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Original Article

Application of comprehensive nursing intervention for Alzheimer's patients and its effects on recovery of cognitive function

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Abstract: Objective: The aim of this study was to explore the effects of comprehensive nursing intervention on cognitive function and daily life activity abilities in patients with Alzheimer's disease (AD). Methods: A total of 367 patients with AD were retrospective analyzed and divided into control (n=165) and experimental (n=202) groups. Routine nursing was given to the control group and comprehensive nursing was given to the experimental group. Cognitive function, daily life activity abilities, and quality of life were evaluated with Mini-mental State Examination (MMSE), Activities of Daily Living (ADL), and Quality of Life-Alzheimer's Disease (QOL-AD) scoring methods, respectively, before intervention and 6 months and 1 year after intervention. In addition, therapeutic compliance of the two groups of patients after one year of nursing intervention was evaluated. Results: There were no significant differences in terms of general clinical data between the two groups (P>0.05). There were significant differences in MMSE, ADL, and QOL-AD scores between control and experimental groups after 6 months and 1 year of nursing (all P<0.05). MMSE, ADL, and QOL-AD scores of the control group after 1 year of nursing were significantly higher than those after 6 months (all P<0.05). No significant differences were seen between pre-intervention and 6-month post-intervention scores (all P>0.05). In the experimental group, the 6-month post-intervention scores were higher than pre-intervention scores. There were statistical differences between 1-year post-intervention scores and 6-month post-intervention scores (all P<0.05). After one year of nursing, index scores of the experimental group were significantly higher than those of the control group, with statistical differences (P<0.05). The compliance rate of patients in the experimental group was significantly higher than that in the control group after one year of comprehensive nursing intervention, with statistical differences (P<0.05). Conclusion: Comprehensive nursing intervention improves cognitive function and the quality of life of patients with AD. It is suitable for clinical application.

Keywords: Activity ability of daily life, Alzheimer's disease, cognitive function, comprehensive nursing

Introduction

The aging population has become a worldwide social problem. Surveys have shown that, at the beginning of the 21st century, about 10% of the world's population was older than 60 years and those over 65 years accounted for 7% of the population. The proportion of the elderly has shown an increasing trend annually [1, 2]. With an aging population, treatment of different geriatric diseases has become the focus of biomedical research [3]. Alzheimer's Disease (AD) is a chronic neurological disorder characterized by declines in intelligence, memory, thinking, understanding, and judgment. The quality of life of patients is severely affected by the decline of these abilities [4]. A survey showed that 750,000 elderly people in the UK had AD. This number is expected to further increase over the next 30 years [5]. In China, the number of patients with AD has exceeded 6.5 million. It is the most common disease that causes death in the elderly after cancer, heart disease, and cerebral infarction [6].

At present, there is no effective treatment for AD. Patients lose their self-care abilities and social activities in the later stages of the dis-

ease, causing a great burden for families [7]. Therefore, it is very important to provide professional and high-quality nursing and life care for patients with AD. Comprehensive nursing is a kind of management first developed by the United States. It is a progressive program that adjusts with the disease and the patient's performance, managing various aspects of the disease as a whole [8]. With years of optimization and improvement, comprehensive nursing has played an objective role in the care of many diseases.

Therefore, the aim of this study was to present information that may provide better nursing care for patients with AD, improving their condition.

Methods and materials

Patient data

A total of 367 patients with AD, admitted in Dezhou Hospital, between March 2014 to June 2017, were retrospective analyzed. They were randomized into control or routine nursing (n=165, including 90 males and 75 females; age ranging 60-79 years, with a mean age of 68.54±6.14 years) and experimental or comprehensive nursing (n=202, 115 males and 87 females; and age ranging 54-80 years, with a mean age of 67.88±5.84 years) groups. All patients met the US criteria for diagnosis of mental disorders [9]. This study was conducted with the approval of the Medical Ethics Committee of Dezhou Hospital. Informed consent was provided for each patient.

