

# Difference in the Contents of Music Intervention to Control Agitation by Music Providers

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## Abstract

**Purpose:** The purpose of this study was to compare the contents of music intervention studies between the music therapists and non-music therapists who endeavored to control agitation in patients with dementia, and to provide meaningful ideas to improve the music interventions by music providers. **Method:** This study is a review study by searching CINAHL, MEDLINE, and PsychINFO for the keywords, “agitation” and “music,” which are used in the searches. **Results:** A total of 30 studies of music intervention (7 studies about music therapists and 23 studies about non-music therapists) were included for the review. The studies about music therapists had a more reasonable sample size, variety of music activities, and comparison groups. The studies of non-music therapists were provided by nurses, researchers, recreational therapists, and trained nursing assistants and they provided music using background music at a scheduled time for care, such as mealtimes and bathing times. **Conclusions:** Studies on music interventions need to have a more rigorous research design, such as randomized controlled trials for the future studies. Furthermore, there is a need for multi-disciplinary music intervention studies by music providers who have different types of educational backgrounds and clinical experiences.

## Keywords

Music, Agitation, Dementia

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## 1. Introduction

Persons with dementia have health problems that include cognitive decline, language deterioration, poor judgment, restlessness, confusion, and changes in social-behavioral problems [1]. Among these problems, agitation

has become a major issue because it increases nursing-home placement, health maintenance costs, and the burdens of caregivers [2]-[4]. Pharmacological interventions are often necessary to control agitation in persons with dementia, but they bring about undesirable effects such as a high risk of fall, declined cognition levels, and monetary burdens [5] [6]. To reduce the undesirable effects of pharmacological interventions, music intervention is currently being provided to control agitation because it is relatively convenient, non-pervasive, and cost-effective. Music therapy is defined as “an established allied health profession using music and music activities to address physical, psychological, cognitive and social needs of individuals with disabilities” [7].

Many studies have reported the positive effects of music intervention on diverse health problems in persons with dementia, including cognitive decline, less-alert responses, lack of engagement between caregiver and care-receiver, disruptive behaviors, impaired language function, inattention, lack of food intake, and poor social relationships [8]-[13]. Many studies have also reported the positive effects of music intervention on agitation in persons with dementia [14]-[18]. Music intervention consists of music group activities, listening to music, singing, or playing instruments [9] [16] [17]. Most music-intervention studies have been performed in nursing facilities, with only one study that was conducted at the client’s residence [17].

Music intervention to control agitation in persons with dementia has been performed by diverse healthcare providers. The providers can be categorized into two groups: music therapists and non-music therapists (the latter includes nurses, certified nursing assistants, recreation specialists, and family members; [15] [19] [20]). Music therapists are inclined to use different methods of music intervention compared with non-music therapists, reflecting their different educational backgrounds and clinical experiences. Even though music intervention providers tend to use different types of music intervention to control agitation, there has been no description regarding how the interventions are different depending on the different educational backgrounds of the music intervention providers. A few studies reviewed the effects of music intervention on agitation, and a review focused on the findings of music interventions, but not on music contents and music providers [21]-[23].

The present study was undertaken to fill the knowledge gap by examining how the content of music intervention is different between music therapists and non-music therapists based on a review of published research articles. The findings reveal more of the strengths and weaknesses of music intervention by each group, and also how music interventions might be improved. Specifically, the present review focused on how the contents of music intervention used to control agitation in persons with dementia differed between music therapists and non-music therapists. This new knowledge should aid in developing more practical guidelines of music intervention for each group of music providers.

## 2. Method

### 2.1. Design

This study is a review study to investigate the contents of music intervention to control agitation in patients with dementia and to compare the contents of music intervention by the intervention providers.

