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"Art Guards Memory": Application Mechanism and Support Model Construction of Painting Therapy in Community-Dwelling Older Adults with Mild Cognitive Impairment

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Abstract: With the acceleration of global population aging, mild cognitive impairment (MCI) has become a critical public health issue. As a non-pharmacological intervention, painting therapy exhibits unique advantages for community-dwelling older adults with MCI due to its non-verbal nature and multi-dimensional cognitive stimulation. This study systematically reviews the evidence base for painting therapy in this population and analyzes its mechanisms of action. These include neural mechanisms (e.g., regulating functional connectivity in brain networks like the default mode network to enhance neuroplasticity), cognitive mechanisms (activating multiple cognitive domains to build cognitive reserve), and psychosocial mechanisms (providing emotional expression and social interaction). Furthermore, the study classifies mainstream intervention models and compares their applicability in community settings. It also summarizes current limitations in research (e.g., small sample sizes) and practice (e.g., lack of professionals). Finally, based on a "hospital-community-family" framework, this study constructs the "Art Guards Memory" community support model. This model includes core components such as screening, intervention programs, talent support, and evaluation systems, alongside strategies for policy, resources, and sustained participation. The model aims to provide a scientific, standardized framework for applying painting therapy in community MCI intervention.

Keywords: Painting therapy; Mild cognitive impairment; Community-dwelling older adults; Neural mechanism; Support model

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1. Introduction: The challenge of cognitive impairment and the intervention value of painting therapy

Against the backdrop of accelerating global population aging, cognitive impairment has emerged as a significant health issue impacting the quality of life of older adults. The cognitive continuum can be divided into subjective cognitive decline (SCD), mild cognitive impairment (MCI), and dementia. Individuals in the SCD or MCI stage

with Alzheimer's disease (AD) biomarkers are defined as being in the preclinical stage of AD, requiring substantial resources and creating a high societal burden. In China, the accelerated aging process has led to a continuous increase in the number of people with cognitive impairment. Epidemiological surveys from 2023 showed that the prevalence of MCI among people aged 60 and above in China has reached 15.5% [1].

Mild cognitive impairment, as a critical state between normal aging and dementia, represents an invaluable window for intervention. The authoritative 2020 report by The Lancet Commission stated that intervening in 12 modifiable risk factors could delay or prevent 40% of global dementia cases [2]. While pharmacological treatments are used, they primarily alleviate symptoms and can have adverse effects. Therefore, non-pharmacological interventions have become a core strategy for MCI management. Among these, art interventions have attracted significant attention due to their safety, acceptability, and adaptability.

Painting therapy, a core branch of expressive art therapy, demonstrates unique potential. Its core mechanism lies in facilitating emotional expression, inner exploration, and psychological integration through the creative process. Unlike traditional art, painting therapy emphasizes the psychological experience rather than artistic skill [3]. For older adults with MCI, it offers dual advantages: its non-verbal nature bypasses common language expression barriers, while activities like visual perception and motor coordination directly stimulate cognitive reserve and neuroplasticity, potentially delaying cognitive decline.

This study aims to systematically review the evidence for painting therapy in community-dwelling older adults with MCI, analyze its mechanisms and intervention models, and ultimately construct an "Art Guards Memory" support model suitable for Chinese community contexts. By clarifying applicable scenarios and implementation keys for different models, this study provides a practical framework to promote the scientific and standardized application of painting therapy in community cognitive impairment intervention.

2. Multi-dimensional action mechanisms of painting therapy

2.1. Neural mechanisms of painting therapy

Breakthroughs in cognitive neuroscience have provided direct means to analyze the neural mechanisms of painting therapy. Functional magnetic resonance imaging (fMRI) and electroencephalography (EEG) studies reveal that painting activities involve large-scale coordinated interactions among the default mode network (DMN), salience network (SN), and executive control network (ECN). The dynamic balance among these networks is crucial for maintaining cognitive functions.

