An Individualized Music-Based Intervention for Acute Neuropsychiatric Symptoms in Hospitalized Older Adults With Cognitive Impairment: A Prospective, Controlled, Nonrandomized Trial

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Abstract

Background: Neuropsychiatric symptoms are common features of dementia, and these occur in three fourths of patients on psychogeriatric inpatient units. These symptoms have traditionally been treated with pharmacological agents, but many medications are as likely to harm patients with dementia as to help them. As a result, nonpharmacological interventions are increasingly being investigated as ways to reduce these symptoms. **Objective:** The current study evaluated the impact of an individualized music-based intervention on agitation, negative mood, positive mood, compliance with care, need for one-on-one nursing staff intervention, and need for PRN medication. **Method:** Participants in this study were older adults who were admitted to a geriatric behavioral inpatient unit for acute agitation or behavioral disturbance. Twenty patients were in a treatment as usual group and 21 were in the individualized music group. **Results:** Agitation, negative mood, and positive mood all benefited from the music-based intervention, with resulting large effect sizes. Resisting care level also significantly benefited from the intervention, with a resulting medium effect size. **Conclusion:** These findings indicate that an easily implemented and reproducible music-based intervention, which is well tolerated and without adverse side effects, can be an effective way to reduce neuropsychiatric symptoms associated with dementia on a hospital unit.

Neuropsychiatric symptoms including agitation, dysregulated mood, and disturbed thought and perception are common features of dementia (Lyketsos et al., 2002). These symptoms decrease patient quality of life and present challenges to medical professionals (Margallo-Lana et al., 2001; Svansdottir & Snaedal, 2006). On an inpatient basis, clinically significant neuropsychiatric symptoms are found in three fourths of patients with dementia, and patients are frequently treated with pharmacological agents such as antipsychotics, anticonvulsants, or antidepressants (Sampson et al., 2014; Seitz et al., 2013).

Most psychotropic medications have a limited ability to treat neuropsychiatric symptoms associated with dementia, and many can result in undesirable and potentially harmful side effects including extrapyramidal symptoms, increased confusion, stroke, and death (Ballard & Waite, 2006; Corbett, Burns, & Ballard, 2014). Indeed, the National Institute of Mental Health Clinical

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Antipsychotic Trials of Intervention Effectiveness—Alzheimer's Disease study found that antipsychotic medications have little effect on neuropsychiatric symptoms associated with dementia when compared with placebo, and the medications were as likely to harm patients with dementia as to help them (Schneider et al., 2006). The 2015 American Geriatrics Society Beers Criteria expanded beyond antipsychotics and indicated that numerous medications within multiple classes of drugs including anticholinergics, antidepressants, antipsychotics, benzodiazepines, mood stabilizers, and sedative hypnotics should be avoided in older adults if possible (American Geriatrics Society 2015 Beers Criteria Update Expert Panel, 2015). Relatedly, American Psychiatric Association practice guidelines recommend that practitioners consider nonpharmacological interventions prior to nonemergent use of antipsychotic medication in patients with dementia (Reus et al., 2016).

Researchers have begun exploring a variety of nonpharmacological interventions, including music-based interventions, for neuropsychiatric symptoms associated with dementia (Livingston, Johnston, Katona, Paton, & Lyketsos, 2005; Olazarán et al., 2010). Music-based interventions are believed to be beneficial in this patient group for multiple reasons. First, many music-based interventions require that patients focus their attention to the environment, thereby increasing arousal regulation (McDermott, Crellin, Ridder, & Orrell, 2013) and awareness of others (Vink, Birks, Bruinsma, & Scholten, 2004). Second, it is hypothesized that presentation of previously known music might stimulate remote memory, thereby providing an interpretable stimulus to override stimuli within the immediate environment that might be confusing to cognitively impaired patients (Gerdner, 2012). Third, music-based interventions can promote relaxation (Brotons & Koger, 2000); reduce stress, anxiety, and fear (Ueda, Suzukamo, Sato, & Izumi, 2013; Vink et al., 2003); and elicit positive emotions that have been previously linked to the music (Gerdner, 2012; McDermott et al., 2013). Fourth, listening and moving/dancing to music can be a form of self-expression in individuals who have largely lost their ability to verbally communicate (McDermott et al., 2013). Fifth, music-based interventions can encourage social interaction with others through sharing, singing with, and talking about the music (McDermott et al., 2013; Vink et al., 2004).

