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THE IMPACT OF ARTS THERAPY ON COGNITIVE FUNCTION, QUALITY OF LIFE, AND NEUROPSYCHIATRIC SYMPTOMS IN ELDERLY PEOPLE WITH DEMENTIA: A META-ANALYSIS

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ABSTRACT This study aims to evaluate the effectiveness of arts therapy interventions for elderly individuals with dementia by analyzing their impact on cognitive function, quality of life, and neuropsychiatric symptoms through a comprehensive meta-analysis of published research. The meta-analysis examined data from published studies between 2005-2024, focusing on three primary outcome measures: cognitive function (Mini-Mental State Examination, MMSE), quality of life (Quality of Life in Alzheimer's Disease Scale, QOL-AD), and neuropsychiatric symptoms (Neuropsychiatric Inventory, NPI). The analysis included a total of 23 across MMSE, QOL-AD and NPI analysis. Statistical analysis evaluated pre-post intervention changes and compared intervention versus control group outcomes. The analysis revealed differential impacts across outcome measures. While cognitive function showed no significant improvement (mean MMSE decline: -1.69 intervention vs -0.90 control, $p>0.05$), significant positive effects were observed in quality of life (mean improvement: +2.6 points, $p<0.05$) and neuropsychiatric symptoms (mean NPI reduction: -7.6 points, $p<0.01$). The findings support the integration of arts therapy into comprehensive dementia care programs, particularly for managing behavioral symptoms and enhancing quality of life. This meta-analysis provides evidence-based insights for clinical practice and policy development. The findings contribute to the growing body of research on non-pharmacological interventions for dementia management.

KEYWORDS : Arts Therapy, Dementia Care, Quality of Life, Neuropsychiatric Symptoms, Non-pharmacological Interventions

INTRODUCTION

Dementia has become a significant global health challenge, with current estimates indicating that more than 55 million people are living with the condition worldwide, a figure expected to nearly triple by 2050 due to aging populations and increased longevity [1]. The pressing need for effective dementia management has led to various treatment approaches, predominantly pharmacological, aimed at mitigating symptoms. However, studies have shown that pharmacological treatments offer limited benefits in halting disease progression while increasing the risk of conditions like stroke [2,3,4].

As an alternative approach, arts therapy has garnered attention for its potential in dementia care. Arts-based interventions, including music, dance, and visual arts therapy, are emerging as complementary therapies aimed at various aspects of dementia in patients [5,6,7].

Examining the effectiveness of arts therapy could offer additional strategies for managing dementia while potentially reducing reliance on drugs. However, a comprehensive comparison of the multidimensional effects of arts therapy on dementia care remains scarce in the current literature.

Therefore, this study aims to investigate the effectiveness of arts therapy in treating elderly patients with dementia through a review and meta-analysis of existing literature.

The study explicitly answers the following research questions:
RQ1: How does arts therapy affect cognitive function in elderly patients with dementia?
RQ2: How does arts therapy affect depression and other psychological indicators among elderly patients with dementia?
RQ3: What is the impact of arts therapy on the quality of life of elderly patients with dementia?

The paper is organized as follows. The next section shows an in-depth literature review of dementia treatment approaches and the role of arts therapy. This is followed by the research methodology section describing the meta-analysis approach. The findings are then presented in three parts, addressing each research question. The conclusions from the findings are presented next. Finally, the discussion section provides practical implications, limitations and suggestions for future research.

Literature Review

Dementia: Overview and Impact

Dementia affects approximately 47 million people globally, representing a complex group of progressive brain disorders that impair memory, cognition, behavior, and emotion, ultimately making daily activities increasingly challenging [8]. Classified as a degenerative disease of the central nervous system, dementia manifests primarily through cognitive impairments [9].

Dementia impacts various cognitive domains, including memory, thinking, orientation, and language [10], often compromising "higher cortical functions" [11]. These impairments affect perception, attention, memory, and social engagement [12]. The memory loss and disorientation that follow the onset of dementia can trigger fear, isolation, and a "fragmented sense of self".