A parallel randomized controlled trial by Chen *et al.* explored the effects of a combined art intervention (CAI) on neuroplasticity in older adults across the cognitive continuum using fMRI. After 12 weeks of bi-weekly intervention, improvements in general cognitive function (MoCA), language ability, and verbal memory in the intervention group were significantly correlated with decreased functional connectivity (FC) in key brain regions (temporal lobe, anterior cerebellar lobe, fusiform gyrus). In contrast, FC values in the control group showed an increasing trend. This suggests painting therapy may improve cognitive output by optimizing neural network efficiency and reducing resource consumption from redundant neural activity [4].

The exertion of neural mechanisms shows significant disease-stage dependence. Subgroup analysis revealed that the SCD group showed the most significant improvements in language and verbal memory; the MCI group achieved significant benefits in general cognitive function, while no significant changes were observed in the possible AD group. This aligns with the "neuroprotective window hypothesis," which posits that the brain retains

strong plasticity in early cognitive decline stages. Painting therapy may exert a protective effect by stimulating synaptic regeneration and regulating neurotransmitter levels. Furthermore, color perception during painting can activate connections between the occipital visual cortex and the limbic system, which may be the neural basis for improving emotion-related brain region function [5].

2.2. Cognitive and psychosocial mechanisms of painting therapy

From a cognitive psychology perspective, painting therapy achieves coordinated activation of multiple cognitive domains through multi-sensory integration and motor coordination. Painting creation is a complex cognitive activity: theme conception involves executive functions; composition relies on visual-spatial processing; detailed depiction requires attention and working memory; and retrieving past experiences activates episodic memory [6]. This multi-dimensional stimulation effectively builds cognitive reserve. According to the "brain reserve theory," a higher cognitive reserve can offset damage through brain network reconstruction.

At the psychosocial level, painting therapy provides threefold support: a channel for emotional expression, a platform for social interaction, and a means for self-worth reconstruction. MCI patients often experience anxiety, depression, and social isolation. Painting provides a non-verbal medium to release emotions. Studies show that MCI older adults participating in a painting intervention had significantly lower Geriatric Depression Scale (GDS-15) and Self-Rating Anxiety Scale (SAS) scores compared to controls [7]. Group painting activities create a positive social environment, reducing isolation. Practice in Yanji Community showed that social participation frequency increased from 1.2 to 3.5 times per week [4].

Furthermore, the sense of creative accomplishment in painting therapy is significant for psychological well-being. When artwork is exhibited or recognized, self-efficacy and life satisfaction can improve, forming a "cognitive-psychological" virtuous cycle. A mixed-methods study by Lin *et al.* confirmed that 83% of participants felt painting "helped them rediscover their value," and this subjective experience positively correlated with cognitive function improvement ($r = 0.47$, $P < 0.01$). In the community context, this effect can be amplified through group atmosphere, forming a supportive community and strengthening intervention sustainability [3].

3. Intervention models and application effects of painting therapy

3.1. Characteristics of mainstream painting therapy models

Based on theoretical foundations, implementation forms, and objectives, painting therapy has developed various models with differentiated adaptability for community MCI intervention.

Based on structure: Theme-oriented vs. free-expression-oriented. The theme creation-oriented model involves therapists setting targeted themes (e.g., "childhood memories") to stimulate specific cognitive domains. It is structured and suitable for groups needing focused improvement in functions like memory. The free expression-oriented model respects participants' creative will without theme restrictions, focusing more on emotional catharsis and creativity stimulation. It is more effective for MCI patients with significant emotional disorders.

Based on implementation format: Group vs. individual. Group intervention (typically 8–12 people) provides social stimulation and peer support through group creation and sharing. Its advantages include high resource efficiency (costing 1/3 to 1/4 of individual interventions) and significant social benefits, making it a mainstream choice for communities. Individual intervention adopts a one-on-one, customized approach (e.g., extra composition training for visual-spatial disorders). While highly targeted, it requires significant resources and is more suitable

for severe cases or special needs.

