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Effectiveness of Art Therapy on Cognitive Function of Older People with Dementia: A Systematic Review and Meta-Analysis

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Abstract
Asia bears the highest global dementia burden with 22.9 million cases—more than double those in Europe and the Americas. Given the progressive cognitive decline associated with dementia and the limitations of pharmacological interventions, evidence-based non-pharmacological approaches are urgently needed. This systematic review and meta-analysis examined the effectiveness of art therapy interventions on cognitive function in older adults with dementia across Asian populations. A comprehensive literature search was conducted across Science Direct, PubMed, Sage Journals, and Google Scholar using relevant keywords. Of 242 initially identified articles, five experimental studies meeting inclusion criteria were analyzed. Meta-analysis employed Hedges' gto calculate effect sizes, with studies involving participants aged 65+ years from Indonesia, Korea, China, and Taiwan. Interventions included drawing, coloring, music therapy, collage-making, and reminiscence therapy, typically delivered by qualified professionals over 4–16 weeks. Meta-analysis revealed a statistically significant positive effect on cognitive function (Hedges' $g = 0.586, p < .001$), indicating meaningful cognitive improvements. The Fail-safe N analysis ($n = 2341$) demonstrated strong resistance to publication bias, supporting the robustness of the findings. Cognitive outcomes were assessed using validated instruments including MMSE, CNPI, and MoCA. Art therapy represents an effective, culturally adaptable intervention for maintaining cognitive function in older adults with dementia in Asian contexts. These findings support integration of art therapy into individual private practices and community-based programs, particularly in resource-limited settings. Future research should emphasize longer follow-up periods, standardized measures, and stratified analysis by dementia severity to enhance generalizability.

Keywords: Art Therapy, Cognitive Function, Older People, Dementia, Effectiveness

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INTRODUCTION

The global economic burden of dementia is staggering, with estimated annual costs exceeding $1.3 trillion, projected to reach $2.8 trillion by 2030. This economic impact encompasses direct medical costs, social care expenses, and the substantial informal care burden borne by families and communities, representing a significant public health challenge that threatens to overwhelm healthcare systems worldwide, particularly in low- and middle-income countries where resources for comprehensive dementia care are already limited. Dementia is one of the most common disorders experienced by older people. With the increasing proportion of older people, the issue of dementia can't be ignored, both in the private and public domains of older people's care. Data presented by the World Health Organization (WHO) in 2023 states that there are more than 55 million people worldwide living with dementia (World Health Organization, 2023).

Dementia is ranked seventh in the world as a cause of death and is a leading cause of disability and dependency among older people. Asia currently has the highest number of dementia cases, with

22.9 million reported, more than twice the number reported in Europe (10.5 million) or the Americas (9.4 million) (Naheed et al., 2023). These figures reflect the rapid growth of the ageing population concentrated in Asian countries (Balachandran, 2022; Balachandran et al., 2020; Goh, 2005). Dementia is primarily caused by injury to certain parts of the brain, which can arise from various conditions (e.g., Alzheimer's, vascular disease, Parkinson's disease, traumatic brain injury). Individuals are diagnosed with dementia when they experience multiple symptoms reflecting decreased cognitive functions that are not explained by other disorders such as delirium or mental illnesses, and these symptoms interfere with their daily activities. These symptoms often develop gradually and can progress over seven years or more (American Psychology Association, 2018). Declining cognitive function is a key indicator of dementia.

Cognitive function refers to individuals' cognitive abilities, including knowledge and awareness such as perceiving, focusing, memorizing, reasoning, judging, decision making, and problem solving (Goldstein, 2019). Previous studies have demonstrated that age-related diseases accelerate dementia and cognitive dysfunction. Over time, dementia impairs older people's ability to perform daily activities and increases their need for care (Murman, 2015). One study revealed how dementia causes mental and physical stress for both older people and caregivers (Jeste et al., 2021). Stressors such as older people's characteristics, care situations, family conflict, financial constraints, and social isolation influence their well-being and contribute to morbidity in many countries (Miu et al., 2016). Drawing on the political economy perspective of ageing, we argue that socio-economic class, educational background, and social networks contribute to dementia prevalence. Consequently, the majority of dementia cases exist in low- and middle-income countries (Miu et al., 2016), characterized by lower education levels (Ngandu et al., 2007), less engagement in healthy lifestyles and exercise (Dhana et al., 2020), and limited social activities and networks (Kujawski et al., 2021).

