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# Music listening for people living with dementia: a systematic review

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**ABSTRACT. Introduction.** *This review aimed at exploring how music listening-based approach can be effective on physiological, cognitive and behavioural aspects, with specific reference to the domain of dementias. Music listening can be considered one of the most common approaches in dementia care, frequently in combination with other non-pharmacological treatments. This type of intervention may allow persons with dementia to work on the organization and regulation of their emotions thanks to the mediation of the sonorous-musical element.*

**Methods.** *Two independent researchers performed literature search by consulting the PUBMED database and the Cochrane Register of randomized controlled trials (articles written in English and published from January 1st 2000 to February 28th 2022 were considered as eligible).*

**Results.** *Twelve articles met the inclusion criteria and were included in this review. The selected studies highlighted some effects of music listening in people with moderate to severe dementia. Assuming a clinical point of view, the results showed how music listening intervention could bring benefits on the behavioural and psychological symptoms of dementia, also if not always statistically significant.*

**Discussion/Conclusion.** *The study focused on the need to define clear criteria of music listening programs selection and administration, but also on the involvement of trained music therapists in planning and managing the music listening-based interventions. Music listening interventions should be developed by implementing evidence-based practice and integrating research in the field. The identification of specific musical elements connected with the therapeutic outcome is a key point for the music therapy future.*

*Key words: Dementia, Behavioural Disturbances, Music Therapy, Music Listening, Evidence-Based Approaches.*

**RIASSUNTO.** *Introduzione.* L'articolo si pone l'obiettivo di esplorare come l'ascolto musicale possa rivelarsi efficace a livello fisiologico, comportamentale e cognitivo, nel contesto dell'invecchiamento patologico. L'ascolto musicale si può infatti considerare uno degli approcci più utilizzati nella cura di persone con demenza, frequentemente in combinazione con altri trattamenti di tipo non farmacologico. L'elemento sonoro-musicale può infatti contribuire a migliorare l'organizzazione e la regolazione emotivo-affettiva.

*Metodi.* Due ricercatori indipendenti hanno condotto una ricerca della letteratura scientifica presente in quest'ambito, consultando PUBMED e il registro Cochrane degli studi controllati randomizzati (sono stati considerati eleggibili gli articoli scritti in lingua inglese e pubblicati tra il 1° Gennaio 2000 e il 28 Febbraio 2022).

## Introduction

The symptoms that people with dementia have to live with concern both aspects related to behavioral disorders and to psychological ones (Behavioral and Psychological Symptoms of Dementia). The difficulties they face affect the patients themselves but also their caregivers, whose burden is often debilitating.

The adoption of non-pharmacological therapies may be helpful in the reduction of the symptoms that cannot be treated with pharmacological therapies.

The results of previous studies have shown evidence of how music therapy may contribute in the reduction of these symptoms in patients who are going through the moderate and more advanced stages (Van der Steen et al., 2018).

Music listening is one of the most common approaches to the use of music in people with dementia. The scientific literature has shown the important emotional and behavioural effects of listening to music, in particular as far as depressive symptoms, anxiety and agitation are concerned (Gaviola et al., 2020; Soufineyestani et al., 2021; Van der Steen et al., 2018) and, more broadly, a general improvement in the Quality of Life (Moreno-Morales et al., 2020). However, when music listening is employed as a therapy it is not yet completely clear which are the musical factors that may produce a therapeutic effect.

Gerdner (2000, 2005) introduced the use of individualized listening (based on preferred music) as the main intervention technique in dementia and, later, Gerdner (2012) suggested an application protocol to guide music therapists and/or caregivers in the creation of music listening programs. From a practical point of view, however, there are still no defined guidelines for therapeutic music listening in dementia. The present review aims to analyse and comment on the more recent randomized controlled studies that have so far been carried out in the field of dementia care and makes a number of recommendations for the future development of this technique.

