Effects of Art and Reminiscence Therapy on Agitated Behaviors Among Older Adults With Dementia

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ABSTRACT

Background: Cognitive degeneration and agitated behavior symptoms of dementia in older adults are the main causes of disability and inability and increase the cost of medical care. Agitated behavior symptoms of dementia are the main causes of early institutionalization and make caregivers exhausted.

Purpose: The aim of this study was to examine the effects of art therapy and reminiscence therapy on the alleviation of agitated behaviors in older adults with dementia.

Methods: An experimental research design with two experimental groups and one comparison group was conducted to examine the effects for each group on agitated behaviors. Participants were recruited from two dementia care centers in central and northern Taiwan. The study included 54 older individuals who met the sampling criteria and completed the data collection process. The participants were randomly allocated into the art therapy group (n = 24), the reminiscence therapy group (n = 22), and the comparison group (n = 8). The intervention consisted of 50-minute sessions conducted weekly for 12 weeks. Regular activities were continued in the comparison group. The structured questionnaires were completed, and observations of agitated behaviors were collected before the intervention and at 1 and 6 weeks after the intervention.

Results: Significant differences were found in agitated behavior symptoms at the three time points in the art therapy group, whereas reminiscence therapy was found to have had a clear and immediate effect on decreasing agitated behavior. The generalized estimating equation exchange model test revealed a significant and sustained, postintervention effect of art therapy on agitated behavior. In contrast, no significant and sustained effect on agitated behavior was observed in the reminiscence therapy group.

Conclusions: The findings of this study support that art therapy may have a positive effect on dementia-associated agitated behaviors in institutionalized older adults. Reminiscence therapy activities conducted weekly for 50 minutes each session did not reach statistically significant implications. It is suggested that future studies consider conducting art and reminiscence therapies for a 16-week duration with two weekly sessions to evaluate the effectiveness of the therapy. The duration of follow-up should be extended as well in future studies.

Key Words: agitated behavior, art therapy, reminiscence therapy, older adults, dementia.

Introduction

Rapid growth in populations with dementia is an issue currently being faced in many countries around the world. According to the World Alzheimer Report 2019 (Alzheimer’s Disease International, 2019), 50 million people now experience dementia worldwide, representing 5% of the world’s older-adult population. Each year, there are 9.9 million new patients with dementia (World Health Organization, 2019). The estimated costs of dementia care currently amount to US$818 billion (1.1% of global Gross Domestic Product) and are expected to reach US$2 trillion in 2030 (Alzheimer’s Disease International, 2019). Dementia treatment costs in Taiwan amounted to US $6.99 billion in 2015 and are expected to increase by more than 76% over the next 25 years (Ministry of Health and Welfare, Taiwan, ROC, 2019). The increase in number of people with dementia because of general population aging trends has made this disease an important global health issue in the 21st century (World Health Organization, 2019).

Dementia is the progressive and sustained deterioration of mental function. Symptoms of dementia include the loss of memory, language, and cognitive functions as well as sleep and may be complicated by agitated behavior, depression, personality changes, delusions, or hallucinations. In severe cases, dementia may disturb social and professional functions and self-care abilities, affecting daily life, social interactions, and work (Lin et al., 2015). Moreover, a recent study indicated that 60% and 66% of older adults with dementia exhibit behavioral disorders and aggressive behaviors, respectively.
Dementia is the main cause of disability in older adults and of being unable to live independently. Furthermore, dementia has a severe impact on patients, caregivers, families, community, and society and increases medical treatment and social welfare costs (Liao, Liou, & Yang, 2017).

Agitated behaviors are typically controlled using antipsychotic drugs, which carry high risks of side effects and may lead to more agitated and interference behaviors in older adults with dementia (Huang & Hwang, 2012). Unless agitation behavior is severe, nonpharmacological treatments are recommended as the first-line option. Nonpharmacological treatments include environmental treatment and activity treatment (Hsu, Tsai, Hwang, Chen, & Chen, 2017). Most studies to date have discussed the short-term effects of treatment only.

Long-term art therapy is used to reduce anxiety and depression and help patients with dementia deal with damaged parts of the brain (Burnside, Knecht, Hopley, & Logsdon, 2017). This therapy encourages participants to think about and link past, present, and future events and to engage in self-introspection through artistic creation. The appropriate use of art activities stimulates patients’ memory of forgotten and suppressed events and issues. Personality may be recovered through the treatment process. Memory treatment through art activities is beneficial for older adults. Therefore, this study was designed to explore the effects of art therapy and reminiscence therapy on agitated behavior in older adults with dementia.

