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SOCIAL WORK INTERVENTIONS FOR PATIENTS WITH COGNITIVE IMPAIRMENT: A SYSTEMATIC REVIEW AND META-ANALYSIS

Wang Tao*

ABSTRACT

Background: There is a lack of study comprehensively comparing the effects of all existing types of interventions on global cognition among patients with mild cognitive impairment (MCI).

Aims: To conduct a network meta-analysis to evaluate the effectiveness of different types of interventions in improving global cognition among MCI patients.

Methods: Randomized controlled trials (RCTs) assessing the effects of pharmacological or non-pharmacological interventions on the Mini-Mental State Examination (MMSE) in MCI patients were included. Two authors independently screened the studies and extracted the data. Random-effects network meta-analysis was used to synthesize the data. Results were summarized as mean difference (MD) and corresponding 95% CIs of MMSE in forest plots.

Results: Fifty RCTs with 5,944 MCI patients met the inclusion criteria and 49 were included in the network meta-analysis. Compared with the control group, cognition-based intervention, physical exercise, combined physical exercise and cognition-based intervention, and antioxidants had positive effects on MMSE in participants with MCI. There was no significant difference between all other interventions included and the control group.

Department of Sociology and Social Work, Minzu University of China, No. 27 Zhongguancun S St, Haidian, Beijing 100081, China; Email: Taowang@edu.cn



Conclusions: This study suggested that cognition-based intervention, physical exercise, combined physical exercise and cognition-based intervention, and antioxidants could be among the most effective interventions on global cognition in older adults with MCI. The availability, acceptability, and cost-effectiveness of interventions should also be taken into consideration when selecting interventions.

Keywords: Nonpharmacological intervention; social work; cognitive impairment; systematic review; meta-analysis.

INTRODUCTION

Since the beginning of the 21st Century, Chinese society has experienced dramatic drops in fertility and mortality, leading to rapid increases in the average life expectancy and the rapid aging of the population. With the increased number of aging individuals, the prevalence of various chronic diseases has also increased. With the rising size of the aged population, it is expected that chronic diseases will be more common and health systems will need to pay attention to the needs of these elderly people. As a greater proportion of the population survives past age 70, age-related diseases that affect daily function and mental health will impact many more people. Therefore, the demand for old-age care and medical care for the elderly will inevitably increase, adding great expense to health systems. A series of cognitive disorders, represented by Alzheimer's disease, have been plaguing the elderly. According to statistics, there are 50 million dementia patients in the world, and 68% of them suffer from Alzheimer's disease. The caregivers of these patients need to take care of them physically and emotionally, and they are under great pressure.

Cognitive disorder generally refers to cognitive impairment caused by various factors, covering the process from mild cognitive impairment to dementia. Cognitive dysfunction is divided into mild cognitive impairment (MCI) and comprehensive severe cognitive impairment. Because it can cause serious mental disability, cognitive disorder often is a heavy burden on families and society. The fundamental problem faced by older adults with cognitive impairment is the decline of cognitive function. The resulting emotional and life problems not only have adverse effects on their health and quality of life, but also greatly affect the physical and mental health of caregivers. Therefore, society and especially medical and social workers have sought early diagnosis and intervention for people in the cognitive impairment stage to delay the progress of the disease.

Department of Sociology and Social Work, Minzu University of China, No. 27 Zhongguancun S St, Haidian, Beijing 100081, China; Email: Taowang@edu.cn



With the increasing number of patients with cognitive impairment in China, screening for and intervening in cognitive impairment among older adults has become a top concern for researchers. Nonpharmaceutical interventions have gradually become a recognized strategy to improve the cognitive health of older adults because they are more economical, convenient, and safer than traditional drug interventions. Meanwhile, nonpharmaceutical intervention has the advantages of being more cost-effective, convenient, and safe free from site restrictions, and easier to implement. At present, nonpharmaceutical interventions for cognitive impairment mainly include leisure-related interventions, neural regulation technology, computer-assisted cognitive rehabilitation, acupuncture and massage, diet intervention, and nostalgia therapy. In a systematic review and meta-analysis of nonpharmaceutical interventions, Tang et al. confirmed the effectiveness of art therapy in reducing the symptoms of depression, anxiety, and fatigue in women with breast cancer based on a transparent literature retrieval method of systematic analysis and standardized inclusion and evaluation criteria. After systematically analyzing 22 studies on the quality of life, depression, and anxiety interventions for cancer caregivers, Fu et al. showed that music therapy could ease the anxiety of caregivers and regulate their emotions.

