Review

Music, music therapy and dementia: A review of literature and the recommendations of the Italian Psychogeriatric Association

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1. Introduction

The term “music therapy” (MT) is widely used in the literature, but the specific contents of its therapeutic interventions often remain vague or unclear. MT is frequently assimilated to other approaches, which are mainly based on the use of music activities (i.e. making or listening to music) [1–6].

The authors are here referring to a definition of MT implying the essentially relational nature of the intervention, which should be grounded upon theory–practice coherence and adequately verifiable. A MT intervention should take place in a therapeutic setting, and be conducted by adequately trained music-therapists. The aims (tending towards stability and duration in time, according to the pathology’s degree of severity) should be well aimed both at symptoms with their complications, and at the modifications in intrapsychic and interpersonal dynamics [2,5,6]. This study aims at describing the state of the art about the therapeutic use of MT and music, by reviewing the literature in this field. The AIP also provides a list of recommendations to facilitate the current use of music and MT techniques in the context of non-pharmacological treatment of patients with dementia.

2. Methods: selection criteria

The present review has considered the following databases: PUBMED, PsychInfo, the Cochrane RCT Register. The following keywords have been used: “music”, “music therapy”, “singing”, “dementia”, and “Alzheimer”. Studies in English published in peer reviewed journals between 2000 and 2011 have been included in the analysis.

Among the 289 studies analyzed, 32 were Randomized Controlled Trials (RCT) or Clinical Controlled Trials (CCT) and were included in this review.

3. Results

3.1. Effect on behavioral and psychological symptoms of dementia (BPSD)

Twenty studies assessed the effect of music or MT on BPSD, eight of which were based on music listening, while the other studies were based on an active music approach (music activities or MT).

Three studies were by Sung et al.; in the first [7] the authors evaluated the effects of group music with movement intervention on occurrence of agitated behaviors of 36 elderly Taiwanese nursing home (NH) residents affected by moderate and severe dementia. The experimental group of 18 individuals receiving group music and a motor stimulation activity twice a week showed a significant reduction of agitated behaviors after 4 weeks’ sessions (evaluated with the modified Cohen–Mansfield Agitation Inventory, m-CMAI), versus 18 controls receiving usual care.

A second study [8] evaluated the efficacy of the listening to preferred music approach to reduce anxiety in older NH residents with dementia. For this purpose, an experimental group of 29 participants received a 30-min session of listening to preferred music according to their personal preferences, twice a week for 6 weeks. There was a significant reduction in anxiety scores (measured by Rating Anxiety in Dementia – RAID, F = 12.15, p = .001) in the patients of the experimental group if compared to 23 controls, who received standard care without music. A further recent paper [9] evaluated the effects of musical activity on both anxiety and agitation, enrolling a cohort of 60 NH residents with dementia, randomly assigned to an experimental or a control groups. The experimental group received a 30-min music intervention (using percussion instruments with familiar music), twice a week for 6 weeks, whereas the control group was assigned to usual care. Anxiety and agitation were assessed at baseline and after 4 and 6 weeks by RAID and mCMAI. The results showed that older adults who are undergoing music activity (27 participants who completed the intervention) had significantly lower anxiety scores than patients in control group (28 participants, F = 8.98, p = .004); however, the level of agitation was unchanged in the whole patients sample.

Nair et al. [10] conducted a study where selected pieces of Baroque music were played through common areas of a multicultural dementia-specific aged care facility. The study included 75 patients with moderate (low-level care unit) or severe dementia (high-level care unit), divided into 2 groups. After a 2 weeks’ observation period, the first group was engaged in listening to music (4 weeks, 3 h a day) followed by 2 weeks of washout (no intervention), whereas the second group continued the observation period. Then, the second group crossed over to receive the 4-week intervention, while the first group crossed over to a 4-week observation period. The authors came to the opposite conclusion with respect to their expectations, since they found that listening to Baroque music negatively influenced patients’ behavior. In fact, behavioral disturbances increased during the weeks of listening to music.