### 2.2. Sample Selection

A review of the research literature was undertaken by searching computerized databases (CINAHL, MEDLINE, and PsychINFO) from 1990-2015 June. Some of the keywords used in the literature search included music and agitated. By the first search, a total of 119 articles were listed. The criteria for article selection were those articles published in English, reported an intervention study using music, and studied controlling agitation in persons with dementia or Alzheimer’s disease. Based on the findings of the inclusion criteria, a total of 30 articles were selected. The others were excluded because they were no intervention studies, not performed for patients with dementia, not mainly performed using music intervention, or not mainly provided to control agitation. Thus, the remaining 30 articles were included for the review.

## 3. Results

### 3.1. Subjects’ Characteristics

A total of 30 research-based studies were included for the review and the studies were divided into two groups according to the purpose of the proposed study of music therapists and non-music therapists. Among the 30 stu-

dies, 7 studies were performed by music therapists and the other 23 studies were provided by non-music therapists, including nurses, certified nurse assistants, recreational specialists, and family caregivers. The overall findings of the music-intervention studies were reviewed, including research design, sample size, setting, music interventions, instruments, and outcomes. The overall findings about the music therapists are shown in **Table 1** and concerning the non-music therapists in **Table 2**. The contents of music interventions were reviewed and they included conceptual framework or theoretical framework, music-intervention providers and agitation raters, music-intervention tools, and music-intervention time schedules (timing, duration, frequency, and total sessions). The contents of music interventions by music therapists are presented in **Table 3** and non-music therapists in **Table 4**.

### 3.2. The Characteristics of Music Interventions Studies

#### 3.2.1. Sample Size and Setting

In the 30 music-intervention studies to control agitation in persons with dementia that were identified, the sample sizes were diverse and varied from 1 - 100. In the music therapists' studies, the sample size varied from 11 - 77, with 86% of the studies having a sample size exceeding 15 (**Table 1**). In the non-music therapists' studies,

**Table 1.** Music therapists: the characteristics of music intervention studies to control agitation (*N* = 7).

Year	Authors	Design	SS* (M/F)	Age range mean (SD)	Setting	Music intervention	Dependent variables	Instrument	Outcome
1994	Clair & Bernstein.	QE* (ABC)	28 (27/1)	56 - 81	A day room, Veterans Affairs Medical Center	Group music activities (stimulative music and sedative music)	Agitation		No significant difference between no music, stimulative music and sedative music
1996	Brotos & Pickett-Cooper	QE	20 (3/17)	70 - 96 82 (6.57)	4 Nursing homes	Group music activities	Agitation, dosages of PRN medication	DBRS* Video analysis	Significantly more agitated before music therapy than during, and after music therapy sessions
2002	Jennings & Vance	QE	16 (2/14)	78.80 (3.91)	An activity room, Alzheimer's adult day care	Group music therapy: sing familiar songs, sing-alongs, and playing instrument	Agitation	M-CMAI*	Agitation was significantly reduced during music therapy compared to baseline:
2003	Brotos & Marti	One group pre-test and post-test	11 pts & 11 care-givers		A rural area	Singing, playing instrument, & movement/ dance	-Agitation. -Caregiver's burden and depression.	CMAQ,* Caregivers burden questionnaire, Back's Depression Scale	Significant difference between pre and post-test scores in agitation, no significant difference in the caregivers' burden and depression over time
2007	Ledger & Baker	A longitudinal repeated measures design	45	71 - 96	13 Nursing homes	EG: group music therapy CG: no intervention	Agitation	CMAI* Interview	No significant difference between EG and CG in agitation over time.
2013	Ridder <i>et al.</i>	A pragmatic, two-armed, cross-over, exploratory, randomized controlled study	42	66 - 96 (81)	14 Nursing homes	EG: individualized music therapy Improvising, singing, dancing/ moving, listening, and other activities) CG: standard care	Agitation Medication QOL	CMAI* ADROL	Agitation and prescription of medication increased during standard care and decreased during music therapy significantly.
2013	Vink <i>et al.</i>	A randomized controlled design	77	82.16 (6.87)	Dutch nursing homes, Netherlands	EG: music therapy (singing, dancing, playing a musical instrument etc.) CG: recreational activities	Agitation	CMAI	A decrease in agitated behaviors in both groups but no difference between groups