## Methods

The literature search was conducted by two independent researchers in the PUBMED database and the

***Risultati.*** **Tra gli articoli analizzati, dodici lavori risultano coerenti con i criteri di inclusione stabiliti e, pertanto, sono stati inclusi nella revisione. Gli studi presi in considerazione hanno permesso di sottolineare alcuni effetti dell'ascolto musicale in persone con demenza di livello moderato-severo. Da un punto di vista clinico i risultati, anche se non sempre statisticamente significativi, hanno mostrato come un intervento basato sull'ascolto musicale può apportare dei benefici soprattutto sui sintomi comportamentali e psicologici della demenza.**

***Discussione/Conclusione.*** **Questo studio ha permesso focalizzare l'attenzione sia sul bisogno di definire criteri sistematici nella scelta e nella proposta di programmi di ascolto, sia sulla necessità di coinvolgere musicoterapeuti formati nella creazione, pianificazione e gestione degli interventi basati sull'ascolto musicale. Questi interventi dovrebbero, inoltre, considerare le evidenze scientifiche presenti in letteratura e costituire essi stessi integrazioni alla ricerca in questo ambito. Un punto chiave da tenere in considerazione per il futuro dell'ascolto musicale terapeutico riguarda, infine, l'identificazione di specifici parametri strutturali della musica finalizzati a ottenere uno specifico effetto terapeutico.**

**Parole chiave:** Demenza, Disturbi comportamentali, Musicoterapia, Ascolto Musicale, Approcci Evidence-Based.

Cochrane Register of randomized controlled trials (RCTs). The review included RCTs (in English and containing a clear reference to music listening treatments for people with a certain diagnosis of dementia), published between January 1st 2000 and February 28th 2021.

The following keywords were used for the search: "music listening", "recorded music", "individualized music listening", "personalized music", "receptive music", in addition to "dementia" or "Alzheimer".

## Results

The Flow Chart of the study shows the process of selection of the studies included in this review (Fig. 1). In their Randomized Controlled Trial study, D'Aniello et al. (2021) proposed an application of the above mentioned protocol designed by Gerdner (2012). The sample consisted of 60 people with moderate- to- severe dementia and their associated caregivers. The participants were randomly assigned to one of the two planned groups, either the experimental group or the control one, in order to have two groups of 30 people each. In the Control Group patients received Standard Care while for the Experimental Group a Music Listening intervention based on Gerdner's indications was provided. The intervention was scheduled for 8 weeks with two half-hours weekly meetings and the effectiveness was assessed through the completion by caregivers of the Neuropsychiatric Inventory and the Caregiver Burden Inventory. The results showed a significant reduction both in neuropsychiatric symptoms and in the caregivers' burden scores in the group that benefited from the Music Listening intervention compared to the Standard Care group.

Kwak et al. (2020) conducted a crossover RCT study, in order to evaluate the outcomes of agitation, behavioral symptoms and the use of psychotropic medications in 59 people with dementia. A Music & Memory intervention was carried out over a 14-week period and its effectiveness was evaluated. Patients were randomized into two groups and they received the same treatments of Music and No music, each lasting six weeks, separated by two weeks of washout. The musical treatment was run by staff trained in the Music & Memory program; playlists of the patients' meaningful and favorite music were created and recorded on an iPod. Patients listening time was flexible and it was monitored through the data collected by each iPod. There were no significant effects in either condition over time both in the Cohen-Mansfield Agitation Inventory total score and in the use of psychotropic medications. Otherwise, for Neuropsychiatric Inventory score a significant increase in depression emerged over time in Condition 1 (Music first) and a significant decrease in Condition 2 (Music last).

Maseda et al. (2018) performed a RCT recruiting 21 patients with diagnosis of severe dementia, randomly assigned to the individualized music listening group (listening to preferred music) or to multisensory sessions group, in a Snoezelen room. Patients underwent 24 bi-weekly sessions conducted by psychologists or occupational therapists.

Therapists selected the music taking into account the participants' preferences. The aim of the study was to explore the effects of two non-pharmacological interventions on mood, behaviour and biomedical parameters. Both groups had immediate positive effects on mood and behaviours. The multisensory group performed a better visual follow-up of the stimuli, while the music listening group was more relaxed and happier. In both groups, participants showed a decrease in Heart Rate and an increase in Oxygen Saturation values after the sessions.

