The Nexus of 'Music, Mind, and Well-being': Effects of Harmony in the Bush Music Intervention for Residents with Advanced Dementia in Australian Rural Nursing Homes

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Abstract

Background

Persons with dementia often show aggression, depression, and anxiety and these symptoms and behaviours escalate overtime without treatment. Music has been found to be useful for managing these symptoms and behaviours and can significantly improve well-being. This paper reports the effect of music on residents with advanced dementia in rural nursing homes, as a key part of the Harmony in the Bush study.

Methods

We conducted a quasi-experimental research in five Australian rural nursing homes. Managers of nursing homes were contacted to select residents with advanced dementia, resulted in 74 residents who participated in person-centred music and culturally-appropriate group music sessions. Staff (104) and musicians (6) participated in 65 interviews and 20 focus groups. One-Way ANOVA and paired-samples t-test were performed to understand Music in Dementia Assessment Scale (MiDAS) scores. Qualitative data were thematically analysed.

Results

Seventy-four residents participated in an average of 9.5 [SD 4.73] person-centred music sessions and most of them were female (n = 52/70%). Analysis revealed the overall mean effect of the person-centred music at two-time points as 67% [during-70% {351.22 (SD:93.51)}; and after-63% {315.09 (SD:98.52)}]. The residents with (moderate to severe) pain, anxiety, sadness, and agitation at pre-intervention, presented an improvement in their levels of interest, response, initiation, involvement, and enjoyment at different time-points. The t-test showed that the MiDAS sub-categories' mean scores differed significantly between the time-points: interest [t = 2.75, p = 0.001]; response [t = 2.94, p = 0.005]; initiation [t = 2.41, p = 0.019]; and involvement [t = 2.78, p = 0.007]. Additionally, the residents were observed at post-intervention with a reduction of agitation (87.5%), low in mood (87.5%), and anxiousness (70.3%); and an improvement in relaxation (75.5%), attentiveness (56.5%), and smiling (56.9%). Themes from qualitative data were behavioural change, meaningful interaction, being initiative, increased participation, and contentment.

Conclusion

Findings suggest the music intervention probably reduce the residents' psychiatric symptoms and behaviours and improve well-being.

Clinical Registration

The study is registered with the Australian and New Zealand Clinical. Trials Registry (ANZCTR) on 20/2/2018 (Registration No: ACTRN12618000263291p;

Highlights

·   Non-pharmacological interventions, such as music has not been widely and systematically intervened for residents with advanced dementia in Australian rural nursing homes, therefore, this paper presents a person-centred and culturally-appropriate music intervention for them;

·   Six-weeks music intervention including person-centred playlist and culturally- appropriate group sessions were found effective for residents with advanced dementia;

·   Effects of the person-centred music sessions last for two hours that contribute in the reduction of agitation, low in mode and anxiousness, and also improve relaxation, attentiveness and activation among the residents;

·   Our study extends the evidence that the simultaneously use of person-centred and groups sessions not only positively affects the neuropsychiatric behaviours but may also have a long-term impact on their emotional and cultural care, leading to a reduced use of psychotropic medications and an enhanced sleep time and quality.

Background

In Australian nursing homes, residents with dementia represent over half of all residents and the estimated proportion of residents with advanced dementia is about 40% of the total aged care population (Brown, Hansnata & La, 2017; Gnanamanickam et al., 2018). Main features of advanced dementia generally include acute memory loss, minimal verbal communication, inability to perform daily living activities, loss of ambulatory capacity, and inappropriate behaviours (Mitchell et al., 2017; Smaling et al., 2018). Prevalence of behavioural and psychological symptoms includes aggression, agitation, mode disturbance, and wandering in residents with advanced dementia has been assessed to be 80-90% and 80% of these symptoms continue for 18 months (Gillespie, Mullan & Harrison, 2014). In the absence of an appropriate care plan and treatments that reduce stress, it is revealed that 82% of these residents showed anxiety, 77% presented physical and non-physical aggression, 53% created disturbances in activity (Gillespie, Mullan & Harrison, 2014). These behaviours cause anxiety and/or distress to the residents themselves, other residents, staff, and/or family members (Seiger Cronfalk, Ternestedt, & Norberg, 2017; Stott et al., 2017).

Pharmacological treatments have been increasingly used in managing behaviours of residents with advanced dementia and promoting their quality of life in residential care (Backhouse et al. 2016; White et al., 2017; Olley & Morales, 2018). The pharmacological interventions on behavioural and psychiatric symptoms involves side effects of using antipsychotic medication, such as dizziness and weakness, that result in falls and injuries (Loi et al., 2018; Tan et al., 2018). For example, a study in rural nursing homes of North-western Virginia indicates that use of medication at the wrong dose and/or at the wrong time results in an increased risk of falls in residents with dementia (Kerns et al. 2018). Another study in two major hospitals of Sweden and reports the use of ineffective/inappropriate drugs for persons with dementia and a discontinuation of prescribed medication because of a large number of prescribed drugs

(Pfister, Jonsson, & Gustafsson, 2017). This disease was estimated to have cost Australia over $15 billion in 2018; and is predicted to cost more than $18.7 billion by 2025 due to a large dependency on pharmacological treatments in nursing homes (AIHW, 2016; Dementia Australia National, 2019). Here, Ballard et al. (2017) suggest that non-pharmacological intervention [i.e. social interaction] contributes to a significant health and well-being benefit for persons with dementia receiving medications, and also no deterioration was found in behaviours of the persons receiving both antipsychotic medication and social interaction.