\*CMAI = Cohen-Mansfield Agitation Inventory; CMAQ = Cohen Mansfield Agitation Questionnaire; DBRS = Disruptive Behavior Rating Scales; M-CMAI = Modified Cohen-Mansfield Agitation Inventory; NPI = Neuropsychiatry Inventory; PGC-IADL = Philadelphia Geriatric Centre Instrumental Activities of Daily Living; SS = sample size.

**Table 2.** Non-music therapists: the characteristics of music intervention studies to control agitation ( $N = 23$ ).

Year	Authors	Design	SS* (M/F)	Age Range Mean (SD)	Setting	Music Intervention	Dependent Variables	Instrument	Outcome
1993	Gerdner & Swanson	A case study	5	70 - 99	A health center	Individualized music	Agitation, # of medication	M-CMAI*	Agitation decreased during music intervention in 4 out of 5 clients.
1994	Goddaer & Abraham	ABAB	29 (6/23)	69 - 93 81.3 (6.9)	2 nursing homes,	A: no music B: Group music (Relaxing music)	Agitation	M-CMAI.	Agitation significantly decreased 54% with music compared to baseline and increased 38.4% when withdrawal period
1995	Tabloski <i>et al.</i>	QE*	20 (3/17)	64 - 84	2 Long term care facilities	Group (Calming music)	Agitation	Agitation Behavior Scale	A significant reduction in agitated both during and after music intervention compared to baseline
1996	Ragneskog <i>et al.</i>		5	69 - 85	A nursing home	Group (Soft, Swedish, Pop/rock music)	Agitation	Video analysis.	Two of the five patients didn't show restless during soothing music condition.
1997	Denney	QE	9 (3/6)	65 - 84 74.8 (6.4)	A nursing home	Quiet music	Agitation.	M-CMAI	Agitation decreased with music from baseline
1997	Gerdner	A case study	1	77		Classical-relaxation & Preferred music (spiritual or religious music)	Agitation	M-CMAI	Agitation decreased during preferred music condition than classical music
1997	Thomas, Heitman, & Alexander.	QE	14 (4/10)	69 - 86	A nursing facility	Individualized and Preferred music	Aggressive behaviors	M-CMAI	There were significant differences on physically aggressive behaviors between pre-music and post-music and music and post-music
1998	Clark, Lipe, & Bilbrey	QE	18 (4/14)	55 - 95 82 (10)	A nursing facility	Preferred music	Aggressive behaviors.	Observation	The total number of aggressive behaviors significantly decreased with music compared to no music
2000	Gerdner	A pre and posttest crossover design	39 (9/30)	82.6	6 long-term care facilities	Individualized M Vs. Classical-Relaxation music	Agitation	M-CMAI	Significant reduction in agitation with individualized music and even after withdrawal compared to classical music
2001	Ragneskog <i>et al.</i>	QE	4	-	4 nursing homes	Individualized M Classical M	Agitation	Video analysis.	Two patients became calmer during some of the individualized music sessions
2004	Richeson & Neill	QE	27 (6/21)	87 (67 - 94)	Nursing facility	Quiet music	Agitation, Food intake	M-CMAI, Percentage of food eaten	Overall agitation decreased compared to baseline to intervention and food eaten increased from baseline
2005	Gerdner	QE	8 (0/8)	83.3	A skilled care facility	Preferred music individualized	Agitation	M-CMAI VAS* Interviews	A significant reduction in agitation during the presentation of music from baseline and daytime
2005	Hicks-Moore	QE	30 (9/21)	82.4 (70 - 101)	A nursing home	Relaxing music	Agitation	M-CMAI	Mean of agitated behaviors decreased with music
2006	Sung <i>et al.</i>	QE	57	-	A residential care facility	EG*: Preferred music CG*: No music	Agitation	CMAI*	A significant reduction in overall CMAI. Physically non-aggressive behaviors in music group decreased compared to the no music group
2006	Sung <i>et al.</i>	RCT*	36	77.61 (8.43)	A residential care facility	EG: Familiar music CG: No music	Agitation	M-CMAI	Agitation of the EG decreased significantly compared to CG and baseline
2008	Hicks-Moore & Robinson	3 * 3 repeated measures design	41	84.5 (6.0) 67 - 92	Three nursing homes	EG1: Favorite music (FM) EG2: Hand massage (HM) EG3: FM & HM CG: no treatment	Agitation	M-CMAI	Agitation significantly decreased in EG1, EG2, and EG3 immediately following the intervention but no significant difference in agitation over the groups
2009	Park & Specht	ABAB A: music B: no music	15	83.40 (10.26) 60 - 98	Home	Individualized and preferred music	Agitation	M-CMAI	Agitation significantly decreased while listening to music compared to baseline. No difference in agitation between music and no music weeks