Inclusion criteria: Patients with definite AD diagnosis, healthy limbs, no congenital mental diseases, no respiratory diseases, and availability of complete clinical data [9].

Exclusion criteria: Patients with the disease for less than 1 year, those with malignant tumors or secondary immune disease, those that abused drugs before nursing care, and patients whose family members were unwilling to cooperate with treatment.

Treatment methods

Patients in the control group received routine nursing, including: 1) Daily care: patients were given comfortable and loose clothes and were encouraged and assisted in the process of dressing and undressing. They were given easily digested food without thorns and bones. They were provided with protective railings at the bedside during sleep; 2) Medication: patients were assisted and encouraged to take their medications regularly. Regular checks were conducted to ensure that they took all the drugs and adverse reactions were observed; 3) Safety: patients were provided with protective railings at the bedside during sleep and were escorted or supported during activities. Going out alone was avoided to prevent them from getting lost and contact cards were placed in their clothes. Sharp objects and medicines were kept out of their reach to prevent self-injury. Adjuvant therapy was performed with simvastatin (10 mg/d, evening oral administration), alprazolam (0.4 mg/ time, 3 times daily), and other drugs [10].

Patients in the experimental group received a combination of comprehensive nursing and drugs. Comprehensive nursing entailed the following [11]: 1) Psychological care: since AD patients are very vulnerable to unfair treatment, their families were encouraged to spend more time and communicate more with them, help the patients participate in collective activities and go out more, respect and encourage them, and enhance their self-confidence. A consultation was held to dispel patient concerns, cultivate their optimism, and maintain their compliance with treatment actively; 2) Life care: a relatively quiet living environment was chosen for the patients and the layouts of their rooms were designed to be as warm and comfortable as possible. A distinct marker was placed at the patient's residence to help in identification and to prevent the patient from getting lost. Patient rooms were regularly disinfected and sheets were regularly replaced. The patients were given training to take care of themselves daily and clothes that were relatively simple and easy to wear were chosen. In case a patient was unable to take care of himself, a professional worker was assigned for daily care. The diet, especially salt and caloric intake, was controlled to avoid high blood pressure and hyperlipidemia. Energy supplements and high-protein foods were included. A reasonable schedule was established for regular administration of medications. Of the patient had a serious sleep disorder, he or she would be given

Table 1. Comparison of general clinical data between the two groups

Group	Control group (n=165)	Experimental group (n=202)	t/χ^2	P
Gender			0.210	0.647
Male	90	115		
Female	75	87		
Age (years)	68.54±6.14	67.88±5.84	1.052	0.293
Hypertension			0.116	0.733
Yes	105	132		
No	60	70		
Diabetes			0.062	0.803
Yes	100	125		
No	65	77		
Place of residence			1.092	0.296
Rural area	60	63		
Urban area	105	139		
Education			0.316	0.574
< High school	99	127		
≥ High school	66	75		
Smoking history			0.131	0.717
Yes	90	114		
No	75	88		

a soporific drug as well; 3) Safety care: nurses were vigilant to prevent patients from falling, getting lost, asphyxiation, and self-injury. The indoor floor was kept dry and handrails were installed where necessary. The nursing staff gave patients their medications and followed the doctor's instructions strictly. In case the patient had any side-effects or other complications, the drug(s) was discontinued and replaced immediately. To prevent patients from accidentally eating and aspirating, they were given only soft foods; 4) Rehabilitation training: patients were given training for cognitive function, social cognitive behavior, daily life, and other activities to delay the progression of their condition. Patients were encouraged to finish their daily activities, such as washing and eating by themselves, under suitable conditions. Their concept of time was strengthened to arrange daily activities. Their instantaneous memory and expression abilities were trained by communicating with them, allowing them recall the past.