Based on media/technology integration: Traditional vs. innovative integrated. The traditional model focuses on pure painting media (watercolor, oil painting), allowing for concentrated, in-depth intervention and facilitating standardization. The innovative integrated model combines multiple art forms or technologies (e.g., "painting + music," "painting + digital platform"). Multi-dimensional stimulation enhances intervention effects; studies show integrated models improve quality of life 37% more than pure painting models. Additionally, culturally localized models (incorporating ink painting, paper cutting) show higher acceptance in Chinese communities, with participation rates 29% higher than Western models [8].

3.2. Application effects of different intervention models in community settings

Group painting intervention is the most widely used in communities, with confirmed comprehensive benefits. A randomized controlled trial involving 120 community-dwelling older adults with MCI showed that after 16 weeks of bi-weekly group theme painting, participants' MoCA scores increased by 2.3 points and MMSE scores by 1.8 points from baseline. Language function indicators also showed significant improvements (effect sizes 0.52–0.68) [9]. Practice in Yanji Community, Shanghai, further verified this model's adaptability. Their "Elderly Have a 'Chair'" group painting activity, through a three-part design, resulted in 82% of participants increasing social frequency, and 76% reporting "improved cognitive sharpness" [10,11].

The mixed art intervention model demonstrates outstanding effects on psychosocial functions due to multi-dimensional stimulation. The "Creative Expression Art Storytelling (CrEAS)" project integrates painting, storytelling, and music. After 12 weeks with 68 participants, Neuropsychiatric Inventory (NPI) scores decreased by 4.6 points, apathy scores decreased by 3.2 points, and quality of life (QOL-AD) social relations scores improved most significantly, with effects stable at 24-week follow-up [12]. Another "painting + Tai Chi" study showed it could also reduce fall risk from 23% to 8% within 6 months, demonstrating multi-target value [13].

Intervention effect sustainability is significantly affected by the implementation environment. A comparative study by Lin *et al.* showed that after a 14-week social-art intervention, both community and nursing home groups improved at intervention end. However, at the 24-week follow-up, the community group maintained a net gain, while the nursing home group reverted to baseline. Qualitative analysis revealed the community group naturally continued activities through a "painting interest group," whereas the nursing home group lacked a continuous mechanism. This highlights the ecological advantage of community settings for sustainability [14].

4. Limitations and challenges in the application of painting therapy

4.1. Limitations in research methods

Current research on painting therapy has methodological limitations affecting conclusion reliability and generalizability.

Small sample sizes: 78% of published RCTs have samples under 100. This leads to insufficient statistical power and vulnerability to outliers.

Flaws in control design: 63% use waitlist or usual care controls; only 12% use active controls (e.g., cognitive training). This cannot rule out attention or expectancy effects. Lack of assessor blinding (in 45% of studies) may introduce bias, especially for subjective outcomes like mood.

Time-dimensional limitations: Most intervention cycles are 12-16 weeks; only 9% last over 6 months. Long-

term follow-up is scarce (15% >6 months, 2% >1 year). This short-term paradigm cannot answer questions about long-term effect trends or optimal intervention dosage. Furthermore, 82% are single-center trials, limiting generalizability across diverse community settings [15].

4.2. Challenges in theoretical construction and effect sustainability

The theoretical system of painting therapy remains incomplete, lacking a clear "action path–intervention elements–effect output" chain. Most studies focus on verifying effectiveness; only 23% involve mechanism analysis, often superficial [16]. Although some fMRI studies explore neural mechanisms, they are mostly static, single-time-point observations, failing to reveal dynamic changes during intervention [17].

Distinguishing the specific effects of intervention elements is another core obstacle. In mixed art interventions, it is impossible to clarify the respective contributions of painting, other art components (music, drama), or their synergy. Even in pure painting intervention, it is difficult to isolate the effects of theme design, material selection, or therapist guidance, hindering the extraction of core active components for program optimization [18,19].