Non-pharmacological treatments with a person-centred focus have been found to be useful in managing behaviours and psychological symptoms for residents with dementia. For example, exercise and music are identified as beneficial in reducing behaviours (Ho et al., 2019; Ridder & Bøtker, 2019). The literature indicates that evidence-based music activity has potential, as a supplement to cognitive behavioural therapy and/or medication, to be an effective and safe compassionate intervention in behavioural change, meaningful interaction and contentment (Gold et al., 2019; Ho et al., 2019). Several rigorous systematic reviews and intervention studies demonstrated the statistically significant effects of music interventions on reducing depression and anxiety, and a discontinuation of psychotic medication (Ballard et al., 2017; Gaviola et al., 2020). Ueda et al. (2013) and Ho et al. (2019) report that involving the residents with dementia in music activities, e.g. listening to music, playing instruments, movement, interaction and singing together, decreased their agitation and depressive symptoms. However, such non-pharmacological interventions (i.e. music) have not been widely and systematically implemented for residents with advanced dementia, especially in Australian rural nursing homes.

The 'Harmony in the Bush' is a dementia study designed to develop a low-stressed organisational culture in rural nursing homes. The study involved implementing eight-weeks intervention of person-centred care plan [week one-four], person-centred music [week three-eight], and culturally-appropriate group music sessions [week five-eight], following the Progressively Lowered Stress Threshold principles (Hall, 1994). It is assumed that by Hall (1994) that behavioural and psychological symptoms are experienced by residents with advanced dementia because of an increased stress triggered by both internal (such as pain) and/or environmental factors (e.g. high noise level). As such, seven principles underpinned this two-component intervention: individualised routines to compensate for conative losses; small group activities to eliminate overwhelming stimuli; allow residents to set their own sleep/wake cycle to prevent fatigue; plan activities based on cognitive and functional abilities; and eliminate misleading stimuli that trigger illusions (Hall, 1994). While the effects of person-centred care plan on the reduction of residents' with advanced dementia behaviours and psychological symptoms have been documented in one article (Authors, 2020), this paper aims to report the effective processes and outcomes of person-centred music and culturally-appropriate group music sessions for the residents.

Aims

- To assess the effects of person-centred music on the residents' (with advanced dementia) interest, response, initiation, involvement, enjoyment, and general reactions; and
- To explore how clinicians, aged care workers and musicians perceive the processes and effects of person-centred and culturally-appropriate group music sessions on the residents.

Methods

Ethics

The study received ethics approval from a National [Name:...] Human Research Ethics Committee, Australia [Project Number: ...].

Research design

A quasi-experimental design was employed, involving a short demographic survey; validated clinical assessment scales and Music in Dementia Assessment Scale (MiDAS) to explore the effectiveness of the music intervention assessed by staff, research assistant, and musicians, and interviews/focus groups.

Sites and participants

Managers of five rural nursing homes [i.e. three in Queensland and two in South Australia] were requested to approach residents with advanced dementia, their family members, and staff [facility manager, clinical nurse, diversional therapist and aged care workers] to participate in this study. The residents with advanced dementia were recruited through consultation with each facility's clinical nurse and assessment by an independent clinical consultant. Consent were collected from the legal family guardians of residents with advanced dementia prior to the intervention. The staff were recruited if they: (i) had experience in caring residents with advanced dementia; and (ii) agreed to participate in the intervention by providing consent, and to participate in an interview/focus group. Three inclusion criteria used to recruit musicians were: (i) local and experienced musicians in dementia care; (ii) agreed to implement a planned program that tailored on individual music preferences; and (iii) agreed to provide consent and participate in interviews. A Participant Information Sheet was provided to potential participants, together with a consent form, mentioning that they could choose to withdraw at any time of the project, that would not cause any adverse effects on their employment. They were also informed that no identification of participants would be disclosed in reporting.

Music intervention flowchart

The intervention included two phases: person-centred music and culturally-appropriate group music sessions [Figure 1]. After recruiting all participants' groups, a list of songs/compositions was developed according to the preference of each resident with advanced dementia, consulting with their family members, staff, and local musicians. An individual playlist was bought through iTunes and downloaded to MP3 players. Each MP3 Player was labelled with the resident's name. Some residents preferred headphones, others used a separate speaker or audio recorder cassette/CD player. The tolerance of

headphones/speakers was tested for the residents prior to conduct a 20–30 minutes person-centred music session [two sessions/a day in morning and afternoon/eight weeks]. In group sessions, the musicians were careful about the culturally-appropriate songs for each site and residents with advanced dementia participants. They also focused on setting the volume of music at suitable level and closely monitored the level of confusion, agitation, and enjoyment among the residents. A group music activity was conducted for 45–50 minutes [two hours/a week in a duration of four weeks], that involved live music and playing instruments by the residents. The musicians were carefully selected, interviewed by the researchers to ascertain how their knowledge and skills would be suitable for each aged care facility and suitable for the setting. For example, one facility had an expensive piano accordion and Aboriginal musicians were employed in the Aboriginal aged care facility. Other nursing homes engaged a harpist, a keyboard player, drummer/percussionist and guitarists. Several musicians had formal qualifications. All were high quality, professional musicians with an extensive repertoire and an interest in the way music could improve wellbeing in nursing homes.

Outcome measures

Standardized Mini Mental State Examination (SMMSE): This scale was used to assess orientation, memory, attention, calculation, language, and visual construction in residents (Molloy, Alemayehu & Roberts, 1991). The scale was administered at the commencement of the project.

Pain Assessment in Advanced Dementia (PAINAD): This was a five-item observational tool (i.e. breathing, vocalization, facial expression, body language, and consolability) with a range of 0 to 10, that was administered to measure pain of the residents at pre-intervention phase (Warden, Hurley, & Volicer, 2003).