Observation indicators

Primary observation indicators included cognitive function, daily life activity ability, and quality of life. Cognitive function of the two groups, before and after 6 months and 1 year of nursing, was evaluated by the Minimental State Examination scale (MMSE). The scale has 30 points. Higher scores indicate better cognitive function [11]. The ability to perform daily life activities at the three time points was evaluated by the Activity of Daily Living (ADL) scale. The scale has 100 points, with higher scores indicating better abilities [12]. Quality of life at the three time points was evaluated with the Quality of Life Scale for Alzheimer's Disease Scale (QOL-AD), wherein higher scores indicate better quality of life [13].

Secondary observation indicator was the compliance of the two groups of patients after 1 year of nursing intervention [14]. The degree of compliance was classified as: 1) Full compliance with the drug schedule and not running around or quarrelling with others; 2) Partial compliance where patients followed the drug schedule, did not run around, but often quarreled with others, and 3) Non-compliance included situations such as refusing to take medicine, often quarrelling with others, or even going out. The compliance rate was calculated as (full compliance + partial compliance)/total number of cases * 100%.

Statistical analysis

SPSS20.0 software was used to statistically analyze the collected data. Measurement data are represented by mean ± standard deviation (mean ± sd). Data following normal distribution were analyzed by t-test. Quantitative data are expressed as percentages (%) and were analyzed by Chi-squared test. Multi-group comparisons were made using a single factor analysis of variance. $P<0.05$ indicates statistical significance.

Results

Comparison of general clinical data between the two groups

No significant differences were seen between the two groups in terms of sex, age, hypertension, diabetes, place of residence, education, and smoking history (all $P>0.05$), indicating

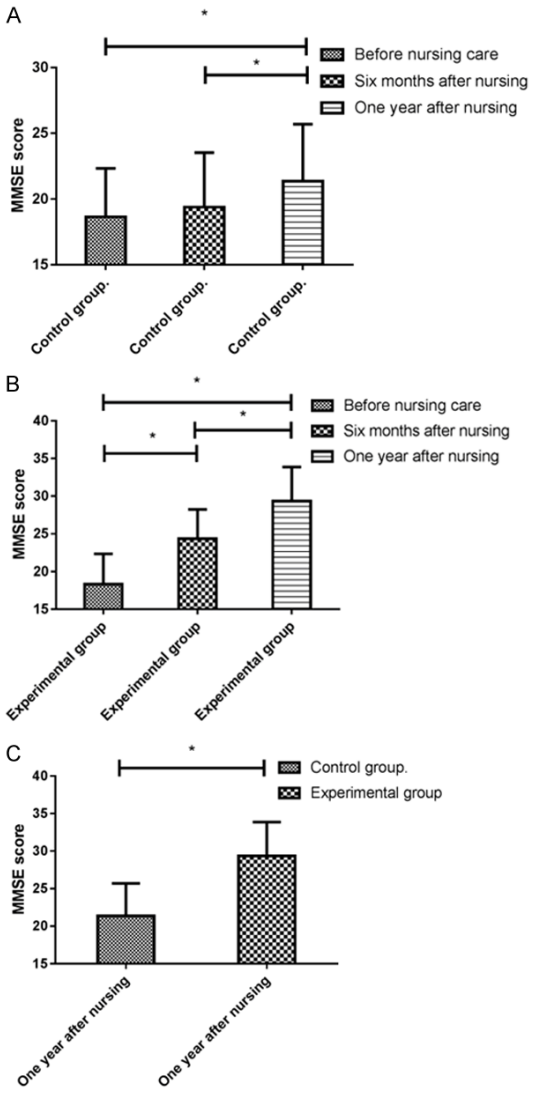

Figure 1. A-C. Comparison of MMSE scores before nursing, after 6 months, and 1 year of nursing. There was a statistical difference between the two groups, *P<0.05.

that the two groups were comparable. See **Table 1**.