Given the disadvantages brought by dementia, prevention and intervention programs are crucial to mitigate the disease's severity. Previous studies identified several interventions targeting cognitive function prevention and rehabilitation. Among these, art therapy is one of the most widely applied interventions for older populations (Fioranelli et al., 2023; Kujawski et al., 2021).

Art therapy is a form of therapy utilizing art and creative expression to support recovery from various mental disorders. Facilitated by professional art therapists, it effectively aids personal and relationship treatment goals as well as community engagement. It is used to improve cognitive and sensorimotor functions, develop self-esteem and self-awareness, cultivate emotional resilience, promote insight, enhance social skills, reduce conflict and anxiety, and foster social and ecological changes (American Art Therapy Association, 2017). In practice, art therapy employs diverse media such as painting, drawing, music, crafts, and body movement. This versatility allows its application in various settings including private practices, hospitals, schools, and communities. Art therapy focuses on the creative process and its psychological benefits rather than the artistic output or skill level. It is also recommended for people with dementia as it provides meaningful stimulation, increases social interaction, and improves self-esteem (Douglas et al., 2004). In this context, art therapy integrates social, physical, and cognitive stimulation, which is believed to enhance older people's cognitive function (Kujawski et al., 2021)[A1].

Several studies have demonstrated the therapeutic benefits of art therapy interventions across various mental health conditions, with growing evidence supporting its use in dementia care specifically. Hu et al. (2021) provided a comprehensive overview showing that art therapy serves as an effective complementary treatment for mental disorders, including dementia, by engaging multiple sensory and cognitive pathways simultaneously. Art therapy has also been shown to improve cognitive function, biological and psychological symptoms of dementia, and the overall well-being and quality of life of older adults (Emblad & Mukaetova-Ladinska, 2021).

Emblad and Mukaetova-Ladinska's (2021) systematic review highlighted how creative art therapy addresses cognitive symptoms alongside behavioral and psychological manifestations of

dementia, offering a holistic, non-pharmacological approach. Fioranelli et al. (2023) emphasized arts engagement as a preventive strategy for reducing cognitive decline among healthy older adults, suggesting that creative activities build cognitive reserve before the onset of dementia. Douglas et al. (2004) established foundational evidence for non-pharmacological interventions in dementia care, positioning art therapy as a viable alternative or complement to medication-based treatments. Kujawski et al. (2021) further demonstrated through longitudinal studies that multimodal interventions including art-based activities contribute to maintaining or improving cognitive function in community-dwelling older adults.

Despite these promising findings, significant gaps remain. Studies vary widely in intervention protocols (duration, frequency, artistic modalities), use different cognitive assessment tools (which complicates direct comparisons), include participants with varying dementia severity (from mild cognitive impairment to severe dementia), and often lack long-term follow-up to evaluate sustained effects. Still, the high prevalence of dementia in Asia highlights the vulnerability of older adults and the commonality of this condition, especially in Asian populations.

Given the escalating dementia burden and the high dependence on informal caregivers in Asia—where formal care systems are often underdeveloped or inaccessible—there is an urgent need to identify culturally adaptable, cost-effective, non-pharmacological interventions that can preserve cognitive function among older adults.

Art therapy presents a particularly promising path as it aligns with many Asian cultural values that emphasize creative expression, collective activities, and intergenerational engagement, while requiring less infrastructure than expensive or inaccessible pharmacological treatments in resource-limited settings. Therefore, this literature review aims to provide a comprehensive overview and evaluation of the effectiveness of art therapy on maintaining cognitive functions and decelerating cognitive decline in older people with dementia, with a focus on application in the Asian cultural context.