Cornell Scale for Depression in Dementia: It was a screening tool for measuring the signs and symptoms of depression among the residents with advanced dementia, such as physical well-being, sleep, appetite, and other vegetative symptoms (Alexopoulos et al., 1988).

Barthel Index of Activities of Daily Living: A 10-item measurement tool was used to assess the capacity of participants in performing activities (Mahoney & Barthel,1965).

Person-centred preferred music – Assessment of Preferred Music scale (family version)

Music in Dementia Assessment (MiDAS): This scale, developed by McDermoot, Orrell and Ridden (2015), was used to assess the effectiveness of person-centred music in the residents' behavioural change and wellbeing. This scale assessed the residents' interest, response, initiation, involvement, enjoyment, and general reactions [0-100 score point]. The higher the score means an effectiveness of music in quality of life improvement for residents with advanced dementia.

Interviews/Focus groups: Qualitative data were collected through interviews and focus groups; of which schedule included the questions and prompts about the effectiveness of music in advanced dementia

care [e.g. health and well-being, behavioural change, meaningful interactions, participation, and memory connection].

Data collection

Seventy-four residents with advanced dementia, one hundred and four staff, and six musicians participated in the intervention and data collection processes [Table 1]. Quantitative data on the effectiveness of person-centred preferred music were collected using MiDAS. Employing the MiDAS, the staff/research assistant rated the changes in the residents' interest, response, initiation, involvement, and enjoyment levels, during the first 10 minutes of music and at two-hour time-point after the music. Major reactions of the residents during the two-time-points were also recorded in MiDAS form. The staff and musicians took part in interviews/focus groups at three phases: during the intervention, one-month follow-up and three-months follow-up, resulted in 65 audio-recorded interviews and 20 focus groups. Audio recordings of the interviews/focus groups were transcribed verbatim by Digital & Audio Transcription Ltd.

Table 1
Study participants' recruitment and data collection process

Study participants	Inclusion criteria	Recruitment method	Data collection method	Number of participants (*n*)
Residents	Residents with advanced dementia	Clinical nurse suggested the suitable participants based on their knowledge and experience with the residents and also a clinical assessment by a nurse consultant	Residents who attended in person-centred music sessions were assessed by staff/research assistant using MiDAS	*n* = 74
Care staff	Staff who are involved in day-to-day care of the residents with advanced dementia	Liaison with each facility manager who distributed invitation letters to all nurses, diversional therapist, and care workers to participate in this project	Focus groups (20) Audio-recorded interviews (59)	*n* = 104
Musicians	Local well-known and experienced musicians. Able to provide a planned program that tailored on individual preferences Capacity in collaboration with staff, family, researchers, local communities and the facility/legal guardians to develop the music preferences. To offer a minimum of 45–50 minutes sessions [twice/week for a duration of 4 weeks; group music]	Professional network of investigators and facility managers	Six individual interviews	*n* = 6

Data analysis

IBM Statistical Package for Social Sciences Statistics software (Version 25) was used to perform descriptive analysis and a paired-samples t-test. Mean scores of age, duration in nursing homes, participated sessions, SMMSE, PAINAD, Cornell Scale for Depression in Dementia and Barthel Index were computed. A paired-samples t-test was conducted to compare mean MiDAS scores between two-time-points of the person-centred music intervention. Frequencies of major reactions of the residents [i.e.

agitation, aggression, mode, anxiousness, attentiveness and cheerfulness] were also calculated. Statistical tests were considered significant at p < 0.05 at the 95% confidence level.

In qualitative data analysis, two researchers independently followed the thematic analysis technique of Braun and Clarke (2006, 2014) and used the software NVivo 12. Six steps of thematic analysis included: (i) listening the audios and read the transcripts to be familiarised with the data; (ii) started open coding through automatic code search tools of Nvivo (auto code wizard, query wizard, word frequency and text search); (iii) a 'topic coding' was conducted to generate derivative categories (i.e. nodes) from each transcript; (iv) reviewed the codes and nodes and the ongoing search of sub-themes and themes; (v) the candidate sub-themes and themes were discussed and reviewed in the 'Harmony in the Bush' project's weekly researchers' meetings; and (vi) defined, named and contextualised the sub-themes and themes to represent the effectiveness of music activities in residential dementia care.

Results

Baseline demographics

Most of the participants were female (n = 52/70%) and the mean age of all participants was 83.07 (± 7.75) (Table 2). While maximum participants had no formal schooling experience (n = 23/31%), a good proportion of them completed secondary education or further (n = 19/26%). The average living duration of the participants in the nursing homes was 2.66 years, and the mean of attended person-centred preferred music sessions was 9.5 [SD 4.73].

At pre-intervention, the participants showed a mean SMMSE score of 9.21 (6.7) and 51% had SMMSE score less than 10. The PAINAD scale indicated that 23% had mild pain and 10% with moderate to severe pain. On the assessment of Cornell Scale for Depression in Dementia, about 69% participants indicated anxiety, 41% reported mild-severe sadness, 42% had mild-severe irritability and 46% demonstrated mild-severe agitation. Barthel Index score of 58.4 (24.0) for Activities of Daily Living was measured in the residents.