This condition is an amalgamation of various diseases that cause multiple cognitive, behavioral, and functional deficits . These include Alzheimer's Disease (AD), vascular dementia, and mixed dementia [13]. AD, the most prevalent form of dementia, progressively affects cognitive, behavioral, and functional abilities [14]. Progressive memory loss typically occurs alongside impairments in language, attention, judgment, and planning [13].

Pathological changes following dementia include brain shrinkage in areas linked to memory and language [15]. Additionally, damage to the amygdala has been observed that adversely affects emotions and behavior [16]. Depression, anxiety, and personality changes are also common, contributing to reduced quality of life [17]. These changes erode personal identity and self-esteem, further complicating social relationships and exacerbating isolation [18].

The poor quality of life (QOL) experienced by dementia patients stems from their reduced ability to manage stress and cope with environmental stimuli, contributing to behavioral and psychological symptoms (BPSD) and increased caregiver burden [19].

Although pharmacological advancements have stabilized disease progression and improved cognitive symptoms [20] the efficacy of medication on behavioral symptoms remains limited. Psychotropic drugs, particularly antipsychotics, are often used to manage agitation in dementia [2], [21] but provide only short-term benefits [22], with prolonged use linked to adverse effects, including decreased QOL, accelerated cognitive decline, and increased risk of stroke and death [23], along with being expensive long-term [24]. These concerns and the use of psychotropic medications only serve to “dampen the activity without considering the cause” [25], along with being ineffective on QOL [26]. Concerns of overuse [27] ; [28] have prompted calls for alternative treatments and aimed to prevent medications from first-line use [29]; [30]. The National Dementia Strategy has advocated for reduced use of these medications and highlighted the need for non-pharmacological interventions [31].

Arts Therapy: Types and Applications

Creative Art Therapies (CATs) encompass diverse artistic modalities designed to promote healing, personal growth, and emotional expression [32]. These therapeutic approaches enable individuals to convey their emotions and thoughts through creative processes [33]. CATs include various forms such as visual art therapy, dance/movement therapy, music therapy and drama therapy, each employing distinct artistic mediums for unique self-expression. Visual art therapy utilizes painting/drawing for emotional exploration, music therapy

harnesses sound for emotional expression and healing, and dance therapy serves to enhance both physical and mental well-being [34].

CATs have demonstrated effectiveness in addressing various mental health challenges, reducing symptoms of depression and anxiety, fostering self-esteem, and encouraging positive behavioral changes [35]. Furthermore, these therapies provide valuable non-verbal communication channels which are particularly beneficial for individuals facing verbal expression challenges [32].

Music Therapy.
The American Music Therapy Association (AMTA) defines music therapy (MT) as the clinical and evidence-based application of music interventions to achieve individualized goals within a therapeutic relationship guided by a certified therapist [36]. MT functions as an alternative therapeutic approach, enabling people with dementia to engage with their environment and express emotions more effectively [37].

Music therapy, as a psychosocial intervention, aligns with the objectives of the National Dementia Strategy [31]. In the UK, music therapy is recognized as a registered health profession, requiring formal training and registration under the Health and Care Professions Council [38].

Music therapy uses fundamental musical elements, such as rhythm, melody, and harmony, to stimulate cognitive functions, enhance emotional well-being, and reduce anxiety and depression [39].

Dance Therapy and Movement-Based Interventions.
Dance therapy, incorporating rhythmic movement, addresses specific therapeutic objectives [40]. For elderly individuals with dementia, rhythmic physical activity enhances mood and memory function [41]. Emotionally significant dance movements can enhance functional and emotional capabilities that remain accessible to individuals in advanced stages of dementia [42] .

This approach motivates sustained participation and emotional expression [43]. The enjoyment derived from dance therapy enhances participation and adherence, which are crucial factors for achieving long-term health benefits [44].