MMSE scores before and after nursing intervention

This study compared MMSE scores before nursing and after 6 months and 1 year of nursing, finding significant differences among the three time points in both groups ($_{\text{control group}}F=19.657$, $_{\text{control group}}P=0.001$; $_{\text{experimental group}}F=358.484$, $_{\text{experimental group}}P=0.001$). Pairwise comparisons in the control group showed that MMSE scores after one year of nursing were significantly higher than those before nursing and after 6-month nursing ($_{\text{before nursing}}t=6.126$, $_{\text{before nursing}}P=0.001$; $_{\text{nursing for 6 months}}t=4.241$, $_{\text{nursing for 6 months}}P=0.001$), while there were no significant differences between the pre-intervention and post 6-month intervention scores (P>0.05). Pairwise comparisons in the experimental group showed that MMSE scores after one year of nursing were significantly higher than those before nursing and after 6-month of nursing ($_{\text{before nursing}}t=25.953$, $_{\text{before nursing}}P=0.001$; $_{\text{nursing for 6 months}}t=11.921$, $_{\text{nursing for 6 months}}P=0.001$). There were statistical significances between the 6-month scores and pre-intervention scores (t=15.359, P=0.001). Finally, MMSE scores after one year of nursing were significantly higher in the experimental group than in the control group (t=17.188, P=0.001). See **Figure 1**.

ADL scores before and after nursing intervention

Significant differences were seen in ADL scores before nursing and after 6 months of nursing and after 1 year of nursing in both groups of patients ($_{\text{control group}}F=9.463$, $_{\text{control group}}P=0.001$; $_{\text{experimental group}}F=164.012$, $_{\text{experimental group}}P=0.001$). Pairwise comparisons in the control group showed that 1-year post-intervention ADL scores were significantly higher than those before nursing and after 6-month of nursing ($_{\text{before nursing}}t=4.029$, $_{\text{before nursing}}P=0.001$; $_{\text{nursing for 6 months}}t=3.175$, $_{\text{nursing for 6 months}}P=0.002$), while no significant differences were seen between pre-intervention and 6-month post-nursing scores (P>0.05). In the experimental group, ADL scores after one year of nursing were significantly higher than those before and after 6-month nursing ($_{\text{before nursing}}t=18.388$, $_{\text{before nursing}}P=0.001$; $_{\text{nursing for 6 months}}t=7.326$, $_{\text{nursing for 6 months}}P=0.001$), while no significant differences were seen in pre- and 6-month post-nursing ADL scores (t=10.505, P=0.001). ADL scores of the experimental group were significantly higher than that of the control group after 1 year of nursing intervention (t=14.339, P=0.001). See **Figure 2**.

QOL-AD scores before and after nursing intervention

QOL-AD scores of the pre-nursing and 6 months and 1 year after nursing were significantly different in both groups ($_{\text{control group}}F=76.645$, $_{\text{control group}}P=0.001$; $_{\text{experimental group}}F=1,293.632$, $_{\text{experimental group}}P=0.001$). In the control group, QOL-AD scores after one year of nursing were significantly higher than that in 6 months and 1 years after nursing ($_{\text{before nursing}}t=10.180$, before nurs-

