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Review Article

Effects of 3 + 1 holistic rehabilitation nursing mode on the rehabilitation and cognitive function of patients with Alzheimer's disease

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Abstract: The effects of 3 + 1 holistic rehabilitation nursing mode on the rehabilitation and cognitive function of patients with Alzheimer's disease (AD) were studied. A total of 80 patients with AD in our hospital from May 2018 to June 2019 were enrolled and assigned to a study group (41 cases) and a control group (con group) (39 cases). The con group was given routine treatment and nursing, and the study group was given the 3 + 1 holistic rehabilitation nursing mode in addition to the routine treatment and nursing in the con group. The total effective rate and the incidence of adverse events were evaluated and recorded. GDS was used to evaluate the depression of the two groups, and the modified emotional apathy scale (MAEs) was used to evaluate the emotional apathy of the two groups. The severity of dementia was assessed by MMSE, and the cognitive function of the two groups was evaluated via the Alzheimer's disease assessment scale (ADAS COG). QOL-AD was adopted for evaluation of the life quality of the two groups. The study group had significantly lower GDS scores and MAEs scores and significantly higher MMSE scores than the con group (all $P < 0.05$). The study group also had significantly lower ADAS COG scores and significantly higher QOL-AD scores than the con group (both $P < 0.05$). The study group showed a significantly higher total effective rate and significantly lower total incidence of adverse events than the con group (both $P < 0.05$). The 3 + 1 holistic rehabilitation nursing mode is helpful to improve the life quality and cognitive function of patients with AD alleviate their depression, lower their emotional apathy, and delay both the progress of disease and decline of function.

Keywords: 3 + 1 holistic rehabilitation nursing mode, Alzheimer's disease patients, application effect, influence of cognitive function

Introduction

Senile dementia is also called Alzheimer's disease (AD) in the clinic. It will gradually deprive the patient of their memory and cognitive ability with the progress of the disease [1], leading to great changes in personality, until a loss of ability to take care of themselves [2]. The aging of the population leads to an increasing incidence and prevalence of AD. However, there are still many unknowns about the prevention, causes and treatment of AD [3]. Some studies have shown that nursing intervention can maximize the potential of AD patients, improve the patients' life quality, and slow down the progress of the disease [4, 5]. Therefore, it is very important to find a safe and effective rehabilitation nursing modality. Routine basic care easily increases the risk of patients' dependence on care [5]. Because the nurses with routine nursing mostly give the patients nursing combined with the clinical experience, so the work is highly repetitive, and they do not pay attention to the individual differences of the patients [6]. How to provide appropriate care for AD patients is a big problem for clinical nurses, because nurses need specific knowledge and skills [7]. The 3 + 1 holistic rehabilitation nursing mode is a new type of nursing modality. By further detailing the nursing content and details, the nursing staff will give phased evaluation, cognitive training, health education, and preventive nursing measures according to the patient's individual condition and development [8-10]. It integrates the means and knowledge of dementia professional nursing, and can be used for

different degrees of dementia patients [11]. Some studies have shown that rehabilitation nursing intervention for patients with AD can be clinically effective or practical, and can play a huge potential in the new culture of AD treatment [12]. Therefore, the research on the value of 3 + 1 holistic rehabilitation nursing in the nursing category of patients with AD is of great value to the selection of clinical nursing methods and the improvement of patients' rehabilitation effect and cognitive function.

Therefore, through the implementation of 3 + 1 holistic rehabilitation nursing mode for AD patients, this study explored the application of the nursing scheme in the rehabilitation process of patients with AD and the impact on their cognitive function.

Data and methods

General information

A total of 80 patients with AD in Yancheng No. 4 People's Hospital from May 2018 to June 2019 were selected and assigned to a study group (41 cases) and control group (con group) (39 cases). The study group consisted of 21 males and 20 females between 65 and 80 years old, with a median age of (73.85±4.25) years, and the con group consisted of 23 males and 16 females between 66 and 85 years old, with a median age of (72.93±3.98) years.