Insufficient effect of sustainability is a prominent practical problem. Follow-up studies show cognitive improvements often diminish 3-6 months post-intervention. For example, one study found MoCA gains of 2.1 points at intervention end reduced to 0.8 points at 6 months and were non-significant at 12 months [20]. Effect duration is also frequency-dependent. The mechanism of this attenuation is unclear; hypotheses include fading neuroplasticity, insufficient cognitive stimulation intensity, or interrupted social support, but direct evidence is lacking.

4.3. Challenges in community practice

Translating painting therapy from research to routine community service faces multiple obstacles.

Shortage of professional talents: China has fewer than 500 certified art therapists, concentrated in large hospitals, with almost none at the community level. Community implementers (social workers, volunteers) often lack training; only 18% have basic training, and 3% have systematic training, leading to low intervention fidelity (42% consistency with standard protocols) [21].

Resource constraints: Communities face "three shortages": lack of dedicated venues (68% use multi-functional rooms), lack of standard materials (45% use ordinary stationery), and lack of special funds (72% rely on temporary funding). For example, in one Shanghai community, funding interruption reduced painting sessions from twice a week to once a month; participation dropped from 85% to 32%, and effects weakened significantly.

Insufficient service integration: Currently, 89% of community painting interventions are standalone projects, not integrated with chronic disease management or elderly care, forming "service silos." This leads to low identification efficiency (missing about 60% of hidden community MCI cases) and a lack of synergy with medical/rehabilitation services [22]. Additionally, a "one-size-fits-all" approach fails to address differences in MCI etiology or cognitive impairment patterns, limiting benefits for some [23].

5. Construction and implementation path of the "Art Guards Memory" community support model

5.1. Core elements of the community support model

Guided by the Chinese Expert Consensus on Multi-Dimensional Rehabilitation Intervention for Alzheimer's Disease (2025), the "Art Guards Memory" community support model constructs a collaborative framework of

"hospital-community-family" three-level linkage. Its core goal is to realize the early intervention, standardized implementation, and long-term maintenance of painting therapy. The construction of this model follows four core principles: taking older adults as the center, respecting their creative autonomy and personalized needs, such as providing adaptive painting tools for those with hand movement disorders; strengths-based perspective, focusing on the remaining cognitive abilities and creative potential of older adults rather than their defects and shortcomings; ecological intervention, integrating painting activities into the daily life scenarios of the community, such as carrying out theme creation in conjunction with festivals; and sustainable development, ensuring the long-term and stable operation of services through mechanism design [3].

The multi-agent collaboration mechanism is the core support for the operation of the model. In this mechanism, hospitals assume the role of professional leadership: providing MCI screening and diagnosis standards, intervention program guidance, and professional training. For example, the neurology department of tertiary hospitals regularly conducts theoretical and practical training on painting therapy for community personnel; community health service centers play a hub role: responsible for the identification of target populations, the organization and implementation of interventions, and effect monitoring, such as screening potential MCI patients through home visits by family doctor teams; social organizations provide resource supplementation: donating painting materials, assigning volunteers, and organizing work exhibitions; families perform support and guarantee duties: encouraging older adults to participate and assisting in completing after-class creative tasks [14].

The practice of Yanji Community, Yangpu District, Shanghai, provides a localized reference for model construction. Through the whole-process service of "cognitive screening-hierarchical intervention-continuous support," the community has realized the standardized implementation of painting therapy: first, it collaborated with a tertiary hospital to screen more than 2,000 older adults aged 60 and above using the MoCA scale, identifying 30% of high-risk groups; second, according to the severity of cognitive impairment, the groups were divided into the prevention group (SCD), intervention group (early MCI), and intensive group (late MCI), providing differentiated services of free painting, theme painting, and painting + cognitive training respectively; finally, long-term intervention effects were maintained by establishing a "painting interest club" and holding quarterly work exhibitions. One year after the implementation of this model, the conversion rate of MCI among participants was 42% lower than the average level of the community.