A specific music-based intervention that has recently gained attention is one which involves listening to familiar and preferred music on an iPod or mp3 player. The research on this individualized music-based intervention has shown that it can be an effective method for reducing neuropsychiatric symptoms (Garland, Beer, Eppingstall, & O'Connor, 2007; Gerdner, 2000; Janata, 2012; Sung & Chang, 2005; Sung, Chang, & Abbey, 2006; Sung, Chang, & Lee, 2010; Ziv, Granot, Hai, Dassa, & Haimov, 2007). Although the research is promising, most studies have been conducted with patients who are residing in long-term care facilities. No studies have examined individualized music-based interventions in older adults with dementia who have been recently hospitalized for acute and significant agitation and behavioral disturbances—individuals who have the greatest need for agitation reduction.

Because of the aforementioned gap in the literature, the current prospective study sought to evaluate the effectiveness of an individualized music-based intervention on neuropsychiatric symptoms in patients who were hospitalized on a geriatric behavioral health unit due to acute agitation or behavioral disturbance. Several hypotheses were examined. First, it was hypothesized that patients who received the study intervention (i.e., individualized music) would have less negative mood symptoms and more positive mood symptoms than control patients (i.e., treatment as usual). Second, it was hypothesized that patients who received the study intervention would have lower rates of agitation than control patients. Third, it was hypothesized that patients who received the study intervention would be less resistant to care in activities of daily living than control patients. Finally, it was hypothesized that patients who received the study intervention would require fewer one-on-one staff interventions and fewer PRN agitation-related medications than controls.

Method

Participants

Potential participants were patients who were admitted to a geriatric behavioral health inpatient unit at a Midwestern hospital in 2016. Inclusion criteria were being age 60 years or above and being admitted due to acute agitation or behavioral disturbance. An exclusionary criterion was having hearing impairments that would preclude listening to music. Participants were divided into two groups based upon which months they were admitted to the hospital. Patients who consented (or had consent provided by legal surrogate decision makers) were placed in either a control group that received treatment as usual or an intervention group that received individualized music in addition to as treatment as usual. A total of 41 patients participated, with 20 in the treatment as usual group and 21 in the individualized music group. A description of patient demographic information is provided in Table 1. Neurocognitive diagnoses were made by attending psychiatrists, based on *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013) diagnostic criteria.

Treatment as Usual

When patients are admitted to the geriatric inpatient unit, psychiatric, medical, and psychosocial evaluations occur. History is taken, medications are examined, lab values are inspected, and imaging of the head (if indicated) is

Table 1. Treatment as Usual and Music-Based Intervention Group Demographics and Descriptives.

	Tx as usual	Music	*p* value
Age	72.3 ± 10.7	75.8 ± 10.1	.29
Education	12.5 ± 2.6	13.1 ± 3.4	.58
Sex (% male)	45.0%	47.6%	.87
Race (% Caucasian)	85.0%	95.2%	.27
Admitted from long-term care residence	50.0%	47.6%	.88
SLUMS score on admission	11.3 ± 10.0	11.5 ± 7.7	.95
Length of hospital stay (days)	24.4 ± 31.7	22.19 ± 14.9	.79
Neurocognitive Dx at discharge			
None	10.0%	0.0%	.14
Mild neurocognitive disorder	10.0%	19.0%	.41
Major neurocognitive disorder	80.0%	81.0%	.94

Note. Tx as usual = treatment as usual group; music = music-based intervention group; SLUMS = Saint Louis University Mental Status; neurocognitive Dx at discharge = neurocognitive disorder diagnosis at hospital discharge; additional races = Asian (*n* = 2), African American (*n* = 1), and Middle Eastern (*n* = 1).

obtained to identify potential issues that might be causing agitation and behavioral disturbances. If underlying medical issues are identified, these are treated. Psychiatric conditions are often treated via both medication (dependent upon previous prescriptions, current condition, and physician preference) and behavioral management (e.g., group and recreational therapies). Acute neuropsychiatric symptoms are addressed via both medication (commonly haloperidol or lorazepam) and behavioral management (e.g., removal of triggers that cause symptoms, participation in therapeutic groups, reassurance). Throughout the course of hospitalization, other disciplines are consulted, as needed, including pharmacy, neuropsychology, occupational therapy, and physical therapy to identify and treat comorbid issues. Prior to discharge, family meetings occur to ensure that patient and family questions and goals are addressed.