**Literature Review**

**Dementia**

According to the Ministry of Health and Welfare, Taiwan, ROC (2019), the population with dementia in Taiwan topped 270,000 in 2017 and is expected to increase to 460,000 by 2031, the equivalent of two cases per 100 population. Over the next 46 years, the population with dementia in Taiwan is expected to grow at a rate of 36 patients per day (Ministry of Health and Welfare, Taiwan, ROC, 2019).

Dementia, a cognitive function disorder that may persist for 10 years or longer, is a common clinical syndrome among older adults. Gradual death of brain cells leads to behavioral changes, deterioration of cognitive function, and memory loss and severely affects daily life functions (Lin et al., 2015). In the beginning stage, mild cognitive disorders occur, and the individual remains able to perform self-care in daily life and does not show unusual conditions in appearance. The middle stage is evidenced by moderate cognitive disorders and clear behavioral symptoms requiring assistance in daily life. In the later stage, severe cognitive disorders result in full dependence on others for care and apparent changes in appearance (Woods, Aguierre, Spector, & Orrell, 2012). Patients with dementia are likely (at a reported risk ranging from 60% to 98%) to develop behavioral and psychological symptoms of dementia such as suspicion, delusion of persecution, hallucinations, wandering, agitation, and confusion (Huang & Hwang, 2012).

Agitation presents the most difficulties for caregivers, with a prevalence of 70%. Common forms of agitated behavior include aggressive behavior, nonaggressive physical behavior, and verbally agitated behavior (Ijaopo, 2017). Aggressive behavior includes attacking, grabbing, kicking, scratching, pushing, and spitting. Nonaggressive physical behavior includes wandering, wanting to move elsewhere, touching things, hiding things, and feeling restless. Verbally agitated behavior includes complaining, repeating questioning, denying, constantly seeking attention, verbally interrupting, and screaming (Ijaopo, 2017). Agitated behavior is most likely to occur during daily care because caregivers may dominate and force assistance onto patients with dementia or intrude into their life such as touching the patient’s personal items without warning (Huang, Liao, Wang, & Lai, 2012).

**Art therapy**

The American Art Therapy Association (2016) defines art therapy as a psychological health approach that uses an artistic creation process to promote and improve physiological, psychological, and mental health. Art therapy encourages self-expression through a creative process to help people solve conflicts and issues, develop interpersonal relations, manage behavior, reduce pressure, and improve self-respect, self-awareness, and perception. Participants in the spontaneous creative process express their thoughts and feelings via imagery, which elicits emotional and psychological treatment effects. Patients express themselves using art media and visual images. Feedback formed through experience and product expression in the treatment relationship has development, prevention, diagnosis, and treatment functions, which promote change and growth, personality integrity, and potential development. The therapy focuses on lived experience and the creative process rather than on achieving a final product (Taiwan Art Therapy Association, 2017). Art has been shown to sustain mixed feelings and to help older adults express incommunicable emotions and abstract feelings (Li, 2015).

**The Art Therapy Perspective in Caring for Older Adults With Dementia**

Participation in creative activities helps maintain excitement in older adults, improve their daily activities, and maintain their cognitive function. Drawing has an accumulative effect, and the trajectory of change becomes increasingly pronounced as time passes. Collage, doodling, weaving, and scrapbook activities in the creative process help older adults maintain movement in joints and peripheral nerves. Art therapy can improve cognitive and sensing capabilities, stimulate senses, help to reconstruct social interaction and help older adults maintain positive energy, enhance skills, increase creativity, stimulate all of their senses, and achieve a sense of accomplishment (Li, 2015). In addition, a finding of Li's study was...
that the creative process served as a medium through which art therapy could help older adults develop a sense of achievement and improved mood. The effects of art therapy on older adults with dementia include maintenance and improvement of cognitive function, assistance in cognitive function evaluation, provision of reminiscence methods, and improvement of agitation, uneasiness, aggressiveness, and confusion (Chancellor, Duncan, & Chatterjee, 2014).

