

# Current development of a nonpharmacological intervention approach for mild cognitive impairment patients and a clinical trial in China

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## INTRODUCTION

The current review focuses on “evidence-based research” in the fields of “nonpharmacological interventions for early-stage mild cognitive impairment (MCI)” and “interventions for caregivers.” We describe examples of nonpharmacological interventions for those with MCI across the west and east and introduce the multicomponent nonpharmacological intervention approach (MCNIA) as an innovative model in China. In order to understand existing interventions, the researchers searched keywords in Elsevier, National Center for Biotechnology Information (NCBI), SocIndex, the National Library of Medicine (MEDLINE), PsychInfo, and the China National Knowledge Infrastructure (CNKI) Chinese database. A total of 53 relevant articles from 1996 to 2021 were extracted, as there is very limited literature on the topic of nonpharmacological interventions targeting older people with MCI. Most evidence-based research is focused on other groups such as children and adolescents in the global context. The following will discuss the current situation of nonpharmacological interventions and the innovative approach initiated by our multidisciplinary research team. The identified prospective intervention for MCI

will be further elaborated.

## *Current interventions from the West and the East*

Nonpharmacological interventions for MCI have been tested in Europe and the USA. For example, based on their intervention and follow-up of the memory support system training for amnesic people with MCI,<sup>[1]</sup> argue that participants’ daily living ability and memory improved after their intervention. Based on a 6-month experiment of group psychological interventions for people with MCI, Buschert *et al.*<sup>[2]</sup> identified that memory training, recall and cognition stimulation, psychomotor recognition, and social interventions are able to improve overall cognitive function of those with MCI. Additional intervention methods that are widely practiced in the west include cognitive intervention (training),<sup>[1]</sup> music therapy,<sup>[3]</sup> nostalgic therapy,<sup>[4]</sup> and horticultural therapy.<sup>[5]</sup> These methods focus on specific interventions for different stages of dementia; however, there are few explorations of the connections between these methods.

Chinese scholars have explored various factors influencing MCI with a focus on local social factors and exercise. Zhang *et al.*<sup>[6]</sup> suggested that 3R therapy (Reminiscence, Reality orientation, and Remotivation) can

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improve the life quality and well-being among people with MCI. Yang *et al.*<sup>[7]</sup> applied the training of memory mnemonics, language strategies, physical mobility, and daily living skills to 90 older adults with mild to moderate dementia, which appeared to delay the progression of dementia symptoms by enabling participants to improve self-care, communication, behaviors, and self-perceived mental health. However, the existing research is not systematic, and it is difficult to separate analyses of pathological behavior from socially desirable behavior. The effects of existing intervention methods have not been systematically tested and optimized with data useful for real-world implementation of interventions in practice.

### ***Needs of innovations from a Systems Theory perspective***

Due to the long course and lack of effective treatments targeting dementia, caregivers and families encounter enormous challenges in the long-term caring experiences, during which their health and life quality often decline substantially.<sup>[8]</sup> The fundamental concern for cognitively impaired older people is the danger they pose to themselves, while there are substantial downstream mental struggles and challenges in daily life that influence the health and life quality of their family caregivers. Therefore, earlier diagnoses and interventions are vital for those with MCI, and nonpharmacological interventions are as important as medical treatments in dementia care.

“Systems Theory” suggests intervention effectiveness can be assessed only after one observes and analyzes all the “systems” that contribute to behavior and welfare, and work to strengthen those systems. Researchers can provide positive role models, therapy, or similar services that create a more supportive system for the individual. The Systems Theory regards different subjects as subsystems that interact with each other in a system.<sup>[9]</sup>

According to the Systems Theory, the care system greatly affects the life quality of caregivers. Many studies show that the burden and stress of caring for people with MCI has a negative impact on caregivers, such as causing high levels of anxiety and depression.<sup>[10]</sup> The most common negative emotions found among MCI caregivers are depression, guilt, anger, and a strong sense of loss and deprivation in care relationships.<sup>[11]</sup> These negative emotions lead to less effective communication, loss of intimacy,<sup>[12]</sup> and reduced marital satisfaction.<sup>[13]</sup> A caregiver’s own lifestyle is affected by the heavy responsibility of 24-h caring. The more tasks the caregiver performs, and the more concerned the caregiver is about the well-being of the older adult, the heavier their burden will be. There are already mature intervention models on an international basis, which have collectively accumulated empirical results of intervention

effects. Most of China’s interventions remain at the level of health guidance and skills training for caregivers.<sup>[14]</sup> A systematic localized caregiver intervention model has not yet been established.

