baseline and 31% from week three (no music) was noted. The syndromes of behaviours most changed in the presence of the music were verbally agitated behaviours (57% decrease with first introduction of music and increased with removal of music) and physically non-aggressive behaviours (56% decrease when music was introduced and increased when music was withdrawn).

Limitations

The researchers acknowledged that the sample size of nine participants is not large enough for generalization. The modified Cohen-Mansfield Agitation Inventory did not fully capture and measure changes behaviours. Merely noting the presence or absence of behaviour does not provide changes in sub-types of behaviours. The researchers did not provide any information about the observer (only one was used) e.g. if the observer was a staff member, research assistant or trained by the researchers. More than one observer would protect from observer bias. The researchers were unable to provide details on onset of dementia, hearing status or language test results for the subjects. Furthermore, the withdrawal of intervention has carryover effects and the claim by the researchers about participants acting as their own control, should be interpreted with caution. Because the effect of the music on the staff was not measured, any subsequent change in their behaviour is unknown. If there was an effect of music on the staff, it is likely that the effect is communicated to patients during caregiving activities and that may be a significant variable.

Overall, based on the low level of participants and effect of other variables not controlled for, this study provides an equivocal evidence that playing music during mealtimes may reduce agitation in individuals with dementia, Alzheimer's or with severe cognition decline.

Single group repeated measure

Sandee Lynn, Hicks-Moore (Dec 2005) conducted a single group repeated measure study, comprised of 30 participants who were diagnosed with irreversible dementia, Alzheimer's or severe cognitive impairment. The age of the participants ranged from 70-101 with a mean age of 82.4 years of which 70% were women and 30% were men. The modified Cohen-Mansfield Agitation Inventory (CMAI), an observational checklist composed of 29 indicators of agitated behaviour was used to measure agitation. The rationale to use this scale was twofold-the focus of the study was to determine the presence of a given behaviour during the defined mealtime period, and the change facilitated scoring of the entire sample by one observer. Researchers choose relaxing music with a tempo of 55-70 beats/minute, played above the background noise.

The observer recorded the presence or absence of the behaviour displayed by any one of the participants during evening mealtime without specifically documenting the number of times

the behaviour was present or which participants displayed behaviour. The focus was the presence or absence of the behaviour, rather than the number of times the behaviour was demonstrated or who demonstrated the behaviour. The study was conducted over a period of 4 weeks: week 1- no music, week 2- music, week 3- no music, week 4- music. Baseline data of agitated behaviours were recorded in week 1 (no music).

Results revealed that in four dimensions of agitation measured in the modified CMAI, the incidence of agitated behaviours observed decreased in the weeks music was played (week 2 and 4) in comparison to the weeks when music was not played (week 1 and 3). The researchers provided a score table for the subsets of behaviours in four dimensions along with total agitated scores reflecting the changes during 4 weeks of study. Furthermore, the study provided the range, mean and standard deviation in four dimensions of agitated behaviours. The results indicated that as a group, there was a decrease in incidences of agitated behaviour from week 1 (baseline) to week 4 (music).

Limitations

A small sample size of 30 participants restricts the generalization. The researchers were unable to provide any information about the observer (only one was used) e.g. if the observer was a staff member, research assistant or trained by the researchers. The researchers did not provide details on onset of dementia, hearing status or language test results for the subjects. The researchers mentioned that the observer noted other changes which were not captured by modified CMAI e.g. the participants were smiling more, seemed less restless, gently swaying to music, remained in their seats after the meals were finished and lightly clapping their hands in tune to the music. These behaviours were noted separately but the researchers were unable to provide baseline for comparison. Limitations of the study were not discussed.

Overall, this study provides a suggestive evidence that playing music during mealtimes may reduce agitation in individuals with dementia, Alzheimer's or with severe cognition decline.

Single group Pre-Posttest

Shu-Yuan et al. (2011). This pre and posttest study was conducted in a hospital-based nursing home located in northeast Taiwan. A sample of 22 participants with age range from 62-91 with mean age of 77.27 years (SD=7.64 years), were selected. The medical diagnosis of participants included Alzheimer's disease, vascular dementia and other dementia. The inclusion criteria for the participants were: no hearing impairment, have resided in the nursing home for more than 3 months, be 65 years and older, have Mini-Mental State Examination (MMSE; Folstein, Folstein & McHugh, 1975) score equal to or lower than 23, have Cohen-Mansfield Agitation Inventory (CMAI) score 35 or higher, not be bed bound, be able to rate their likeability of the music, have ability to communicate in either Mandarin or Taiwanese. The researcher, who was not involved