Individualized Music-Based Intervention

Building off of prior research, published guidelines, and professional recommendations (e.g., Gerdner, 2012; Raglio et al., 2012; Sung et al., 2010), the authors of the current study utilized an individualized music-based intervention program that would likely appeal to patients hospitalized on a geriatric inpatient unit. To do so, 31 music playlists were created, with songs grouped according to decade (1940s-1970s), music genre (Country, Big Band, etc.), and, in some instances, individual artist (Elvis Presley, Frank Sinatra, etc.). Patients were asked which type of music they previously enjoyed listening to. If a patient was unable to provide an answer to this question, a family member provided information regarding the patient's music preferences. Playlists were then chosen for each patient based upon their music preferences.

Each patient received an iPod shuffle with Bluetooth-enabled cordless headphones on which to listen to their individualized music. It was recommended that patients listen to music for at least 30 min each day in the late morning. In addition, iPods were available on an "as needed" (staff suggested as patient irritability starts to increase) or "as requested" (patient request) basis as long as this PRN iPod usage did not interfere with treatment as usual (e.g., mandated groups and medical consultations). The iPods were set up and provided to patients by a recreational therapist and/or nursing staff.

Outcomes

The outcome variables examined in this study included level of agitation, negative mood, positive mood, resistance to care, number of one-on-one nursing staff interventions, and number of agitation-related PRN medications. All variables were documented by nursing staff who were trained to identify and rate each of the behaviors comprising the variables. Nursing staff used behaviorally anchored Likert-type scales to do so (see Figures 1 and 2). Documentation of outcome variables was performed twice daily, at the end of nursing staff shifts (approximately at 7:00 a.m. and 7:00 p.m.). Nurses were instructed to complete the rating scales based on patient behaviors over the entirety of their shifts. This resulted in each patient being rated every 12 hr during the hospital stay. While nursing staff completed these assessments, they were not informed that the items contained on them would be used as outcome variables for this study.

Behaviors that comprised the agitation scale were largely consistent with the International Psychogeriatric Association's consensus definition for agitation in cognitive disorders (Cummings et al., 2015). This included having excessive motor activity, verbal aggression, physical aggression, aberrant vocalizations, and repeated requests for help. Figure 1 lists examples of each of the agitation behaviors utilized in the current study, along with the benchmarks for determining severity level. Figure 1 also lists the resisting care behaviors ranked

1) **Agitation Scale**: Please use the benchmarks to determine severity level. Not all benchmarks must be met for a given severity level and please choose the most severe level that applies.

- *0 (Absent)* = behaviors are not present
- *1(Mild)* = behaviors are infrequent, cause no to little disruption, require minimal staff intervention, *AND* are easily redirected
- *2 (Moderate)* = behaviors occur frequently, are moderately disruptive, require repeated staff intervention, *OR* show only minimal improvement with redirection
- *3 (Severe)* = behaviors occur frequently or persistently, are significantly disruptive, require significant staff intervention, *OR* do not respond to redirection

Agitation Scale	Absent	Mild	Moderate	Severe
Aberrant vocalizations - Examples: screaming, moaning, crying, inappropriate laughter, repetitive vocalizations	0	1	2	3
Requests for help - Examples: Excessive complaining or requesting for help or attention from staff	0	1	2	3
Verbal aggression - Examples: Cursing, verbal threats, verbal intimidation, verbal sexual advances	0	1	2	3
Motor agitation - Examples: Pacing, wandering, moving in chair, disrobing, picking at self or objects, restlessness	0	1	2	3
Physical aggression towards others - Examples: kicking, pushing, hitting, biting, spitting	0	1	2	3
Physical aggression towards self or objects - Examples: Throwing objects, breaking things, hitting or kicking objects, banging head or hand against objects	0	1	2	3
Total Agitation Score				

2) **RCL:** Please provide the level of resistance for each activity using the following scale:

- *0* = Compliant without any resistance
- *1* = Some avoidance or procrastination but compliant
- *2* = Initially resistant but complied only with staff persistence
- *3* = Verbal or physical refusal to comply (care activity either is not completed or, if it is completed, requires excessive persistence and intervention)

Meds _____   Eating _____   Bathing _____   Toileting _____   Dressing _____   Sleeping _____
Total Resisting Care Score _____

Figure 1. Agitation scale and resisting care scales.
Note. RCL = resisting care level.

in this study, along with the benchmarks used for determining severity level. After each agitation behavior and resisting care behavior were ranked, scores across the items were summed to obtain an agitation index score and a resisting care index score.