**Reminiscence therapy**

Reminiscence is a process that occurs in stages, involving the recalling of early life events and previous interpersonal interactions (Dempsey et al., 2014). Alternatively, reminiscence may be seen as how recollections and interpretations of past life events, typically those that occurred in the distant past, are generated in the present (Gonzalez, Mayordomo, Torres, Sales, & Melendez, 2015). Reminiscence is an independent nursing intervention known as reminiscence therapy, which is defined under the Nursing Intervention Classification system as an intervention that utilizes the recollection of past thoughts, feelings, and events to enhance the happiness and quality of life of an individual or to assist that individual to adapt to his or her present situation (McCloskey & Bulechek, 2000). As a psychosocial intervention, reminiscence is frequently applied to elderly patients and to those being treated for dementia (Yen & Lin, 2018). For patient participants with dementia, the aims of the therapy must be sufficiently flexible to adapt to their specific needs and cognitive abilities. Any object utilized in therapy should have as much meaning to the participants as possible. Moreover, the number of participants in a group should be small, and the cognitive capacities of potential participants should be considered when forming a group (Dempsey et al., 2014; Martinez, 2012). Gonzalez et al. (2015) noted that reminiscence therapy involves the discussion of past activities, events, and experiences, usually with the aid of prompts such as photographs, household and other familiar items from the past, music, and archived sound recordings.

**The Reminiscence Therapy Perspective in Caring for Older Adults With Dementia**

Discussing familiar topics for group reminiscence therapy may help older adults relive happy experiences from the past, which may help them foster feelings of actuality, decrease behavioral problems, and improve self-esteem (Kao & Lin, 2002). The efficacy of reminiscence therapy for patients with dementia has been shown in several studies, particularly in terms of promoting cognitive functioning and lessening symptoms of depression (Gonzalez et al., 2015). Van Bogaert et al. (2013) developed a structured reminiscence protocol using user involvement and six to eight reminiscence sessions. Their findings showed positive effects associated with individual, thematically based reminiscence on well-being variables such as reduced depressive symptoms and increased cognition. Furthermore, a more recent study by Lök, Bademli, and Selçuk-Tosun (2018) found positive effects of reminiscence therapy on reducing depression symptoms and on increasing quality of life in older patients with dementia.

**Methods**

This study used a true experimental research design with repeated measures, with two experimental groups and one comparison group (see Figure 1 for the design plan). Data were collected between June 1, 2017, and December 10, 2017.

**Design and Sampling**

Cluster sampling was used in this study. To reduce interference from management, we recruited eligible individuals from two large dementia care centers (≥ 50 residents) with similar care models in, respectively, northern and central Taiwan. The researchers contacted center managers by phone to explain the research objectives and obtained consent, after which documents were dispatched and center visits were scheduled. Inclusion criteria included (a) diagnosed with dementia by a doctor; (b) aged 55 years or older; (c) had a Mini-Mental State Examination (MMSE) score of 6 points and higher; (d) had no severe visual, hearing, or upper limb disabilities; (e) able to communicate in Taiwanese; and (f) provided informed consent to participate.

We informed all of the older patients who expressed interest in participating about the study purpose, the data collection procedure, and their rights as research participants. Those who subsequently agreed to participate were assigned a number arranged in a random order, which was used to randomly assign them into the Experimental Group 1, Experimental Group 2, or comparison group. Seventy-two older adults who signed the consent form were enrolled as participants, of which 38 (47%) were from the dementia care center in northern Taiwan and 34 (53%) were from the dementia care center in central Taiwan. At pretest, 24 participants were assigned to Experimental Group 1; 24 participants, to Experimental Group 2; and 24 participants, to the comparison group. All 24 participants in Experimental Group 1 remained and completed the entire study. The final sample size for Experimental Group 2 decreased from 24 to 22, as one older adult relocated and another one died because of a heart attack. However, the final sample size for the comparison group significantly decreased from 24 to 8, as one participant relocated, three were hospitalized because of flu infection, and 12 decided to withdraw. The main reason for the decision to withdraw was the perception of receiving no treatment, although all were informed before signing the consent form regarding the possibility of being randomly assigned to the comparison group. As a result, the final sample size for the study included 54 participants who completed both the pretest and the two posttests, including 24 people in Experimental Group 1 (44.4%), 22 people in Experimental Group 2 (40.7%), and eight people in the comparison group (14.8%). Of these 54 participants, 26 (48%) were from the dementia care center.
in northern Taiwan and 28 (52%) were from the dementia care center in central Taiwan. Experimental Group 1 included 10 participants (42%) from the dementia care center in northern Taiwan and 14 (58%) from the dementia care center in central Taiwan. Experimental Group 2 included 11 participants (50%) from the dementia care center in northern Taiwan and 11 (50%) from the dementia care center in central Taiwan. The comparison group included five participants (63%) from the dementia care center in northern Taiwan and three (37%) from the dementia care center in central Taiwan.

