

Research and Practice 3

SHAPE Model: Innovating Cognitive Impairment Management in China's Aging Population

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Key highlights:

- Older adults in China confront a daunting situation with a high prevalence of cognitive disorders, coupled with low rates of recognition and a shortage of medical resources.
- The SHAPE model is a preventive and control approach proposed by the Department of Geriatrics at Shanghai Mental Health Center, characterized by its "Shanghai uniqueness".
- The SHAPE model aims to facilitate the early detection and comprehensive management of cognitive impairment through stratified screening, specialized and accurate diagnosis and early intervention.

Introduction

In mainland China individuals aged 60 and above has surpassed 280 million, and concurrently the prevalence of cognitive disorders increases exponentially with age. Epidemiological surveys reveal that the prevalence of dementia among individuals over 60 stands at 6%, while for Mild Cognitive Impairment (MCI) it reaches 15.5% ^[1], constituting the largest cohort of cognitive disorder patients globally. In stark contrast, there is a significant imbalance in the allocation of medical resources. Geriatric psychiatry, as an interdisciplinary field, faces a critical shortage of professionals, with an average of merely 0.3 specialists per 100,000 older adults, which is far below the levels observed in developed nations ^[2]. Furthermore, primary care physicians often lack experience managing cognitive disorders; less than 30% of community general practitioners receive adequate training in this area, which has been associated with misdiagnosis and an underdiagnosis rate exceeding 60% at the initial diagnostic stage. Consequently, approximately 78% of patients with mild cognitive impairment fail to receive early intervention ^[3]. The field of cognitive disorder diagnosis and treatment in mainland China is thus confronted with formidable challenges.

Overview of SHAPE

The SHAPE model is a preventive and control approach proposed by the Geriatric Department of the Shanghai Mental Health Center, characterized by its "Shanghai uniqueness". The model aims to facilitate the early detection and comprehensive management of cognitive impairment through stratified screening, specialized and accurate diagnosis, and early intervention.

Shanghai Action to prevent the elderly from dementia	
Step1: Stratified Screening	A self-developed "Thoven Cognitive Self-Assessment" ^[4] is a user-friendly cognitive screening application. This tool enables rapid and efficient identification of individuals at high risk of cognitive impairment at the community level.
Step 2: Specialized Diagnosis	Individuals identified as being at high risk are referred to district psychiatrists for further diagnosis, which encompasses foundational hematological examinations, risk gene screening and MRI. They are also provided with basic cognitive enhancement therapy. For patients necessitating a more definitive treatment plan, referrals are made to geriatric psychiatry memory clinics for comprehensive investigations.
Step 3: Precision Diagnosis	Upon entering the geriatric psychiatry memory clinic, the diagnostic process is further refined with genomic assessments, cerebrospinal fluid analysis and PET scans. Tailored interventions are then prescribed based on the diagnostic findings, encompassing pharmacotherapy, cognitive training and lifestyle modifications.

The SHAPE funnel model has achieved remarkable achievements in the screening and intervention of geriatric cognitive disorders, earning high recognition from the elderly population, healthcare colleagues, and the government. Taking Shanghai as an example, since last year, under the promotion of the Shanghai Civil Affairs Bureau, the SHAPE model has been widely implemented in numerous communities. At the community level, we have completed screenings for over 90,000 older adults, identifying approximately 26.5% at risk of cognitive impairment. For these individuals, the community has established cognitive profiles and recommended high-risk individuals for further diagnosis and treatment at district-level mental health centers, while low-risk individuals are monitored annually. At the specialized cohort level, we have accumulated data on nearly 3,000 patients with cognitive disorders, all of whom have undergone