Negative mood behaviors were derived from *DSM-5* (American Psychiatric Association, 2013) symptoms for major depressive disorder and generalized anxiety disorder, along with symptoms that research has indicated can be effective for identifying depression in older adults, such as being tearful or withdrawn (Yesavage et al., 1982-1983). Symptoms likely to be confounded by significant medical issues (e.g., weight loss) and significant cognitive issues (e.g., reduced concentration) were eliminated due to the high occurrence of these symptoms in acutely hospitalized older adults. Finally, symptoms that required some degree of self-report (e.g., feelings of worthlessness) were eliminated, as some individuals with confusion, dementia, or a lack of insight may not be able to adequately report these symptoms. Figure 2 lists the negative mood behaviors ranked in this study, along with the corresponding benchmarks used for determining severity level. Figure 2 also lists positive mood behaviors with

1) Negative Mood Scale: Please mark one of the following for each item.

- *Absent* if condition is absent
- *Mild* if condition occurs rarely and is easily modified through staff engagement or re-direction
- *Moderate* if condition occurs frequently and is only somewhat responsive to staff intervention
- *Severe* if condition is pervasive or occurs frequently and is unresponsive to staff intervention
- *N/A* is <u>only</u> to be marked if patient is completely incapable of expressing mood characteristic

Negative Mood Scale	Absent	Mild	Moderate	Severe
Is tearful	0	1	2	3
Is withdrawn (prefers to stay in bed or avoids interaction with others)	0	1	2	3
Appears sad	0	1	2	3
Appears anxious or worried	0	1	2	3
Is irritable or short-tempered	0	1	2	3
Lacks sense of enjoyment	0	1	2	3
Lacks energy or appears fatigued beyond what can be explained by medical issues or level of exertion	0	1	2	3
Is fidgety or restless	0	1	2	3
Total Negative Mood Score				

2) Positive Mood Scale: Please mark one of the following for each item.

Positive Mood Scale	Almost Never	Infrequent	Frequent	Almost Always
Smiles	0	1	2	3
Appears happy	0	1	2	3
Expresses positive emotions	0	1	2	3
Appears to enjoy activities, hobbies, groups, etc.	0	1	2	3
Interacts positively with staff and other patients	0	1	2	3
Has appropriate energy	0	1	2	3
Is easygoing and agreeable	0	1	2	3
Participates in activities on the unit	0	1	2	3
Total Positive Mood Score				

Figure 2. Mood scales.

corresponding benchmarks utilized in this study. After each negative and positive mood behavior was ranked, scores across the items were summed to obtain a negative mood behavior index score and a positive mood behavior index score.

For the number of one-on-one nursing staff interventions variable, nursing staff was instructed to document the frequency of significant one-on-one interventions with each patient. The number of interventions was recorded as a continuous variable, with the total number of interventions across the patient's hospitalization summed for each patient. For the number of agitation-related PRN medications variable, nursing staff documented the number of PRN medications for agitation control for each patient. The number of PRN medications was recorded as a continuous variable, with the

Table 2. Median Scores and Mann–Whitney *U* Statistic for Individual Items.

Variable	Tx as usual	Music	*U*	*p*
Agitation measures				
Aberrant vocalizations	0.85	0.20	52	<.01
Requests for help	0.74	0.53	121	.02
Verbal aggression	0.54	0.13	59	<.01
Motor agitation	0.89	0.47	66	<.01
Physical aggression toward others	0.49	0.00	78	<.01
Physical aggression toward self	0.41	0.00	56	<.01
Resisting care measures				
Resisting medications	0.48	0.40	139	.06
Resisting eating	0.33	0.22	145	.09
Resisting bathing	0.07	0.00	166	.22
Resisting toileting	0.62	0.00	44	<.01
Resisting dressing	0.62	0.03	45	<.01
Resisting sleeping	0.48	0.16	70	<.01
Negative mood measures				
Tearful	0.11	0.10	207	.93
Withdrawn	0.94	0.67	129	.03
Appears sad	1.06	0.78	64	<.01
Appears anxious or worried	1.00	0.67	64	<.01
Irritable or short tempered	1.07	0.45	41	<.01
Lacks sense of enjoyment	1.08	0.68	93	<.01
Lacks energy or fatigued	0.46	0.39	148	.11
Fidgety or restless	1.00	0.69	95	<.01
Positive mood measures				
Smiles	1.11	1.48	123	.02
Appears happy	1.08	1.50	115	.01
Expresses positive emotions	1.00	1.44	114	.01
Appears to enjoy activities	1.00	1.60	96	<.01
Interactions positively	1.14	1.84	102	.01
Has appropriate energy	1.55	1.91	139	.06
Easygoing and agreeable	1.36	1.79	66	<.01
Participates in activities on the unit	1.17	1.58	90	<.01

Note. Tx as usual = treatment as usual group; music = music-based intervention group.

total number of PRN medications required for agitation control summed for each patient.