in data collection to avoid expectancy bias, composed the music. The music was played at mealtimes twice a day, 7 days a week. The volume of the music was chosen to be slightly higher than the background noise with a tempo of 60-80 beats per minute. Agitated behaviours were measured by using a Chinese version of CMAI. The Cronbach's alpha for the Chinese version of CMAI has been shown to be 0.90 with test-retest reliability and interrater reliability were 0.99 and 0.77, respectively (Yang, Wu, Lin, & Lin, 2007). The interclass correlation coefficient of CMAI was 0.91. To control for interrater reliability, six observers, who were staff nurses of the nursing home, were trained to use CMAI by the researchers before baseline data collection. The observers provided a continuous 24-hour period record of agitated behaviour for 7 days per week. Data was analyzed using SPSS 18.0 and Fisher's skewness coefficient was used to check the normality of the data. The Friedman test with significance P values set at 0.05, was used to examine treatment effects across time. Post hoc multiple *t* test with the Bonferroni's correction were used to determine group differences in CMAI scores at each weekly posttest. The study was conducted over 6 weeks with baseline data collected before introducing the music. The music was played continuously for 4 weeks with 2 weeks of no music at two separate mealtimes.

Results: Friedman tests revealed that treatment effects between different time points were observed for global agitation scores and sub-scores (all $p < .001$), indicating that music had beneficial effects on decreasing agitated behaviour. These included physical nonaggressive, physical aggressive, verbal nonaggressive and verbal aggressive behaviours. The global agitated scores had significantly declined by 29.1% of baseline at T5. All four sub scores of CMAI had also gradually decreased by 25.09% - 35.91% of baseline by T5. The four components of the CMAI were slightly increased at T6 but still significantly lower compared with baseline data (all $P < .008$), indicating that the 4-week music intervention had a 2-week linger effect for agitation.

Limitations

A small sample size of 22 participants restricts the generalization. The Friedman test is the non-parametric alternative to the one-way ANOVA with repeated measures. A Friedman test requires that the data "passes" the four assumptions associated with this test. This study passed on three assumptions except that the selected population appeared to be a convenience sample rather than a random sample. The age inclusion criteria for this study was reported to be 65 years and older. However, the participant's age ranged from 62-91 years old.

Although, this study provided a statistically significant difference but other weaknesses mentioned above, provides a suggestive evidence that music played during mealtimes with dementia patients can be beneficial in reducing agitated behaviours.

Systematic Review

Whear, Rebecca, Rebecca Abbott, Jo Thompson-Coon, Alison Bethel, Morwenna Rogers, Anthony Hemsley, Will Stahl-Timmins, and Ken Stein (2014). The author's objective for this systematic review was to examine the effectiveness of mealtime interventions aimed at improving behavioural symptoms in elderly people living with dementia in residential care. Fifteen databases were searched from inception to November 2012 including OpenGrey. The electronic searches found a total of 6118 results; of these 97 full text were retrieved for examination. A total of 11 studies were included in the final review, with 2 identified from forward and backward citation chasing.

The authors clearly outlined the objective for the review, protocol that was followed, methods used, and approach to locating articles, which is a strength. Both the inclusion and exclusion criteria were well defined by the authors. Scientific quality of the included studies were presented in a table. Two independent reviewers collected data and discrepancies were resolved with a third independent reviewer. Furthermore, quality appraisal for the studies was assessed by one of the two reviewers and checked by one of the three reviewers. Any discrepancies was discussed and resolved. The authors also took into consideration the methods used to compile data and administer therapy, and weighed the effectiveness of those methods.

The authors provided a list of included studies but were unable to provide a list of excluded studies. Disease status, severity and type of dementia were not reported. The authors reported that the standard of reporting for the studies was too poor to make an informed judgement on the quality of the study e.g. validity and reliability of data collection was rarely discussed even though in most circumstances the tools had known validity and reliability.

This review provides a suggestive evidence that mealtime intervention with music decreases agitative behaviours in people diagnosed with dementia

Discussion

The papers reviewed offered different levels of evidence and validity, but overall the findings are suggestive that music played at mealtimes with dementia patients can reduce agitated behaviours.

There were some overall limitations of the literature reviewed. Firstly, low number of participants in the studies restricts generalization of the results. Details on inclusion criteria including stage and type of dementia, hearing status and

language delay were not clearly reported. Secondly, only one study by Shu-Yuan et al. (2011) provided statistically significant results.

There were some universal strengths of the research. All of the research reviewed, reported positive results supporting the use of music during mealtimes in reducing agitative behaviours. All the studies used the Cohen-Mansfield Agitation Inventory (CMAI) scale or a modified version of it. Using the same instrument tools allows for easy comparison. On the whole, the treatment programs were simple and well described, making them an easy therapy to replicate.

Further studies should include well-designed controlled trials. Perhaps; delayed intervention randomized controlled trials to strengthen the evidence. The addition of follow-up studies and maintenance measures would allow for investigation of the effects over the long term. People with different types and stages of dementia may respond differently to music. Future directions for research could include studying the effect of different types of music and dosage.

Clinical Implications

Music is an easy, inexpensive, and non-invasive intervention that can be incorporated during mealtimes to reduce negative dementia related behaviours. In view of a suggestive evidence provided by this current review, it is recommended that clinicians remain cautious when implementing the findings of these studies into clinical practice.

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