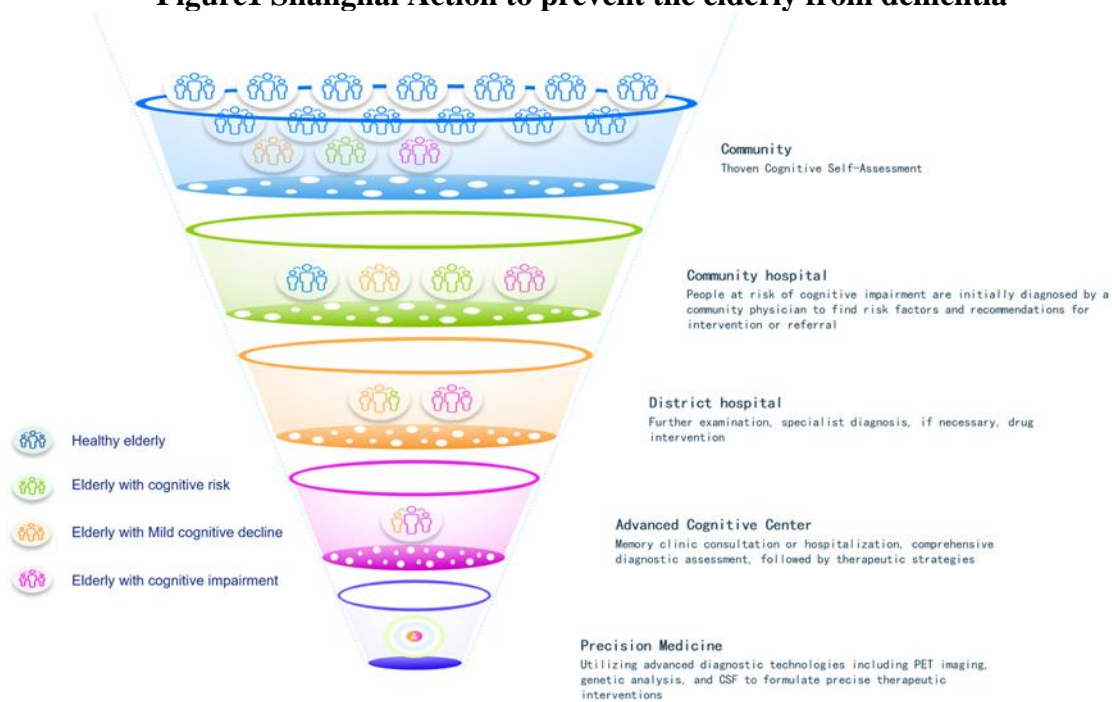
comprehensive neuropsychological testing. Over 75% have undergone hematological and APOE risk gene testing, and 40% have completed multimodal MRI examinations. Doctors at the district mental health centers provide community diagnostic (initial diagnosis) recommendations based on the patient's specific circumstances, clarifying whether district-level intervention or referral to a higher-level medical facility is necessary. At the level of precision diagnosis, over 400 patients have received accurate diagnostic results through advanced technologies such as genomics, cerebrospinal fluid (CSF) testing, and PET imaging. Furthermore, treatment plans tailored to their individual needs have been formulated accordingly. The SHAPE model has facilitated early detection, diagnosis, and treatment of geriatric cognitive disorders, providing robust support for enhancing the cognitive health of this population. Happily, this model has gradually expanded to six other provinces and municipalities outside of Shanghai.

This comprehensive-disease-management approach aids in identifying cognitive impairment at early stages when symptoms are less severe. Referrals to specialized physicians for further diagnosis ensures the accuracy and reliability of the diagnosis. Personalized intervention plans address cognitive, behavioral and daily living abilities, significantly improving patients' quality of life and reducing the burden on families. Additionally, the SHAPE model optimizes medical resources, implementing a tiered referral system involving general practitioners, psychiatrists and geriatric psychiatry specialists, thereby enabling comprehensive patient management. This collaborative model allows doctors at different levels to fulfill their roles, maximizing professional strengths and enhancing the professional value of general practitioners in early screening for geriatric cognitive disorders. It alleviates the screening burden on geriatric psychiatry specialists, enabling them to focus more on precise diagnosis and treatment, thereby improving the efficiency of medical resource utilization. Furthermore, the model promotes the formation of geriatric healthcare alliances, ensuring comprehensive management of older adults with cognitive impairment.

Future perspective

The SHAPE model will integrate digital technology to further enhance the precision and efficiency of screening and intervention. For instance, by leveraging artificial intelligence and big data analytics, screening tools will be optimized to enable earlier and more precise identification of cognitive impairments. Concurrently, the development of more computer-based and mobile application cognitive training software will provide patients with personalized and convenient intervention strategies. Furthermore, we will explore a profound integration with community healthcare, achieving a seamless transition from community screening to hospital diagnosis, and finally to home rehabilitation. Ultimately, we aspire to extend our model to more provinces and municipalities across China, benefiting a larger population of older adults and healthcare professionals.

Figure1 Shanghai Action to prevent the elderly from dementia



For further reading:

[1] Jia L, Du Y, Chu L et.al. Prevalence, risk factors, and management of dementia and mild cognitive impairment in adults aged 60 years or older in China: a cross-sectional study. *Lancet Public Health*. 2020 Dec;5(12):e661-e671. doi: 10.1016/S2468-2667(20)30185-7

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[3] Writing Committee for the 2018 Chinese Guidelines on the Diagnosis and Management of Dementia and Cognitive Disorders, Cognitive Impairment Disorders Committee of the Chinese Neurologist Association. 2018 Chinese Guidelines on the Diagnosis and Management of Dementia and Cognitive Disorders (Part V): Diagnosis and Treatment of Mild Cognitive Impairment [J]. *National Medical Journal of China*, 2018, 98(17): 1294-1301. DOI: 10.3760/cma.j.issn.0376-2491.2018.17.003.

[4] Nie J, Yang Y, Gao Y, et.al. Newly self-administered two-step tool for screening cognitive function in an ageing Chinese population: an exploratory cross-sectional study. *Gen Psychiatr*. 2023 Feb 3;36(1):e100837. doi: 10.1136/gpsych-2022-100837



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