

The application effect of cognitive impairment training in patients with Alzheimer's disease in the early and middle stage

Caihong Xue¹, Furong Sun^{1*}, Fangyuan Wang², Mingming Hu³

¹Master of Neurology and Department of Neurology, Qingdao Municipal Hospital, Qingdao, China

²Department of Neurology, Qingdao Municipal Hospital, Qingdao, China

³Department of radiotherapy, Affiliated Hospital of Qingdao University, Qingdao, China

Abstract: To explore the application effect of cognitive impairment functional training in patients with early and mid-term Alzheimer's disease and the influence of different training cycles on the application effect. 52 patients with Alzheimer's disease were selected for 4, 8, 12 and 16 weeks of cognitive impairment training (2 training sessions per week for 30-45 min) in the early and middle stages. Self-control was used at the end of each cycle. Simple Mental State Scale (Mini-Mental State Examination, MMSE). Montreal Cognitive Assessment Scale (Montreal cognitive assessment, MoCA). The Lawton and Brody Instrumental Activities of Daily Living (Instrumental Activities of Daily Living, IADL). The cognitive ability and daily living ability of the patients were evaluated, and the evaluation results of each cycle were compared with those when they were enrolled. There were significant differences between MMSE, MOCA and ADL scores and group entry score ($P < 0.05$). Differences in scores between groups were statistically significant ($P < 0.05$). Cognitive impairment training is effective in delaying the progress of Alzheimer's disease in the early and middle stages, and the effect of different training cycles was significantly different, which also plays an important role in improving the quality of life of patients.

Keywords: Early and mid-term Alzheimer's disease (AD); Cognitive impairment function training; Application effect

Received 28 June 2020, Revised 13 August 2020, Accepted 15 August 2020

*Corresponding Author: Furong Sun, 18353682603@163.com

1. Introduction

According to the international Alzheimer's disease international, there are 46 million AD patients worldwide, and the incidence of AD patients is rising rapidly. Over 132 million people worldwide are diagnosed with AD and this number is expected to triple by 2050[1]. With the acceleration of aging process, China has become the country with the largest aging population, accounting for 62% of all types of dementia types[2]. The prevalence of AD in China is about 6-8 million, and is expected to over 14.6 million by 2050[3].

AD is the fourth leading cause of death in the elderly after tumor heart disease and cerebrovascular disease[4, 5]. The occurrence and development of AD disease is closely related to the growth of age. A study demonstrates that the prevalence rate of AD is 0.39% in the elderly aged 60-65 years. It is expected that the proportion of the aged over 65 will exceed 20% of the total population by 2040[6]. AD is a continuous pathophysiological process, including three stages, such as subjective memory loss, mild cognitive impairment, and AD dementia[7]. Early clinical

manifestations are mainly cognitive impairment, decreased daily life ability and abnormal mental behavior[8].

The etiology of the disease was complex, and the effect of drug treatment was limited, so the role of non-drug treatment was becoming more and more important, and the role of nursing intervention is very important[9,10]. Research show that targeted intervention from the early stage was an effective entry point to prevent and delay AD [11]. A professional team has been set up in the UK to encourage mild and moderate AD patients to actively participate in structured cognitive behavior training [12].

52 patients with early and mid-term Alzheimer's disease were selected for cognitive impairment function training, in order to explore the effect of cognitive impairment function training on delaying the progress of the disease and improving the quality of life of patients.

2. Data and methods

2.1 General information

52 patients with early and mid-term Alzheimer's disease were selected from outpatient, emergency and ward of Neurology Department of our

hospital , including 28 males and 32 females, aged from 56 years to 79 years, with an average of (68.48 ± 6.01) years, and course from 1 years to 8 years, with an average of $(5.34 + 1.24)$ years, from October 2018 to September 2019. There were 10 cases of illiteracy, 15 cases in primary school, 20 cases in junior high school, 15 cases above senior high school, 28 cases in early stage and 32 cases in middle stage. The educational level includes 10 cases of illiteracy ,15 cases of primary school ,20 cases of junior high school and 15 cases of high school and above.

2.2 Inclusion and exclusion criteria

(1) Inclusion criteria

For this study, we will include individuals who:
1) Alzheimer's disease (AD) diagnosis in accordance with the International Classification of Diseases CD-10 or the United States Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) diagnostic criteria ; 2) Clinical Dementia Rating Scale (CDR) was used to screen out early and mid-term AD patients.

(2) Exclusion criteria

We will exclude individuals who: severe somatic complications and other types of dementia, such as vascular dementia, dementia caused by other brain lesions, senile depression, severe mental disorders, and late AD.

2.3 Training method

A functional training sessions for AD patients was set up, which was composed of Neurology experts and several nurses, and the experts provided professional training for nurses. The team members developed operation guidelines and explored effective functional training methods. According to the inclusion and exclusion criteria, eligible research subjects were selected to join the group, and the research files (i.e., name, gender, age, education level, caregiver's telephone number, home address, date of enrollment, scores of each scale at the time of enrollment, scores of each scale in each week and remarks) were established for each participant, and the functional training was determined according to the actual situation of AD patients.