Valdiglesias et al. (2017) carried out a study to verify whether an individualized music listening intervention rather than a multisensory stimulation environment in a Snoezelen room produce changes in Salivary Chromogranin A (sCgA) level in patients with dementia. Twenty-two patients with severe dementia were randomly assigned to the multisensory stimulation environment group or the individualized music listening group. The treatments were based on 32 bi-weekly sessions. The stress level was evaluated by determining sCgA concentration in saliva samples collected immediately before and after each session. There were no significant differences in the sCgA levels between groups.

Sakamoto et al. (2013) investigated the effects of different individualized music interventions for patients with severe Alzheimer's disease. Thirty-nine patients were randomly assigned to two music intervention groups (music listening or interactive activities combined with music listening) or to a no-music control group and the intervention period lasted 10 weekly sessions. Behavioral and physiological assessment was made in the study. The short-term effects showed a dominant parasympathetic nerve activity after music interventions, a significantly more comfortable mood in the music listening group and a greater improvement of emotional state in the active group com-
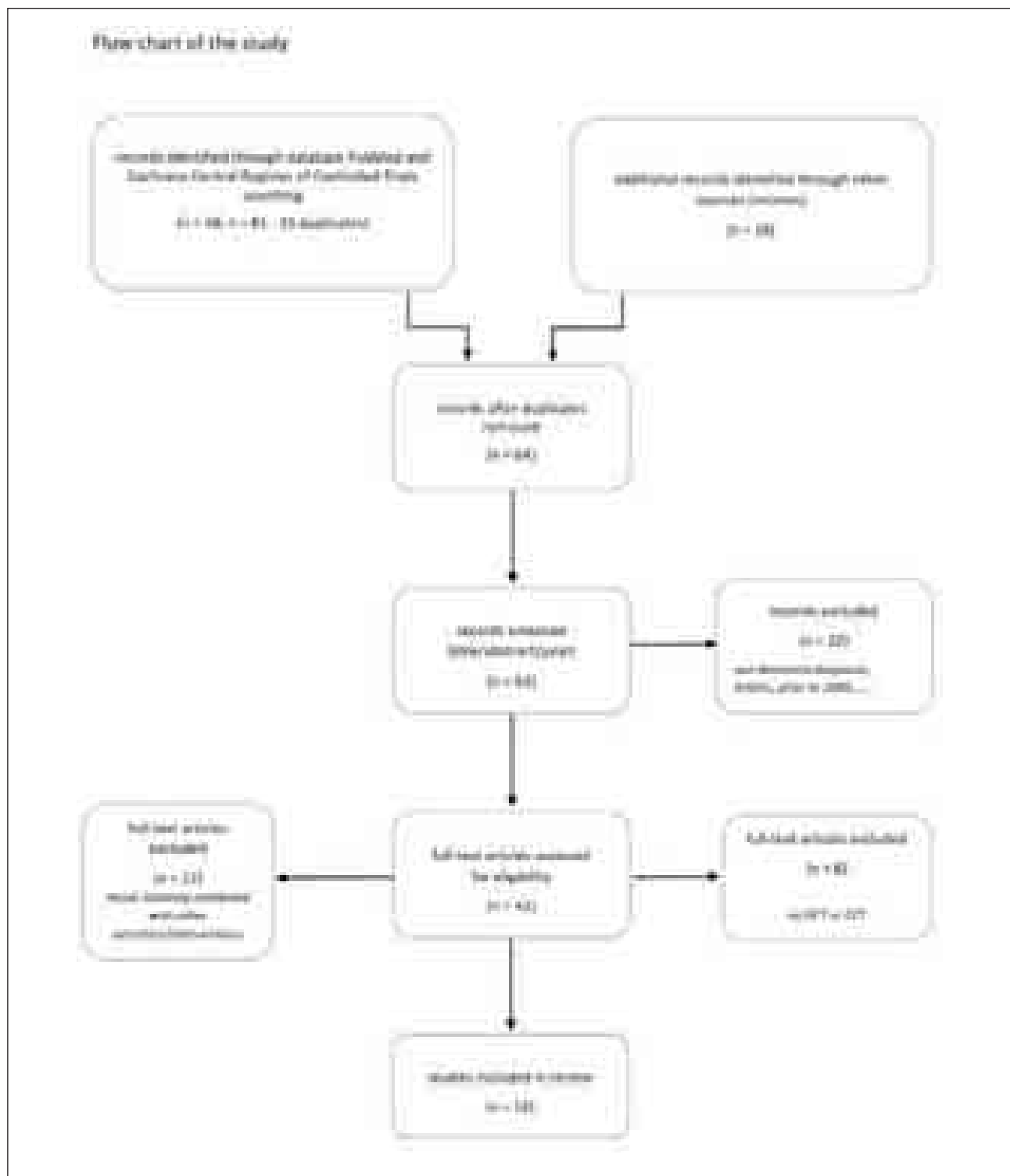
**Figure 1**