RESEARCH METHOD

This study used a Systematic Literature Review approach that focused on evaluating and synthesizing previous studies related to the topic. The article search process was conducted through reputable journal databases, including Science Direct, PubMed, and Sage Journal using the keywords: "Art Therapy" OR "Creative Art Therapy" AND "Dementia" OR "Neurocognitive Disorder" AND "Cognitive Function" OR "Cognition" AND "Elderly" OR "Older Adult". The results of the search in Science Direct resulted in 60 articles, in Pubmed 49 articles, and in SageJournals 131 articles, accompanied by 2 additional articles through searches on secondary databases, namely Google Scholar, to gain broader and more in-depth information. Therefore, the total article search results reached 242 articles. The search results were then filtered based on title, abstract, and research method, as well as publication year criteria. The screening process was carried out using inclusion criteria, namely research conducted on a) older people aged 65 years and over, b) measuring cognitive function, c) experimental research, including general experiments, preliminary experiments or Randomized Controlled Trials, regarding art therapy interventions and the similar approaches, d) the range of publication years in the last 10 years (2013-2023), e) research using English and Indonesian, f) research conducted in Asia, and) in the form of research articles.

JASP (Jeffreys Amazing Statistics Program) (JASP Team, 2023) was used to compute and meta-analyze the effect sizes of included studies. The software was designed to facilitate a diverse array of statistical analyses, including meta-analysis—the synthesis of findings from multiple independent studies to ascertain an overarching effect size

estimate. Within the context of meta-analysis, Hedges' g (Borenstein et al., 2009) emerges as a metric in this report. Hedges' g is a standardized effect size measure, which is helpful for its correction of bias stemming from small sample sizes, thereby enhancing the precision of the estimated effect size. This correction assumes particular significance in the amalgamation of disparate study results. This metric also reveals the range of improvement in variables from the pre-test to the post-test. The result is positive when there is positive progress from the pre-test to the post-test. In this study, the mean impact magnitudes are presented distinctly for the art therapy interventions and the control groups. The main analyses considered each study as an independent unit, contributing an improvement either exclusively for the art therapy interventions or the control groups

RESULTS AND DISCUSSION

Study characteristics

As shown in Table 1, studies in this review were published between 2013 to 2020. The studies were conducted in various locations, such as care centres or Tresna Werdha, and included patients from local hospitals. The countries involved in the studies included Indonesia, Korea, and China, which majority is around Asia. The control groups that were retrieved in these studies were Brain Exercise, Standard Cognitive Training or with No Treatment at all.

Sample characteristics

The demographic data reveals quite homogenous data in terms of participants' age, which scatters between 60 and 90 years. Older people involved in the study had declining cognitive function that had been diagnosed through the administration of neuropsychological assessments, such as the Mini-Mental State Examination (MMSE). In addition, the diagnosis was also established through clinical records from hospitals or care centres. The diagnosis had been made based on the Diagnostic and Statistical Manual of Mental Disorders (DSM) IV and V edition criteria. Across the groups, there is a notable prevalence of females, ranging from 51.6% to 76.8%. Education levels are generally high, with percentages ranging from 31.7% to 93,5%, in the range of elementary school to further education. The severity of dementia varies, encompassing mild, moderate, and severe categories mostly according to MMSE interpretations. However, there are distinct differences among the groups. Marital status, for instance, fluctuates, with some groups reporting a higher percentage of widowed older people (52%) than lasting marriage (30,2%). Certain studies indicate variations among individuals residing with family, specifically highlighting family support at a notable 96.8%. One study indicates that 86.6% of individuals engage in labour to fulfil their survival and everyday necessities.

Unique details, such as medical history show variability, with percentages for conditions like hypertension, diabetes, and dyslipidemia differing across groups. Furthermore, lifestyle factors, such as exercise engagement (79.6%) and ambulatory status (6.5%), are specified in one group. Medication usage, including sedatives (53.2%) and dementia-specific medications (13%), also displays variability. In summary, while commonalities exist in age and gender distributions, substantial differences emerge in marital status, family support, employment, medical history, and lifestyle factors across the diverse demographic groups.