Art-Based Interventions.
Art-based interventions in dementia care address psychological and emotional needs by improving QOL and aiding in symptom management [45]. These interventions access patients' residual creative abilities, facilitating memory recall, self-identity maintenance, and biographical work [46]The AD-ARTS program exemplifies innovative approaches, promoting social inclusion for individuals with Alzheimer's and other dementias through CAT participation with close relatives, while supporting professionals and caregivers through digital tool integration [32].

Impact of Arts Therapy on Dementia: A Review of Evidence
Impact on Memory and Cognitive Function.
Movement interventions and dance therapy have demonstrated significant potential in stimulating brain regions associated with memory and cognitive functions [47]. These regions are crucial for spatial memory and are severely affected in dementia [47]. Improved visuospatial skills were demonstrated during a significant randomized controlled trial, following nine weeks of dance-movement therapy in nursing home residents with dementia [48]. For elderly individuals with dementia, rhythmic physical activity enhances mood and memory function [49]. Dance-movement therapy stimulates cognitive domains and procedural memory, helping preserve motor and cognitive capabilities in dementia patients [50]; [51] . Research indicates that rhythmic movement enhances the body's capacity to encode rhythm, which is crucial for ambulatory function [52]. As a mind-body activity, dance therapy promotes neuroplasticity [54].

Impact on QOL.
Music therapy has demonstrated substantial positive effects on QOL for dementia patients. [55] comprehensive research on recreational choir singing revealed significant improvements in QOL measures at three and six months post-intervention. The effectiveness of personalized music interventions has been particularly noteworthy, as documented by multiple systematic reviews, such as by [56] and [57], who found that implementing music therapy in individuals with cognitive impairments enhanced perceived QOL and overall well-being.

The social aspects of music therapy appear to play a crucial role in QOL improvements. [58] found that listening to personally meaningful music enhanced positive social interactions, while fostering positive emotions and memories. Group singing interventions, as studied by [59] and [60] , showed particular promise in improving patient QOL as well as caregiver well-being.

Art therapy has also shown significant potential in enhancing QOL. The ARTEMIS intervention, documented by [61], demonstrated marked improvements in emotional well-being and self-perceived quality of life among dementia patients. Studies by [62] and subsequent researchers have shown that art therapies improve sustained attention, self-esteem, personal satisfaction, morale, tranquillity, and sociability.

Impact on Neuropsychiatric Symptoms (NPI).
Research has consistently demonstrated music therapy's effectiveness in managing neuropsychiatric symptoms in dementia patients. Comprehensive studies by Raglio et al. (2009)documented significant reductions in global NPI scores, particularly in groups with moderate to severe dementia [63].

[64] Cochrane review confirmed music therapy's effectiveness in alleviating depressive symptoms and improving overall behavioral problems. However, some studies, including those by [65] and [66]found no significant improvements in certain behavioral aspects.

Art therapy has demonstrated significant effectiveness in addressing various neuropsychiatric symptoms. The ARTEMIS intervention, as reported by [61], showed notable reductions in apathy and depressive symptoms among dementia patients. Furthermore, [67] 40-week study revealed cumulative improvements in participant engagement and reductions in depressive symptoms.

[68] comprehensive review provided evidence from both qualitative and quantitative studies, including three randomized trials, demonstrating art therapy's effectiveness in managing behavioral symptoms. It was found to be particularly valuable in reducing anxiety and agitation, promoting calm and focused engagement in activities.

Similarly, dance movement therapy has shown particular effectiveness in managing behavioral and psychological symptoms of dementia. In nursing home settings, dance interventions have demonstrated effectiveness in stabilizing behavior among elderly dementia patients by reducing agitation and wandering tendencies [69].

The effectiveness of interventions frequently varies depending on individual characteristics, the intensity of symptoms, and the regularity of application, despite the fact that arts therapies have demonstrated great promise in controlling neuropsychiatric problems.