Table 2
Demographic characteristics of residents with advanced dementia

Characteristics	Residents with advanced dementia (n = 74)
Gender (%)	
Female	52 (70)
Male	22 (30)
Mean age (SD*)	83.07 (7.748)
Highest Level of qualifications (%)	
No formal education	23 (31)
Primary schooling	15 (20)
Secondary schooling	19 (26)
University Graduate	6 (8)
Average duration in aged care centres (years)	2.66
Mean person-centred music sessions participated (SD*)	9.50 (4.73)
Mean SMMSE score (SD*)	9.21 (6.7)
PAINAD (%)	23
Mild Pain	10
Moderate to Severe	69
Depression (%)	41
Anxiety	46
Mild-Severe sadness	42
Mild-Sever agitation	58.4 (24.0)
Mild-Severe irritability	
Mean Barthel Index score (SD*)	
*Standard deviation	

Effects of person-centred preferred music

Our analysis revealed the overall mean effect of the person-centred preferred music on MiDAS score as 67%, and the effect at two time points were: during [70% (Mean of total score: 351.22; SD 93.51)] and after [63% (Mean of total score: 315.09; SD 98.52)] (Table 3). The female residents with dementia scored higher MiDAS mean than the male residents in both during [358.07:332.38] and post music intervention

[315.78:313.34] without any significant difference. The residents who were experiencing (moderate to severe) pain, anxiety, sadness, and agitation at pre-intervention presented an improvement in the levels of interest [during – 72.24; post – 63.24], response [during – 71.48; post – 63.65], initiation [during – 64.40; post – 57.75], involvement [during – 69.65; post – 61.77], and enjoyment [during – 73.46; post – 66.67] at different time-points. However, after a paired-samples t-test between during and post intervention, the person-centred music was observed to result in statistically significant decrease in the level of interest, response, initiation, and involvement [Figure 2]. There was no significant difference in enjoyment between the time-points.

Table 3
Effect of person-centred music intervention on behavioural symptoms and well-being

	During	Post-intervention	Paired t-test
Interest	72.24 (17.13)	63.24 (20.30)	2.75 (59); 0.001*
Response	71.48 (18.76)	63.65 (19.64)	2.94 (59); 0.005*
Initiation	64.40 (21.17)	57.75 (21.49)	2.41 (59); 0.019*
Involvement	69.65 (19.51)	61.77 (20.56)	2.78 (59); 0.007*
Enjoyment	73.46 (19.44)	66.67 (19.82)	1.69 (59); 0.97
Total MiDAS	351.22 (93.51)	315.09 (98.52)	2.75 (59); 0.008*

In addition, analysis of the major reactions [MiDAS] of the residents with advanced dementia indicated that there was a positive effect of person-centred music, that continued up to two hours, relating to the reduction of agitation and aggression [87.5% residents were observed with no agitation and aggression, while eight residents showed 11 cases/total 608 sessions]; low in mood [87.5% didn't withdraw or exhibit low mood, with eight residents presented 13 cases//608 sessions]; and anxiousness [70.3% didn't show any anxious, with 19 residents reported 33 cases//608 sessions] [Figure 3]. Also, the residents with advanced dementia presented an improvement in relaxation [75.5%]; attentiveness [56.5%]; and cheerfulness or smiling [56.9%].

Major themes of music effects

The themes that emerged from the qualitative data analysis were: behavioural change; meaningful interaction; initiative and activity; increased participation; and life with contentment. These themes and relevant of the staff and musicians are presented in the following sections.

Behavioural change

The participants identified personal and culturally-appropriate group music as a preventive care strategy for challenging behaviours of residents with advanced dementia. All staff related the person-centred

music with changes in the level of aggression, agitation, anxiety, wandering, facial expression, relaxation and sleep, and calmness. A combination of these indicators contributed to the reduction of prescribed medication use, especially PRN psychotropic medication. While few staff questioned the benefits of group music for the residents with advanced dementia, the majority of facility managers and nurses found the music as one of the few ways to keep the residents calm and less agitated.

And one of the residents, um, since she started to listen to her music, and it's been over a month that there have no challenging behaviours. So, I can say it probably – she'll be the one with the PRN medication that they didn't have to use it as much as they used before, but to confirm that I'll still have to go and check, check the charts, but during that period of time not many behaviours or, um, not many aggression episodes from her. [Nina (Manager), Aged care facility 1]

Yeah, somehow you hear if someone's agitated, I know I put the headphone on a particular lady, you know, who can be wandering and agitated, and she'll suddenly stop and start smiling and dancing, and, so, that's beautiful to see. [Tanya (Clinical nurse), Aged care facility 5]

… it helps reduce agitation and anxiety um, so I have got people in my groups – like this morning I was doing a group, and a woman – she is very agitated, always moving, always talking, and when she is in therapy she will actually sit there and go to sleep, close her eyes and relax. [Barbara (Music therapist), Aged care facility 3]

The staff focused on the importance of reducing behaviours among the residents with advanced dementia that impacted on their job stress, as such, both person-centred and group music were found effective in reducing behaviours, leading to a lowered stress in working place.

Meaningful interaction

According to the participants, the music intervention showed a positive change in the meaningful engagement of the residents with advanced dementia with staff and musicians. It was identified in several interviews that the residents often responded to the songs/compositions verbally or emotionally expressed, and interacted with the staff and musicians at during and after the intervention. Level of response and interaction of the residents with others varied, based on the tempo, dynamic, and style of the music.

