



Research Article

Art therapy for the prevention of cognitive decline

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ARTICLE INFO

Keywords:

Art therapy
Cognition in older adults
Mild cognitive impairment

ABSTRACT

In recent years, non-pharmacological approaches have been introduced for older adults with mild cognitive impairment (MCI) in an attempt to address cognitive decline and improve cognitive functioning. Art therapy is a widely accepted psychosocial treatment known to engage attention and enhance cognition, and improve mood for persons with dementia. However, research assessing the benefits of art therapy in the MCI population is limited. This study used structured art therapy that was introduced as a 9-month randomized control trial of older adults with MCI (N = 68). The trial involved three arms, art therapy (N = 22), music reminiscence activity (N = 24) and a control group (no treatment; N = 22). Both art therapy and music reminiscence activity were conducted weekly for 3 months and then fortnightly for 6 months. Art therapy comprised of two structured components, physical creation of art pieces and the cognitive evaluation of paintings. The primary outcome, cognitive performance on neuropsychological tests, showed significant improvement in memory domains which were sustained at 9 months with art therapy. Additional improvements were noted in visuospatial abilities, attention, working memory, and executive function.

Introduction

Cognitive decline and impairment are amongst some of the most significant issues for ageing populations (United Nations, 2015). Together with physical and functional decline, these problems are associated with significant medical co-morbidity and psychological sequelae. Evidence suggests that very little improvement can occur in cognitive domains once dementia (major neurocognitive disorder) sets in. However, in the pre-dementia or mild cognitive impairment (MCI, minor neurocognitive disorder) stage, even though almost 50% will progress to dementia, up to 40% remain in the MCI stage and some do revert to normal ageing (Koepsell & Monsell, 2012; Roberts & Knopman, 2013). Non-pharmacological treatment for older adults in the MCI stage, could offer opportunities in preventing/delaying cognitive decline or developing dementia. Evidence have shown improvements in cognition and functioning in daily activities using non-pharmacological treatment for individuals with MCI (Karssemeijer et al.,

2017; Rodakowski et al., 2018). However, sometimes improvements were not significantly better than active controls, emphasizing the need for researchers to focus on 'more intense or different therapeutic approaches' (Martin, Clare, Altgassen, Cameron, & Zehnder, 2011). Art therapy is one such approach that has been shown to effectively treat symptoms faced by persons with dementia (Chancellor, Duncan, & Chatterjee, 2014). Art therapy is well recognized in Singapore. However, local research on the effectiveness of art therapy in older adults with MCI is limited.

Literature review

Studies with normal ageing older adults

Studies with normal ageing older adults showed that art therapy could enhance cognitive performance (Alders & Levine-Madori, 2010). Community-living Hispanic/Latino older adults aged above 60 years

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<https://doi.org/10.1016/j.aip.2018.12.003>

Received 2 April 2018; Received in revised form 25 July 2018; Accepted 9 December 2018

Available online 10 December 2018

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($n = 24$) participated in sessions described as “relaxing art therapy sessions” (e.g., 2-D art making) for ten weekly sessions that lasted two hours each or control group sessions that engaged in creating art or crafts on their own, playing dominoes or bingo, socializing, or watching television. Findings from the Clock Drawing Test (CDT) and self-report Cognitive Failures Questionnaire (CFQ) administered at pre-and post-treatment indicated that more than 60% of participants had improved cognitive performance with art-making activities. On the other hand, Im and Lee (2014) found that 12 sessions of art therapy alleviated depressive symptoms but not cognitive function (i.e., Mini-Mental State Examination for Korea) in older Asian adults ($n = 65$). The study did not include a control group in their design and cognitive results cannot be generalised, as age and education were not included in their analysis.