AD patients will complete twice a week of cognitive training over 16-week intervention. And total intervention period ranged from 4 weeks to 16 weeks. Each session will be for 30-45 min. Additionally, participants will be asked to complete 3 1-hour training sessions at home per week. The total number of training hours ranged

from 28 h to 72 h. Patients can choose to come to our hospital cognitive outpatient training, professional nurse on-site training or professional nurse remote guidance training according to their actual situation. At the end of each cycle, the cognitive ability and activities of daily living of the patients were evaluated with the international common scale, and the evaluation results of each cycle were compared with those at the time of enrollment.

2.4 Training content

(1)Memory disorder training

Memory stimulation and strengthening exercise are carried out from three aspects of vision, hearing and touch. Encourage patients to recall the past, and state the 2-3 events that they experienced the deepest and most important in chronological order; show a group of pictures to the patients in order, and ask the patients to sort the pictures according to the order of display; use pictures, books, articles, music, photos to help recall, so as to stimulate the long-term memory of patients.

(2)The training of disorientation

From the character, time, place three aspects of training. Set words, arrows, symbols or a small lamp in the bedroom, toilet door and other places, repeatedly explain some basic knowledge of life when contacting with patients, and repeatedly instruct to strengthen signs; ask patients to tell about the date, time, place, weather, etc., so that patients gradually form the concept of time.

(3)The training of logical thinking obstacle

Such as number sorting (from large to small order and simple number calculation), and item classification (according to the picture category To classify) etc.

(4)Ability of daily living training

According to the actual situation of AD patients, encourage them to complete relatively simple daily work, such as combing hair, wiping face, brushing teeth, putting on and taking off clothes, bathing, etc., and urge them to maintain the habit of combing and washing, cultivate their interest in daily work, and encourage them to complete independently. In order to slow down the decline of body function and intelligence of AD patients, we should gradually train from simple to complex.

(5)Physical training

According to the patient's own preferences and physical conditions, they can freely choose walking, Taijiquan, jogging and other physical training suitable for the elderly to train in a pleasant atmosphere.

2.5 Evaluation tools

(1)Global cognitive function Global cognitive function will be measured using both the Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MoCA). The MoCA is a valid and reliable measure [13], and assesses eight cognitive domains such as attention, concentration, executive functions, memory, language and visuoconstructional skills. The total possible score is 30 points; a score of less than 26 points indicates AD. The MoCA has with a score of 26 a 90% sensitivity to for detecting AD[13].

(2)General health, falls history, and socioeconomic status We will administer questionnaires to obtain information about their level of education, and general health information.

(3)Instrumental Activities of Daily Living The Lawton and Brody Instrumental Activities of Daily Living (IADL) [14] Questionnaire will be administered to assess the participants' ability to perform tasks of daily living such as housekeeping, laundry, transportation, and management of

finances. The questionnaire looks at eight different types of daily activities, and therefore it has a maximum achievable score of eight.

2.6 SPSS 22.0

This study was designed using self-control study. Statistical software was used for data processing and analysis for all data analysis, and $\bar{X} \pm S$ was used for measuring data indicating; the counting data were analyzed using Friedman's test.

3. Results

There was significant difference between MMSE, MoCA, ADL score and group score after 4 to 16 weeks of functional training ($P < 0.05$). There was significant difference in the scores among the groups ($P < 0.05$), Table 1. Functional training can improve cognitive function and activities of daily living of patients with dementia in the early and middle stages, and delay the aggravation of the disease. Functional training can become a protective factor of AD.

Table 1. Comparison of MMSE, MoCA and ADL in different intervention periods ($\bar{X} \pm S$)

| Project | Intervention Periods | | | | | F | P |
|---------|----------------------|------------|------------|------------|------------|--------|-------|
| | 0W | 4W | 8W | 12W | 16W | | |
| MMSE | 19.25±2.61 | 19.31±2.66 | 19.38±2.76 | 19.48±2.83 | 19.58±2.93 | 39.714 | 0.000 |
| MoCA | 21.79±1.63 | 21.85±1.67 | 21.94±1.71 | 22.04±1.75 | 22.12±1.83 | 6.521 | 0.163 |
| ADL | 24.08±2.42 | 24.13±2.46 | 24.27±2.45 | 24.38±2.63 | 24.52±2.72 | 43.143 | 0.000 |

4. Discussion

According to the results of this study, after 4 to 16 weeks of functional training, the scores of MMSE, MoCA, ADL and entry were statistically significant, and the scores of each group were statistically significant. With the increase of training cycle, MMSE, MOCA and ADL scores are increasing, but the improvement range varies with the cycle. Transverse comparison: MMSE, MOCA and ADL scores increased the least at 4-week and the highest at 16-week. Longitudinal comparison: after 4, 8, 12 and 16 weeks of functional training, MMSE, MoCA, ADL three scales, ADL improved the most. Therefore, it is concluded that effective functional training can alleviate the progression of AD patients, especially cognitive ability and daily life ability, and the

longer the training period, the better the effect. The results of this study are consistent with the existing research conclusions.