pared to the other groups. Long-term effects showed a greater improvement of behavioral disturbances in the active group compared to music listening and no music groups.

Cheung et al. (2018) enrolled 165 patients with dementia in a multicenter RCT study to examine the effects of three different activities (music-with-movement, preferred music listening and social activity) on cognitive functions and psychological symptoms. The interventions

(12 bi-weekly sessions) were carried out by two independent and trained research assistants. Psychological and cognitive outcomes were evaluated. While the improvements in the Music listening group were limited to global cognition and anxiety, Music-with movement group improved in global cognition, memory, anxiety and depression. No significant results were found in the social activity group and no significant differences between groups were observed.

Cheung et al. (2020) in a further RCT study, examined the same number of patients, allocated in similar three intervention groups (music-with-movement, preferred music listening and social activity), with the intention of verifying the level of agitation after the bi-weekly treatment, lasting 30/45 minutes, for 6 weeks. There were no significant differences between groups: in fact, all three types of intervention showed a significant reduction in agitation from baseline to post-intervention, although the music-with-movement treatment showed better results.

Sánchez et al. (2016) performed a study that involved 22 institutionalized patients with dementia. The study compared the effects of a multisensory stimulation environment and an individualized music listening approach on agitation, emotional and cognitive status and dementia severity. The patients were undergone 32 bi-weekly sessions conducted by psychologists or occupational therapists. A behavioral, cognitive and functional assessment was made in the study. There was an improvement in agitation for both groups, while in anxiety and dementia severity only the multisensory stimulation environment group improved during the treatment.

Raglio et al. (2015) evaluated the effects of active music therapy and individualized listening to music on 120 people with behavioral and psychological symptoms of dementia, assigning them randomly to one of the following three treatments: Active Music Therapy plus Standard Care, Individualized listening to music (preferred music, chosen with the help of a music therapist) plus Standard Care and Standard Care only. The treatments were held twice a week for 10 weeks and music therapists conducted the music sessions. Functional, cognitive and behavioral evaluations were performed in the study. All groups showed a reduction of behavioral disturbance and improved in quality of life. No significant differences were found between groups.

The study by Särkämö et al. (2014) investigated the effects of everyday musical activities (singing or regular music listening) conducted by caregivers in patients with mild-moderate dementia. Eighty nine patients-caregivers dyads were randomized to a singing group, music listening group (whose playlist was based on the individual musical preferences) or to a usual care control group. The study showed that the music interventions improved the cognitive performances, especially attention and executive functions. Music groups improved also in quality of life. Moreover, a change in the psychological stress and burden of the family members was observed in all groups, with effects lasting longer in the singing group compared to music listening group.

Arroyo-Anlló et al. (2013) investigated the impact of familiar music on self-consciousness in 40 patients with Alzheimer's disease. Patients were allocated in the experimental group (listening to familiar songs) and the control group (listening to not familiar songs). Family caregivers administered 36 three-weekly sessions of music listening. Cognitive and psychological evaluations were made in the study. The patients who received a familiar music intervention showed a stabilization or improvement in aspects of self consciousness. On the contrary, control group showed a deterioration of most of the self consciousness aspects after unfamiliar music stimulation, except the self consciousness aspects of body representation and affective state.

Guétin et al. (2009) enrolled 30 mild-to-moderate patients with Alzheimer's disease to study the effect of music therapy based on a specific music listening approach on anxiety and depression. The experimental group underwent 16 weekly sessions, while the control group underwent the same number of reading sessions. The music therapy group showed significant improvements in anxiety and depression compared to the control group.