Intervention characteristics

The intervention shown in Table 1. demonstrates a comprehensive and varied approach to promoting therapeutic engagement for older persons with dementia. The incorporation of diverse activities such as drawing, colouring, collages, music, and traditional recreation programs suggests a holistic strategy to address various aspects of dementia, especially in cognitive function. The structured nature of the sessions, led by qualified professionals including art therapists, psychologists, and music therapists, reflects a commitment to ensuring the effectiveness and quality of the interventions. The combination of different modalities, from creative expression therapy to reminiscence therapy, highlights a tailored approach that considers individual preferences and needs. The consistency in frequency and duration of sessions, ranging from twice-weekly to weekly, also contributes to establishing a routine that can benefit participants throughout the intervention.

Outcome measures

The variables assessed in these studies include cognitive function, daily living skills, depression, and so on. The main variable to be focused on in this report is cognitive function or cognition. The measures of the outcome of the studies were common with MMSE (Mini Mental-State Examination), CNPI (Chinese Version of the Neuropsychiatric Inventory), and some complete battery of neuropsychology tests. All of these are valid and widely used in older people populations experiencing dementia. The most used outcome measure is MMSE, which was conducted in 3 studies (Choi & Jeon, 2013; Chu et al., 2014; Putri & Sulistyowati, 2020), then CNPI was used in 1 study (Li & Li, 2017) together with MMSE and 1 study operating complete battery test, including MoCa, CVAVLT, CVCVFT, DST, TMT-A, TMT-B (Zhao et al., 2018). All of the articles reviewed in this report are experimental studies, to show the effectiveness of art therapy in cognitive function in older persons with dementia.

Meta-Analysis

The data underwent a meta-analysis that incorporated fixed and random effects to examine model coefficients and residual heterogeneity (Borenstein et al., 2009). The Omnibus Test indicates the overall significance of the model coefficients ($Q = 41.830$, $df = 1$, $p < .001$), revealing a highly significant model. Subsequently, the Test of Residual Heterogeneity ($Q = 67.103$, $df = 13$, $p < .001$) suggests residual heterogeneity after model adjustment, consistent with the presence of variability in the data. Hedges' method was employed for model estimation, acknowledging its suitability for small sample sizes in meta-analyses (Borenstein et al., 2009). Examining coefficients, the intercept stands out with a significant estimate (0.586, $SE = 0.091$, $z = 6.468$, $p < .001$), implying a departure from zero. The 95% confidence interval for the intercept ranges from 0.408 to 0.763, further supporting its significance. The Wald test confirmed the individual significance of coefficients. The meta-analysis identifies a significant overall effect amid residual heterogeneity. The intercept is notably significant, and the Fail-safe N analysis underscores the robustness of the observed effect.

Conducting a File Drawer Analysis, the Fail-safe N was 2341.000, surpassing the Target Significance of 0.050, and the Observed Significance was < .001. This suggests a robust observed effect, requiring a substantial number, which is 2341 of non-significant

studies to nullify. Moreover, the result indicates high statistical significance. The data in Table 2 presents a summary of effect sizes (Hedges g) and related statistical information from various studies focusing on cognitive measures in different countries. Each study investigates the impact of certain interventions or conditions on cognitive performance, with a particular emphasis on measurements such as the Mini-Mental State Examination (MMSE), the Memory Satisfaction Questionnaire (MSQ), Montreal Cognitive Assessment (MoCA), and others. Findings indicate substantial positive impacts on cognitive performance in specific measures, such as MMSE (Hedges g = 0,86), CNPI (Hedges g = 1,67), and CVADL (Hedges g = 0,91).