Continued

2010	Cooke <i>et al.</i>	A randomized crossover design	47 (14/33)	74 - 94 (87.2%)	2 LTC facilities	EG: Music group CG: reading group	Agitation Anxiety	CMAI-SF* RAID*	Significant increase in the frequency of verbal aggression over time, but no overall effect of the music on agitation and anxiety
2011	Ho <i>et al.</i>	A single group pre and post design			A hospital-based nursing home	Researcher-composed music	Agitation	CMAI	Significant decline in mean agitation scores
2011	Lin <i>et al.</i>	A pre and posttest control group design	100	65 - 97, 82 (6.80)	3 nursing home facilities Taiwan	EG: music intervention CG: normal daily activities	Agitation	Chinese version of CMAI	Agitation reduced significantly in the experimental group
2011	Sung <i>et al.</i>	QE	55	81.37 (9.14)	A residential care facility Taiwan, Australia	EG: music intervention CG: usual care	Agitation Anxiety	CMAI RAID	The reduction of agitation between two groups was not significantly different
2013	Dunn & Riley-Doucet	A within-subjects, repeated-measures design	5(2/3)	77 - 88 (83)	An adult day care center	Non-religious music group and religious music group	Neuropsychiatric symptoms (agitation etc)	The Agitated Behavior Scale	There was no significant differences between the non-religious music and religious music on NPS
2013	Park	One group pre and posttest design	26	82.19	Own home	Individualized preferred music	Agitation	M-CMAI	Agitation decreased while listening to the music compared to the baseline

\*ADROL = Alzheimer’s Disease-Related Quality of Life; CG = Control group; CMAI = Cohen-Mansfield Agitation Inventory; CMAI-SF = Cohen-Mansfield Agitation Inventory-Short Form; EG = Experimental group; M-CMAI = Modified Cohen-Mansfield Agitation Inventory; RAID = Rating Anxiety in Dementia Scale; RCT = Randomized Controlled Trial; SS = Sample Size; QE = Quasi-Experimental Design; VAS = Visual Analog Scale.

**Table 3.** Music therapists: the contents of music interventions (N = 7).

Year	Authors	CF*/TF*	Music providers/ agitation raters	Using tool	Timing	Duration	Frequency	Total-week	Total-sessions
1994	Clair & Bernstein	-	PI* (MT*)/Pairs of observer	Stereo system	10:30 am - 11 am Noon (meal time) 3:00 pm - 3:30 pm	90 min (30 min for each condition)	5 days/week	8 wks	-
1996	Brotos & Pickett-Cooper	-	Two MTs /MT & Caregivers (nurses, nurses aids, activity directors)	A variety music activities	Afternoon	30 min	2/week	-	5
2002	Jennings & Vance	-	MTs/ nursing assistants	-	-	30 min	1/week	4 wks	-
2003	Brotos & Marti	-	MTs/ Neuropsychologist	Group activities	Morning (7 sessions): patients and caregivers Afternoon (4 sessions): caregivers	-	-	-	-
2007	Ledger & Baker	-	MTs/MTs	Group activity	3 Groups in the morning & 2 in the mid afternoon	30 - 45 min	1 - 3/week	At least 42 wks	-
2013	Ridder <i>et al.</i>	-	MTs/MTs	-	-	-	2/week	6 wks	12
2013	Vink <i>et al.</i>	-	Music therapy-MTs, recreational activities-occupational therapist/nurses	Group activity	-	40 min	2/week	2 months	34