Details related to studies results are summarized in Table I.

## Discussion

This review selected a limited number of RCTs dealing with the use of music listening in dementia, this being a frequently used approach in music therapy (Kern & Tague, 2017).

The studies examined display a number of weaknesses. The samples numbers are small. The authors often fail to describe the rationale of their study other than by referring to listening to familiar or preferred music by patients. Regarding music preferences, moreover, it remains unclear how a given listening program relates to a specific therapeutic objective (e.g. the reduction of a behaviour disorder or the overall activation of the person). It emerges, in fact, that the musical preferences of the patient with dementia frequently derive from interviews with family members and/or are mediated by those who propose the listening intervention, without reference to a specific therapeutic objective. It is further to be noted that application protocols are conspicuous by their absence in these studies. The notable exception is the work of Guétin et al. (2009), aimed at the reduction of anxiety and depression, which proposes a "U" model in which the musical pieces follow a sequence of gradual reduction of musical parameters until a level of maximum relaxation is reached, followed by a partial recovery of the activation level. The authors describe the intervention protocol but not its therapeutic rationale.

Another notable absence in the studies is the figure of the music therapist. There are some exceptions (Guétin et al., 2009; Raglio et al., 2015; Särkämö et al., 2014), in which the therapist has at least the role of choosing the pieces to be played. Music listening intervention in these studies is not therapist-led but involves situations in which the patient listens to the playlists independently, without a healthcare professional present. This point requires elucidations too, given that people with severe dementia rarely have sufficient autonomy to be able to listen to music without any support.

From the clinical point of view, the study findings show that listening to music brings some benefits on the physiological, cognitive and behavioral levels.

On the whole, however, the results do not constitute clear evidence or reach significance. The exceptions are

**Table 1. Main results of the study**

| Author(s)/Year | Study Population | Types of Intervention/Duration | Intervention characteristics | Assessment | Results |
|---|---|---|---|---|---|
| D'Aniello et al., 2021 | 60 people with moderate-to-severe dementia and associated caregivers | ML (n=30) SC (n=30) Bi-weekly sessions/30 minutes /8 weeks | Music listening intervention based on patients' preferences respecting Gerdner and colleagues' protocol | Psychological/neurological examination at baseline (MMSE included) BDI-II, PSWQ used prior to the intervention, NPI (mainly frequency for severity, NPI_aXb and distress, NPI_distress) and CBI for caregivers before and after the intervention | Time X Group effect found in CBI scores ($p = 0.006$) showing a significant reduction in caregivers' burden scores after the intervention for the Music Listening group. Time X Group effect found in NPI_frequencyXseverity and NPI-distress scores ($p = 0.001$), with greater effect found for the Music Listening group |
| Cheung et al., 2020 | 165 People with any type of dementia | MM group (n=58) ML group (n= 54) SA group (social chatting) (n=53) Bi-weekly sessions/30-45 minutes/6 weeks | Music listening based on patients' preferences (family relatives' interviews): mainly popular music from 1940s to 1970s | CMAI-NH at baseline, after 6 week (T1) and at follow-up (3 months after the end of treatment) | No significant differences between groups in reducing agitation. Significant reductions of CMAI-NH total ($p < .001$) and subscores ($p < .001$) within group. Significant reduction from baseline to T1 in all groups: MM ($p < .001$), ML ($p < .001$), SA ($p = .007$) |
| Kwak et al., 2020 | 59 People with dementia or Alzheimer's disease | Condition 1 (n=30) Condition 2 (n=29) 14 weeks (condition 1: M&M for 6 weeks, 2 weeks washout, no music for 6 weeks; condition 2: no music for 6 weeks, 2 weeks washout, M&M for 6 weeks) | Music listening based on individual's preferences or songs significant to person's life experience, music popular from childhood to adulthood. listening time flexible (content, frequency and dosage delivered by staff. time of usage recorded by an application in the iPod) | CDRS, Katz index DLD at baseline CMAI, NPI-NH, use of psychotropic medications at baseline, 6th week, after the 2-weeks washout, 8th and 14th weeks | No significant effects in both conditions by time in CMAI total score. Significant effects for irritability and depression. Condition 1 in phase 1 increase over time in irritability, decrease in Condition 2. In condition over time for NPI a significant increase in depression (NPI subitem) over time in Condition 1 and significant decrease in Condition 2 ($p = .04$). No significant effect on use of medication (data not shown) |
| Maseda et al., 2018 | 21 People with dementia (severe and very severe cognitive decline) | Individualized music group (n=11); MSSE group (Snoezelen room) (n=10) Bi-weekly sessions/30 minutes/12 weeks | Music listening (PC) based on patients' preferences (different types of Spanish music) | Finger pulse oximeters (HR and SpO₂), before/after sessions; IS (mood and behavior), immediately before/during and after and during sessions | No significant differences between groups. MSSE and Music groups: Improvement in mood (IS, happy/content: $p = .001/p =.013$), relating to people (IS, related well: $p = .023/p = .034$), relating to environment (IS, more attentive/focused on environment/objects: $p = .005/p = .007$); decrease in HR ($p = .013$) and increase in SpO₂ values ($p = .011$). MSSE group: improvement in stimulation level (IS, enjoying themselves/active or alert: $p = .017$, Bored, inactive or sleeping inappropriately: $p = .026$, relaxed, content or sleeping appropriately: $p = .021$). Differences between groups (IS during) in tracking observable stimuli, MSSE group: observant (IS, $p = .044$), Music group: relaxed/content (IS, $p = .003$) |