A combination of art viewing in a museum, group discussions, journaling and art making was found to increase the well-being and social connectedness in older adults (Bennington, Backos, Harrison, Reader, & Carolan, 2016). Participants aged above 70 years ($n = 8$) attended four art therapy sessions in a museum. They were led in viewing and discussing four paintings during each session; thereafter they were given a stimulus art and instructed to create art that portrays their experiences in the galleries. Qualitative analyses of participants’ art and journal writing showed that art viewing promoted De Botton and Armstrong’s (2013) seven therapeutic functions; remembering, hope, sorrow, rebalancing, self-understanding, growth and appreciation. However, the sample was small, self-selected and had high levels of education, suggesting the lack of generalizability.

Studies with older adults with dementia

Several studies using art viewing and art-making activities found cognitive changes in persons with dementia. Eekelaar, Camic, and Springham (2012) found an increase in episodic memory from 7% to 26%, which was maintained after a month (26%) in individuals with dementia ($n = 6$). However, verbal fluency was found to only increase from 0% to 6%, and not sustained in the long-term with deterioration at the end of the art-viewing and art-making sessions (3%). Rusted, Sheppard, and Waller (2006) evaluated persons with dementia ($n = 21$) from multiple day care or residential facilities and engaged them in 40 weekly sessions of art activities, such as painting, making collages and making ceramics. Cognition and short-term memory of the participants did not significantly improve; this result is likely related to the form and method of the art activities and the sensitivity of the assessment tools. While art therapy helps improve some cognitive function domains in the persons with dementia, effects are variable and measurements were less precise largely due to methodological issues.

In Asia, mixed outcomes on cognitive function were found with art therapy alone or in mixed approaches (which included art therapy) in older adults with mild dementia. Hattori, Hattori, Hokao, Mizushima, and Mase (2011) conducted 12 group art therapy sessions for persons with mild Alzheimer’s disease ($n = 20$). The sessions used techniques such as colouring abstract patterns and line drawing of familiar objects based on participant’s memory. Findings from the study suggested that art therapy was not effective in maintaining or improving cognition ($p = .22$), but improved quality of life. On the contrary, art therapy improved cognitive function in older adults with mild dementia only when combined with cognitive stimulation, music therapy and horticultural therapy (Kang et al., 2010).

Generally, for people with dementia, art therapy is effective in treating behavioural and emotional changes with the illness. Rusted et al. (2006) also assessed the mood of individuals with mild to severe dementia ($n = 21$), and found that art therapy improved mood such as calmness in a sustainable manner, without enhancing cognition over a 40 week period. In an art viewing study, persons with dementia ($n = 37$) and their caregivers were invited to the Museum of Modern Art (MoMA) in New York City to view artworks as well as discuss their

thoughts, personal experiences and feelings; findings suggest a positive change in mood after the program (Rosenberg, 2009). However, the study lacked objective measures of mood (e.g., self-rating of smiley faces was used) and did not measure cognition.

These results suggest many gaps in the literature and several methodological issues in studies assessing the efficacy of art therapy on cognition in older adults. In one study, participants could choose the group they wanted and those in the experimental group could attend as few as 3 out of 10 art therapy sessions (Alders & Levine-Madori, 2010). In reality, many of these studies did not deliver art therapy as psychotherapy but used participative arts instead (Eekelaar et al., 2012; Hattori et al., 2011; Kang et al., 2010). In the study by Rusted et al. (2006), the control group activity (not described) differed based on the residential facility the participant was in and qualitative data was biased. Most studies had either no active comparators or had control group activities which consisted of socializing, watching television, health education, or reading (Eekelaar et al., 2012; Kang et al., 2010; Rusted et al., 2006), while others had no control group at all (Im & Lee, 2014). Many case studies and clinical trials have showed that art therapy engages persons with dementia’s attention, improves mood and symptoms (Chancellor et al., 2014). It was suggested that there is a need to establish structured art therapy methods, assess efficacy beyond an art studio and define optimal conditions for art therapy. Moreover, most studies have evaluated art therapy for persons with dementia rather than persons with MCI, a pre-dementia stage where it may still be possible to reverse cognitive decline.