From the perspective of the Systems Theory, the integrated intervention MCNIA includes two dimensions: (1) referring to the physical–psychological–social model: MCNIA treats participants as a “holistic agent,” paying attention to their multidimensional needs and (2) focusing on practice: through integrating global cognitive intervention models, we aim to provide targeted and integrated interventions based on the needs of people with MCI.

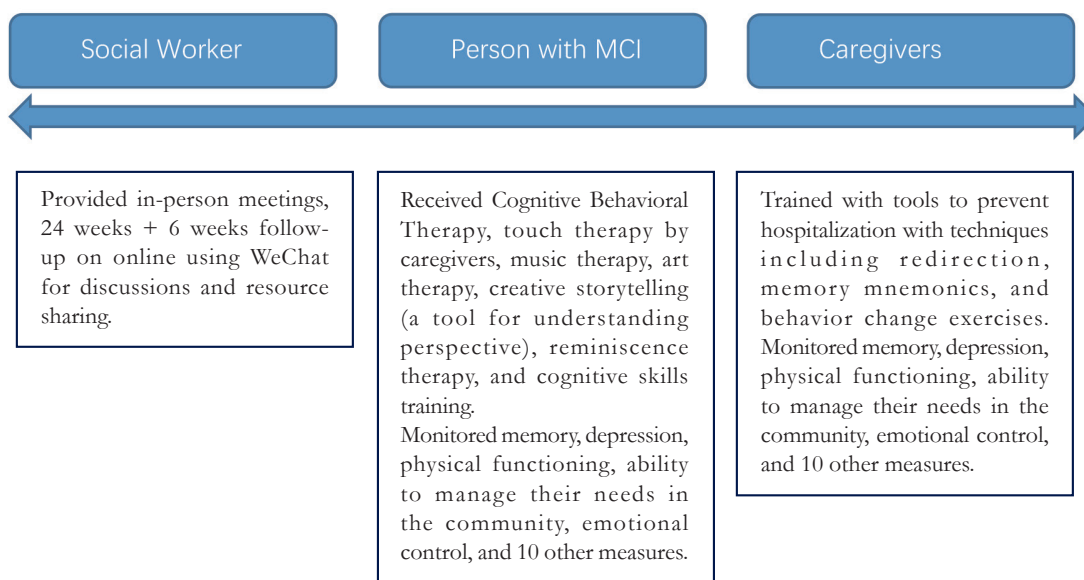
### ***Pilot trails***

With the above references, the research applies the Multicomponent Intervention Approach.<sup>[15]</sup> In consideration of the local characteristics in China, it also innovates an integrated approach to systematically offer an intervention effective for those with MCI and members of their care networks. As noted from the literature, various methods have been tested as targeted interventions for different stages of cognitive disorders, such as the implementation of the new Chinese MCI intervention built on the expertise of Hongtu Chen of Harvard University as well as the research and development of the “helping love home” cognitive care tool, the Finger study,<sup>[16]</sup> Cell Signaling Technology (CST)<sup>[17]</sup> in the UK, Compas<sup>[18]</sup> in Canada, Maks<sup>[19]</sup> in Germany, as well as the intervention methods tested in Japan, Denmark, Germany, and Israel.

Based on the initial exploration, the research team selected 60 older participants with MCI and their 60 caregivers from 2018 to 2019 in a neurology department in a hospital in Shanghai. A 6-month pilot study was conducted after receiving ethical approval. Feedback from MCI participants and their caregivers was very positive, and the project report received a top 10 research award from the China Aging Affairs Committee.