5.2. Specific components of model construction

5.2.1. Scientific screening and assessment system

The screening and assessment system adopts a "two-level screening + dynamic assessment" structure to ensure the accurate identification of target populations and scientific monitoring of intervention effects. The first-level screening is conducted by community health service centers using simple cognitive assessment tools (such as the AD8 scale and Mini-Cog scale) for annual regular screening of older adults aged 60 and above [18]. Those who test positive enter the second-level assessment. The second-level assessment is completed by the neurology department or geriatrics department of the hospital, using a comprehensive assessment package: cognitive function assessment (MoCA, MMSE scales), etiological assessment (brain MRI, blood biomarker testing), psychosocial assessment (GDS-15, SAS, Social Support Rating Scale), and painting ability pre-assessment (creative willingness, hand movement ability, visual function), forming a personalized assessment report.

Dynamic assessment runs through the entire intervention process, including baseline assessment (within 1 week before the intervention), process assessment (once every 4 weeks), and outcome assessment (at the end of

the intervention, and 3 months, 6 months, and 12 months after the end). The assessment indicators cover four dimensions: cognitive function (MoCA, MMSE, executive function tests), psychological state (GDS-15, SAS, self-efficacy scale), social function (social participation frequency questionnaire, communication ability scale), and quality of life (QOL-AD scale) [24]. To ensure the objectivity of the assessment, a "double-blind assessment + cross-validation" mechanism is adopted: two assessors who are unaware of the grouping conduct independent assessments, and when the result difference exceeds the allowable range, a third assessor is invited for arbitration.

5.2.2. Hierarchical and classified intervention program system

Based on the severity of MCI, cognitive impairment patterns, and individual preferences, a three-level intervention program system of "basic version + advanced version + integrated version" is constructed. The basic version is oriented to the SCD population and early MCI patients, focusing on group painting guided by free expression, once a week for 60 minutes each time. The content includes color perception training and simple still-life sketching, with the core goals of maintaining cognitive function and stimulating creative interest. The advanced version is targeted at patients with moderate MCI, adopting group intervention guided by theme creation, twice a week for 90 minutes each time. The theme design is combined with cognitive training goals, such as "family memory painting" to strengthen episodic memory and "community map painting" to improve spatial orientation ability. At the same time, individual guidance sessions are added (15 minutes per person each time) [24].

The integrated version is oriented to patients with late MCI or those with obvious emotional/social disorders, adopting a multi-dimensional intervention program of "painting + X," 2–3 times a week for 90 minutes each time. Specifically, it includes: "painting + music" to improve mood (creating with soothing Chinese folk music), "painting + storytelling" to strengthen language function (telling stories behind the paintings based on the works), and "painting + digital technology" to expand intervention scenarios (completing interactive painting tasks through smart tablets). For groups with special needs, adaptive programs are developed: providing large-handle brushes and auxiliary brackets for those with hand movement disorders, and using high-contrast pigments and tactile auxiliary tools for those with visual impairments.

The implementation of the program adopts a "standardization + personalization" combined strategy: core links (such as warm-up activities, creative processes, and sharing sessions) strictly follow the Standard Operating Procedure (SOP) to ensure intervention fidelity; at the same time, 20% of flexible time is reserved, allowing the leader to adjust the content according to the real-time status of the participants [5]. For example, adding a color healing session for those with low mood, shortening the single creative time, and increasing rest intervals for those with poor attention.

5.2.3. Professional talent support system

The talent support system adopts a three-level echelon structure of "core team + backbone personnel + volunteers" to solve the problem of insufficient professional personnel in the community. The core team is composed of hospital art therapists, geriatricians, and rehabilitation therapists, undertaking the responsibilities of program design, professional training, and quality supervision. They conduct on-site supervision at least once a month and online guidance twice a month. The backbone personnel are community social workers and nursing staff who have received systematic training [19]. They are required to complete no less than 40 hours of theoretical training (basics of painting therapy, pathological mechanisms of MCI, etc.) and 60 hours of practical training (program implementation, emergency handling, etc.), and can independently carry out intervention activities only after

passing the assessment.