A study by Chang et al. [11] investigated the effect of a listening to music programme on BPSD. A total of 41 patients with severe dementia admitted to an institution underwent listening to piano music and sounds from nature (imitating that of a heartbeat) during their lunchtime. The study had duration of 8 weeks (starting with 1 week without music and alternating 1 week of the listening to music from the 2nd to the 8th week). BPSD were evaluated by using the Chinese CMAI. The authors recorded a significant reduction in physical and verbal aggressive behaviors during the study period, registering a 1-week delay in the benefit, possibly associated to the effect of music.

Zare et al. [12] compared a 16-member experimental group of patients with dementia to a 10-member control group. The experimental group was divided into 4 sub-groups, each exposed to a different kind of listening individually preferred music, group-preferred music, classical music – e.g. Vivaldi – and a singing activity (favourite music). At the end of the study, all patients in the experimental group showed a significant reduction in agitation, in comparison to controls.

Ziv et al. [13] investigated the effect of background music in periods of non-activity (e.g. after lunch) upon the behavior of 28 AD elderly patients. The results showed a significant reduction in disruptive behaviors and an improvement in positive social behaviors during the presence of music.

Garland et al. [14] compared the efficacy of two individualized psychosocial treatments (simulated family presence and preferred music) in reducing the frequency of physically and verbally agitated behaviors in NH residents with dementia and marked BPSD. Thirty patients with dementia were enrolled and assigned to various groups: listening to preferred music, simulated presence of family members (via taped voices) reading of a Horticultural book (placebo), compared to standard care. Treatments were repeated for 3 consecutive days over 3 weeks, alternating with washout periods. Simulated presence and preferred music both proved to be effective upon physical agitation; simulated presence (but not preferred music) significantly reduced verbally agitated behaviors. Moreover, also the placebo condition produced unexpected positive effects in comparison to usual care.

Lin et al. [15] included in their study 100 Taiwanese patients (mean age = 82 ± 6.8 years, range 65–97) with moderate to severe dementia (mean MMSE = 13.3). The 49 participants randomly assigned to the experimental group received 12 half-an-hour sessions of group MT, twice a week (including music-playing, listening to selected pieces, singing, and creating music according to a predefined programme), while the 51 control subjects were assigned
to standard care. Agitated behavior was evaluated by using the Chinese version of CMAI at baseline, at 6th and 12th sessions, and at 1 month after cessation of the intervention. The results showed a reduction of agitated behaviors in the experimental group at the 6th and 12th sessions, and after 1 month, confirming that patients with dementia benefit from participating in this MT approach.

Two studies from Cooke et al. analyzed the effect of live music on quality of life (Qol), depression, agitated behaviors, and anxiety. The first investigated Qol and depression, respectively assessed by using the Dementia Quality of Life and the Geriatric Depression Scale [16]. The study included 47 patients with different kinds of early to moderate dementia (mean MMSE = 16.5 ± 6.7), who were divided into an intervention group (n = 24) and a control group (n = 23). The intervention (arm 1) consisted in a musical activity (familiar songs chosen by a musician, and pre-taped music), in which patients were invited by two musicians to take part actively (i.e. playing an instrument, singing and dancing). Alternatively, patients from the control group (arm 2) were involved in a reading activity. During the eight-weeks study period, three sessions of 40 min per week took place. After a five-week washout period, participants crossed over into the opposite arm, and the study continued for further eight weeks. This study showed that this approach did not significantly improve depression and Qol in comparison to a reading activity. However, a sub-analysis suggested that both music and reading group activities improved sense of belonging, self-esteem, and depressive symptoms.

The second study [17] used the same randomized cross-over design on 47 patients, investigating the effect of a 40-min live group music programme (3 sessions weekly for 8 weeks) on agitation and anxiety. A guided reading activity was adopted for the control group. All participants were assessed three times (baseline, washout period, and after the conclusion) by using the CMAI-Short Form and the RAID. Participation in the music programme did not significantly improve agitation or anxiety, but both music and reading activities increased the patients’ verbalization (including verbal aggression). Multiple regressions found cognitive impairment severity, length of institutionalization, and gender to be predictors for agitation.