Objective

An earlier study (Rawtaer et al., 2015) revealed improvements in sub-syndromal anxiety and depressive symptoms in community-living older adults after introducing music reminiscence activity, art therapy, mindfulness awareness practice and Tai Chi exercise. In this present study (Mahendran et al., 2017), we explored the feasibility of structured art therapy for older adults with MCI, with an active comparator music reminiscence activity and a control group with no treatment. This paper highlights the development and delivery of art therapy and, its effectiveness in providing cognitive benefits.

Method

Design

This exploratory study had an open-label randomized control, parallel groups design involving three arms over a period of nine months (June 2016–April 2017): art therapy, music reminiscence activity and a control group, where participants did not receive any treatment and continued life as usual. Art therapy consisted of 24 one-hour sessions: 12 weekly sessions for the first three months and 12 fortnightly sessions for the remaining six months. The study was registered retrospectively on 7 July 2016 at Clinical Trials.gov, a service of the US National Institute of Health (NCT02854085), retrospectively.

Outcome measures

Standardized measures (Z-scores) of cognition were taken at baseline, three months and nine months of the study (Mahendran et al., 2017). This manuscript highlights cognitive outcomes measured by an interviewer-administered battery of selected neurocognitive assessments. Specifically, it assessed different cognitive domains: (1) memory using Rey auditory verbal learning test (RAVLT) List Learning, Delayed Recall and Recognition Trial (Schmidt, 1996), (2) visuospatial abilities using Wechsler Adult Intelligence Scale-3rd edition (WAIS-III) Block Design (Wechsler, 1997), (3) attention and working memory with the Digit Span Forward task from WAIS-III Digit Span Task, and (4) executive function with the Color Trails Test (CTT) Form A – Trial2

(D'Elia, Satz, Uchiyama, & White, 1996).

Participants

Sixty-eight community-living older adults (aged 60–85 years) who met Petersen's (2004) diagnostic criteria for MCI were included in the study. A detailed description of the inclusion and exclusion criteria is provided in the study protocol (Mahendran et al., 2017). 22 out of 68 participants (4 males, 18 females; mean age 71.1 years) were randomly assigned to the art therapy group, using a web-based randomization system. In addition, permuted block randomization stratified by gender was used to ensure balanced treatment assignments. Participants were informed of their assignments three days prior to the start of the sessions. During baseline interview, participants were asked specifically if they had any training in art and/or music or had special interests or hobbies in these activities; only two participants indicated prior and current exposure (i.e. less than 2 h per week) in art as a hobby. The study received ethics approval from the National University of Singapore Institutional Review Board and all participants provided written informed consent.

Art therapy

Studies have highlighted that producing artworks and cognitively evaluating artworks potentially benefit an individual in slightly different ways (Bolwerk, Mack-Andrick, Lang, Dörfler, & Maihöfner, 2014). Both methods were incorporated into this study; (1) structured art making activities were developed by trained and licensed art therapists (Art Therapists' Association of Singapore [ATAS], 2018), while (2) 12 art pieces for the art viewing activity were selected by curators from the National Art Gallery Singapore and the National University of Singapore Museum in consultation from a team of art therapists and psychiatrists involved in the study (KEH, RM). Selected art pieces were relevant to older adults, whereby the themes or events portrayed in each art piece was linked to the country's past and held cultural and social significance. Curators of the museums in consultation with art therapists and psychiatrists selected the art pieces. It was foreseen that this would provide a stimulus for recall and discussion.

Apart from promoting social interaction, group interactive art therapy also provides opportunities to instil hope, promotes universality and altruism amongst group members (Waller, 2003). The therapists had experience in delivering art therapy in a group setting. The art therapy sessions were conducted in a small group setting (e.g., two groups of 11 participants) coupled with clearly defined goals. Participants were encouraged to narrate their thoughts and inner experiences in both types of sessions. The therapists set clear goals to help the participants: reconcile emotional conflicts, reduce anxiety, build self-awareness, solve problems and improve self-esteem.

There is suggestion that older adults may require longer art therapy sessions to fully gain from the creative process (Pike, 2015, p. 278). However, the duration of each art therapy session was 45 min long (excluding breaks and relaxation technique), which was sufficient to effectively engage the participants without tiring them out. Participants were informed about the following art therapy sessions as seen in Table 1, so that they could anticipate the upcoming sessions. Both types of art therapy sessions included a fifteen minute break and a 5-minute relaxation exercise (at the start of each session) to help participants focus on the art activity.

