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Original Article

The effect of idioms combined with situational training on the speech rehabilitation and self-efficacy of stroke patients with non-fluent aphasia

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Abstract: Objective: To determine the effect of idioms combined with situational training on the speech rehabilitation and self-efficacy of patients with non-fluent aphasia (NFA) after a stroke. Methods: A total of 156 patients with NFA after a stroke treated in our hospital from April 2019 to April 2020 were recruited as the study cohort and assigned to a regular group (n=74) or the observation group (n=84). The patients in the regular group underwent routine treatment, and the patients in the observation group underwent idioms combined with situational training in addition to the routine treatment. After the intervention, the two groups intervention effects were compared, and the Chinese Rehabilitation Research Center Aphasia Examination (CRRCAE), the Montreal Cognitive Assessment (MoCA), the Stroke Self-Efficacy Questionnaire (SSEQ), the Barthel Index, the Self-Rating Anxiety Scale (SAS), the Self-Rating Depression Scale (SDS), and the Quality of Life Assessment Scale were used to evaluate all the patients' language functions, cognitive functions, self-efficacy, self-care abilities, negative psychological states, and quality of life. Results: After the treatment, the total effective rate in the observation group was higher than the total effective rate in the conventional group, and the CRRCAE scores (retelling, expressing, reading aloud, and naming) in the observation group were also higher than the corresponding scores in the regular group (all $P<0.05$). In addition, the observation group had higher MoCA, Barthel, and life quality scores and lower SAS and SDS scores than the regular group ($P<0.05$). Conclusion: Idioms combined with situational training is of great significance in ameliorating language function, cognitive function, self-efficacy, a negative psychological state, self-care ability, and the quality of life in patients with NFA after a stroke, so it can be popularized in clinical practice.

Keywords: Idioms, stroke, aphasia, rehabilitation training, self-efficacy

Introduction

Stroke is the second leading cause of death and the primary cause of disability worldwide [1]. It causes different degrees of damage to patients' brains when it occurs, resulting in various sequelae related to brain injury, and aphasia is the most common one [2]. Aphasia is mainly characterized by language expression and understanding disorders, which leads to the inability of patients to communicate with others and participate in social activities independently, so it poses a serious impact on patients' physical and mental health and quality of life [3]. About one-third of adult stroke patients reportedly suffer from aphasia at discharge [4]. According to the Boston classification on aphasia, aphasia can be classified into two categories: Fluent aphasia and non-fluent aphasia (NFA). The former is mainly characterized by meaningless language and obstacles in language understanding, while the latter is characterized by unsmooth pronunciation accompanied by retelling obstacles and dysrhythmia [5]. Currently, there are many ways to treat aphasia, but there are still many patients whose language function is difficult to return to normal [6, 7]. Therefore, clinical workers urgently need a way to improve the language function of stroke patients with aphasia.

In addition to drug therapy, speech therapy is a well-recognized rehabilitation strategy for aphasia at home and abroad [8]. Speech therapy refers to language-related speech training me-

thods, such as phonetic and semantic therapy, compulsory induced speech therapy, and music intonation therapy [9-11]. Idioms are some stereotyped phrases or short sentences in the Chinese vocabulary. First, they have a fixed structural form and a fixed statement, and they are as highly vivid and concise as a whole in a sentence. Second, they are widely known by the public, and they have a tenacious vitality, because they can even be heard everywhere in the streets and lanes and can be utilized by both the old and the young. Third, idioms have a unique and rich context. For example, "the red sun rises in the east" can remind people of the image of a flaming sun rising slowly, and "Three visits to the cottage" can remind people of the story of Liubei who asked Zhuge Liang repeatedly to take up a responsible post. The above features of idioms suggest that helping patients pick up idioms is also beneficial to the extension of oral expression. Fourth, idioms have a strong sense of rhythm, and they have catchy ragged rhythms. Research shows that the rhythm of rehabilitation training materials stimulates patients to read familiar contents [12]. Therefore, we suspect that idioms can be used as rehabilitation training materials for stroke patients with NFA to increase their interest and enthusiasm and to meet the diversified and individualized needs of patients.