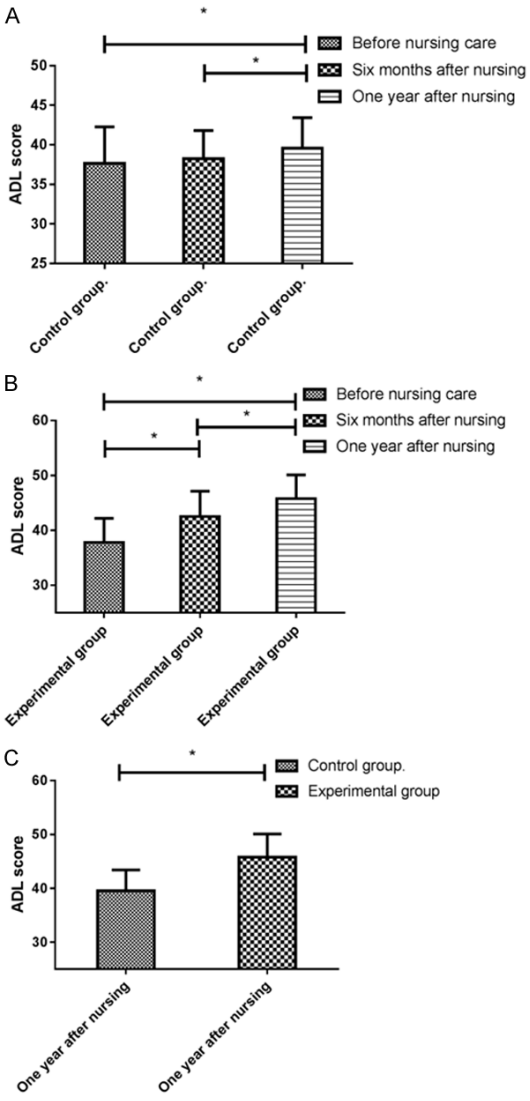

Figure 2. A-C. Comparison of ADL scores before nursing, after 6 months, and 1 year of nursing. There was a statistical difference between the two groups, *P<0.05.

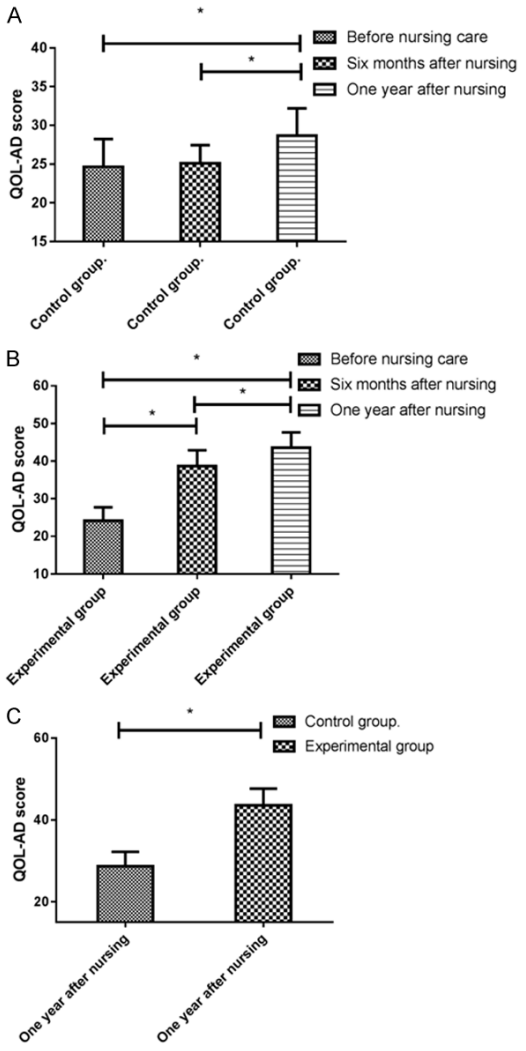

Figure 3. A-C. Comparison of QOL-AD scores before nursing, after 6 months, and 1 year of nursing. There was a statistical difference between the two groups, *P<0.05.

$_{ing}$P=0.001; $_{nursing\ for\ 6\ months}$t=10.699, $_{nursing\ for\ 6\ months}$P=0.001), while pre-intervention and 6 months post-intervention QOL-AD scores were similar (P>0.05). Pairwise comparisons of the experimental group showed that QOL-AD scores after one year of nursing were significantly higher than those before nursing and after 6 months of nursing. ($_{before\ nursing}$t=50.657, $_{before\ nursing}$P=0.001; $_{nursing\ for\ 6\ months}$t=37.112, $_{nursing\ for\ 6\ months}$P=0.001). There were statistical differences between 6 months of nursing scores and pre-nursing scores (t=11.769, P=0.001). QOL-AD scores of the experimental group were significantly higher than those of the control group after 1 year of nursing (t=36.801, P=0.001). See **Figure 3**.