Inclusion and exclusion criteria

Inclusion criteria of the patients: Patients meeting the AD diagnostic criteria issued by the National Institute of Neurology, language communication disorders and stroke-AD and related diseases (NINCDS-ADRDA) [13], patients with decreased self-care ability, language disorder, memory loss, or disorientation, patients between 65-85 years old, and with education level at the primary level or above. The study was carried out with the permission from the ethics committee of Yancheng No. 4 People's Hospital and this study was in line with the Declaration of Helsinki. The subjects and their families have signed the fully informed consent after understanding the study. Exclusion criteria: Patients with vascular dementia, serious physical diseases, consciousness disorders, or other mental diseases.

Nursing methods

The patients in the con group were given the routine treatment and nursing: Simple safety and health education were carried out for the patients. Medication nursing was carried out for the patients. Regular inspection of the ward was carried out to help the patients solve their life needs and other nursing measures.

The patients in the study group were nursed under the 3 + 1 holistic rehabilitation nursing mode in addition to the treatment and nursing for the con group: 1. Evaluation by stages: With the continuous deterioration of patients' condition, their ability of daily life continues to decline. Therefore, it is necessary to evaluate the cognitive function and physical ability of patients on a regular basis, so that nurses can timely implement rehabilitation nursing intervention, rehabilitation guidance and training for the patients. Evaluation was carried out once a week, and the nursing was adjusted according to the dynamic changes of patients at any time. 2. Health education: The nursing staff were arranged to regularly give lectures or use pictures, videos and other methods to explain how to prevent AD for patients, and strengthen the education and guidance on the safety and nursing of patients with dementia for their families. The health education method was reasonable according to the requirements of patients and their families, and the speech was easy to understand. 3. Cognitive function training: (1) Memory training: Nurses randomly report several groups of numbers for patients to repeat, and gradually increase the difficulty according to the completion of patients. The nurses were arranged to provide different animals, people or landscapes for patients to observe, randomly point to a picture, and then guide patients to say more related items. (2) Life ability training: The nursing staff guided the patients to independently complete the daily life actions such as washing face, taking off socks, changing clothes, eating, etc., train repeatedly and encourage them, guided the patients to complete these tasks independently. During the guidance period, the nursing staff demonstrated more and did less on behalf of patients. (3) Orientation ability training: The nursing staff pasted a big character label on the ground, on the wall or in a more striking place (write the time, place and the orientation of the charac-

ters), strengthened the orientation ability training in the hall, and then helped the patients to determine their orientation and time. (4) Language ability training: The nursing staff demonstrated the oral pattern in person, guided the patients to follow up, asked the patients to say the names of objects or characters repeatedly, and strengthened repeated training. The nursing intervention time of the two groups was 6 months. 4. Predictive nursing: The nursing staff were arranged to observe the living habits, character and environment of the patients, comprehensively evaluate the possible adverse events of the patients, give preventive nursing intervention, avoid the adverse events such as falling out of bed, self injury and falling, and strengthen basic nursing and care.

Observation indicators

(1) Geriatric Depression Scale (GDS) was used to evaluate the depression of the two groups [14]. There are 30 items in the GDS to evaluate the subjective feelings of patients, with a total score of 30 points, of which 0-10 points are rated as normal, 11-20 points as mild depression, and 21-30 points as severe depression.

(2) The modified apathy evaluation scale (MAES) was used to evaluate the emotional apathy of the two groups [15]. MAEs covers 14 items in total, which are defined by 14 points. A MAES score ≥ 14 points indicates indifference, and a higher score indicates more serious indifference.

(3) The severity of dementia in the two groups was assessed by the Mini-Mental State Examination (MMSE) [16]. The total score is 30 points, of which 27-30 points are rated as normal, 27 points as cognitive dysfunction, 21-26 points as mild mental retardation, 10-20 points as moderate mental retardation, and 0-9 points as moderate mental retardation.

(4) The Alzheimer's disease assessment scale (ADAS COG) was adopted for evaluation of the cognitive function of the two groups [17]. The score range is 0-75 points. The cognitive ability is evaluated from memory, language, attention, and operation ability. A higher score indicates more serious cognitive impairment.

(5) The Quality of Life-Alzheimer's Disease (QoL-AD) Scale was adopted to evaluate the quality of life of the two groups [18]. There are 13 items in total. The options of items are poor, general, good and very good. When scoring, the score is converted into 1-4 points, and 13 items produce a total score, which are 13-52 points. A higher score indicates better life quality of the patient.