After assessing the baseline measurements of participants and their families, we provided integrated interventions to the participants and their caregivers, which included online and offline interventions. We are currently collecting the pilot study data and will refine the intervention and research program after analysis.

Figure 1 describes the intervention which builds on the literature of the primary drivers of behavior (competence, autonomy, and relatedness). Participants were guided in effective approaches to address the behavioral concerns commonly found among those with MCI. This intervention was evaluated based on a comparison of pre-test and post-test evaluations of memory using the Mini-Mental Status



**Figure 1: Multicomponent nonpharmacological intervention approach. MCI: mild cognitive impairment.**

Exam (MMSE) and the Montreal Cognitive Assessment (MoCA), as well as tests that measure common sleeping disorders (Pittsburgh Sleep Quality Index [PSQI]) and depression using the Geriatric Depression Scale (GDS). Positive outcomes were evidenced from all these above indicators compared with the control group. While the experimental group received a sequence of MCNIA intervention in a group once a week in addition to the drug treatment, the control group only received treatment as usual.

### ***Innovations of MCNIA***

The MCNIA intervention was based on the concept that having a cost-effective intervention for cognitive disorders in older people is an important topic for integrated health care in China.<sup>[20]</sup> Compared to the medical interventions alone, combining non-medical practice with medical interventions can produce more significant effects, which will promote maximized cognitive ability, reduce medical costs, improve the psychosocial aspects of older people, and promote “holistic health.”

The pilot intervention embraces innovations in content and research methods: (1) The study is evidence-based research. The application of this approach requires rich information and a reliable implementation process. However, there is no corresponding evidence-based research information system in China. The identification and application of evidence is a challenge for the researchers. (2) There are many variations of applications of nonpharmacological interventions. This approach applies intervention methods that have been applied in some Chinese communities with Chinese features, in order to refine and analyze

the multi-intervention effects of integrated intervention mode on the physical and mental health of older people based on local characteristics during the process of introducing international non-medicine intervention methods. (3) The overall intervention of MCNIA requires the cooperation of participants, caregivers, and social workers. The management of the intervention benefits from coordination between care professionals and the unique role of technology-assisted devices to create a personalized experience supportive of one’s unique needs. Therefore, the research team will work closely with geriatric medical institutions to integrate multiple resources, strive to achieve mutual benefit and win-win results, achieve improvements in practice and research, benefit the clients, and develop the best local intervention pathways and systems for people with MCI. In summary, the MCNIA is an innovation as an evidence-based research approach in practice that will contribute to clinical interventions in China and offer a new pathway for intervention for those with MCI. A nonpharmaceutical intervention manual has been produced with standard guidelines on how to implement the intervention for MCI participants. As a key nonpharmacological intervention for cognitive diseases, the multicomponent intervention path and system approach is a groundbreaking development that will add to the multi-intervention methods in China.

### **PROSPECT AND CONCLUSION**

While most nonpharmacological models were developed for the western society, the MCNIA has been developed in a Chinese context and can be customized with local

approaches. This approach builds on a collective wisdom from a multidisciplinary approach based on ideas from neuroscience, social work, medicine, information technology, anthropology, and psychology. Its current intervention tool is customized based upon a holistic process, which will include advocating, preliminary diagnosis and assessment, intervention, evaluation, and dissemination. Initial results of psychosocial measures appear to show significant improvements for both participants with MCI as well as caregivers in depression, emotional control, and ability to care for their own needs. Feedback from participants included statements such as “The energy input from the social worker makes us look forward to the activity once a week, thank you for your loving support” and “I think your group is the best way to vent stress. Just tell you I can help us think of ways to relieve stress, and teach us how to deal with this matter from spiritual and psychological aspects. I really thank you.” The interactive component is often cited as the most valuable aspect. Respondents have said, “Talking is also venting. I heard what other people in the group said, and then I saw that, oh, it’s not easy for other people at home. Really, I am not alone, but there are people working together. Moving forward I find it very enlightening. I will seek more support.” With this insight, the future plan of the MCNIA and other intervention approaches should be developed to work seamlessly with the support of technology training tools, which build on our digitalized lives and integrate the living features of people.

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## Conflict of Interest

None declared.

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