In the process of development, social work has been constantly adopting theoretical knowledge and intervention methods from psychology. Social workers have also employed music therapy as a treatment method in cognitive impairment intervention and hospice care with positive outcomes. Horticulture therapy has been adopted to help empty nesters cope with loneliness and older adults with chronic schizophrenia. Painting therapy has been mainly used with children, adolescents, and patients with mental illness. In recent years, social work practitioners have also tested nonpharmaceutical interventions for patients with cognitive impairment, using professional social work methods such as case work, group work, and group counseling combined with psychological treatment modes such as memorial therapy and horticultural therapy. Many of these social work interventions have been implemented in combination with the previous approach, including regular exercise, diet management, etc. However, there have been few evidence-based research outputs. Evidence-based medicine involves combining clinical expertise with the best external evidence from systematic research and considering patients' values and expectations. By combining the best external evidence with individual clinical expertise and patient preferences, doctors who practice evidence-based medicine can identify and apply the most-effective interventions to maximize their patients' quality and length of life. Evidence-based social work practice is based on scientific research, which seeks basic concepts and an operational framework of best practices from numerous sources, to understand what is and is not beneficial to the stakeholder according



to the scientific research results, and to provide professional services accordingly. In evidence-based practice, the clients are active participants.

The main purpose of this study was to evaluate and meta-analyze nonpharmaceutical social work interventions for cognitive impairment by systematically investigating the methods and achievements of nonpharmaceutical interventions in the existing literature, exploring the best evidence of effective intervention for patients with cognitive impairment and establishing a scientific intervention system in terms of “practice–evidence–practice” in the field of nonpharmaceutical intervention in cognitive impairment. Accordingly, this study systematically reviewed the related research on nonpharmaceutical interventions for patients with cognitive impairment in both English and Chinese from 2010 to 2021. At the same time, a meta-analysis examined whether nonpharmaceutical social work interventions can improve the cognitive function and neuropsychiatric status of patients with cognitive impairment to provide evidence and ideas for further research on nonpharmaceutical intervention in cognitive impairment.

MATERIALS AND METHODS

Inclusion and Exclusion Criteria

Studies using randomized controlled trials (RCTs) were included. RCTs have been mainly used in the field of medical therapy and health services, as well as drug effect detection. Evidence is the core of evidence-based medicine (EBM), and systematic reviews/meta-analyses based on RCTs are currently recognized as the highest level of evidence.

The inclusion criterion was patients diagnosed with cognitive impairment, from MCI to dementia. The exclusion criteria were: (a) mixed samples of participants with cognitive impairment and healthy older adults, with no separate data analysis of patients with cognitive impairment; (b) patients with cognitive impairment caused by other reasons, such as drug or alcohol dependence. The experimental groups received nonpharmaceutical interventions, whereas the control groups received a blank control or routine health education.

The main outcome was overall cognitive function. General cognitive function screening scales were adopted, including the Mini-Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA), to investigate whether nonpharmaceutical intervention had a significant effect on the cognitive ability of patients with cognitive impairment. Secondary outcome measures included using the

Department of Sociology and Social Work, Minzu University of China, No. 27 Zhongguancun S St, Haidian, Beijing 100081, China; Email: Taowang@edu.cn



Neuropsychiatric Inventory to measure neuropsychiatric status, which evaluates the improvement of the neuropsychiatric and psychological aspects of patients with cognitive impairment.

Studies were excluded if they: (a) were not published in Chinese or English; (b) were duplicate publications; (c) were comments, news reports, meeting minutes, editorials; or (d) had obvious data errors, insufficient key data, or data that could not be converted into the required data format.

DISCUSSION

Cognitive impairment includes the process from MCI to dementia. According to the investigation, 10–15% of patients with MCI advance to dementia every year. At present, there is no effective treatment for dementia. If intervention treatment occurs in the early stages of dementia, it may slow the progress of the disease. In view of the fact that nonpharmacological intervention usually has the advantages of few adverse reactions and easy implementation, it has become a new area of interest for intervention treatment and research in recent years. Nonpharmacological intervention methods such as cognitive training, physical exercise, music therapy, and memorial therapy for patients with cognitive impairment are favored by researchers and widely used. However, according to existing research, intervention for patients with MCI mainly focuses on the improvement of cognitive ability. Cognitive impairment not only leads to the decline of memory, spatial perception, attention, and task ability, but it also causes mental harm to patients, such as problems related to emotions, abnormal psychological experiences and ways of thinking, and even severe mental disorders. At the same time, the appearance of emotional apathy symptoms also increases the risk of progressing from MCI to dementia. Therefore, broad intervention should be carried out for patients with MCI, including cognitive and mental aspects. Professional nonpharmacological intervention is helpful to improve the overall cognitive function of patients with cognitive impairment, whereas the improvement of neuropsychology requires family care and social support.