\*CF = Conceptual Framework; MT = Music Therapist; PI = Principle Investigator; TF = Theoretical Framework.

the sample size varied from 1 - 100, with 39% of the studies having a sample size exceeding 15 (Table 2). In music therapists’ studies, all studies were conducted in long-term care facilities including nursing homes, an Alzheimer’s adult day care, and a Veterans Medical Center. In the non-music therapists’ studies, all studies were conducted in long-term care facilities such as nursing homes, a health center, and a residential care facility, except one, and that one study was at the patient’s own home.

### 3.2.2. Music Interventions

In the music therapists’ studies, all studies except one provided using group activities for music interventions to

**Table 4.** Non-music therapists: the contents of music interventions ( $N = 23$ ).

Year	Authors	*CF/*TF	Music Providers/ Agitation Raters	Using tool	Timing	Duration	Frequency	Total-Week	Total Session
1993	Gerdner & Swanson	*PLST	*PI (Nurse)/PI	An audio cassette player	3:30 pm - 4:00 pm (Prior to peak level of agitation)	30 min	5 days	2 wks (*W1: baseline, W2: Music)	-
1994	Goddaer & Abraham	PLST	PI (Nurse)/A trained independent rater	A tape player	Meal time	-	-	4 wks (W1, 3: no music W2, 4: music)	-
1995	Tabloski <i>et al.</i>	PLST	Researchers/ Researchers	A CD player	When agitation occurs	15 min	1/week	2 wks	2
1996	Ragneskog <i>et al.</i>	-	Staff/authors	A tape recorder	Meal time (Dinner)	30 - 45 min	-	11 wks (W1: baseline W2, 3, 5 - 6, 8 - 9: music; W4, 7, 10 - 11: no music)	40
1997	Denney	PLST	-	A tape player	Meal time: 11:45 am - 1:15 pm	90 min	Daily	4 wks (W1, 3: No music W2, 4: Music)	14
1997	Gerdner	*IMIA	-	-	Peak agitation time	30 min	2/week	6 wks (classical music), 2 wks (no music), 6 wks (religious music)	-
1997	Thomas <i>et al.</i>	-	*CNA/CNA	A tape recorder	Bathing time	-	-	-	3
1998	Clark <i>et al.</i>	-	*RAs/RAs	A CD radio cassette recorder	Bathing time	-	-	2 wks: no music 2 wks: music	10
2000	Gerdner	IMIA	RAs/RAs	A portable audio cassette player	Peak agitation time	30 min	2/week	W2 - 4: baseline W5 - 10: Individualized music, W11 - 12: wash-out, W13 - 18: Classical music	-
2001	Ragneskog <i>et al.</i>	-	Staff/Researchers	A prerecorded cassette recorder	Most agitated time	30 min	-	Control period: no music, 2 periods: individualized music, 1 period: classical music	4 - 5
2004	Richeson & Neill	*NDB	Therapeutic recreation specialist, nursing staff, & researchers/ researchers	A CD player	Meal time: 5 pm - 6 pm.	60 min	4/week	W1: baseline W2: Music	-
2005	Gerdner	PLST, IMIA	CNA/CNA	A portable CD player	Peak agitation time	30 min	Daily	Month 1: baseline, month 2 - 3: music	-
2005	Hicks-Moore	-	-/researchers	-	Meal time	-	Daily	W1, 3: no music, W2, 4: music	-
2006	Sung <i>et al.</i>	-	Trained nurses/-	-	Mid-afternoon	30 min	2/week	6 wks	-
2006	Sung <i>et al.</i>	-	A nursing researcher & RAs/nursing staff	A CD player	3:00 - 3:30 pm	30 min	2/week	4 wks	8
2008	Hicks-Moore & Robinson	-	RNs or Faculty/RA	A portable CD player	when agitation occurred	10 min	-	-	1
2009	Park & Specht	PLST	Family caregivers/family caregivers	A portable CD player	Peak agitation time	30 min	2/week	W1 - 2, 5 - 6: music W3 - 4, 7 - 8: no music	8
2010	Cooke <i>et al.</i>	-	Musicians/RAs	Guitar, pre-recorded instrumental music	Morning	40 min	3/week	W1 - 8: music, W9 - 13: wash out, W14 - 21: reading	16
2011	Ho <i>et al.</i>	-	Researchers	A CD player	Meal time	60 min	daily	4 wks	28
2011	Lin <i>et al.</i>	-	Researcher	Group activities	-	30 min	2/week	6 wks	12
2011	Sung <i>et al.</i>	-	RAs	Percussion instruments	Mid afternoon	30 min	2/week	6 wks	12
2013	Dunn & Riley-Doucet	-	Formal caregivers	A CD player	Any time in a private corner	-	M	W1 - 2: non-religious music W3 - 4: religious music (or the other way)	34
2013	Park	-	PI	A CD player	Peak agitation time	30 min	2/week	2 wks	4