There was one in particular that presented as fairly aggressive, um, in the first couple of sessions, like he kicked a drum over and wasn't willing to sort of engage or anything like that, but um, by the end, you know, by our last session, he was sort of laughing and engaging with the group and with myself and with other music therapist … [Trudi (Care staff) Aged care facility 4]

One of the beautiful things that came out of, um, the sessions at …, on the very last day – there was a lady who had been playing the drum every session, and she said to me that was because she could do it, that's why she liked it. On the last day she actually told us a story about when her baby died. So, whatever was going on in the session actually prompted this memory of when her baby died, and how the

community supported her through that time. So, it was a beautiful story that she actually shared with the group about that. [Pauline (Music therapist) Aged care facility 3]

… some of the staff, um, took it on really well and were really involved and that sort of stuff, um, which I think was – was good, because it was about, you know, providing the um, staff with, you know, resources for building their relationships with the, um, residents as well. [Anita (Music therapist) Aged care facility 1]

The residents' participation in discussion, vocalising, touching, head turning, and increased eye-contact were considered as emotional interactions. Person-centred music was also described by the participants as a resource of building relationships with these residents.

Initiative and activity

Personal connection to the list of music played and music activities in group sessions encouraged the residents to be interactive. This interaction of the residents was related by the participants to their memory connection and activeness. According to the participants, the residents often connected the songs with reminiscence. In addition, most of the residents, in person-centred and group music sessions, requested their preferred songs they wanted to listen or sing along to. The residents were curious and confident in playing music instruments and making comments after the songs finished.

Well I suppose, you know, one lady in particular that she doesn't really, um, meet with the other ones, she doesn't really talk much, she'll mumble to herself or to her little doll that she has, but when, when we're close enough to her, like, sitting right beside her and singing loud enough, that she gets at what you're singing, she remembers those and it's like you can almost see the memories; it's like she's going back to a place maybe with her husband and they used to sing those songs together and she has the biggest smile on her face, and there's another one that goes, "I remember that song," you know, and they just smile, it's just, it, it makes them happy. … You find a lot of them try to join in, even if they can't say the words, they're humming it… [Lillian (Care staff), Aged care facility 5]

I'll put their music on. They start tapping their feet. They start tapping their fingers, start humming along. And those stresses that normally are there, melt away. "Would you like some music? "Yes." I turn on into his classical music and he closes his eyes and gives kisses to the radio. And he absolutely loves it. [Zoyana (Music therapist), Aged care facility 2]

While reminiscing of family, place, love, and loss was closely tied up with song lyrics, according to the participants, the music contributed to the residents' stimuli and engagement, despite the progression of dementia.

Increased participation

The participants viewed group music activities as a means of participation for the residents with advanced dementia. Participation of the residents in live music performances was at three different levels: (a) engagement with the situation; (b) talking to each other; and (c) signing songs together.

Well, the particular person I'm talking about is when the music and that is played you can see she lights up and her mood level is quite high, and she's engaged with what's going on. [Rabeya (Care staff), Aged care facility 1]

Yes, yes, they are more proactive and, you know, talking to each other and singing the songs together, yeah, the group sessions are really healthy for them. [Tanya (Clinical nurse), Aged care facility 5]

All participants emphasised on the importance of social aspects of group music sessions.

Life with contentment

The most effective aspect of the interventions, as identified by the participants, was the change in the residents' facial expression and level of happiness. The staff highlighted the natural enjoyment of the residents, because of the person-centred and shared music sessions. For example, smiles and content facial expressions were repeatedly reported for the aggressive or low in mood residents.

… when they all start to sing, someone starts it off, and you can just see the smile and then their happiness and the words that they remember of all of the old songs; it all just naturally comes out. And then the, um, the headphones, the individual iPods that the residents have got, um, there's a couple of residents that love those. One lady she goes down in the afternoons and, um, listens to her music lying on the bed and she doesn't normally go to sleep, but she just loves listening to the music. And then another lady who has her individual music, and at night, every night we put it on at 7 o'clock and she just, you know, she lies there with a very content facial expression. [Pamela (Clinical nurse), Aged care facility 2]

Apart from the benefits of music, some participants expressed their concerns about the increased noise level during the group sessions, and found the person-centred music more effective in this regard.

That [person-centred music intervention] was really good, but we also noticed that before, we used to play music all the time, we had music playing in the middle – we just used to play music all the time and that kind of settled the residents but I think that was a bit more noisy for the ones that wanted to rest. Even though they I think a bit of noise pollution there, so sitting them down with their headphones as good. [Eve (Manager) Aged care facility 5].

In summary, the effects of person-centred and culturally-appropriate group music were highlighted in five aspects of the residents' psychosocial health and well-being: behaviour, interaction, initiation, participation, and happiness. Behavioural changes were related to the reduced aggression/agitation, leading to an improvement of sleep and decrease in psychotropic medication use. The residents also demonstrated meaningful emotional interaction and taking more initiative. Participation and enjoyment in music sessions was reflected in their facial expression and smiles.

Discussion

We identified music as a paired tool of person-centred care plan, in Harmony in the Bush study, for residents with advanced dementia who showed moderate to severe pain, aggression, agitation, anxiety, and depression. Previously, music has been investigated for residents with dementia in non-pharmacological clinical trials (Murphy et al., 2018; Tang et al., 2018; Cohen et al., 2020; Hamiduzzaman et al. 2020). Our findings fill a gap in advanced dementia treatment with an integration of cultural and emotional care [i.e. music] into the residents' person-centred care plans. We investigated the effectiveness of person-centred and culturally-appropriate group music in residents with advanced dementia of rural nursing homes. Our findings suggested that when compared to a general care plan, an integration of music into the person-centred care plans presented a reduction of aggression, agitation, improved mood, and anxiousness; and an improvement in interest, response, initiation, involvement, relaxation, attentiveness, and smiles. These changes combined led to a decrease in psychotropic medication use and better sleep. It seems the music intervention has positive implications for facility managers, clinicians, diversional therapists, and care workers in designing and implementing the music activities.