The volunteer team is mainly composed of art majors, retired teachers, and older adults. After 20 hours of basic training (communication skills, activity assistance, safety protection, etc.), they undertake auxiliary work such as material preparation, one-on-one assistance, and activity recording. A "training-assessment-promotion" mechanism is established: advanced training is conducted twice a year, and backbone personnel who pass the assessment with excellent results can be included in the reserve pool of the core team, and volunteers with outstanding performance can be promoted to backbone personnel. At the same time, a talent incentive mechanism is established, integrating intervention work into the performance evaluation of community workers, and providing service hour certification and recognition awards for volunteers.

5.2.4. Closed-loop effect evaluation and improvement system

The effect evaluation and improvement system adopts a closed-loop operation mechanism of "data collection–analysis and feedback–program optimization." Data collection is carried out through dual channels of "paper records + digital platforms": process data (participation rate, creative completion rate, real-time feedback) is recorded in real-time by the leader; assessment data is entered into digital systems such as the TCM Brain Health Cloud Platform by professional assessors to realize automatic summary and preliminary analysis [3]. A monthly effect analysis meeting is held, where the core team and backbone personnel jointly interpret the data: analyzing the average effect of the intervention program from the overall level, identifying the benefit differences of different characteristic groups from the subgroup level, and tracking the change trajectory of special cases from the individual level.

Program optimization is divided into real-time adjustment and phased iteration: when the process assessment shows that the participation rate of a certain link is less than 60% or the negative feedback exceeds 20%, real-time adjustment is launched immediately, such as changing "still-life sketching" to "memory graffiti" to enhance interest; phased iteration is carried out every 6 months based on the outcome assessment data, optimizing the intervention content, duration, or frequency in combination with the latest research evidence and actual community needs. For example, increasing the proportion of theme creation in the advanced version program based on the research finding that "theme creation is more significant for improving executive function"; adjusting the activity time to Saturday mornings based on community feedback that "participation is higher on weekends." At the same time, an effect assessment database is established to provide an empirical basis for subsequent research and policy-making.

5.3. Guarantee strategies for model implementation

5.3.1. Policy and institutional guarantee

Policy guarantee needs to construct a three-level policy support system of "national guidance + local implementation + community refinement." At the national level, relying on the National Action Plan for Responding to Senile Dementia (2024–2030), painting therapy is clearly included in the core content of community elderly cognitive health services, and the Community Painting Therapy Service Standards are formulated to clarify service standards, personnel qualifications, and assessment requirements. At the local level, painting therapy services are included in the basic public health service projects, special funds are set up, and subsidies are provided at a standard of "300–500 yuan per person per year." The implementation of the service is included in the performance evaluation index system of local governments.

At the community level, three core systems need to be established: an admission and withdrawal system, clarifying the inclusion criteria for participants (clear MCI diagnosis, no severe mental illness, and basic creative ability) and withdrawal criteria (progression to dementia, occurrence of severe adverse reactions, etc.); a safety management system, equipped with first-aid equipment and drugs, conducting health risk assessments for participants, and clarifying the handling procedures for emergencies during activities; a privacy protection system, standardizing the collection, storage, and use of assessment data, creative works, and other information, and strictly prohibiting unauthorized disclosure [21]. In addition, a multi-department collaboration system is established to clarify the responsibilities of community health service centers, cultural stations, civil affairs offices, and other departments to form a joint work force.

5.3.2. Resource integration and supply guarantee

Resource integration adopts a multi-dimensional supply model of "government leadership + social participation + family support." The government assumes the responsibility of basic resource guarantee: equipping communities with standardized painting activity rooms (requiring good lighting and an area of no less than 30 square meters), providing painting material funds at a standard of "100 yuan per person per year," and including art therapists in the talent introduction plan of primary medical and health institutions. Social participation focuses on resource supplementation: through public welfare donations, project cooperation, and other methods, striving for enterprises to donate painting materials and intelligent equipment, and cooperating with art colleges to establish "college student practice bases" and regularly assigning professional teachers and students to provide technical support.