This study utilized these characteristics of Chinese idioms to try and explore the application of idioms combined with situational training in the speech rehabilitation of aphasic patients.

Materials and methods

Research cohort

A total of 156 stroke patients with NFA treated at the Renmin Hospital of Wuhan University from April 2019 to April 2020 were recruited as the study cohort and assigned to the regular group (n=74) and the observation group (n=84) according to treatment method each patient selected. Inclusion criteria: Patients with brain damage who underwent a transcranial CT or MRI and a clinical diagnosis, patients who were stable, patients with a clear consciousness and without any cognitive impairment, patients whose cognitive and language functions were normal before the onset, patients diagnos ed with aphasia according to the *Aphasia Screening Test*, and patients with an educa tion level of junior high school or above. Exclusion criteria: Patients with serious diseases, patients with an intolerance to testing or unwilling to cooperate with the study, patients with Wernicke's aphasia or transcortical combined aphasia (a severe hearing and understanding disorder), patients with comorbid emotional and cognitive function obstacles, patients with mental disorders, hearing disorders, dysarthria, or speech apraxia, and patients whose binocular corrected visual acuity was lower than 1.0 or with visual field defects. Written informed consents were obtained from all the patients in the two groups, and the study was approved by the Ethics Committee of our hospital and was carried out in accordance with the Declaration of Helsinki.

Intervention

The patients in the regular group were given neurological routine treatment, including drug treatment and specialist nursing for patients. In addition to the treatment given to the regular group, the patients in the observation group were given idioms combined with situational training as follows: Each patient was given a planned speech function training during his/her stable period for four consecutive weeks and 40 minutes each day. First, the language disorder of each patient in terms of listening, speaking, reading, and writing and his/her remaining communication skills were evaluated comprehensively according to the results of the aphasia examination, and efforts were made to understand the factors that affected the patient's communication skills. Then a speech treatment plan was developed for each patient according to his/her language disorder severity and aphasia types, and different training methods were adopted to the different types of aphasia. For patients with Broca aphasia, anomic aphasia, or transcortical motor aphasia who had relatively good listening and understanding abilities, expression training was mainly adopted. First, a story was told to them. For example, a farmer with a short temper always thought that the seedlings in the field grew too slowly. He wandered around the field all day, measuring the height of the seedlings by hand every once in a while, but the seedlings always seemed to be the same in height. In what way can the seedlings

grow faster? He turned and thought, and finally came up with a way: When I pull the seedlings up, the seedlings would grow a lot. Without delay, he began to raise the seedlings one by one. After the story, the patients were encouraged to say "Many coaches encourage young athletes to accelerate the training pace at will, causing the athletes injuries and illnesses, which is tantamount to the behavior of the farmer".

However, for the patients with global aphasia or transcortical sensory aphasia who had relatively poor listening and comprehension abilities, comprehension training was mainly used, including pointing out articles after listening to their names, executing instructions, and word-map matching. For example, a cartoon picture about "The foolish old man who removed the mountains" was displayed before a patient, and then the patient was guided in observing and interpreting the picture to bring the patient into the situation, thus helping the patient realize the meaning of the idiom. Finally, the idiom was displayed before the patient, and the patient was asked to read it. During treatment, the treatment plan of each patient was adjusted at any time according to the progress of the patient's language function.

Outcome measures

The treatment efficacy in the patients was evaluated according to the Boston Diagnostic Aphasia Examination (BDAE) after the intervention [13]. Markedly effective: The BDAE grade was changed to 0 or improved by 2 grades; effective: the BDAE grade was improved by 1 grade; ineffective: the BDAE grade was not improved. Total effective rate = (The number of markedly effectively treated patients and the number of effectively treated patients)/the total number of patients × 100%.