(6) Evaluation of curative effect: Significant effect: The patients can take care of themselves and their cognitive function returns to normal. Effective: Patient is basically able to self-care and cognitive function is improved. Invalid: The patients' life ability and cognitive function had no significant change compared with that before nursing. Total effective rate = (the number of patients with significant effect + the number of patients effective effect)/total cases ×100%.

(7) We observed and record the adverse events of the two groups.

Statistical analyses

SPSS 17.0 was used to carry out statistical analysis. The counting data is expressed by the number of cases/percentage [n (%)]. Chi square test was applied for count data comparison between groups. When the theoretical frequency of chi square test is less than 5, continuity correction chi square test is used. The measurement data is expressed by the mean ± standard deviation (x ± sd). T-test of independent samples was applied for measurement data comparison between groups. The paired t-test was adopted before and after group comparison. $P < 0.05$ means a significant difference.

Result

General information

No significant difference was found between the study group and the con group in general clinical baseline data including sex, age, body mass index (BMI), duration of disease (month), residence, nationality, education background, smoking history, drinking history, diabetes history (all $P > 0.05$) (**Table 1**).

Comparison of GDS scores between the two groups before and after nursing

Before nursing, there were no significant differences in GDS between the two groups (P >

Table 1. General clinical data of the two groups [n (%)] (x ± sd)

Classification	Study group (n = 41)	Con group (n = 39)	t/χ^2 value	*P* value
Sex			0.486	0.486
male	21 (51.22)	23 (58.97)		
female	20 (48.78)	16 (41.03)		
Age (years)	73.85±4.25	72.93±3.98	0.998	0.321
BMI (kg/m^2)	15.84±1.19	15.92±1.23		
Course of disease (month)			0.775	0.679
< 30	11 (26.83)	14 (35.90)		
30-60	16 (39.02)	13 (33.33)		
> 60	14 (34.15)	12 (30.77)		
Place of residence			0.179	0.673
City	24 (58.54)	21 (53.85)		
countryside	17 (41.46)	18 (46.15)		
Nation			0.302	0.582
Han nationality	26 (63.41)	27 (69.23)		
Ethnic minority	15 (36.59)	12 (30.77)		
Education			0.075	0.748
≥ high school	17 (41.46)	15 (38.46)		
< high school	24 (58.54)	24 (61.54)		
Smoking history			0.534	0.465
Yes	23 (56.10)	15 (38.46)		
No	18 (43.90)	24 (61.54)		
Drinking history			0.775	0.379
Yes	24 (58.54)	19 (48.72)		
No	17 (41.46)	20 (51.28)		
Diabetes history			0.599	0.439
Yes	25 (60.98)	27 (69.23)		
No	16 (39.02)	12 (30.77)		

Table 2. GDS score of two groups before and after nursing (x ± sd)

Group	n	Before nursing	After nursing	T	P
Research Group	41	17.53±2.63	13.99±2.05	6.798	< 0.001
Con group	39	17.11±2.49	15.74±2.19	2.580	0.012
t		0.733	3.692	-	-
P		0.466	0.004	-	-

Table 3. MAEs score before and after nursing of two groups (x ± sd)

Group	n	Before nursing	After nursing	T	P
Research Group	41	15.63±2.51	12.41±1.86	6.600	< 0.001
Con group	39	15.29±2.03	14.12±2.07	2.520	0.014
t		0.664	2.890	-	-
P		0.509	0.002	-	-

0.05). While after nursing, both groups had significantly lower GDS scores (P < 0.05), and the study group got a significantly lower GDS score than the con group (P < 0.05) (**Table 2**).

Comparison of MAEs scores between the two groups before and after nursing

Before nursing, there were no significant differences between the two groups in MAEs score (P > 0.05). While after nursing, both groups had a significantly lower MAEs score (P < 0.05), and the study group had a significantly lower MAEs score than the con group (P < 0.05) (**Table 3**).

Comparison of MMSE score between the two groups before and after nursing

Before nursing, there were no significant differences in MMSE score between the two groups (P > 0.05). There were no significant differences in MMSE score before and after nursing in the con group (P > 0.05). The MMSE score of the study group was significantly higher than that before nursing (P < 0.05). The MMSE score of the study group was significantly higher than that of the con group (P < 0.05) (**Table 4**).