In this study, person-centred preferred music interventions, i.e. playlist, MP3 players, speakers/headphones, was based on the principles of Progressively Lowered Stress Threshold model (Söylemez, Küçükgüçlü & Buckwalter, 2016). Group music activities, i.e. welcoming/goodbye songs, music choice of residents with advanced dementia, singing along, and playing instruments, were constructed by experienced local musicians through a consultation with the residents, family, and the community. The literature indicates that playing preferred music for a person with dementia reduces their behaviours and enhances swallowing. However, previous studies were based on two-weeks interventions (Gomez et al., 2016; Ray & Mittelman, 2017; Cohen et al., 2020). The music interventions in this study were implemented, in conjunction with person-centred care plan, for an extended period of time [person-centred preferred music – six weeks, followed by culturally-appropriate group music (four weeks)], rather than the suggested periods by previous studies (Ray & Mittelman, 2017; Cohen et al., 2020). Interviews and focus groups with the participants at post-intervention, one-month follow-up, and three-months follow-up strengthened the findings of previous studies that person-centred playlist and group music activities were effective in improving psychosocial health and well-being of residents with advanced dementia (McDermott, Orrell & Ridder, 2014; Cohen et al., 2020). This study also provided evidence of using the music in conjunction with person-centred care plan that created a harmonised environment in the rural nursing homes (Hamiduzzaman et al., 2020). The nursing homes that sustained the music activities after the intervention identified an alliance of 'music, mind, and well-being' for the residents.

Our findings presented a nexus of 'music, mind, and well-being' regardless of the age and gender of the residents with advanced dementia. Similar to the current literature, this study's findings reported that the residents had an opportunity for memory connection, leading to a self-expression, because of the music intervention (Ray & Götell, 2018; Cohen et al., 2020). The 's memory connectedness was related to the tempo, dynamic, and style of the music; and their expressions [i.e. mumbling, touching, head turning, eye-contact, movement, and smiles] were the outcomes of memory connection (Grady & Beach, 2020). Person-centred playlist and playing musical instruments not only enabled the reminiscence of family, place, love, and loss, but also became a means of encouragement for the residents to show participate in

physically and cognitively stimulating activities. We found an improvement in well-being for the residents with severe pain, which lasts for at least two hours after the intervention (Andrew, Smith & Meeks, 2017; Melhuish, Beuzeboc & Guzmán, 2017; Cohen et al., 2020). While the mean effect of music in our study was comparable to the previous study findings (Melhuish, Beuzeboc & Guzmán, 2017; Cohen et al., 2020), the person-centred playlist based on each resident's preferences and cultural background and the residents' engagement by the musicians to the familiar songs and activities contributed to their connection to memory, well-being, and behavioural changes.

Previous studies identified that the number of incidents relating to aggression, agitation, and depression varied according to the types and severity of dementia (Chu et al., 2014; Gaviola et al., 2020). Gerdner (2012) notes the inappropriate behaviours of residents with advanced dementia occurs often and without any explanation. Our findings corroborate the findings of the studies of Chu et al. (2014) and Cohen et al. (2020) that the residents with dementia who participated in person-centred and group music demonstrated a greater improvement in behaviours. In addition, our study advocated that the residents who attended more music sessions were more likely to show an increase in calmness and less aggression/agitation compared to others. Interviews with the clinicians and care workers confirm that the behaviours of the residents, such as resistance to care, screaming, hitting, and wandering, were less immediately after the person-centred music intervention and continued up to two hours. While other studies found the music as effective in reducing aggression and agitation (Chu et al., 2014; Gaviola et al., 2020), our study extends the evidence that the music intervention not only positively affects the neuropsychiatric behaviours but may also have a long-term impact on their emotional and cultural care.

There are some limitations in this study. First, while no control group was employed in the research design, data were recorded in the absence of pre-intervention. However, the data collected at during and post-intervention provided an insight into the effects of person-centred music on the residents' mind, well-being and behaviours. Second, the participation of family members of the residents could have provided an opportunity to compare study's findings. But the views of facility managers, clinicians, care workers, diversional therapists, and musicians captured the residents' behavioural changes and well-being status rigorously. Third, while it is possible that simultaneous MiDAS scoring by care workers and research assistant may influence the assessment of the intervention, it is unlikely because they were trained about how to measure the changes. Finally, we generated an adequate sample size (n =74) of the residents with advanced dementia from five rural nursing homes, but future research may make an effort to increase sample sizes to test inter-reliability of the effects of music as part of person-centred care plan for residents with advanced dementia.

Conclusion

The Harmony in the Bush music intervention informs the way aged care providers can effectively manage behavioural symptoms and improve psychosocial well-being of residents with advanced dementia. Our study provides an in-depth insight on how the residents' behavioural changes and symptoms can be managed from diverse and meaningful perspectives, using music in conjunction with person-centred care

plan. We were able to generate a nexus of 'music, mind, and well-being' for the residents with advanced dementia through a cause-effect analysis of the mechanisms through which person-centred music achieved success in reducing neuropsychiatric symptoms and improving health-related quality of life. Our findings should encourage facility mangers and clinicians to integrate music into the person-centred care plans as a tool that benefits staff and residents and improves the organisational culture. It is also possible to utilise music as a complementary intervention to pharmacological treatment of behaviours where and when necessary to review and discontinue psychotropic medications use. Future studies should be designed to deepen our understanding about the mechanisms of music interventions and how to sustain the residents' well-being in nursing homes.

Declarations

Authors' contribution

Mohammad Hamiduzzaman: Conceptualization; data curation; formal analysis; investigation; methodology; project administration; software; validation; visualization; writing original draft; and review & editing.