The patients' language functions were evaluated using the Chinese rehabilitation research center aphasia examination (CRRCAE) before and after the intervention [14], and compared. The evaluation involves four items: retelling, expressing, reading aloud, and naming. Each item is worth 100 points. The score is directly proportional to language ability.

The cognitive function of each patient was evaluated using the Montreal Cognitive Assessment (MoCA) before and after the intervention [15]. The assessment involves eight cognitive dimensions including memory, language, abstract thinking, orientation, executive function, and concentration, for a total possible score of 30 points. The score is directly proportional to cognitive function.

The self-efficacy of each patient was evaluated using the Stroke Self-Efficacy Questionnaire (SSEQ) before and after the intervention [16]. The questionnaire involves daily activities and self-management and has 13 questions. Each question is worth 10 points (130 total possible points). The score is directly proportional to confidence and self-efficacy. The life self-care ability of each patient was evaluated using the Barthel index before and after the intervention [17]. The index has a maximum score of 100 points and covers 10 items such as personal toilet use, walking on a level surface, and dressing, feeding, and bathing oneself. The score is directly proportional to life one self-care abilities.

The anxiety and depression levels of each patient were evaluated using the Self-Rating Anxiety Scale (SAS) and the Self-Rating Depression Scale (SDS) [18, 19], respectively. Each scale has a total possible score of 100 points, and a higher score indicates more serious anxiety or depression.

The patients' quality of life at three months after their discharges was evaluated using the Quality of Life Questionnaire (QLQ) [20]. The questionnaire covers 6 items, namely general health (GH), role physical (RP), physical function (PF), social function (SF), role emotional (RE), and mental health (MH). Each item has a maximum possible score of 100 points, and a higher score indicates a better quality of life.

Statistical analyses

In this study, the data were statistically analyzed using SPSS 21.0 (IBM Corp, Armonk, NY, USA), and we created the figures using GraphPad Prism 7. The enumeration data were compared using chi-square tests, and the measurement data were compared between the groups using independent-sample t tests, compared within the groups before and after the treatment using paired t tests, and compared among more than two groups using one-way ANOVA. In addition, back-tests were carried out to verify the correctness of the statistical val-

Table 1. Comparison of the two groups' general clinical data ([n (%)], x±sd)

Group	Regular group (n=74)	The observation group (n=84)	χ^2/t	*P*-value
Sex			0.935	0.333
Female	32 (43.24)	30 (35.71)		
Male	42 (56.76)	54 (64.29)		
Age (Y)	58.68±6.78	60.38±7.65	1.462	0.146
BMI (kg/m^2)	23.15±2.12	22.95±2.36	0.580	0.555
Place of residence			1.897	0.168
Urban area	51 (68.92)	49 (58.33)		
Rural area	23 (31.08)	35 (41.67)		
Exercise habit			0.411	0.521
Yes	28 (37.84)	36 (42.86)		
No	46 (62.16)	48 (57.14)		
Education level			0.965	0.326
< senior high school	33 (44.59)	31 (36.90)		
≥ senior high school	41 (55.41)	53 (63.10)		
Stroke type			0.659	0.417
Cerebral infarction	42 (56.76)	53 (63.10)		
Cerebral hemorrhage	32 (43.24)	31 (36.90)		

Table 2. Intervention effect [n (%)]

Group	Markedly effectively treated patients	Effectively treated patients	Ineffectively treated patients	Total effective rate
Regular group (n=74)	19 (25.68)	34 (45.95)	21 (28.38)	53 (71.62)
The observation group (n=84)	29 (34.52)	43 (51.19)	12 (14.29)	72 (85.71)
χ^2	-	-	-	4.729
P-value	-	-	--	0.030

ues. *P*<0.05 was regarded as statistically significant.

Results

Comparison of the general patient clinical data

There were no significant differences between the two groups in terms of their general clinical data, such as sex, age, body mass index (BMI), place of residence, exercise habits, educational level, or stroke type (all *P* > 0.05) **Table 1**.