Comparison of ADAS cog scores between the two groups before and after nursing

Before and after nursing, the ADAS cog scores of the study group were (21.37±4.03) and (15.24±3.07), respectively, and those of the con group were (21.96±4.05) and (17.32±3.51), respectively. There was no significant differ-

Table 4. MMSE score of two groups between before and after nursing (x ± sd)

Group	n	Before nursing	After nursing	T	P
Research Group	41	18.93±5.56	22.69±4.56	3.348	0.001
Con group	39	19.13±5.54	20.16±5.55	0.820	0.415
t		0.161	2.232	-	-
P		0.872	0.029	-	-

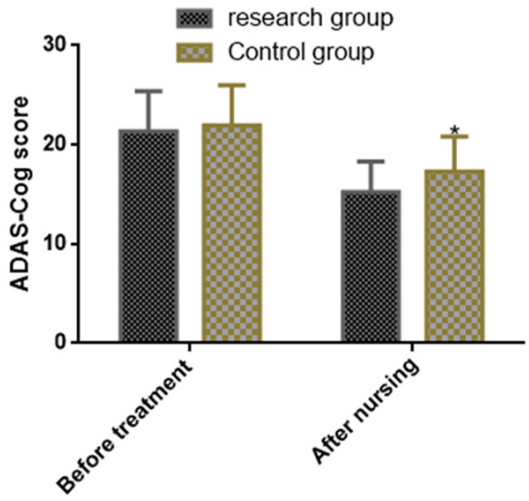

Figure 1. Comparison of ADAS cog scores between the two groups before and after nursing. There was no significant difference in ADAS cog score between the two groups before nursing (P > 0.05). The study group after nursing got a significantly lower ADAS cog score than the con group (P < 0.05). Note: compared with the con group after nursing, * < 0.05.

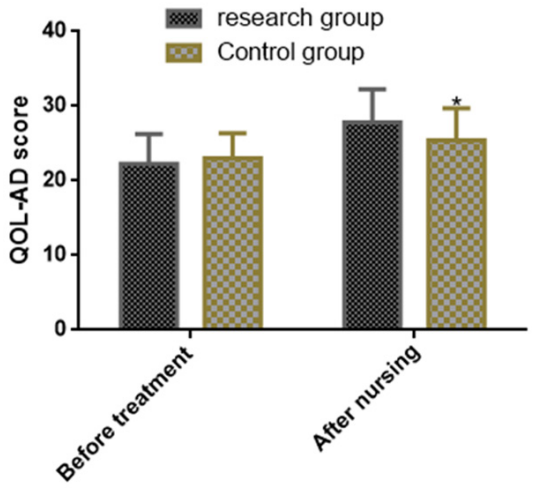

Figure 2. Comparison of QOL-AD score between the two groups after nursing. There was no significant difference in QOL-AD score between the two groups before nursing (P > 0.05). The study group after nursing got a significantly higher than QOL-AD score than the con group (P < 0.05). Note: compared with the con group after nursing, * < 0.05.

ence between the two groups (P > 0.05). After nursing, the ADAS cog scores of the study group were significantly lower than those of the con group (P < 0.05) (**Figure 1**).

Comparison of QOL-AD score between the two groups after nursing

QOL-AD scores of the study group before and after nursing were (22.26±4.01) and (27.83±4.46), respectively, and those of the con group before and after nursing were (23.03±3.35) and (25.43±4.28), respectively. There were no significant differences between the two groups before nursing (P > 0.05). The study group after nursing had a significantly higher QOL-AD score than the con group (P < 0.05) (**Figure 2**).

Comparison of the total effective rate between the two groups after nursing

After nursing, there were 25 cases (60.98%) with significantly effective treatment, 14 cases (34.15%) with effective treatment, and 2 cases (4.88%) with invalid treatment in the study group, showing a total effective rate of 95.12%. In the con group, there were 3 cases (33.33%) with significantly effective treatment, 15 cases (38.46%) with effective treatment, and 11 cases (28.21%) with invalid treatment in the con group, showing a total effective rate of 71.79%. The study group showed significantly higher total effective rate than the con group (P < 0.05) (**Table 5**).