\*CAN = Certified Nurse Assistants; IMIA = Individualized Music Intervention on Agitation; NDB = Need-Driven Dementia-Compromised Behavior; PI = Principle Investigator; PLST = Progressively Lowered Stress Threshold Model; RAs = Research Assistants; W = Week.

control agitation and one study provided individualized music therapy (**Table 1**). The music interventions included diverse music activities such as singing songs, music listening, playing rudimentary instruments, dance/movement, composition/improvisation, music games, and music relaxation exercises. These diverse music activities allowed clients to enjoy the music depending on their functional status. In the non-music therapists' studies, 39% of the studies provided individualized music to meet the patients' music preferences and the patients' music favorites were assessed before offering music intervention (**Table 3**). The music interventions included playing the recorded music, such as relaxing/quiet music, classical music, rock music or religious music as background music. The genre of recorded music was determined based on the researchers' own plans or the clients' music preferences.

### 3.2.3. Instruments

In the music therapists' studies, the agitation level was measured using diverse measurements, including, most commonly, the Cohen-Mansfield Agitation Inventory, the Disruptive Behavior Rating Scales, the Neuropsychiatry Inventory, video analysis, and interviews. In the non-music therapists' studies, the agitation level was also measured using diverse instruments: the Cohen-Mansfield Agitation Inventory (CMAI) was the most commonly used assessment, followed by an agitation behavior scale, video analysis, and observation. In both groups, the CMAI was most commonly used after being modified in several studies [16] [18] [20].

### 3.2.4. Outcomes

In the music therapists' studies, 4 out of 7 studies showed significant decreases in agitation during the presence of music compared with the baseline and the other group, and the other 3 studies reported no significant difference between the groups. The authors assumed that the absence of an effect from background music on agitation was because the music was selected without guidance as to the clients' musical tastes. Also, the lack of significant difference in agitation between the groups over time may indicate that music intervention has only a short-term effect on agitation. In the non-music therapists' studies, most studies showed a decrease in agitation with music compared with the baseline but only 5 studies showed a significantly reduced agitation with a music group, compared with the other group (preferred music other than classical music or no music).