Intervention effect

The intervention effects in the two groups were evaluated. The results indicated that the regular group showed a total effective rate of 71.62%, with 19 patients markedly effectively treated (25.68%), 34 patients effectively treated (45.95%), and 21 patients ineffectively treated (28.38%), while the observation group showed a total effective rate of 85.71%, with 29 patients markedly effectively treated (34.52%), 43 patients effectively treated (51.19%), and 12 patients ineffectively treated (14.29%). Therefore, the total effective rate of the observation group was significantly higher than the total effective rate of the regular group (*P*<0.05) **Table 2**.

Language function assessment

According to the two groups' language function evaluations before and after the intervention, before the intervention, there were no significant differences between the two groups in terms of their CRRCAE scores (retelling, expressing, reading aloud, and naming) (all P > 0.05), but after intervention, the CRRCAE scores in both groups increased significantly, and the CRRCAE scores in the observation group were higher than the scores in the regular group (all *P*<0.05) **Figure 1**.

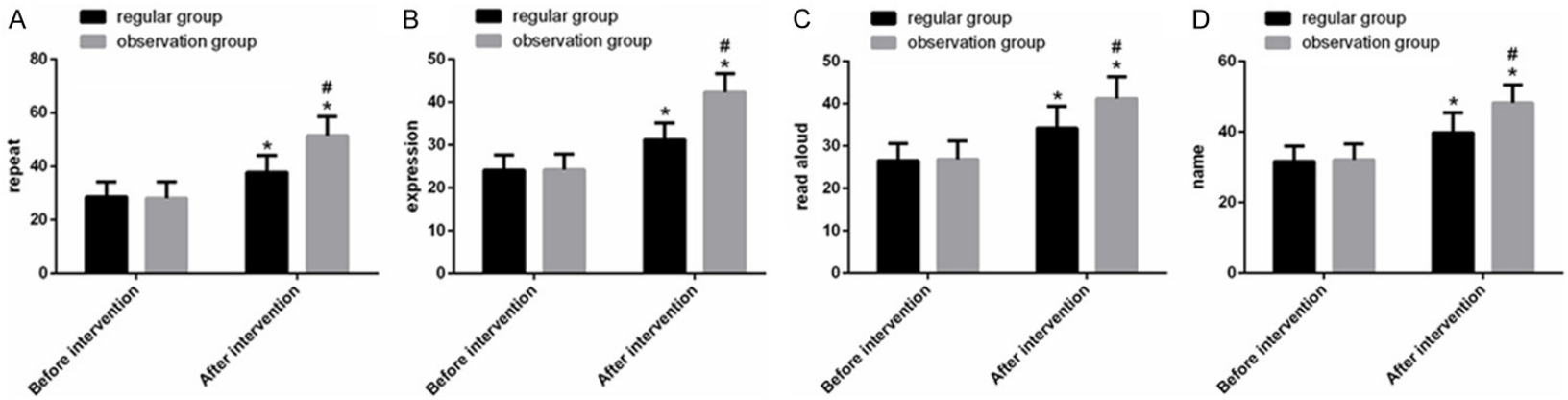

Figure 1. Comparison of the language function between the two groups. A. Comparison of the retelling scores between the two groups before and after the intervention. B. Comparison of expressing scores between the two groups before and after the intervention. C. Comparison of the reading scores between the two groups before and after the intervention. D. Comparison of the naming scores between the two groups before and after the intervention. Notes: * indicates compared with the same group before the intervention, $P<0.05$; # indicates compared with the regular group after the intervention, $P<0.05$.