Statistics

Patients were grouped according to their intervention (i.e., music-based intervention versus treatment as usual). Baseline characteristics for patients in the two clinical groups were calculated using chi-square tests or independent-sample *t* tests, as appropriate.

For the first set of outcome analyses, the individual symptom-based items that comprised the agitation, negative mood, positive mood, and resisting care assessment scales were averaged for each patient across his or her hospital stay. Thus, each patient had one averaged score for each symptom on these four scales, which represented his or her average behavior in regard to that symptom. The patient's averaged symptom scores were statistically compared across intervention groups using the Mann–Whitney *U* test.

Total index scores for the agitation, negative mood, positive mood, and resisting care scales were also averaged for each patient across his or her hospital stay and statistically compared across intervention groups. Chi-square tests or independent-sample *t* tests, as appropriate, were utilized for these comparisons and effect sizes were calculated. The average number of one-on-one interventions and PRN medications per nursing staff shift were compared across groups using independent-sample *t* tests. To strike a balance between minimizing the likelihood for Type I error given multiple comparisons and minimizing restriction of power given limited sample sizes, all results were considered statistically significant at $p \leq .01$.

Results

Comparisons between the two clinical groups across baseline characteristics did not reveal significant differences for any variable (see Table 1). As indicated by Table 2, there were significant group differences on all symptom-based outcome measures. Five of six agitation symptoms, five of eight negative mood symptoms, and three of six resisting care symptoms evidenced

Table 3. Statistics for Outcome Variables.

Care level	Tx as usual	Music	Test statistic		Effect size	
			U	t	r	Cohen's d
Agitation	4.08	1.81	—	5.25*	—	1.59
Negative mood	6.84	4.51	—	4.51*	—	1.39
Positive mood	9.28	11.84	—	−3.51*	—	1.10
Number of one-on-one	1.67	0.61	—	2.01	—	0.62
Number of PRN medications	0.97	0.39	—	1.44	—	0.45
Resisting care	2.96	1.00	40.00*	—	−.69	—

Note. Tx as usual = treatment as usual group; music = music-based intervention group; number of one-on-one = number of one-on-one nursing staff interventions.
*$p \leq .01$.

significant group differences, which were consistently lower for the music-based intervention group, indicating less severe and/or persistent symptoms. Similarly, six of eight items on the positive mood scale evidenced significant group differences, which were consistently higher, indicating more positive mood behaviors for the music-based intervention group. The scores reported in Table 2 represent the sample median rating for each behavior as averaged across the course of hospitalization.

Table 3 shows statistics for the index-level outcome variables. The music-based intervention group had significantly lower scores on the agitation (1.81 vs. 4.08, $p \leq .01$) and negative mood scales (4.51 vs. 6.84, $p \leq .01$) and a significantly higher score on the positive mood scale (11.84 vs. 9.28, $p \leq .01$), indicating less pathology and better mood in this group. The effect size was large for all three variables ($d = 1.10$-1.59). The music-based intervention group also had a significantly lower score on resisting care level (1.00 vs. 2.96, $p \leq .01$), with a medium effect size demonstrated ($r = -.69$). Statistically significant group differences were not found for number of PRN medications administered (0.39 in the intervention group vs. 0.91 in the treatment as usual group, $p = .04$) or number of one-on-one nursing staff interventions (0.61 in the intervention group vs. 1.67 in the treatment as usual group, $p = .05$). Of note, when only individuals with major neurocognitive disorder were examined, agitation, negative mood, positive mood, and resisting care remained significantly different between the study groups, while number of PRN medications administered and number of one-on-one staff interactions remained nonsignificant. Finally, no significant differences were found between males and females for any of the variables in the intervention group.

Discussion

This is the first study to examine whether an individualized music-based intervention can result in improved neuropsychiatric symptoms when applied to patients on a psychogeriatric hospital unit. It was found that patients in the intervention group had significantly less agitation, improved mood, and less resistance to care than patients receiving treatment as usual. Furthermore, the effect sizes for the significant findings were medium to large, indicating that there was a high degree of clinical impact from the intervention.