**Tabella 1.** *(segue)*

| Author(s)/Year | Study Population | Types of Intervention/Duration | Intervention characteristics | Assessment | Results |
|---|---|---|---|---|---|
| Cheung et al., 2018 | 165 People with any type of dementia | MM group (n=58) ML group (n= 54) SA group (social chatting) (n=53) Bi-weekly sessions/duration not given/6 weeks | Music listening based on patients' preferences (family relatives' interviews) | RAID, GDS, MMSE, FOME, MVFT, DST at baseline, after 6 week and at follow-up (6 weeks after the end of treatment) | No significant differences between groups MM group: improvement in global cognition (MMSE: $p < .001$), memory (FOME total storage: $p < .001$; FOME delayed memory: ($p$ .002); anxiety (RAID: $p < .001$) and depression (GDS: $p$ .002) ML group: significant changes in global cognition (MMSE: $p = .003$) and anxiety (RAID: $p < .001$) |
| Valdiglesias et al., 2017 | 22 People with dementia (severe and very severe cognitive decline) | MMSE group (n=11); Music group (n=11) Bi-weekly sessions/30 minutes/16 weeks | Music listening based on patients' preferences | sCgA concentration in saliva samples (before/after each intervention), CMAI, RAID, SMMSE and BANS-S at pre-trial, mid-trial, post-trial and 2 months after the intervention (follow-up) | No significant differences in the sCgA levels in both groups and between groups Exploration of hypothetical existence of associations of agitation, anxiety, cognitive function and dementia severity with sCgA levels. No significant correlation found in any sampling time |
| Sánchez et al., 2016 | 22 People with dementia (severe and very severe cognitive decline) | MMSE group (n=11); Individualized music group (n=11) Bi-weekly sessions/30 minutes each/16 weeks | Music listening based on patients' preferences (different types of Spanish music) | CMAI, CSDD, RAID, SMMSE, BANS-S at baseline, after 8 weeks), at the end of treatment and at follow-up (after 8 weeks from the end of treatment) | Both groups improved in agitation (CMAI: $p = .031$) mood (during follow-up, CSDD: $p = .006$), anxiety (during follow-up, RAID: $p = .021$) MSSE group: improvement in the severity of dementia between pre-, mid- and post-intervention (BANS-S: $p = .007$) No significant differences between groups |
| Raglio et al., 2015 | 120 People with moderate to severe dementia and BPSDs | MT (plus Standard care n=40); LtM (plus SC, n=40), and SC (n=40) Bi-weekly sessions/30 minutes/10 weeks = | Music listening based on patients' preferences (PWD or and formal or informal caregivers' interviews) | CDR, MMSE, NPI, BI, CBS-QoL and CSDD before, after the treatment and 2 months after the end of treatment | All groups showed a reduction in behavioral disturbances (NPI global scores: $p = \leq .001$), depression (CSDD: $p = .001$), and quality of life (CBS-QoL: $p = .01$) No significant results were found between groups Addition of MT or LtM to SC didn't show significant effects on BPSDs |
| Särkämö et al., 2014 | 89 PWD-caregiver dyads (with mild-moderate dementia) | SG (n=30); MLG (n=29); CG (usual care, n=30) 10 Weekly sessions/1.5 hour each | Music listening based on the individual musical preferences of PWDs (Finnish popular music from the 1920s to 1960s) | Standard neuropsychological tests (MMSE), CBS, GHQ, QoL-AD, ZBI (before/after the intervention and 6 months later) +final short semi-structured interview at follow up 2 | Music intervention groups: improvement of performance on tasks of general cognition (MMSE: $p = .041$), attention and executive function (MMSE: $p = .039$); significant long-term effects for orientation level (MMSE: $p = .005$); improvement in quality of life (CBS: $p = .001$) Significant long-term effect in SG compared to MLG (ZBI: $p = .029$) |