Abraham Kuot: Conceptualization; data curation; formal analysis; funding acquisition; methodology; project administration; resources; software; validation; writing - review & editing.

Jennene Greenhill: Conceptualization; funding acquisition; investigation; methodology; supervision; validation; writing - review & editing.

Edward Strivens: Methodology, validation; writing - review & editing.

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Dr Mohammad Hamiduzzaman is Research Fellow in College of Medicine & Public Health at Flinders University. He is currently engaged in two major projects, funded by Australian Department of Health, Harmony in the Bush: Personalised Model of Dementia Care [Chief Investigator/AUD 1.5 Million] and Virtual-Dementia-Friendly-Rural-Communities [Project Coordinator – South Australia/AUD1.7 million]. He is Principal Investigator in Clinical Interactions (University-Internal-College-Grant/AUD15K); and COVID-19 Risk Management Projects [University-Internal-College-Grant/AUD 20K). He has a record of Publications: Accepted [5]; Submitted [14]; & Published [25].

Dr Abraham Kuot is Research Fellow in the College of Medicine & Public Health, Flinders University. He is a molecular biologist, geneticist and a public health researcher with 12 years of experience and career progression; resulting in proven skills in quantitative and qualitative research methodologies. He is Chief Investigator and Project Manager of Harmony in the Bush Study and has extensive research record in residential dementia care and non-pharmacological interventions.

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Dr Daya Ram Parajuli is a clinical researcher with 11 years of experience in pharmaceutical research and currently works as a Research Assistant in Harmony in the Bush project. His research skills include, quantitative research design, systematic review and meta-analysis, project management, statistical

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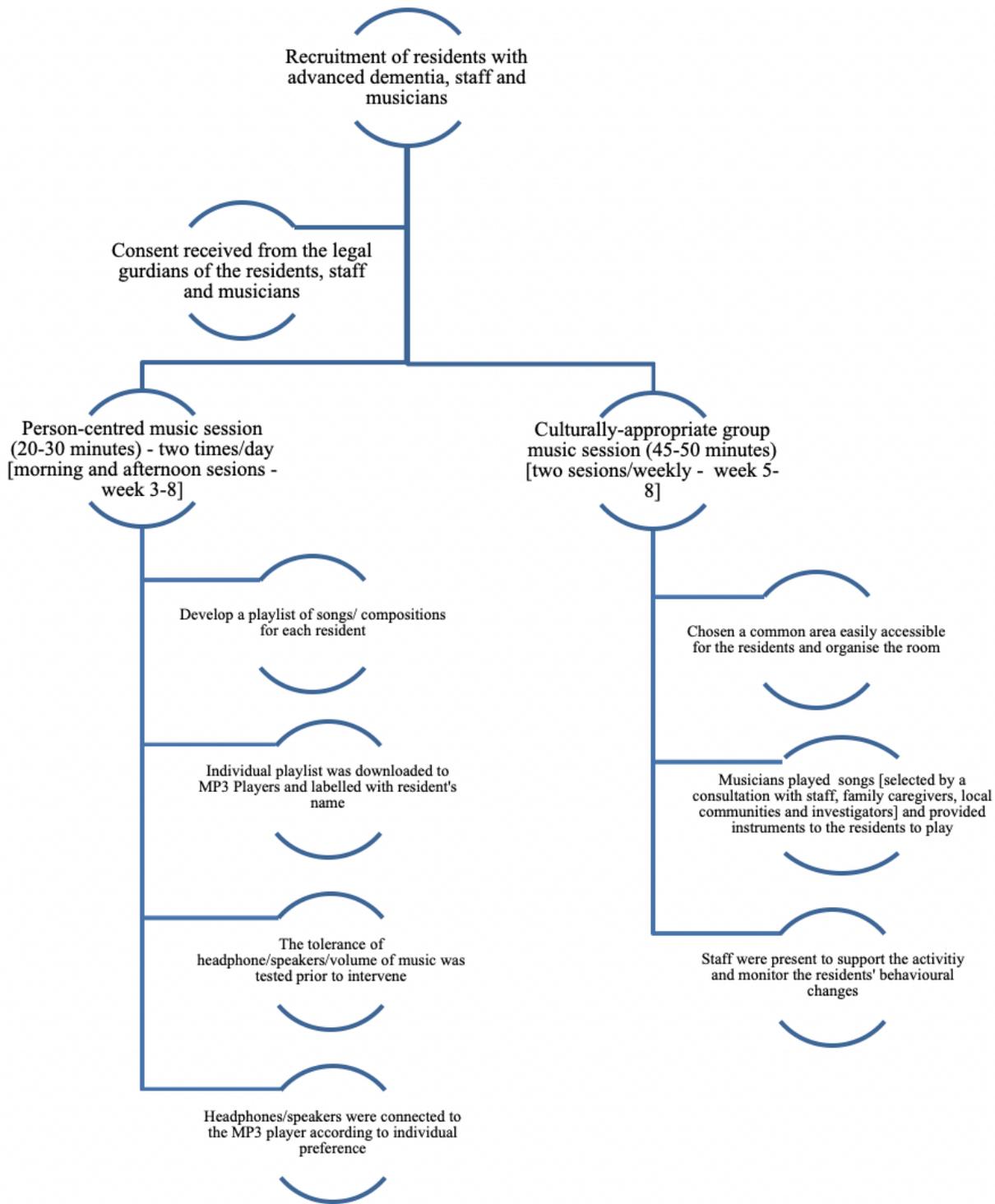
Figures