Measures
The measures used in this study included a demographics datasheet, the MMSE, and the Cohen-Mansfield Agitation Inventory (CMAI). Each is described below.

Demographics datasheet
The basic demographic data collected included age, gender, educational level, religious beliefs, cognitive function, date of admission, and number of chronic diseases. Ability to perform activities of daily living, current drug use, and the number of family member visits per week were also assessed.

Mini-mental state examination
The MMSE (Folstein, Folstein, & McHugh, 1975) was designed to evaluate patient cognitive function using a quantitative method. Scale content includes 11 items in six constructs: orientation, registration, attention, calculation, recall, and language. The maximum possible score is 30 points, with higher scores indicating better abilities (Folstein et al., 1975). The correlation between the MMSE and the Wechsler Adult Intelligence Scales is .776 (p < .001) in the construct of verbal
intelligence quotient and .660 in the construct of performance intelligence quotient (p < .001). Test–retest reliability and interrater reliability was found to be .89 and .83, respectively.

Depaulo and Folstein (1978) revised the 20-point score of the original scale and defined 0–23 as indicating abnormal function and > 24 as indicating normal function. Yip et al. (1992) developed a Chinese version of the MMSE, which has been assessed at a Cronbach's alpha coefficient of .91. This Chinese version of the scale has been used in an epidemiological survey of dementia in the Taipei area, with scores consistent with those of Depaulo and Folstein.

### Cohen-Mansfield agitation inventory
The CMAI was developed by Cohen-Mansfield and Billig in 1986 and evaluated the frequency of agitated behavior in older adults with dementia. The CMAI consists of 29 items in four constructs: aggressive physical behavior, nonaggressive physical behavior, aggressive verbal behavior, and nonaggressive verbal behavior. The minimum possible score, indicating the absence of agitated behavior, is 29 points, whereas the maximum possible score, indicating completely agitated behavior, is 203 points. The frequency of agitated behavior in the last 2 weeks is assessed by caregivers using a 7-point scale, with 1 = absence of agitated behavior, 2 = once per week, 3 = 1–2 times per week, 4 = several times per week, 5 = 1–2 times per day, 6 = several times per day, and 7 = many times per hour. The scale is characterized by high validity and reliability (Finkel, Lyons, & Anderson, 1992). Nurses use this scale to evaluate the frequency of agitated behavior in patients during the immediately preceding 1-week period. The Cronbach's alpha coefficient of the Chinese version of this scale is .93 (Sung, Chang, & Abbey, 2006), and the Cronbach's alpha coefficient of the CMAI for this study is .87.

### Research process
This study included three groups: Experimental Group 1, Experimental Group 2, and the comparison group. Participants in Experimental Group 1 received art therapy, and the participants in Experimental Group 2 received reminiscence therapy. Participants in the comparison group engaged in normal activities. Participants in the experimental groups received either an art therapy or reminiscence therapy session each week for 12 weeks. Each therapy session was 50 minutes in length. Each participant completed the instruments immediately before the intervention and 1 and 6 weeks after completion of the intervention.

The researchers and the therapy specialist developed the action plan for all of the therapy sessions before the first therapy sessions began. The week-by-week activity plan included the main theme, objectives, description of the activities, and materials needed. Each therapy session lasted for 50 minutes, which included getting everyone seated (5 minutes), a warm-up exercise (5 minutes), a main theme activity (35 minutes), and a closing activity (5 minutes). Example of warm-up activities included choosing background music for the day, greeting and introducing the main theme, objectives, description of the activities, and materials needed. Each therapy session lasted for 50 minutes, which included getting everyone seated (5 minutes), a warm-up exercise (5 minutes), a main theme activity (35 minutes), and a closing activity (5 minutes). Example of warm-up activities included choosing background music for the day, greeting and introducing the main theme for the current day's session. Participants differed in terms of cognitive impairments. Active and silent older adults were placed together so that the active older adults initiated interaction with the therapist, providing other participants with opportunities to imitate and learn. Each older adult introduced herself or himself, which improved their verbal greeting and interaction skills. Each activity was guided by a specialist who had received training in art therapy and reminiscence therapy and occurred in the activity rooms of the dementia care centers included in the study. Summaries of weekly themes, learning objectives, and resources used for art therapy are shown in Table 1, and those used for reminiscence therapy are shown in Table 2.