This research has the following implications for policy development, public health practice, and future research. The meta-analysis showed that nonpharmacological intervention has a positive effect on improving the overall cognitive function of patients with cognitive impairment. During the 14th Five-Year Plan period in China, Alzheimer's disease prevention and control schemes were launched, and the National Action Plan for Alzheimer's Disease Prevention was initiated with the promotion of pilot screening for older adults' cognitive function. It also incorporated with a massive construction of supportive infrastructures in nursing homes, care institutions, and community centers. From the policy

Department of Sociology and Social Work, Minzu University of China, No. 27 Zhongguancun S St, Haidian, Beijing 100081, China; Email: Taowang@edu.cn



aspect, the governmental recommendations on professional development of nonpharmaceutical interventions are promising responses for early intervention and prevention for cognitive impairment. Meanwhile, the families, communities, and nursing institutions should work jointly to provide seamless and holistic treatment mechanism for Alzheimer's disease. In order to fulfill that, professional care personnel should be trained to support the expected services' provision in different phases of Alzheimer's disease prevention and intervention, namely screening, treatment, and evaluation. Nevertheless, the community should promote the public awareness of Alzheimer's disease and facilitate early screening and nonpharmacological intervention for neighborhood residents. Last but not the least, the future research should further explore the combination of various nonpharmacological intervention approaches on the basis of evidence-based research and practice, so as to explore the effective models for the treatment of the respective symptoms of cognitive impairment.

LIMITATIONS

The limitations of this study are as follows. First, only Chinese and English documents were searched, which is not comprehensive enough. Second, the time, frequency, intervention mode, measurement time, and outcome index of nonpharmacological interventions included in the study were heterogeneous, which may have influenced the results. Third, the included research included all stages of cognitive impairment, and the intervention effect on patients at different stages may be different, which would affect the results. Fourth, observational studies include cross-sectional studies, case--control studies, cohort studies, etc. Compared with RCTs, observational studies have higher external authenticity. The observational studies of nonpharmacological interventions may also provide relevant data and conclusions on this topic. However, the current review excluded observational studies and only reviewed and analyzed intervention studies, which might have ignored notable information. Finally, the number of included studies was small, and the generalizability of the results is limited.

Few related studies have been conducted in China, and they were mainly based on a single intervention, lacking relevant data analysis to evaluate the intervention effect. Many related studies have occurred abroad, most of which were comprehensive nonpharmacological intervention studies. Patients with MCI and dementia have been the main subjects of intervention, with less intervention involving other types of cognitive impairment. Therefore, it is still necessary to further explore such issues as the combination of nonpharmacological interventions, the scientific measurement of intervention effects, the combination of nonpharmacological interventions being the most effective, and which nonpharmacological interventions can achieve the best results for patients at different stages of cognitive impairment. In sum, the current

Department of Sociology and Social Work, Minzu University of China, No. 27 Zhongguancun S St, Haidian, Beijing 100081, China; Email: Taowang@edu.cn



evidence shows that nonpharmacological intervention can significantly improve the overall cognitive function and neuropsychiatric status of patients with cognitive impairment. The early identification of and intervention in MCI is still at the forefront of research. At present, most existing achievements come from laboratory and small-sample research. How to apply these cutting-edge research results to the community of older adults who represent the greatest proportion of the aging population remains a problem in the field of early identification of and intervention in MCI. Therefore, the conclusions of this study need to be further verified by large-sample and high-quality RCTs.

CONCLUSIONS

This meta-analysis included 851 patients with cognitive impairment in seven RCTs. The MMSE, MoCA, and Neuropsychiatric Inventory were used as outcome indicators to investigate whether the nonpharmaceutical intervention had a significant effect on the cognitive ability and mental health of patients with cognitive impairment. The results showed that nonpharmaceutical intervention could improve the overall cognitive function of patients with cognitive impairment and was superior to the control group in relieving neuropsychiatric problems, with statistically significant differences. However, in terms of overall cognitive function, there was no significant difference between the two groups in the MMSE score, which is consistent with Mei's meta-analysis of a multicomponent nonpharmaceutical intervention for people with MCI and Zeng's meta-analysis of an exercise intervention for people with dementia. Based on this review of the relevant literature, the MMSE scale showed no significant effect, which may be due to its obvious ceiling and floor effect – that is, the sensitivity of the test may be reduced due to the favorable or unfavorable influence of personal characteristics, but not the influence of cognitive function. Second, the measurement results of the MMSE are closely related to the educational level of the participants, which was not measured separately in the included RCTs. This may be one reason for the decreased sensitivity of the MMSE. In addition, some studies showed that, compared with the MMSE scale, the MoCA scale has higher sensitivity in screening for cognitive impairment, which may be related to its measurement content. Besides, the participants included in this study had different stages of cognitive impairment, and the effects of nondrug intervention were also different, which may also have affected the sensitivity of the MMSE scale.

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Department of Sociology and Social Work, Minzu University of China, No. 27 Zhongguancun S St, Haidian, Beijing 100081, China; Email: Taowang@edu.cn



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