Two studies from Raglio et al. evaluated the effects of a MT approach. The first [18] evaluated the efficacy of MT (3 cycles of 12 sessions alternated with 1-month interval without treatment) upon BPSDs (assessed by the Neuropsychiatric Inventory score) in patients with moderate–severe dementia. All participants (n = 60) received standard care (educational and occupational activities), while patients in the experimental group additionally underwent a MT approach (intersubjective, improvisational approach) three times a week. Results showed that MT was more effective than usual care in reducing BPSDs. The second study from Raglio et al. [19] investigated the role of MT in reducing BPSDs in patients with moderate to severe dementia (n = 59). The subjects were randomized into an experimental (n = 30) and a control group (n = 29). All patients received educational support or attended entertainment activities: the experimental group underwent in addition 30 MT sessions (16 weeks of treatment). The experimental group showed a significant reduction in NPI global score and in specific behaviors (delusions, agitation, anxiety, apathy, irritability, aberrant motor activity and sleep disorders).

Han et al. [20] included 43 persons with dementia (28 in an experimental and 15 in a control group). The experimental group was engaged in sessions of various activities led by an occupational therapist and sessions of music (singing, movement, instrument exploration, memory exercises accompanied by music, etc.) led by a music therapist. The control group received usual care. After 8 weeks (with once-weekly interventions), the experimental group significantly improved both behavioral and depressive disorders, while controls did not.

Cho et al. [21] proposed a rather articulated musical programme (singing and writing songs, analysing texts, making and playing instruments, etc.) to 10 persons with dementia. The intervention consisted in 15 sessions, held three times a week. The control group (n = 10) was assigned to standard care. BPSD (especially agitation) significantly improved in the experimental group but not in controls.

Guettin et al. [22] enrolled 30 mild-to-moderate AD patients to study the effect of MT on anxiety (Hamilton Scale) and depression (Geriatric Depression Scale). The experimental group of 15 individuals participated in 16 weekly sessions of individual receptive MT, while the 15 controls underwent the same number of reading sessions. The MT group showed significant improvement in anxiety and depression, starting from the fourth week and continuing up to follow-up (8 weeks after discontinuation of treatment between weeks 16 and 24).

Svansdottir and Snaedal [23] performed a case–control study upon 38 moderate or severe AD patients, assigned randomly to receive MT sessions (shared singing, instrumental accompaniment and sonorous-musical improvisation led by 2 qualified music therapists) or usual care (control group). The three-weekly 30-min sessions amounted to 18. The study demonstrated a significant reduction in agitation and anxiety in the experimental group.

Holmes et al. [24] enrolled 32 patients with dementia in a case–control study. The experimental group underwent live music with a direct involvement of patients or pre-taped music while controls received standard care. The authors found a reduction in apathy and an increase in the level of involvement during exposure to live music in most patients, whereas no significant effects were found with the pre-taped music. Four weeks later the effects had mostly disappeared.

Gerdner [25] enrolled 39 patients with Alzheimer’s or other types of dementia. A comparison was established between listening to preferred music or to classical music (12 sessions). The author found a significant reduction in agitation when the patients were listening to preferred rather than to classical music.

Ashida [26] analysed the effects of MT sessions upon depressive symptoms in 20 patients with AD. They underwent sessions in which they were stimulated to remember facts related to definite themes by listening to songs accompanied by a guitar; each session began with the playing of percussion instruments and the listening to a song. The sessions alternated with periods without treatment, and a final comparison was made between the two modalities. A significant reduction in depressive symptoms was found in the music group.

In conclusion most of the studies show that MT may improve BPSD in patients with dementia.

### 3.2. Effect on cognitive performances

Six studies assessed the effect of music on cognitive functions. In a Randomized Controlled Trial, Van de Winckel et al. [27] assessed the effect of a musical exercise programme on mood state and cognitive function in women with dementia. Fifteen patients attended exercise training (daily session of 30 min with physical exercises supported by music). The control group (10 patients) received an equivalent amount of attention through daily conversations. The exercise group showed a significant improvement in cognition, as demonstrated by the change in Mini Mental State Examination, and in verbal ‘fluency’, as demonstrated by the change in the Amsterdam Dementia Screening-6 test. The control group showed no significant improvement. There were no effects on behavior. Optale et al. [28] implemented a Virtual Reality (VR) training intervention to try to lessen cognitive decline and improve memory functions in 36 patients resident in long-term care facilities. Patients were randomized into two groups: the experimental group underwent
a 3-month VR memory training followed by 3 months auditory stimulation, while the control group underwent equivalent face-to-face training, using music approach (i.e., listening to relaxing music), while telling short stories. Neuropsychological evaluations showed a significant increase in memory test scores in the experimental group and a significant effect size in other cognitive abilities, whereas a decline in cognitive function was observed in the control group.