## 3.3. The Contents of Music Intervention

In the music therapists' studies, no study explained a conceptual framework or theoretical framework, but in the non-music therapists' studies, 9 studies presented a theoretical framework, such as the progressively lowered stress threshold model, a mid-range theory of individualized music intervention for agitation, and the need-driven dementia-compromised behavior model. In the non-music therapists' studies, music interventions were provided by nurses, certified nursing assistants, musicians, therapeutic recreation specialists, research assistants, staff, and family caregivers.

In the music therapists' studies, the timing of providing music interventions were morning, noon (meal time), or afternoon. In the non-music therapists' studies, the timing of providing music interventions were diverse, such as peak agitation time, meal time, bathing time, morning, afternoon, and any time. In the music therapists' studies, the duration of music intervention was 30 to 45 minutes for a session. In the non-music therapists' studies, the duration of music intervention was more diverse from 15 to 90 minutes, but the most common duration of music interventions was 30 minutes (14 studies in both groups). The rationale of offering music intervention for 30 minutes was in the recognition of the limited attention span in patients with dementia. Finally, the frequency of offering the music intervention was diverse in the music therapists' and non-music therapists' studies and they offered the intervention most commonly two times a week (11 studies).

## 4. Discussion

The present study was undertaken to review the differences of music interventions to control agitation in patients with dementia between music therapists and non-music therapists, with the aim of providing practical ideas to improve the interventions for each group. Music-intervention studies by music therapists were inclined to have more subjects compared with non-music therapists. A more reasonable sample size needs to be included using calculation of the sample size, and furthermore the rationale for determining the sample size needs to be presented in the studies. All studies except two studies took place in nursing homes, health center, nursing facil-



ity, long-term care facility, skilled care facility, and so on and only two studies were performed in the patients' own homes [17]. Thus, more music intervention studies need to be conducted on different communities including patients' own home for the future studies.

In terms of the findings about music interventions, 4 out of the 7 music therapists' studies reported significant effects of music interventions compared with the other group. In non-music therapists' studies, most studies showed significant decreases in agitation compared with the baseline, but only 5 out of 27 studies showed significant effects of music interventions to the comparison groups. For future studies, a comparison about the effects of music on agitation with different types of music needs to be conducted using a more sophisticated level of research design, such as randomized controlled trials.

The Cohen-Mansfield Agitation Inventory (CMAI) is not only the most commonly used instrument to measure agitation in the music therapists' studies but also for the non-music therapists. To increase the validity of the study findings, another measurement, such as video analysis, observation or interviews with caregivers, might be added to measure agitation for both types of music providers. In addition, while music therapists provided music interventions any time, such as morning, noon, or afternoon, the non-music therapists performed music interventions mostly at peak agitation time, mealtime, or bathing time [17] [24] [25]. The reasons for performing the intervention at those times are assumed to be that meal time and bathing time are important moments to care for patients with dementia for the usual care and is also the time when it is likely for agitation to often occur, so that the care providers want to control agitation during the meal time and bathing time with music.

For the contents of music interventions, the music therapists' studies provided music interventions including diverse methods with group activities, such as singing, playing instruments, improvising, or dancing. On the other hand, the non-music therapists' studies usually provided music interventions using recorded music for background music and they were likely to perform the intervention for individual patients with dementia. The differences of offering music intervention methods between the studies are based on their educational backgrounds and clinical experiences. For future studies, to consider the pros and cons of each music provider's education background and clinical experiences, multi-disciplinary music intervention studies need to be carried with music therapists, nurses, or recreational therapists.

## 5. Conclusion

The current study reviewed the differences in the contents of music intervention studies to control agitation between the music therapists and non-music therapists, with the goal of providing practical guidelines for music providers. The music therapists' studies had a more reasonable sample size, various music activities, and the comparison groups. Whereas, the non-music therapists' studies had a more theoretical framework of music interventions, used the recorded music for the background music, provided music at more diverse times such as peak agitation time, meal time, or bathing time. For future studies, multi-disciplinary music intervention studies including music therapists, nurses, recreational therapists, occupational therapists and so on are recommended to improve the effects of music intervention on agitation

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