The institutional review board at Kaohsiung Medical University Hospital approved this study (IRB No. KMUHIRB-SV [I]-20160051). The two dementia care centers included in the study were not affiliated with the Kaohsiung Medical University Chung-Ho Memorial Hospital. Before this study, patients were informed of the study purposes and procedures and assured of their right to refuse to participate or to withdraw from the study at any time without affecting current or future care. Participant identities were anonymized using random codes. Collected data and codebooks were locked in secured and separate areas. Findings are presented as group data only.

### Statistical Analysis
Collected data were coded, double-checked, and analyzed using SPSS for Windows Version 22.00 (IBM, Inc., Armonk, NY, USA). Descriptive statistics, including percentage, mean, standard deviation, frequency distribution, maximum values, and minimum values, were used to describe the basic data distribution and the differences among the three groups. Changes in agitated behavior over the different time points were analyzed using a generalized estimating equation (GEE) approach. Statistical significance was set at the p < .05 level (two-tailed).

### Results

#### Demographic Characteristics
The sample included older adults residing in two dementia care centers in New Taipei City and Taichung. Fifty-four participants completed the pretest and two posttests, including 24 in Experimental Group 1 (44.4%), 22 in Experimental Group 2 (40.7%), and eight in the comparison group (14.9%).

In this study, 35.2% of the participants were male and 64.8% were female. Most were > 80 years old (64.8%); had an elementary or junior high school education (40.8%), followed by “illiterate” (29.6%), junior college or higher education (14.9%), and high school education (14.8%); were widows
or widowers (61.1%); and were Buddhists (59.3%). All were visited by relatives and friends, with the main visitors being children (76.4%). Most participants were visited once per week (36.4%). The main source of income for 37 participants (68.5%) was family. Activity participation was two to three times per week (36.4%). The average total Barthel Index score was 54.4, indicating moderate to high level of dependence. The average MMSE score was 15.7 points, with 32.7% showing mild dementia (MMSE: 18–23), 38.2% showing moderate dementia (MMSE: 12–17), and 25.5% showing severe dementia (MMSE: ≤ 12). Chi-square and one-way analysis of variance as well as analysis of homogeneity of demographic characteristics between the groups indicated that the three groups did not differ significantly in terms of demographic characteristics, activities of daily living, or MMSE scores before the intervention (p > .05).

| Week | Main Theme                      | Learning Objective                                                                 | Resources Used                                                                                     |
|------|--------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| 1    | Making name tag                | (a) Introducing each other (b) Establishing ground rules for weekly activities (c) Making a name tag | Crayons, colored pens, colored paper, craft yarn, scissors, glues, tapes                           |
| 2    | Painting a dotted picture      | (a) Evaluating hand–eye coordination (b) Choosing favorite color (c) Connecting the dots (d) Group sharing | Crayons, large papers with dotted drawings or images                                              |
| 3    | Painting illustration for a storybook | (a) Taking turns to tell a story based on the artwork created last week (b) Group sharing | Crayons, large papers with dotted drawings or images, scissors, glues, tapes                     |
| 4    | Stamping art                   | (a) Relieving stress (b) Using the bubble wrap to make the fruit and vegetable imprints | Sliced fruit and vegetable, large drawing paper, watercolor paints, paintbrush, bubble wrap, scissors, glues, tapes |
| 5    | Drawing from a photo           | (a) Bringing one’s favorite photo (b) Drawing from the photo (c) Group sharing       | Photos, drawing papers, colored pencils                                                          |
| 6    | Scrapbooking I                 | (a) Scrapbooking with items that remind them of the most memorable moments (b) Sharing life stories | Drawing paper, colored paper, crayons, colored pencils, watercolor paints, paintbrush, scissors, glues, tapes |
| 7    | Scrapbooking II                | (a) Scrapbooking with items that remind them of the most difficult time (b) Sharing life stories | Drawing paper, colored paper, crayons, colored pencils, watercolor paints, paintbrush, scissors, glues, tapes |
| 8    | Scrapbooking III               | (a) Scrapbooking with items that remind them of the time they missed the most (b) Sharing life stories | Drawing paper, colored paper, crayons, colored pencils, watercolor paints, paintbrush, scissors, glues, tapes |
| 9    | Sculpting with moldable clay   | (a) Connecting with family members (b) Naming their family members and using clay to make a model for them (c) Group sharing | Moldable clay with assorted colors                                                               |
| 10   | Making artistic gifts          | (a) Connecting with friends (b) Decorating a reused household item (c) Making it into a gift for a friend (d) Group sharing | Dry, cleaned, reused plastic containers or bottles; small paper boxes; assorted decorative ribbons; bows; stickers; scissors; glues; tapes |
| 11   | Making a galaxy bottle         | (a) Making a connection with the universe (b) Making a galaxy bottle or jar (c) Group sharing | Dry, cleaned, reused small jars or bottles; baby oil; glitters; liquid; food color; water         |
| 12   | Folding origami                | (a) Sharing things they do or say to bring them peace and comfort (b) Making a good luck charm by following the origami guidebook (c) Concluding the art therapy program | Colored paper, colored pencils, red ribbon, origami guidebook scissor, glues, tapes                |
Changes in Agitated Behavior