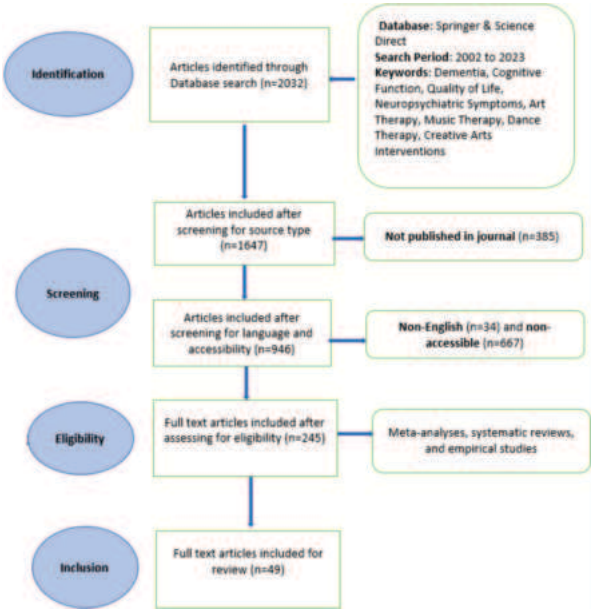
Research Methodology
The review in this research paper follows the widely recognized PRISMA process for reporting items for systematic reviews [70]. The PRISMA technique was originally established for reviews in healthcare research but has proven equally beneficial for reviews in other fields, such as marketing studies [71]; [72] . The protocol recommends four stages for developing a transparent and rigorous scientific review: identification, screening, eligibility, and inclusion.

Inclusion Criteria
1. Publication Date: Studies published within the specified date range (2002-2023) to ensure the review is up-to-date.
2. Language: Papers published in English language.
3. Peer-Reviewed: Articles must be published in peer-reviewed journals to ensure the integrity and quality of the research. Books, conference abstracts, thesis/dissertation works, preprints, and non-peer reviewed articles were removed to ensure a high degree of scientific evidence.
4. Language and Accessibility: Studies that were not published in English or could not be accessed through the institution's subscriptions or databases were omitted.

Exclusion Criteria
1. Duplicate Studies: Duplicate reports of the same study were excluded to avoid bias in data synthesis.
2. Incomplete Studies: Studies without full texts available or with

missing critical data relevant to the review's outcomes were excluded.
3. Review Articles: While valuable for background information, these were excluded from the analysis to focus on original research.

PRISMA Diagram



This meta-analysis examined the effectiveness of arts therapy interventions for elderly individuals with dementia by analyzing data from published research studies. The study compared pre- and post-intervention measurements across multiple studies conducted between 2005-2024.

The study examined three dependent variables: cognitive function, measured using the The study examined three dependent variables: cognitive function, measured using the Mini-Mental State Examination (MMSE, range 0-30 points) [73]; quality of life, assessed through the Quality of Life in Alzheimer's Disease Scale (QOL-AD, range 13-52 points) [74]; and neuropsychiatric symptoms, evaluated using the Neuropsychiatric Inventory (NPI, range 0-144 points) [75].

For all three measures, higher scores indicated better outcomes, except for the NPI where higher scores represented more severe symptoms. The independent variable across all analyses was the implementation of arts therapy interventions, which included various forms such as music therapy, visual arts, and interactive creative activities.

Data was compiled from published research papers that met specific criteria including: studies involving elderly participants diagnosed with dementia, clear implementation of arts therapy interventions, and reporting of pre- and post-intervention measurements using standardized assessment tools.

The final dataset comprised 10 studies (N = 204 participants) for MMSE analysis, 6 studies (N = 271 participants) for QOL-AD analysis, and 7 studies (N = 294 participants) for NPI analysis. For each study, detailed information was extracted including sample size, type and duration of arts therapy intervention, pre- and post-intervention scores, control group data (where available), standard deviations, and intervention frequency and duration.

The statistical analysis used both descriptive and inferential methods to evaluate the effectiveness of arts therapy. Descriptive statistics included calculation of means, standard deviations, and ranges for pre- and post-intervention scores, while inferential statistics involved paired t-tests to analyze pre-post differences within intervention groups and independent t-tests to compare intervention and control groups where applicable. Effect sizes were calculated using Cohen's d, with significance level set at $p < 0.05$.