**Tabella 1.** *(segue)*

| Author(s)/Year | Study Population | Types of Intervention/Duration | Intervention characteristics | Assessment | Results |
|---|---|---|---|---|---|
| Sakamoto et al., 2013 | 39 people with severe Alzheimer's type dementia | Control group (n=13); Passive group (listening to selected music through CD player) (n=13); Interactive group (listening to music and interactive activities, like clapping, singing, and dancing) (n=13)<br><br>Weekly sessions/30 minutes/10 weeks | Music listening based on patients' preferences and related to special memories | MMSE, CDRS at baseline<br><br>Short-term effects (indices of BPSD influencing emotion and stress levels): autonomic nerve index and FACES Scale before/after session<br><br>Long-term effects: BEHAVE-AD to evaluate changes in BPSDs, 2 weeks before/after 10 music sessions/3 weeks after the end of the intervention<br><br>HR and HRV (HF), before/after session | Passive and Interactive groups: dominant parasympathetic nerve activity after intervention in (HR: $p < .01$; HRV(HF) $= p < .01$);<br>significant increase in BPSD ($p < .025$) 3 weeks after music intervention<br><br>Passive group: more comfortable mood (Faces Scale: $p < .01$); improvement in affective disturbance and anxieties and phobias (BEHAVE-AD: $p = .02$)<br><br>Interactive group: improvement in emotional state (Faces Scale: $p < .01$); improvement in affective disturbance (BEHAVE-AD: $p = .02$), anxieties and phobias (BEHAVE-AD: $p = .01$), paranoid and delusional ideation (BEHAVE-AD: $p = .01$), aggressiveness (BEHAVE-AD: $p = .01$), and activity disturbance (BEHAVE-AD: $p = .01$); reduction of caregiver burden (BEHAVE-AD global rating: $p = .01$) |
| Arroyo-Anlló et al., 2010 | 40 People with diagnosis of probable Alzheimer's disease | Experimental AD group (familiar songs, n=20); Control AD group (not familiar songs, n=20)<br><br>Three times a week/2-4 min/ 12 weeks | Music listening was chosen from online Spanish traditional music databases, self-selected for Experimental group (familiar music) and based on the researchers' proposals for Control group (not familiar music) | MMSE, FAS, SC-questionnaire, 1-2 weeks pre/post interventions | Experimental AD group: improvement in SC questionnaire sub-items: Personal identity ($p = .023$), Affective state ($p = .031$), Moral judgements ($p = .037$), Body's representation ($p = .049$)<br><br>Comparisons between groups: significant pre/ post-intervention difference in the total scores of the SC questionnaire ($p = 0.016$)<br><br>Significant differences in SC questionnaire subitems: Personal identity ($p = .019$), Anosognosia ($p = .042$), Affective state ($p = .02$), Prospective memory ($p = .04$), Moral judgements ($p = .034$)<br><br>Control AD group: Significant increase in impairment for the total SC score in control group ($p = 0.038$)<br><br>Significant worsening in cognitive functions (MMSE: $p = .038$; FAS: $p = .009$) |
| Guétin et al., 2009 | 30 People with moderate stages of AD | Intervention group (individual receptive music therapy, n=15); Control group (reading sessions), n=15)<br><br>Weekly/20 minutes/16 weeks | The music based on the patients' personal tastes after an interview/questionnaire (through headphones and wearing a mask to minimize visual interference)<br><br>The validated "U" technique was employed (from stimulating to slow and moderate rhythm) | MMSE at baseline, HRSD, GDS at 0/4/8/16/24 weeks | Significant differences between groups in anxiety and depression<br><br>Music therapy group: significant improvements in anxiety ($p < .01$) and depression ($p < .01$) from week 4 to the follow-up (week 24) ($p < .01$) |