Comparison of adverse events between the two groups

In the study group, there was 1 case of pressure sores (2.44%), 2 cases of falling (4.88%), no self-injury and falling from the bed, with a total incidence of 7.32%. In the con group, there were 5 cases of pressure sores (12.82%), 6 cases of falling (15.38%), 1 case of self-injury (2.56%), 2 cases of falling in bed (5.13%), with a total incidence of 35.90%. The study group showed a significantly lower total incidence of adverse events than the con group (P < 0.05) (**Table 6**).

Discussion

Patients with AD are prone to depression, irritability, indifference, and anxiety in the early stag-

Table 5. Total effective rate of two groups after nursing [n (%)]

Curative effect	Study group (n = 41)	Con group (n = 39)	χ^2 value	*P* value
Markedly effective	25 (60.98)	13 (33.33)	-	-
Effective	14 (34.15)	15 (38.46)	-	-
invalid	2 (4.88)	11 (28.21)	-	-
Total effective rate	39 (95.12)	28 (71.79)	7.992	0.005

Table 6. Incidence of total adverse events in two groups after nursing [n (%)]

Group	n	Pressure sore	Fall	Self injurious	Falling bed	Total incidence rate
Research Group	41	1 (2.44)	2 (4.88)	0 (0.00)	0 (0.00)	3 (7.32)
Con group	39	5 (12.82)	6 (15.38)	1 (2.56)	2 (5.13)	14 (35.90)
χ^2 value	-	3.105	2.452	1.065	2.156	9.756
P value	-	0.078	0.117	0.302	0.142	0.002

es [19], and dementia leads to the decline of memory and other cognitive abilities, resulting in the disorder of daily life activities [20]. With the aggravation of the disease, patients easily lose the ability of self-care such as self-feeding [21]. However, patients' cognitive decline, depression and other clinical symptoms often cause serious events such as self-injury and other losses [22, 23]. Therefore, it is crucial to effectively improve the cognitive level and self-care ability of patients with AD.

In this study, the 3 + 1 holistic rehabilitation nursing mode was used to evaluate patients with AD in stages, health education, cognitive function training (memory training, life ability training, orientation ability training, language ability training), and predictive nursing. The nursing mode is patient-centered, which carries out targeted professional nursing for patients and integrates professional nursing knowledge and care [24]. The results of this study revealed that after nursing, the GDS score and MAES score of the study group were significantly lower than those of the control group, indicating that 3 + 1 holistic rehabilitation nursing mode can better alleviate the depression of patients with AD and lower the degree of their apathy. In the study of Bahar et al. [25], cognitive training and cognitive rehabilitation were carried out for patients with AD to improve their daily activities. The results of this study showed that after nursing, the MMSE score of the study group was significantly higher than that of the control group, while ADAS-Cog score of the study group was significantly lower than that of the control group, implying that 3 + 1 holistic rehabilitation nursing mode improves the cognitive function of patients by training the memory ability and daily behaviors of patients, which was similar to the study results of Bahar et al., implying that nursing interventions such as cognitive training can improve the cognitive function of patients with AD, and 3 + 1 holistic rehabilitation nursing mode can also alleviate the depression of patients while improving their cognitive function, thus accelerating the rehabilitation of the patients. In the study by lyketsos et al. [26], a series of interventions by nurses can delay the progress of AD patients' disease, improve the patients' life quality, delay the decline of function and control symptoms. In this study, the QOL-AD score of the patients in the study group was significantly higher than that in the con group, indicating that the 3 + 1 holistic rehabilitation nursing mode improved the patients' life quality. The total effective rate of the patients in the study group was significantly higher than that in the con group, while the adverse events were significantly lower than those in the con group, indicating that the 3 + 1 holistic rehabilitation nursing mode can better improve the rehabilitation effect of the patients and lower the damage to themselves caused by the decline of cognitive function. This is similar to the results of lyketsos, which indicated that nursing intervention can improve the life quality of patients with AD. Moreover, this study revealed that 3 + 1 holistic rehabilitation nursing mode can also significantly improve the rehabilitation effect of patients, reduce the occurrence of adverse events, and effectively control the clinical symptoms of patients, so it is worthy of clinical application.

Conclusion

The implementation of 3 + 1 holistic rehabilitation nursing mode for AD patients is helpful to

improve the life quality and cognitive function of patients, alleviate their depression, lower their emotional apathy, and delay the progress of disease and decline of function.

Disclosure of conflict of interest

None.

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