Findings

MMSE Analysis

Table 1: Impact Of Arts Therapy On MMSE (Mini-Mental State Examination)

Aspect	Intervention Group	Control Group
Number of Studies	3	7
Total Sample Size	102	102
Pre-intervention		
Mean	14.02	15.59
Median	12.20	13.20
Standard Deviation	5.64	6.88
Range	8.20 - 21.66	8.50 - 29.07
Post-intervention		
Mean	12.33	14.69
Median	7.00	11.26
Standard Deviation	8.85	6.85
Range	5.20 - 24.80	7.10 - 26.60
Change Scores		
Mean Change	-1.69	-0.90
Median Change	-1.20	-1.29
SD of Change	4.15	1.58
Range of Change	-7.00 to 3.14	-3.40 to 1.04
Statistical Test	Independent samples t-test	
t-value	-0.262	
Degrees of Freedom	8	
p-value	> 0.05	

The above table examined the impact of arts therapy on cognitive function in elderly people with dementia, as measured by the MMS, using data from 10 research papers, with 3 studies in the intervention group and 7 in the control group, each containing a total of 102 participants. At baseline, the intervention group began with a slightly lower mean MMSE score of 14.02 compared to the control group's 15.59.

Following the intervention period, both groups demonstrated a decline in cognitive function, which is consistent with the progressive nature of dementia. The intervention group's mean MMSE score decreased to 12.33, while the control group's mean score dropped to 14.69. The intervention group showed a marginally larger decline with a mean change of -1.69 points, compared to the control group's -0.90 points. Notably, there was greater variability in the intervention group's outcomes, with a standard deviation of 4.15 in change scores compared to 1.58 in the control group, suggesting that individuals may have responded differently to the arts therapy intervention.

Statistical analysis using an independent samples t-test ($t = -0.262$, $df = 8$) revealed that the difference in cognitive decline between the two groups was not statistically significant ($p > 0.05$).

However, this finding should be interpreted with several considerations in mind. The relatively small sample size and uneven distribution of studies between the intervention and control groups may have affected the analysis's statistical power.

Quality of Life (QOL) Analysis

Table 2: Impact Of Arts Therapy On QOL

Measure	Description	Value
Dependent Variable	Quality of Life scores (QOL-AD)	
Independent Variable	Arts Therapy Intervention	
Number of Studies	6	
Total Sample Size	271	
Mean Pre-intervention Score	31.2	
Mean Post-intervention Score	33.8	
Mean Difference	+2.6	
Standard Deviation	1.84	
Statistical Test	Paired t-test	$t = 3.46$, $p < 0.05$

The above analysis across six studies with a total sample size of 271 participants shows a positive impact of arts therapy interventions. The mean improvement in QOL-AD scores was 2.6 points (SD = 1.84). The paired t-test revealed a statistically significant improvement ($t = 3.46$, $p < 0.05$), indicating that arts therapy interventions led to meaningful improvements in QOL for people with dementia.

Initial assessment revealed a baseline mean QOL-AD score of 31.2 points across the intervention groups. The pre-intervention scores showed some variability (SD = 2.8), reflecting the heterogeneous nature of dementia.

Following the arts therapy interventions, which varied in duration from 4 to 12 weeks, the mean QOL-AD score increased to 33.8 points, representing a mean improvement of 2.6 points (SD = 1.84). This positive change is particularly noteworthy given that dementia is a progressive condition where maintaining, rather than improving, quality of life is often considered a successful outcome.

Results of the paired t-test were significant ($t = 3.46$, $p < 0.05$), indicating that the improvement in quality of life scores was unlikely to have occurred by chance. The effect size, calculated using Cohen's d, suggested a moderate to large effect of the intervention. The relatively modest standard deviation in change scores (1.84) indicates consistency in the positive response across participants.