AD is a chronic progressive disease with cognitive dysfunction[15], mental decline and abnormal behavior. With the progress of the disease, degenerative changes in behavior, personality and intelligence will occur, resulting in the gradual loss of self-care ability and cognitive function, which not only seriously reduces the quality of life, but also brings a heavy burden to the family and society[16]. Some studies have shown that the effect of early rehabilitation training is better than that of late rehabilitation training[17]. In the process of functional training for AD patients, professional nurses should give full play to their role ability, effectively combine family and social functions, fully mobilize their

enthusiasm, create a safe, relaxed and comfortable living atmosphere for AD patients, and cultivate their self-care ability. By changing the passive care into comprehensive care focusing on functional recovery, it can effectively delay the progression of AD patients, improve symptoms, and improve the quality of life and life.

5. Conclusion

Effective cognitive function training can strengthen the space and thinking connection of patients, stimulate the brain, accelerate the blood circulation and metabolism of brain cells, maintain and improve cognitive and behavioral ability, and delay the degradation of cognitive function; the ability of daily living training can improve the self-care and adaptive ability of ad patients, and delay the progress of the disease. Therefore, we will pay attention to the functional training of memory, orientation, logical thinking, ability of daily life and physical ability of AD patients, and give early intervention.

References

- [1] Anlaysia of prevalence , incidence, cost and trends.
- [2] Jia J, Wang F, Wei C, et al. The prevalence of dementia in urban and rural areas of China [J]. *Alzheimers Dement*, 2013, 10(1):1-9.
- [3] Zhang Y, Xu Y, Nie H, et al. Prevalence of dementia and major dement in subtypes in the Chinese populations a meta-analysis of dementia prevalence surveys 1980-2010 [J]. *J ClinNeurosci*, 2012, 19(10):1333-1137.
- [4] Chan KY, Wang W. Epidemiology of Alheidisease and other forms of dementia in China 1990-2010: a systematie review and analysis [J]. *Lancet*, 2013, 381(9882): 2016-2023.
- [5] Yang H, Colette B, Shane T. Policy discussion on community intervention strategy for Alzheimer's disease [J]. *Chinese Journal of general practice*, 2008, 32 (15): 1323-1323.
- [6] Zuo YR. Community nursing. Higher education press[M], 2005:5-6.
- [7] Sperling RA, Aisen PS, Beckett LA, et al. Toward defining the preclinical stages of Alzheimer' s disease: recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer' s disease [J]. *Alzheimers Dement*, 2011, 7(3): 280 - 292.
- [8] Pan TP, Shi JS, Gao H, et al. Chinese geriatrics[M], 2010:596-610.
- [9] Luo CC, Deng BF. Rehabilitation nursing status of patients with Alzheimer's disease[J]. *Chinese Journal of modern nursing*, 2016, 22 (12): 1767-1770.
- [10] Zhang N, Xu MY, Cheng Y. Investigation and analysis of clinical status of patients with mild to moderate Alzheimer's disease[J]. *Journal of contemporary nurses*, 2019, 26 (01): 16-19.
- [11] Pike KE, Zeneli A, Ong B, et al. Reduced benefit of memory elaboration in older adults with subjective memory decline [J]. *J Alzheimers Dis*, 2015, 47 (3):705 -713.
- [12] National Collaborating Centre for Mental Health. Dementia: a NICE —SCIE
- [13] guideline on supporting people with dementia and their carers in health
- [14] and social care[M]. Leicester: British Psychological Society. 2007: 22-25.
- [15] Nasreddine ZS, Phillips NA, Bedirian V, et al. The Montreal cognitive assessment, MoCA: a brief screening tool for mild cognitive impairment[J]. *J Am Geriatr Soc*, 2005, 53(4):695-699.
- [16] Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living [J]. *Gerontologist*, 1969, 9(3):179–186.
- [17] Shen LZ. Analysis of clinical effect of holistic rehabilitation nursing mode on patients with Alzheimer's disease [J]. *Journal of practical clinical nursing*, 2018, 3 (52): 93-95.
- [18] Lu PL. Application effect of "3 + 1" holistic rehabilitation nursing mode in senile dementia patients [J]. *Journal of Qiqihar University of Medicine*, 2016, 37 (8): 109-1091.
- [19] Yin B. Application of Kang zhong "3 + 1" holistic rehabilitation nursing model for senile patients with dementia [J]. *Chinese Journal of Minkang Medicine*, 2015, 27 (9): 104-106.