Changes in agitated behavior were analyzed using a GEE model. An exchangeable working correlation matrix was used to control time effects. Significance was calculated using robust standard error (Liang & Zeger, 1986). Wald $\chi^2$ reaching the significance level ($p < .05$) indicates differences in participants' perceptions at the three time points, in which case post hoc comparisons must be conducted using the least significant difference.

Table 3 shows significant differences in CMAI scores for Experimental Group 1 at the three time points. CMAI scores were lower at Time Point 3, indicating decreased agitation at 6 weeks after the intervention. No significant difference was observed in the CMAI scores for Experimental Group 2 at the three time points, meaning that the agitated behavior of the participants in the Experimental Group 2 did not change substantially across the three time points. Thus, the treatment effect of reminiscence therapy on agitated behavior was not clear in this study. A significant difference was observed in the CMAI scores of the comparison group, with Posttest 1 and Posttest 2 results significantly higher than pretest results, meaning that agitated behavior in the comparison group increased progressively to Posttest 1 and Posttest 2.

Comparison of the Effects of Art and Reminiscence Therapy

A GEE model was used to compare and analyze the effects of treatment on agitated behavior in the three groups. An exchangeable working correlation matrix was used to control...
time effects, with significance calculated using the robust standard error (Liang & Zeger, 1986). Factors included “group,” “time point,” and “interaction effect” (Group × Time Point), among which the former two factors were main effects and the third represented an interaction effect. An interaction effect that reached significance indicated significant differences between changes in the two groups, with greater changes in experimental Group 1 confirming the effectiveness of the related intervention.

Table 4 shows that the interaction effect of “Experimental Group 1 vs. Comparison Group vs. Posttest 1” (β = -.05, p > .05) did not reach significance, indicating that changes in agitated behavior in Experimental Group 1 between pretest and Posttest 1 did not differ significantly from those in the comparison group. Thus, art therapy did not have an effect on agitated behavior that differed significantly from the comparison group. However, the interaction effect of “Experimental Group 1 vs. Comparison Group × Posttest 2” (β = -.20, p < .05) reached significance, indicating that changes in agitated behavior in Experimental Group 1 between pretest and Posttest 2 differed significantly from those in the comparison group. Figure 2 shows that the decrease in agitated behavior between pretest and Posttest 2 was greater in Experimental Group 1, indicating that art therapy had a clear and sustained effect on agitated behavior in comparison with the comparison group.

The interaction effect of “Experimental Group 2 vs. Comparison Group × Posttest 1” (β = -.12, p < .05) reached significance, indicating that changes in agitated behavior in Experimental Group 2 between pretest and Posttest 1 differed significantly from the changes in the comparison group. Figure 2 shows that the decrease in agitated behavior between pretest and 6-week posttest was greater in Experimental Group 2 than in the comparison group, indicating that reminiscence therapy had a clear and immediate effect on agitated behavior. However, the interaction effect of “Experimental Group 2 vs. Comparison Group × Posttest 2” (β = -.06, p > .05) did not reach significance, indicating that changes in agitated behavior in Experimental Group 2 between pretest and Posttest 2 did not differ significantly from those in the comparison group.
did not reach significance, indicating that changes in agitated behavior in Experimental Group 2 between pretest and Posttest 2 did not differ significantly from the comparison group. Reminiscence therapy did not have a more sustained effect on participants’ agitated behavior when compared with the comparison group.