Delivery of art therapy: creation of art pieces

Art making sessions were conducted at a community research center (Training and Research Academy at Jurong Point, TaRA@JP). Various techniques were used: drawing and scribbling, collage work, symbol work, pictorial imagery and clay work/sculpture. Materials used were flexible and not limited to paint, pencils, crayons, picture cards, pastels,

Table 1
Themes of Art Therapy Sessions.

Session	Theme/Art Activity	Type of Art Activity
<u>Weekly sessions:</u>		
Session 1	Art exploration and expression	Art making
Session 2	Friendship	Art making
Session 3	Visit to the NUS Art Museum	Structured art viewing
Session 4	Visit to the National Art Gallery	Structured art viewing
Session 5	Emotions and feelings	Art making
Session 6	Family	Art making
Session 7	Visit to the NUS Art Museum	Structured art viewing
Session 8	Visit to the National Art Gallery	Structured art viewing
Session 9	Happiness	Art making
Session 10	Hopes, dreams and wishes	Art making
Session 11	Visit to the NUS Art Museum	Structured art viewing
Session 12	Visit to the National Art Gallery	Structured art viewing
<u>Fortnightly sessions:</u>		
Session 13	Life review	Art making
Session 14	Visit to the NUS Art Museum	Structured art viewing
Session 15	Celebrations and culture	Art making
Session 16	Visit to the National Art Gallery	Structured art viewing
Session 17	Chinese New Year	Art making
Session 18	Visit to the NUS Art Museum	Structured art viewing
Session 19	Family and Friends	Art making
Session 20	Visit to the National Art Gallery	Structured art viewing
Session 21	Coping with Stress	Art making
Session 22	Visit to the NUS Art Museum	Structured art viewing
Session 23	Mini-Gallery (Self-perception)	Art making
Session 24	Visit to the National Art Gallery	Structured art viewing



Fig. 1. “Me”, a scribbling art piece produced and shared by a participant indicating an understanding of current situation encountered.

stickers and coloured paper. Each session had a planned theme (refer to Table 1). The art therapist invited participants to share in pairs about the artwork they had created, coupled with their feelings and perspectives (See Fig. 1). Thereafter, they were invited to share about their artwork with the group, and engage in image appreciation activities conducted by the art therapist to guide participants in assigning emotional and cognitive significance to their artworks.

Delivery of art therapy: viewing and cognitive evaluation of Art pieces

During structured art viewing sessions, participants were invited to the National Art Gallery and National University of Singapore Art Museum to view the pre-selected displayed artworks (e.g., paintings, drawings, heritage objects). Each session was conversation-based. Participants gathered around the selected art piece and engaged in meaningful conversations by sharing their perspectives, experiences and feelings about the artwork in the museum (See Fig. 2). Specifically, the art therapist introduced the title of the artwork, its artist, and provided a brief description of the artwork. Guiding questions were then asked based on, the theme of the artwork (e.g., “If you can give this painting a title, what would it be?”), visual observations (e.g., “Which part of this painting captures your attention?”), feelings (e.g., “What do you feel when you look at this painting?”), and specific details of the artwork (e.g., “Why do you think the character of this



Fig. 2. A painting that depicts a group of students learning the Malay language in the 1950s. By Chua Mia Tee, titled 'National Language Class', a collection of National Gallery Singapore. Reprinted with permission.

painting was drawn this way?"). Freedom of expression was encouraged throughout all sessions.

Music reminiscence activity

Combining reminiscence therapy and music, the music reminiscence activity starts with five minutes of mindful relaxation. The 1-hour session consisted of music videos put together by trained volunteers in consultation with psychiatrists; participants selected their favourite songs and brought 10–20 photographs. The therapist encouraged the group to listen, recall memories, and share their experiences related to the music video. More details of the music reminiscence activity are available in the study protocol (Mahendran et al., 2017). Reminiscence provides older adults a platform to share their feelings, uplift their self-esteem; at the same time, being in a group promotes validation (Burnside & Haight, 1994). Similar to the art therapy group, participants attended 12 weekly sessions and 12 fortnightly sessions of the music reminiscence activity.