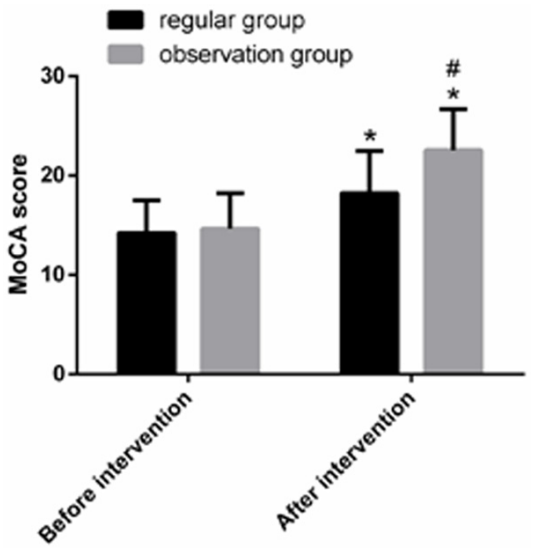

Figure 2. Comparison of the MoCA scores in the two groups before and after the treatment.

Cognitive function assessment

According to the two groups' cognitive function evaluations before and after the intervention, before the intervention, there were no significant differences between the two groups in terms of their MoCA scores (P>0.05), but after the intervention, both groups' MoCA scores increased significantly, and the observation group's MoCA score was higher than the regular group's MoCA score (all P< 0.05) **Figure 2**.

Self-efficacy and self-care ability assessment

According to the two groups' self-efficacy and self-care ability evaluations before and after the intervention, before the intervention, there were no significant differences between the two groups in terms of their SSEQ and Barthel scores (both P>0.05), but after the intervention, both groups' SSEQ and Barthel scores increased significantly, and the observation group's two scores were higher than the corresponding two scores in the regular group (both P<0.05) **Figure 3**.

Evaluation of the adverse psychological state

According to our evaluation of the depression and anxiety of the two groups before and after the intervention, before the intervention, there were no significant differences between the two groups in terms of their SAS and SDS scores (both P>0.05), but after the intervention, both groups' SAS and SDS scores decreased significantly (both P<0.05), and the observation group's scores were notably lower than the regular group's scores (both P<0.05) **Figure 4**.

Life quality assessment

Our comparison of the two groups' quality of life after the intervention showed that the quality of life scores of GH, RP, PF, SF, RE, and MH in the observation group were significantly higher than they were in the regular group (all P<0.05) **Figure 5**.

Discussion

Aphasia, a common speech and cognitive disorder in stroke patients, is a language disorder syndrome caused by an impairment of the decoding and coding abilities of the language components due to organic damage in the language center and its related centers in the cerebral hemisphere [21]. At this point, there is no standard treatment for aphasia following a stroke, and many patients are unable to restore their language function. Therefore, it is necessary to find an effective way to promote aphasic stroke patients' language function recovery.

Idioms, a unique and interesting language form in China, are not only extensively known but are also characterized by their simple grammatical structure and strong ragged rhythms. One previous study has demonstrated that rhythmic expression is beneficial to speech extraction and expression [29]. One other study concluded that the improvement in verbal competence of patients with aphasia lies in the re-acquisition of the ability to re-extract the phonetic codes of words related to memory parts, rather than the re-learning of language [22]. Therefore, we believe that idioms may effectively improve the linguistic competence of NFA patients following a stroke when they are used as rehabilitation training materials. In this study, the total effective rate in the observation group was higher than it was in the regular group, and the observation group's CRRCAE scores were also higher than the regular group's CRRCAE scores, indicating that idioms combined with situational training intervention can effectively promote aphasic stroke patients' recovery of language function. The reason may be due to the fact that, with a strong sense of