The interaction effects of “Experimental Group 1 vs. Experimental Group 2 × Posttest 1” ($\beta = -0.07, p > 0.05$) and “Experimental Group 1 vs. Experimental Group 2 × Posttest 2” ($\beta = 0.14, p > 0.05$) did not reach significance, indicating that consecutive changes in agitated behavior between pretest, Posttest 1, and Posttest 2 in Experimental Group 1 and Experimental Group 2 did not differ significantly. Thus, art therapy did not have an immediate and sustained positive effect on agitated behavior.

**Discussion**

Both of the dementia care centers included in the study provided independent living rooms for the interventions to be conducted and were mostly free from interference from other residents, allowing for privacy, which enabled participants to freely express their feelings and emotions. There were significant differences between the results observed at the three CMAI time points for art therapy. A comparison showed that Posttest 2 results were better than Posttest 1 results, indicating a significant decrease in agitated behavior 6 weeks after the completion of art therapy. Art therapy was shown to have a treatment effect on agitated behavior, although its short-term effects were not significant.

Most participants indicated that they liked their creative works. By sharing these works and exchanging compliments with each other, a lively atmosphere was created that increased social interaction. The social interactions resulting from art therapy suggest that group activities such as art therapy increase the sense of security of participating individuals as well as their interactivity with the outside world. Furthermore, the art therapy group experienced a greater drop (from pretest to Posttest 2) in CMAI scores relative to the comparison group, supporting previous findings of accumulating effect of drawing producing a trajectory of change that becomes increasingly pronounced as time passes.

The art therapy sessions that were conducted lasted 50 minutes each, and many participants were only able to spend a short amount of time on the process of art creation. Reminiscence therapy led to the intervention group experiencing a greater drop (from pretest to Posttest 1) in CMAI scores relative to the comparison group, indicating that the immediate effects of reminiscence therapy on agitation in the participants were more pronounced relative to the comparison group. Compared with the comparison group, no significant change in CMAI scores was observed between pretest and Posttest 2 in the reminiscence therapy group, indicating no sustained effect on the CMAI scores of participants. However, participants’ agitation issues were found to have stabilized. When compared with reminiscence therapy, no significant difference in the effect of art therapy on CMAI scores was found between pretest and Posttest 1, indicating that art therapy did not produce an immediate and positive effect on CMAI scores when compared with reminiscence therapy. However, it was observed and reported by the main caregivers of these dementia care centers that, compared with the participants who underwent reminiscence therapy, some of those who underwent art therapy exhibited significantly fewer behavioral issues, experienced better sleep, and were less easily agitated.

**Conclusions**

The results of this study indicate that art therapy was effective for older adults living in the participating dementia care centers in terms of helping them evoke positive memories that induce joy and relaxation, reducing anxiety and the frequency of agitated behavior. The GEE exchange model test revealed the significant sustained effect of art therapy on agitated behavior. The results of this study indicate that art therapy helps
alleviate the agitated behavior of older adults with dementia, increase socialization, raise self-confidence, lower anxiety, reduce the frequency of mental and behavioral symptoms and the use of unnecessary psychiatric medications, and raise the quality of life and care quality for older adults with dementia. Incorporating art therapy into activities for older adults with dementia is feasible and beneficial.

In this study, reminiscence therapy did not have an apparent effect on decreasing agitation behavior. The small comparison group \(n = 8\) may have contributed to the inability in this study to illuminate the impact of reminiscence therapy on agitation behaviors. The potential threat to the internal validity of this study because of experimental mortality must be acknowledged because of the significant dropout rate in the comparison group. However, out of the obligation of the researchers to study participants and to the funding agency, the study was completed and the findings were disseminated despite the lack of a significantly large comparison group.

Limitations and Recommendations
This study was only able to recruit participants from two dementia care centers in northern and central Taiwan. Findings should not be generalized beyond this limited geographic area. The authors intervened and observed effectiveness for 12 weeks only. Thus, the long-term effects of art therapy and reminiscence therapy among older adults in nursing homes are unknown. The number of participants in the comparison group was overly small. Therefore, increasing the number of research participants, extending the length of the intervention to at least 16 weeks, holding two intervention sessions per week, extending the length and frequency of the therapy, and implementing follow-up intervention measures 3 months after the original intervention may improve the relevance and validity of results. Finally, we suggest that both art and reminiscence therapy be applied to patients with dementia not only in future research but also in nursing care based on patient preference.

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