Comparison of compliance rates of the two groups

Compliance rates of patients in the experimental group were significantly higher than rates in the control group after one year of nursing intervention (P<0.05). See **Table 2**.

Discussion

AD is a degenerative neurological disease, with frequent onset between 60 and 65 years of age. This disease is relatively asymptomatic in

Table 2. Comparison of compliance rates of the two groups

Group	Full compliance	Partial compliance	Non-compliance	Compliance rate	χ^2	P
Control group (n=165)	88	45	32	80.61%	11.650	0.001
Experimental group (n=202)	138	49	15	92.57%		

early stages and the development is slow. Symptoms progress and become more obvious with time [12]. With the exacerbation of the disease, cognitive and memory abilities of the patients evidently decline and their self-care ability and daily life activities get progressively worse [13].

China is, at present, an aging society, with the number of elderly individuals increasing by 8 million annually [14]. Advanced age and declines in body function have led to an increase in various geriatric disorders, including AD. Thus, research has focused on AD treatment and nursing problems. Although studies have implicated several causative factors of AD, neuritis plaque of the β-amyloid peptides seen in the brains of patients with AD has been considered to be the most important factor driving AD pathogenesis [15]. Since there is no clinical treatment, nursing intervention is one of the more effective methods to delay the symptoms of AD, further improving patient quality of life and treatment compliance [16].

Comprehensive nursing is a more refined and systemic approach with core nursing methods. Appropriate nursing measures are selected according to the severity of the patient's condition, thus providing better care [17]. In the past, nursing care was mainly focused on the safety and life management of patients, often ignoring their psychological and mental health [18]. In this study, comprehensive nursing intervention was carried out. It entailed psychological, life, safety, and rehabilitation. Improvement in patient conditions was recorded to determine the clinical effects of this nursing mode. To this end, pre- and post-intervention MMSE, ADL, and QOL-AD scores were compared between nursing groups. The control group that received routine care had only slightly higher scores in all indices after 6 months of nursing, with significant differences, indicating that their conditions were not improved by routine nursing. After one year of nursing, however, there was a significant increase in indicator scores, compared to those at the pre-intervention and 6-month time points. This indicated that long-term routine nursing did improve their condition to a certain extent. In contrast, in the experimental group, MMSE, ADL, and QOL-AD scores increased significantly after only 6 months of comprehensive nursing. Compared to the control group, scores of the experimental group were significantly higher after one year of nursing, clearly indicating greater improvement due to comprehensive nursing intervention. It led to outstanding results in a short time, which was conducive to the recovery of patients with AD. Zhang et al. showed that nursing intervention could improve the treatment and cognitive ability of the elderly and improve their quality of life [19]. As comprehensive nursing is a combination of multiple nursing models that adjusts with patient conditions, it is particularly suitable for AD patients. Present results were consistent with another study by Zhang et al. which showed that comprehensive nursing intervention effectively improved the quality of life of patients with AD and delayed development of the disease [20]. Through health education and psychological counseling, the negative emotions of patients with AD were alleviated. Positive emotions were encouraged to protect their self-esteem, thereby improving therapeutic effects [21].

This study also investigated the compliance of patients, which was significantly lower in the control group than the experimental group, indicating that comprehensive nursing intervention had a significant effect on the patients. Compliance is the key to ensuring treatment efficacy. Most families of AD patients do not pay enough attention to the disease and do not actively cooperate with the treatment and nursing, all of which influence the effects of treatment [22]. However, comprehensive nursing still has some limitations, such as significantly higher costs. Most families cannot afford this mode of nursing and opt for regular care.

In conclusion, cognitive function and daily life abilities of AD patients are improved signifi-

cantly through comprehensive nursing intervention. It is suitable, therefore, for widespread clinical application.

Disclosure of conflict of interest

None.

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