Results

The SAS software version 9.4 (SAS Institute, Cary, NC) was used and analyses were performed on the intention-to-treat population. Using the linear mixed model with 90% confidence intervals (CIs), adjusted for baseline values and gender, mean change from baseline in neurocognitive Z-scores were estimated and compared between treatment and control groups. Statistically significant improvements in memory and attention was observed over 3 months in the art therapy arm compared to those in the control group; List Learning (difference [d] = 0.542; 90% CI 0.105, 0.810; p = 0.042), and Digit Span Forward (d = 0.991; 90% CI 0.251, 1.730; p = 0.028) respectively. Positive trends were observed in the art therapy group for Delayed Recall, Recognition Trials, Block Design, and Color Trails 2; these results however were not statistically significant (p > 0.05). Participants in the art therapy group compared to controls scored statistically significantly higher in overall memory (d [memory domains] = 0.403; 90% CI 0.126, 0.679; p = 0.017) and overall cognitive function (d [all domains] = 0.462; 90% CI 0.202, 0.722; p = 0.004). Additionally, the effect of art therapy sustained memory function over another 6 months despite the reduced frequency of art therapy participation to fortnightly (d = 0.308; 90% CI 0.068, 0.548; p = 0.035). Moreover, the mean number of cognitive domains with Z-score < -1.5 at 3-months was reduced in participants from the art therapy group compared to controls (d = -0.314; 90% CI -0.629, 0.000; p = 0.100).

Despite having higher estimated mean changes in the MRA group compared to the CG group, for Delayed Recall (d = 0.172), Recognition Trial (d = 0.088), Digit Span Forward (d = 0.787), Color Trails 2 (d = 0.033), and Block Design (d = 0.130), music reminiscence activity did not significantly enhance cognition (each p > 0.05). Likewise, the

means of memory domains and all cognitive domains were higher in the music reminiscence activity compared to the CG group but were not statistically significant (d [memory domains] = 0.037; d [all domains] = 0.180; each p > 0.05). In addition, the effect of music reminiscence activity at 9-months was similar to the effects observed at 3-months.

Discussion

Findings support the effectiveness of art therapy as a psychosocial approach for persons with MCI, whereby overall cognitive function improved within a short period (three months) and memory was sustained over six months even with reduced frequency of art therapy. Results were akin to studies that found art activities to improve memory in persons with dementia (Eekelaar et al., 2012; MacPherson, Bird, Anderson, Davis, & Blair, 2009). Moreover, positive findings of the art therapy group on attention and cognitive function were similar to other self-reported observations in the literature, which indicated sustained attention (Rentz, 2002), and improved mental acuity (Rusted et al., 2006).

Previous studies have used structured art viewing and art making in art therapy sessions which were found to stimulate cognition. People with dementia and their carers reported that the discussion of artworks at an art gallery allowed them to recall past events and stories, which provided memory stimulation (MacPherson et al., 2009). The aforementioned, Eekelaar et al.'s study (2012) that combined art viewing and art making for participants with dementia, postulated that increased stimulation and engagement during both types of art therapy sessions improved episodic memory. However, the study lacked objective measures and clear directives in art making sessions. In contrast, the present study supports the evidence of using a combined art therapy approach with the inclusion of objective cognitive measures and defined therapeutic goals in each art therapy session.

In most art therapy approaches, therapists have a clear treatment goal and conduct structured activities accompanied with directed conversations (Malchiodi, 2003). For older adults, the goal is for art therapists to understand and acknowledge age-related changes in order to instil a sense of hope despite their losses. As art making taps into an individual's emotions, making them vulnerable, it is essential for his or her defences to be protected through structured art activities (Rubin, 2005). By adopting a directed psychotherapeutic approach in this study, participants were able to engage in spontaneous expression based on selected themes while the art therapist directed conversations. This allowed the therapist to introduce to the group age-related issues in a direct but safe way. Findings from this study highlights the benefits of combining structured art viewing and art making in art therapy and the inclusion of clear directives in each art therapy session.