Family support focuses on emotional and practical guarantees: through family education courses, guiding family members to master simple painting auxiliary skills (such as how to guide recall-based creation), and encouraging family members to participate in characteristic activities such as "parent-child joint painting" to enhance the participation motivation of older adults. For resource-poor communities, a "regional resource sharing" mechanism is established: the district-level government coordinates the allocation of painting materials and professional personnel, and implements a "mobile service vehicle" system to carry out activities in different communities every week to improve resource utilization efficiency [2]. In addition, a "painting material recycling and reuse" program is developed to process waste paintings into handmade products, which not only reduces costs but also enhances the sense of accomplishment of participants.

5.3.3. Strategies for sustained participation and effect maintenance

To address the obstacles to effective maintenance, a three-dimensional strategy system of "motivation stimulation–participation guarantee–community continuation" is constructed. In terms of motivation stimulation, a "achievement feedback + personalized incentive" mechanism is adopted: selecting "Creation Stars" every month and holding small-scale work exhibitions; establishing "creative growth files" for participants to visually show the progress of their works and the trajectory of cognitive improvement; designing incentive methods according to personal preferences, such as providing more sharing opportunities for those who like socializing and designing family-themed creations for those who value family. Studies have shown that the intervention compliance of community participants using this mechanism has increased from 65% to 89% [23].

The participation guarantee strategy focuses on solving practical obstacles: for discontinuous participation caused by physical decline and chronic diseases, flexible participation options of "online + offline" are provided, and those who are unwell can complete creations through live broadcasts and share online; for those with

transportation difficulties, volunteers are arranged to pick them up or provide home-based services; for those with poor memory, multiple reminders of activity time are provided through phone calls, family member notifications, and calendar markings. A "flexible attendance" system is established, allowing 2 absences per month, and simple creative tasks are provided during the absence period to ensure the continuity of the intervention.

The community continuation mechanism aims to maintain social support and creative habits after the intervention: after the end of the intervention project, participants are supported to spontaneously establish a "painting interest club," and the community provides venue and basic material support; a large-scale work exhibition is held every quarter to build a communication platform; an online community is established to encourage participants to share daily creations and life experiences, forming a continuous interactive atmosphere [24]. Practice in Yanji Community shows that the cognitive function maintenance rate of the group that established the interest club was 58% higher than that of the group that did not establish it 6 months after the end of the intervention. In addition, professional personnel are regularly invited to conduct public lectures and guidance to enhance the professionalism and attractiveness of community activities.

6. Conclusion and prospects

As a non-pharmacological intervention combining science and humanism, painting therapy demonstrates multi-dimensional value for community-dwelling older adults with MCI. Through the synergy of neural, cognitive, and psychosocial mechanisms, it achieves comprehensive benefits: maintaining cognitive function, improving emotional state, and enhancing social engagement. Different intervention models show differentiated adaptability: group theme painting balances effect and efficiency for large-scale promotion; mixed art intervention offers comprehensive benefits for complex needs; digitally-empowered models break spatiotemporal limits for resource-poor or mobility-impaired groups.

Current research and practice face challenges: methodological limitations (small samples, flawed controls), an underdeveloped theoretical system, practical constraints (talent shortages, resources), and a need for improved effect sustainability. The "Art Guards Memory" community support model constructed in this study addresses these bottlenecks through its four core components and three guarantee strategies, providing a systematic, practical framework.

Future research should move toward refinement and localization. This includes conducting multi-center, large-sample, long-term RCTs with active controls; using longitudinal multi-modal neuroscience to reveal precise mechanisms; and developing personalized programs via machine learning. Practically, transformations are needed: from project-based to regular services, from single intervention to integrated care, and from Westernized to localized models incorporating traditional arts. Strengthening the professional talent training system is also crucial.

The potential of painting therapy in MCI intervention is not yet fully realized. With deepening research and improved practice, this art-science integration is expected to become a core component of community cognitive impairment prevention. The "Art Guards Memory" approach can help MCI older adults maintain cognitive vitality and build a supportive, humane community environment, offering a creative solution to the challenges of population aging.

Disclosure statement

The authors declare no conflict of interest.

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