the findings of Guétin et al. (2009), Arroyo-Anlló et al. (2013), Sakamoto et al. (2013) and D'Aniello et al. (2021). The study of Särkämö et al. (2014) evaluated the effects of several music interventions, including the approach based on musical listening and found evidence of an effect but the variety of interventions makes it difficult to attribute the effect to music listening alone.

The review highlights a number of issues. Firstly, the musical content on which listening is based needs to be defined in detail and in step with the therapeutic objectives. The criteria for compiling playlists also need to be defined and the procedures specified, i.e. the criteria for the inclusion of patients, the therapeutic objectives, the type of listening, the methods of proposal and verification of the intervention. It is difficult to imagine patients with dementia being able to suggest listening pieces to the music therapist on the basis of their musical tastes. As with musical content, it is necessary to identify which parameters of patients' preferred music correlate with the therapeutic need. The mere musical preference and the resulting pleasure in listening cannot be considered the only factor that acts therapeutically. The creation of therapeutic playlists is rather the product of several factors, subjective (preferences) and musical (parametric and structural characteristics of the pieces). (Raglio et al., 2018). Compiling playlists therefore requires a specific music therapeutic competence and the supervision of a professional in this field. Finally, the role of formal and informal caregivers is extremely important. People with dementia frequently present behavioural disorders and a lack of autonomy, making it difficult to implement listening programs at all. The caregiver's support is a key factor in the management of such programs and in the qualitative-quantitative evaluation of their effects (Gerdner & Schoenfelder, 2010).

## Recommendations

In light of our analysis, we would make the following recommendations. A music therapy professional should always be present and active in the application of therapeutic music listening.

On the basis of musical, psychological and neuroscientific knowledge, the therapist will define an appropriate listening program, which should take into account not only the musical identity of the person but also the parametric and structural characteristics of music pieces and use them as a tool for pursuing certain therapeutic objectives (Raglio et al., 2018).

It is also important to establish a clear application plan, which details when and how the person should listen to the music, giving continuity and regularity to the intervention. The use of well-defined criteria for the evaluation of outcomes is a fundamental aspect of the therapeutic intervention (Raglio & Gianelli, 2009).

Further research is needed to define the musical contents used in order to create a link between the listening program and the desired therapeutic outcome.

Furthermore, it is essential to identify the target group of patients with dementia best responding to musical stimulation based on therapeutic listening, with particular reference to the type of dementia and the level of severity. Recent machine learning techniques could be a valuable support in identifying the factors predictive of success in a proposed intervention (Raglio et al., 2020). Finally, it could be useful to carry out more studies aiming at comparing the effectiveness of active music therapy with therapeutic music listening (Raglio et al., 2012).

## Conclusion

Music listening can be a valid therapeutic support for people with dementia. This technique can be developed by taking into account the factors identified in our analysis, implementing evidence-based practice and integrating research in the field. The identification of specific musical elements related to the achievement of the therapeutic outcome is fundamental to the scientific approach to music therapy. Future studies that build on the points we have highlighted will hopefully strengthen existing clinical evidence on music listening in dementia.

## Declaration of Conflicting Interests

The Authors declares that there is no conflict of interest.

## Consent Statement

Not Applicable.

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Not Applicable.

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