Bruer et al. [29] assessed the cognitive changes determined by listening to familiar songs (from the mid-fifties) as compared to watching films, in 28 patients with cognitive impairment. The sessions occurred once a week both for the experimental and control groups. Cognitive functions were assessed before the activities (music and films), straight after afternoon treatment, and the following morning: the weekly variations were then compared. A significant improvement was observed in weekly assessment of cognitive function, the morning after the music session in the experimental group. The subgroup with a diagnosis of dementia showed the most relevant improvement in comparison to controls, both in the assessment after music session and on the day after. By the week following treatment, no significant differences remained between the two groups.

Irish et al. [30] enrolled 10 persons with mild dementia of the Alzheimer type in an experimental group and 10 healthy older adults as controls. Using a repeated-measures design, each participant was seen on two occasions: once in music condition (Vivaldi’s ‘Spring’ movement from ‘The Four Seasons’) and once in silence condition, with order counterbalanced. A considerable improvement in autobiographical memory was observed in the experimental group in the music condition, in combination with a significant decrease in anxiety. No differences in autobiographical memory, either in presence or in absence of music condition, were observed in the control group.

Thompson et al. [31] investigated the effect of listening to an excerpt of Vivaldi’s Four Seasons on category fluency in 16 healthy older adult controls and 16 AD patients. In a counterbalanced repeated-measure design, participants completed two 1-min category fluency tasks whilst listening to an excerpt of Vivaldi and two 1-min category fluency tasks without music. There was a positive effect of the listening to music on category fluency, with performance in the music condition exceeding performance without music in both the healthy older adult control participants and the AD patients.

Brotons [32] carried out a study assessing to what extent music can influence language disorders in patients with dementia (n = 20), as opposed to conversational sessions. The patients underwent 8 sessions (4 of active MT and 4 of conversation or vice versa). Assessments were performed at conclusion of each type of session, i.e. every 4 weeks. Results of this study showed that MT significantly improved performance on both speech content and fluency dimensions of the spontaneous speech sub-scale of the Western Aphasia Battery. No difference was observed in overall Aphasia Quotient (AQ) for music and conversation sessions in a subgroup of 10 participants (5 per condition) for whom AD scores were available.

Thus despite the limitation inherent to the small population sizes, the few studies which assessed the effects of MT on cognitive functions in patients with dementia show the improvement of the impairment.

3.3. Effect on motor performances

Only two studies focused on this topic. Clair and O’Konski [33] compared the effects of a rhythmic acoustic stimulus combined to music with a rhythmic acoustic stimulus (a metronome) in the absence of music and with any intervention (absence of both the acoustic stimulus and music) upon gait features such as speed, cadence, and stride length, in 28 patients with advanced dementia, during a motor rehabilitation programme. Although no significant differences in gait were observed between treatments, caregiver burden appeared to benefit from the use of acoustic stimuli.

Hagen et al. [34] assigned 60 patients to different groups: absence of activity, occupational therapy and movements combined with music (of the 20’s, 30’s and 40’s). Positive effects were found upon both physical and cognitive functions in the occupational therapy group and in those undergoing exercises with music (where the group using music showed changes in a greater number of functions). Treatments had a 10-week duration, and benefits gradually decreased after programme conclusion.

3.4. Effect on physiological parameters

Raglio et al. [35] evaluated the effects of MT (active approach) upon BPSDs and individual’s physiological parameters, such as heart rate and its variability in a group of AD and vascular dementia patients. Twenty subjects were randomized to an MT approach or standard care. In patients receiving MT a reduction in depressive symptoms was observed (50% of the whole patients’ sample) combined with an increase in heart rate variability, suggesting a possible improvement of cardiovascular function.