In addition to demonstrating that this intervention can have a positive impact on neuropsychiatric symptoms in this patient population, it is noted that the intervention was well tolerated by patients and easily implemented by hospital staff. There were no adverse events from the intervention, nursing staff qualitatively indicated that patients appeared to have enjoyed listening to the music, and nursing staff reported that the intervention seemed to have improved quality of life for patients while on the hospital unit. Nursing staff additionally indicated that administration of the intervention did not result in any hardship for them. The intervention does not require staff to possess any musical ability, it can be easily implemented by existing staff, and it requires only a one-time, relatively low expense, start-up cost. All items can be reused after patients are discharged from the hospital.

As others have recommended, we suggest that music be individualized to each patient (Gerdner, 2000, 2012; Sung et al., 2010). The music was based on artists or genres that patients enjoyed listening to when they were in their early adulthood years. Using familiar and preferred music from a patient's past is thought to be of importance, as knowledge of and emotions associated with this previously enjoyed music are more likely to be retained than knowledge of and emotions associated with newer music in patients with dementia (Cuddy & Duffin, 2005; Sung & Chang, 2005). We also suggest that the music be played prior to peak levels of agitation, when possible, as interventions for agitation are thought to be most beneficial before agitation fully emerges (Gerdner, 2000; Hall & Buckwalter, 1987).

It is noted that while patients who received the music-based intervention had significantly improved mood and agitation when compared with their treatment as usual counterparts, the rate of PRN medication prescription for agitation was not statistically different between the

two groups. It is unclear why significant differences in this outcome did not emerge, but issues related to degree of intervention effectiveness, level of maintenance versus adjustment of staff care routines, study limitations, or a combination of the aforementioned factors are conceivable. More specifically, while significant improvements in agitation and mood resulted from the intervention, the improvements might not have been to such an extent that it significantly altered PRN medication administration practices in this acute care setting. It is questioned whether providing feedback to staff on the results of the intervention and/or educating staff about the utility of nonpharmacological interventions might help to adjust care approaches. It is also conceivable, though, that the lack of significant difference might be related to a limitation of the study: a somewhat small sample size that resulted in reduced statistical power. While the p value did not reach significance at .01, it was trending in that direction ($p = .04$), the effect size was found to be medium, and it was noted that those in the music-based intervention group received 60% fewer PRN medications for agitation per nursing staff shift than those in the treatment as usual group.

An additional limitation of the study is that two adjacently timed convenience samples were utilized. Because of this, differences regarding history and selection could not be controlled for explicitly. At the same time, it was found that patient background and demographic variables could not explain the significant findings, as patients included in the two study groups did not have significant differences in age, education, sex, race, rate of admittance from long-term care residences, length of hospital stay, degree of cognitive dysfunction, or frequency of neurocognitive diagnoses.

Finally, it is noted that the assessment scales utilized in the current study were not previously published tools. Published assessment scales that would be appropriate for this study's patient population and/or purposes did not exist. Because certain mood and agitation symptoms can differ between adults and older adults (Cummings et al., 2015; Yesavage et al., 1982-1983), the authors searched for tools that would assess for mood and agitation symptoms that are likely to occur in older adults. Furthermore, observer-rated tools were sought because it was known that many of the inpatients would be too cognitively impaired to accurately provide ratings of their agitation and mood disturbance. In addition, the authors searched for tools that would allow them to rate behaviors as they occur over brief intervals (i.e., 12 hr) because hospital stays can be brief and agitation in older adult inpatients can significantly fluctuate over a short period of time (Cohen-Mansfield, Marx, & Rosenthal, 1989; Cole, 2004). While a number of measures were reviewed, none met all of these criteria. Therefore, observer-rated behaviorally anchored scales, which were comprised of items derived from evidence-based sources, were utilized. The fact that these scales differentiated between the music-based intervention and treatment as usual groups suggests that they are efficacious in assessing symptoms in older adults on a psychogeriatric inpatient unit.

Conclusion

Overall, this study described and provided empirical evidence for a relatively low-cost, easily implemented, and well-tolerated nonpharmacological intervention to improve mood and agitation in hospitalized patients. It is noted that neuropsychiatric symptoms are complex and solutions for managing them are rarely simple. Thus, individualized music-based interventions may be most effective when added to other behavior management strategies, creating a multicomponent intervention. This was essentially demonstrated in the current study, as it was found that the intervention, when added to treatment as usual, incrementally improved neuropsychiatric symptoms. This underscores the importance of actively utilizing empirically supported nonpharmacological interventions within a broader organizational treatment plan.

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