Figure 1
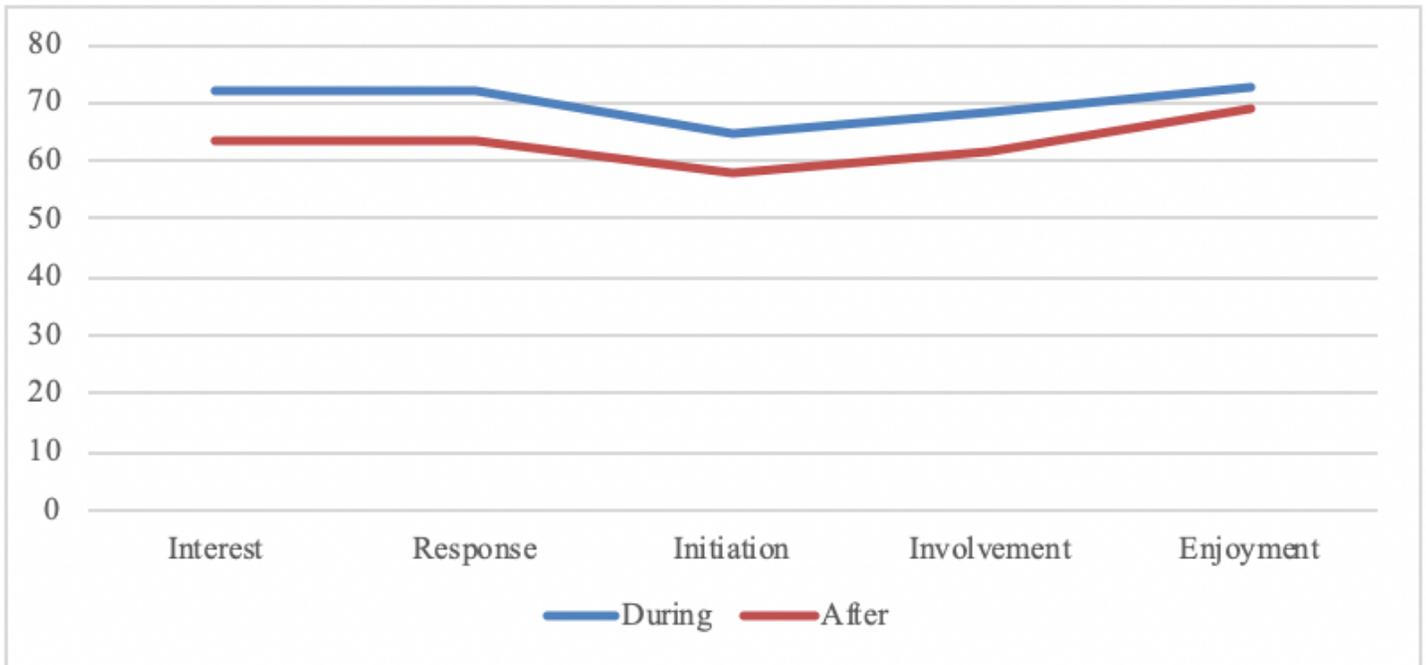
Outline of the music intervention process

Figure 2

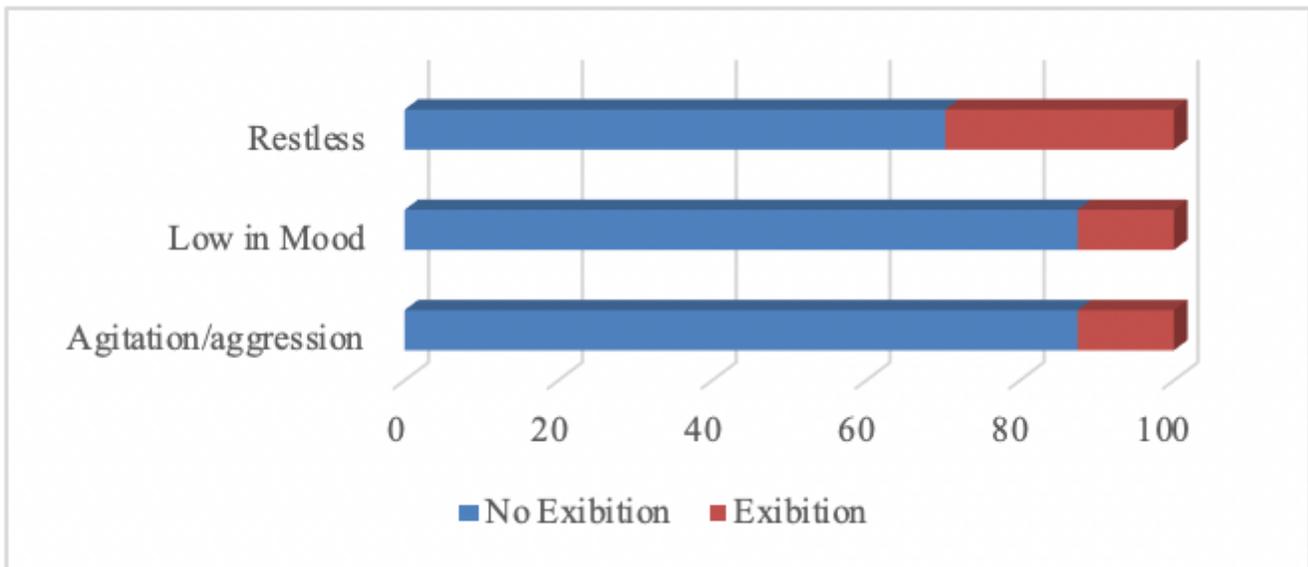Mean MiDAS sub-scores for the effect of person-centred music intervention

Figure 3

The effect of person-centred music intervention in reducing behaviours