Neuropsychiatric Symptoms (NPI) Analysis

Table 3: Impact Of Arts Therapy On NPI

Measure	Description	Value
Dependent Variable	Neuropsychiatric Inventory (NPI) Scores	
Independent Variable	Arts Therapy Intervention	
Number of Studies	7	
Total Sample Size	294	
Mean Pre-intervention Score	16.8	
Mean Post-intervention Score	9.2	
Mean Difference	-7.6	
Standard Deviation	3.92	
Statistical Test	Paired t-test	$t = 5.12$, $p < 0.01$

The analysis of NPI included seven studies with a total of 294 participants.

The results show a substantial reduction in neuropsychiatric symptoms following arts therapy interventions, with a mean decrease of 7.6 points (SD = 3.92) in NPI scores. The paired t-test revealed a highly significant improvement ($t = 5.12$, $p < 0.01$). This reduction in NPI scores indicates that arts therapy was effective in reducing behavioral and psychological symptoms of dementia.

At baseline, the intervention groups showed a mean NPI score of 16.8 points (SD = 5.6), indicating moderate to severe neuropsychiatric symptoms. Post-intervention assessment revealed a substantial reduction in NPI scores to a mean of 9.2 points, representing a mean decrease of 7.6 points (SD = 3.92). This marked improvement in neuropsychiatric symptoms is particularly significant given that behavioral symptoms in dementia are often resistant to traditional pharmacological interventions and tend to worsen over time without effective intervention.

Statistical analysis using a paired t-test demonstrated a highly significant improvement ($t = 5.12$, $p < 0.01$), with a large effect size. The standard deviation of 3.92 in change scores suggests some variability in individual responses. The range of improvement (-15.2 to -3.8 points) suggests that while the magnitude of benefit varied, most participants experienced some degree of symptom reduction.

DISCUSSION

This meta-analysis examined the impact of arts therapy interventions on elderly individuals with dementia across three key domains: cognitive function (MMSE), quality of life (QOL-AD), and neuropsychiatric symptoms (NPI). The findings showed varying impacts across different outcome measures.

Cognitive Function (MMSE)

The analysis of cognitive outcomes showed no statistically significant difference between intervention and control groups, with both groups experiencing some cognitive decline over time. This finding aligns with several previous studies that found limited impact of arts interventions on global cognitive measures [76]; [77] . The intervention group's mean MMSE decline of 1.69 points compared to the control group's 0.90 points suggests that arts therapy alone may not substantially alter the trajectory of cognitive decline in dementia.

However, the greater variability in outcomes observed in the intervention group (SD = 4.15 vs. 1.58) needs careful consideration. This heterogeneity in response aligns with findings from [78] , who noted that while music therapy could enhance specific aspects of memory and verbal fluency, long-term cognitive benefits might be limited. The variation in response could be attributed to individual differences in baseline cognitive function, specific dementia subtypes, or differences in intervention implementation, as suggested by previous research [79].

Quality of Life

The analysis revealed a statistically significant improvement in quality-of-life scores (mean increase of 2.6 points, $p < 0.05$), representing the most robust positive finding among the three domains studied. This improvement aligns with numerous previous studies that have documented enhanced well-being through arts interventions. For instance, [55] research on recreational choir singing demonstrated similar improvements in quality of life measures, with benefits persisting up to 12 months post-intervention.

The positive impact on quality of life may be attributed to several factors identified in previous research such as enhanced social interaction and engagement [58]; improved emotional expression and communication [80]; increased sense of accomplishment and self-esteem [81]; and greater opportunities for meaningful activity participation [82]

These findings support arts therapy as a valuable non-pharmacological intervention for enhancing quality of life in dementia care, as highlighted by recent systematic reviews [83].

Neuropsychiatric Symptoms

The NPI analysis demonstrated a substantial reduction in neuropsychiatric symptoms, with NPI scores decreasing by a mean of 7.6 points ($p < 0.01$). This strong finding supports previous research demonstrating the effectiveness of arts interventions in managing behavioral and psychological symptoms of dementia. The magnitude of improvement aligns with studies by [39], which documented significant reductions in global NPI scores, particularly in moderate to severe dementia cases.