Okada et al. [36] investigated the effect of 10 weekly 45 min–MT sessions (including nursery rhymes, Japanese folk songs, hymns and recent Japanese pop music, proposed by a music therapist according to guidelines of the Japanese Association of Music Therapy) upon a group of 55 patients with cerebro-vascular diseases and dementia. The control group (n = 32) received standard care. In the experimental group, a significant improvement in parasympathetic activities and a reduction in plasma cytokines and catecholamine levels were found, while not in the control group.

Takahashi and Matsumiha [37] performed a study upon 43 persons with moderate–severe dementia divided into two groups, one of which underwent a MT intervention (folk songs thought to stimulate memories, accompaniment with typical instruments – percussions in particular – and an exhibition/concert). The intervention occurred once weekly and had a duration of 2 years. Assessments regarding cognition, cortisol, and systolic blood pressure (SBP) levels were obtained. The SBP levels were significantly lower in participants who received MT than in others. No significant differences in cortisol level in saliva or cognitive assessment score were observed, but the MT group maintained better physical and mental state during the 2-year period than the nonmusic therapy group.

Suzuki et al. [38] proposed an approach with twice-weekly MT sessions (songs, music created with rhythmical instruments, songs chosen from those familiar to the patients in their early life) to 10 patients with dementia for 8 consecutive weeks, comparing its efficacy with a control group receiving standard care. At the end of the study, a significant improvement in the language sub-scale was observed in the MT group combined with a significant reduction in “irritability”. Furthermore, salivary levels of chromogranin A (probably related to levels of stress) significantly decreased at the end of the study. However, there were no significant differences in the pre–post assessment at a cognitive level.

Thus, there is a suggestion for potential positive cardiovascular effects of MT in patients with dementia.

4. Discussion and recommendations

From the analysis of the literature it emerges quite clear that the prevalent interventions are those finalized to the improvement of BPSD, whereas studies related to a possible efficacy on cognitive and physiological aspects are scant. Most of the studies
focusing on BPSD were based on active music or MT approaches. As a whole, these MT approaches showed an improvement of BPSD when compared to usual care or no treatment. Studies with using the listening to music showed controversial results in BPSD reduction. This review was endorsed by the Italian Psychogeriatric Association (AIP) and represents its view on the use of music and MT approaches for patients with dementia. Accordingly, we developed a list of recommendations.

Concerning the clinical practice the AIP recommends:

1. Personalized interventions with music or MT as the surest predictor of success.
2. The use of active music and music therapy approach in the management of BPSD in addition to standard care as the direct music therapist/patient interaction appears to be the most effective.
3. The preferential use of MT to make the treatment more tailored to meet the patients’ needs, and to improve BPSD and communicative skills in particular in moderate–severe dementia.
4. Also the use of individualized music listening based on preferred and/or familiar music as background music did not prove its efficacy.
5. The introduction of Evidence Based Practice [39,40] in the choice and in the conduct of the music and MT treatment.

Concerning the research activity in the field of music and MT in dementia the AIP recommends:

1. A more rigorous methodology including a more accurate definition of the population of patients and of the type of interventions.
2. The conduction of studies aimed at identifying which types of dementia have the greatest chances of improvement due to different kinds of music and MT interventions.
3. The assessment of a possible dose–effect relationship of the different interventions.
4. The evaluation of the cognitive and physiological aspects, by identifying adequate assessment tools.
5. The conduction of the comparative studies on the effects of the MT versus music.

5. Conclusion

In conclusion, our opinion is that interventions with music (MT, musical activities and individualized music-listening), in addition to standard care, can be considered a meaningful support to the management of BPSD. Also the economic aspect has been recently investigated [41] with the suggestion for a reasonable cost/benefit ratio of the interventions with music. Further studies with the goal of expanding the areas of clinical applications of music and MT are expected in the near future.

Contributors

Dr. Raglio planned the review, provided expertise and wrote this paper; Dr. Bellelli, Dr. Bellandi, Dr. Giovagnoli, Dr. Farina, Dr. Gentile, Dr. Ubezio, Dr. Zanetti and Dr. Stramba-Badiale summarized the papers included in the review and contributed to writing this article; Prof. Gianelli translated and contributed to writing the review; Dr. Mazzola and Prof. Trabucchi revised final text of the review.

Competing interest

We do not have any conflicts of interests to declare.

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