DISCUSSION

This review provides compelling evidence that art therapy offers significant cognitive benefits for older people with dementia across Asian continent. The collected studies consistently report improvement in cognitive performance, particularly when measured using widely accepted neuropsychological assessments such as the MMSE, CNPI, MoCA, and so on. The findings suggest that creative interventions may be a valuable complement to conventional dementia care, particularly in resource-limited settings where pharmacological treatments may be limited or inaccessible. The meta-analytic findings demonstrate a substantial overall effect size (Hedges' g = 0.586), indicating art therapy interventions contribute meaningfully to improvements in cognitive function. The robustness of this effect is reinforced by the Fail-safe N analysis, suggesting that a large number of null-result studies (n=2341) would be needed to offset the observed findings. These results show the potential of art therapy as evidence-based intervention to reduce cognitive decline among older adults with dementia.

The observed cognitive improvements through art therapy can be understood through several neurobiological mechanisms. Engagement in creative activities may stimulate neuroplasticity—the brain's capacity to form new neural connections and reorganize existing networks—particularly in regions affected by dementia such as the prefrontal cortex and hippocampus. Art-based interventions activate multiple neural pathways simultaneously, including visual-spatial processing, motor coordination, emotional regulation, and memory retrieval, creating enriched sensory experiences that may compensate for degenerating neural structures. Furthermore, the social and emotional components of group art therapy sessions may trigger the release of neurotrophic factors such as brain-derived neurotrophic factor (BDNF), which supports neuronal survival and synaptic plasticity. The combination of cognitive stimulation, emotional engagement, and social interaction inherent in art therapy creates a multimodal intervention that addresses the multifaceted nature of cognitive decline in dementia, potentially slowing the progression of neural degeneration while enhancing cognitive reserve.

However, while the reviewed studies report significant gains in cognition, most of the did include baseline information on dementia severity, classifying participants into mild, moderate, or severe stages based on cognitive assessments such as the MMSE. This categorization provides valuable context for understanding participants' conditions at the beginning of the intervention. Nevertheless, the studies generally did not perform a stratified analysis of outcomes by these severity levels, except one research that shows effectiveness of group music therapy only for mild and moderate dementia. Therefore, future research should aim to explore more whether individuals with mild, moderate, or

severe dementia respond differently to art-based interventions (chu et al., 2014). Furthermore, future research is required to examine if demographic factors including gender, education, and marital status affect the intervention outcomes, even though these characteristics were often reported—with a higher number of females, highly educated, and occasionally married individuals.

Regarding the long-term effect, most interventions were short in duration ranging from 4 to 16 weeks, and only one of them included a follow up assessment of 6 months. This presents a limited understanding whether the observed cognitive improvements are sustained over time or decline once the intervention ends. Given that dementia is a progressive condition, it become essential to evaluate the lasting benefits of art therapy to establish is as an effective long term care strategy. The review also reveals that most studies were conducted in Asian countries like China, Korea, Indonesia, and Taiwan – regions that experiencing rapid demographic aging. Asia currently accounts the largest proportion of global dementia cases (22.9 million), highlighting the urgency of culturally tailored interventions in this region. The burden of dementia in Asia is more than double that of Europe (10.5 million) and the Americas (9.4 million), reflecting population trends and the need for scalable, non-pharmacological therapies such as art therapy. The receptivity and effectiveness of such treatments may also be impacted by the sociocultural norms of many Asian nations, where older people frequently reside in multigenerational households and rely significantly on family support.