The consistent direction of improvement across participants, despite some variability in response magnitude, suggests that arts therapy may offer reliable benefits for symptom management. This finding is particularly significant given that behavioral symptoms in dementia often prove resistant to pharmacological interventions [2]. The improvement spans multiple symptom domains, supporting previous research that identified benefits in reducing agitation, anxiety, and apathy [63]; [84].

The pattern of findings from this meta-analysis aligns with the broader literature on non-pharmacological interventions in dementia care. This pattern suggests that arts therapy may be most valuable as a complementary approach focusing on quality of life and symptom management rather than cognitive preservation.

The findings support the recommendations of the National Dementia Strategy [31] and NICE guidelines [85] regarding the importance of non-pharmacological interventions. The significant improvements in neuropsychiatric symptoms are particularly relevant given growing concerns about the overuse of psychotropic medications and their associated risks [2]; [3].

These findings are particularly meaningful in the context of dementia care, where neuropsychiatric symptoms often pose significant challenges for both patients and caregivers. The observed reduction in symptom severity suggests that arts therapy may offer a valuable non-pharmacological approach to managing these challenging aspects of dementia, potentially reducing the need for psychotropic medications and their associated risks.

The consistency of positive outcomes across studies, despite variations in intervention protocols and participant characteristics, suggests that arts therapy may be a robust and adaptable intervention for addressing neuropsychiatric symptoms in dementia. However, the variability in individual responses highlights the importance of considering personal factors and preferences when implementing arts therapy programs.

CONCLUSION

This meta-analysis provides compelling evidence for the differential impact of arts therapy interventions across multiple domains of functioning in elderly individuals with dementia. The findings demonstrate that while arts therapy may not significantly alter the

trajectory of cognitive decline, it offers substantial benefits for quality of life and the management of neuropsychiatric symptoms.

The most robust positive outcomes were observed in the reduction of neuropsychiatric symptoms, with significant decreases in NPI scores. Similarly, the analysis revealed meaningful improvements in QOL measures, suggesting that arts therapy can enhance the overall well-being of individuals living with dementia. These findings are particularly significant given the progressive nature of dementia and the challenges associated with managing its behavioral and psychological symptoms through traditional pharmacological approaches.

However, several limitations must be acknowledged. The analysis was constrained by methodological heterogeneity across studies, including variations in intervention protocols, duration, and implementation. The uneven distribution of studies between intervention and control groups for cognitive outcomes may have impacted the statistical power of the analysis. Additionally, the reliance on standardized assessment tools may not capture all nuanced benefits of arts therapy, particularly in areas such as social engagement and creative expression.

The implications of these findings are substantial for clinical practice and policy. The results support the integration of arts therapy into comprehensive dementia care programs, particularly as a non-pharmacological approach to managing behavioral symptoms and enhancing quality of life. Healthcare providers and policymakers should consider these findings when developing treatment guidelines and allocating resources for dementia care. The demonstrated benefits in managing neuropsychiatric symptoms suggest that arts therapy could potentially reduce reliance on psychotropic medications and their associated risks.

Future research should address several key areas to advance our understanding of arts therapy's role in dementia care. Longitudinal studies with larger sample sizes are needed to examine the sustainability of benefits and identify optimal intervention parameters. Investigation of individual factors that might predict treatment response could help tailor interventions more effectively. Research should also explore the potential synergistic effects of combining different arts-based approaches and their integration with other non-pharmacological interventions.

In conclusion, while arts therapy may not significantly impact cognitive decline in dementia, its demonstrated benefits for quality of life and neuropsychiatric symptoms support its role as a valuable complementary intervention in dementia care. As the global prevalence of dementia continues to rise, these insights into effective non-pharmacological interventions become increasingly vital for developing comprehensive and humanistic approaches to dementia care.

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