A possible explanation for the improvement in cognition found could be the long periods of focused engagement and sufficient practice of art therapy (e.g., 24 sessions) in this study. Art therapy coupled with educating older adults on art methods (i.e., drawing, painting, etc.) provides older adults with dynamic learning opportunities, in turn engaging their remaining cognitive, motor and social abilities (Alders, 2011). At a neural level, attention researchers have uncovered the connection between neural networks, genes and socialization that provides an explanation to human cognition and emotion (Posner & Rothbart, 2007). Evidence suggests that sustained training in arts strengthens the brain's attention network, and in turn improves overall cognition (Posner & Patoine, 2009). Moreover, specific brain networks underlie specific art forms (e.g., visual arts, linguistic arts, movement arts, music), whereby the involvement and practice of such tasks increases the efficiency of underlying brain networks and improves brain connectivity amongst the brain areas. It is posited that learning of art making and art viewing techniques could have increased activation in the brain's attention network and improved memory functions.

Art therapy can simultaneously stimulate cognitive functioning and

provide psychological engagement. Dalley (1984) pointed out that the art form as a therapeutic tool provides a focus for discussion, analysis, and self-evaluation. She further stressed that when art is used for communication, a person can gain insight both intellectually and emotionally by connecting the meaning of the picture to his or her own life situation (Dalley, 1984, p. xii). During the art-making sessions, participants expressed their thoughts and feelings, by linking their produced art pieces to their personal life events, review, and create or rediscover the meaning of their art pieces.

Chancellor et al.' (2014) theoretical framework postulates that art therapy (e.g., art making and art viewing) can benefit persons with dementia based on three assumptions; art therapy relies on preserved abilities, art therapy provides older adults a channel to express their emotions, and finally art therapy can generate a state of 'flow' which in turn increase one's sense of well-being. As mentioned earlier, existing literature on the effects of art therapy on cognition of people with dementia were mixed (Hattori et al., 2011; Kang et al., 2010). It is possible that results in this study showed improved cognition as participants had higher preserved cognitive abilities (i.e., pre-dementia stage) as compared to persons with dementia.

Tyler (2002) also indicated that creating art pieces could provide a healing effect, promote a sense of achievement and control, and the opportunity of being understood by others (p. 81–82). Similarly, art viewing helps individuals with emotional issues process difficult personal experiences (Shaer et al., 2008). As such, in art therapy there is potential for the exploration of important thoughts and feelings both conscious and unconscious, which may help to resolve hidden or inner conflicts. Most participants in this study re-examined their previous life transitions and came to terms with their current situation. Older adults with MCI may require a combination of art-as-therapy, art-psychotherapy technique and theoretical perspectives in order to make cognitive and emotional progress.

Limitations

Despite having found some positive findings, the study sample was small, participants were predominantly females and the study is not statistically powerful enough to assess effectiveness or generalizability. In addition, double-blinding is not possible with the sessions provided. However, precautions were taken to ensure that assessors were blinded to the art therapy and music reminiscence activity sessions.

Conclusion

This pilot RCT contributes to the limited literature on art therapy and its effects on cognition in persons with MCI. Not only were short-term gains identified but also sustainability of the gains were shown. While the findings should be interpreted with caution, this exploratory RCT suggests scope for a substantive study on art therapy that includes both art viewing and art making and the need to not only address some of the study limitations but also explores other variables such as socialization. Only then, would there be more grounding for the use of non-pharmacological approaches such as art therapy for community-dwelling older adults with MCI.

Funding

This work was funded by a donation gift from the Kwan Im Thong Cho Temple and Lee Kim Tah Holdings.

Acknowledgments

We thank the curators, docents and volunteers from the National University of Singapore Art Museum, National Gallery Singapore, Singapore Action Group of Elders Counselling Centre and Presbyterian Community Services.

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