In particular, one research in China shows that improvements were observed in general cognitive functioning, memory, executive function, attention, activities of daily living, and memory satisfaction. This research also reported positive outcomes in measures such as MMSE, BI, and CNPI for older people with dementia engaging in a traditional recreation program involving art activities, games, and music (Li & Li, 2017). This suggests a sustained positive impact on cognitive abilities following the intervention. Similarly, another study (Chu et al., 2014) reported no significant decline in major cognitive functions post-intervention, with the music therapy group showing the most improvement in recall function. The collective exploration of diverse art-based interventions for individuals with dementia or cognitive impairment presents notable insights. One study in Indonesia (Putri & Sulistyowati, 2020) demonstrated that drawing and colouring activities had positive effects on cognitive function compared to a brain exercise control group. A similar study in Korea (Choi & Jeon, 2013) found positive outcomes in measures such as MMSE, GDS, and Quality of Life among women at high risk of dementia engaged in group art therapy with collages and reminiscence therapy. Taiwanese older people with dementia experienced improved recall function through group music therapy, highlighting the potential of music interventions (Chu et al., 2014). Lastly, Creative Expression Therapy demonstrated lasting improvements in cognitive functions for older adults with mild cognitive impairment in China (Zhao et al., 2018). This finding revealed enduring enhancements in various cognitive functions six months after an intervention.

The implications of these findings extend beyond individual clinical practice to broader healthcare policy and nursing care systems. For policymakers, these results advocate for the integration of art therapy programs into national dementia care strategies, particularly in Asian countries where the demographic tsunami of aging populations demands cost-effective, scalable interventions. Healthcare systems should consider allocating resources for training qualified art therapists and establishing community-based

art therapy centers that can serve multiple older adults simultaneously, thereby maximizing the reach of limited healthcare budgets. For nursing practice, these findings suggest that nurses working in geriatric care settings—whether in hospitals, long-term care facilities, or community health centers—should receive training in facilitating basic art-based activities as part of routine dementia care. Incorporating creative activities into daily care routines can transform standard nursing practice from purely custodial care to therapeutic engagement that actively supports cognitive maintenance. Furthermore, nursing care plans for dementia patients should systematically include art therapy components, with documented cognitive assessments before and after interventions to monitor effectiveness. At the community level, public health nurses can lead the development of culturally adapted art therapy groups that leverage traditional Asian art forms—such as calligraphy, origami, traditional music, or textile crafts—to enhance cultural relevance and participant engagement. These community-based programs can also provide respite for family caregivers while simultaneously offering cognitive stimulation for older adults with dementia, addressing the dual burden of dementia care in Asian societies where informal family caregiving predominates.

Limitations of the review

This review presents several limitations that should be taken into account when interpreting its findings. Firstly, although the initial screening identified 242 articles, only five met the final inclusion criteria for meta-analysis, which limits the comprehensiveness and representativeness of the findings. This narrow selection might not fully reflect the broader scope of existing literature on art therapy interventions for dementia. Secondly, the potential for publication bias remains, as indicated by the File Drawer Analysis, which—despite demonstrating the robustness of observed effects—cannot fully account for unpublished studies with non-significant results. Thirdly, the heterogeneity in intervention types, session durations, and especially outcome measures (e.g., MMSE, CNPI, MoCA, TMT-A/B, etc.) creates challenges for data synthesis and limits direct comparability between studies. In addition, the comprehension of the long-term durability of art therapy's cognitive benefits is limited by the short-term nature of the interventions (varying from 4 to 16 weeks), with only one study having a 6-month follow-up. Finally, although culturally relevant, the review's exclusive focus on older persons in Asian populations restricts its applicability to populations in other areas. Therefore, to improve the validity and generalisability of the results, future studies should include longer-term follow-ups, stratified analyses by dementia severity, more standardised cognitive tests, and culturally varied samples.

CONCLUSION

This systematic review and meta-analysis demonstrate that art therapy significantly enhances cognitive function in older people with dementia across diverse Asian countries, using measures such as MMSE, CNPI, and neuropsychological tests. While the findings show a positive effect, the study faces limitations including a small article pool, potential publication bias, heterogeneity in outcome measures, and limited population diversity. Additionally, few studies performed stratified analyses by dementia severity, and only one included a six-month follow-up, restricting insights into long-term benefits. Future research should address these gaps by employing larger sample sizes, standardized assessment tools,

dementia stage–specific analyses, longer follow-up durations, and more culturally and demographically diverse populations. Expanding evidence in these areas will better clarify art therapy's sustained effectiveness and support its practical application in both individual care settings and community programs, especially in regions with limited access to pharmacological treatments.

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