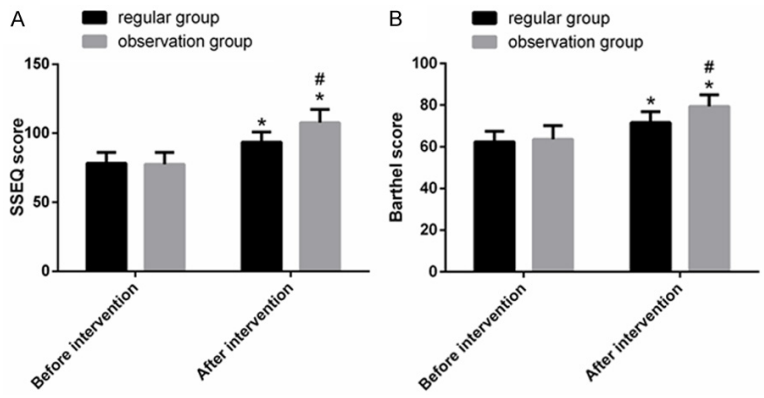

Figure 3. Comparison of the self-energy efficiency and self-care ability scores in the two groups. A. Comparison of the SSEQ scores in the two groups before and after the intervention. B. Comparison of the Barthel scores between the two groups before and after the intervention. Notes: * indicates compared with the same group before the intervention, $P<0.05$; # indicates compared with the regular group after the intervention, $P<0.05$.

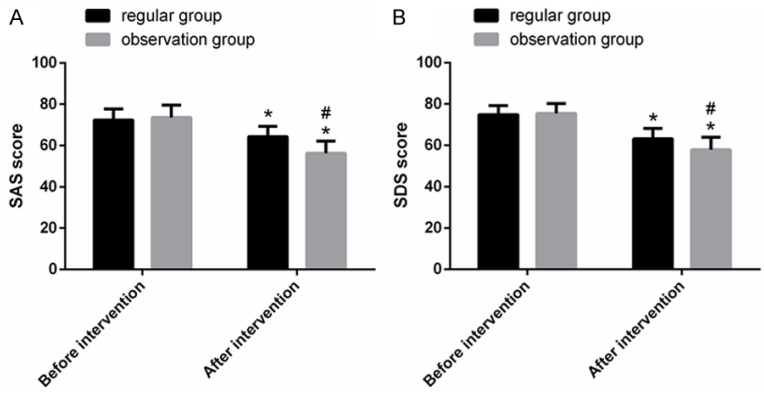

Figure 4. Comparison of the adverse psychological states in the two groups. A. Comparison of the SAS scores between the two groups before and after the intervention. B. Comparison of the SDS scores in the two groups before and after the intervention. Notes: * indicates compared with the same group before the intervention, P<0.05; # indicates compared with the regular group after the intervention, P<0.05.

rhythm, idioms may achieve a curative effect similar to melodic intonation therapy, and they have stable coding in patients' minds due to their wide public use.

Cognitive function refers to all kinds of conscious mental activities that always exist in human beings in the waking state. Stroke survivors generally suffer from different degrees of cognitive dysfunction, seriously compromising their physical and mental health [23]. One study has found that aphasic stroke patients also often suffer from cognitive dysfunction, a condition that seriously affects the recovery of their language function [24]. In addition, one study also found that there is a positive correlation between the language function score and the cognitive function of patients with traumatic brain injury, and the recovery of the listening and understanding function is important for improving cognitive function [25]. In this study, after the intervention, the MoCA scores in both groups increased significantly, and the MoCA score in the observation group was higher than it was in the regular group, indicating that idioms combined with situational training can effectively improve the cognitive function of NFA stroke patients. One study found that inducing association is conducive to the recovery of cognitive function [26]. Idioms are rich in stories. Patients often connect with the stories behind idioms when they hear or see them, and thus obtain a faster recovery of their cognitive function.

One's Sense of self-efficacy is an individual's judgment on his/her organization and execution ability during the action required to complete the stated objective. Many patients with stroke lack self-efficacy [27]. One study pointed out that improving self-efficacy can cause positive effects on health-related actions and negative emotions, thus promoting the improvement of patients' psychosomatic symptoms and quality of life [28]. In this study, we evaluated the self-efficacy and negative psychological states of the two groups, and found that after the intervention, the observation group got higher SSEQ and Barthel scores and lower SAS and SDS scores than the regular group. The results implied that idioms combined with situational training intervention can effectively improve the self-efficacy of NFA stroke patients, thus alleviating their bad emotions and improving their self-care abilities. In our opinion, the reasons may be as follows:

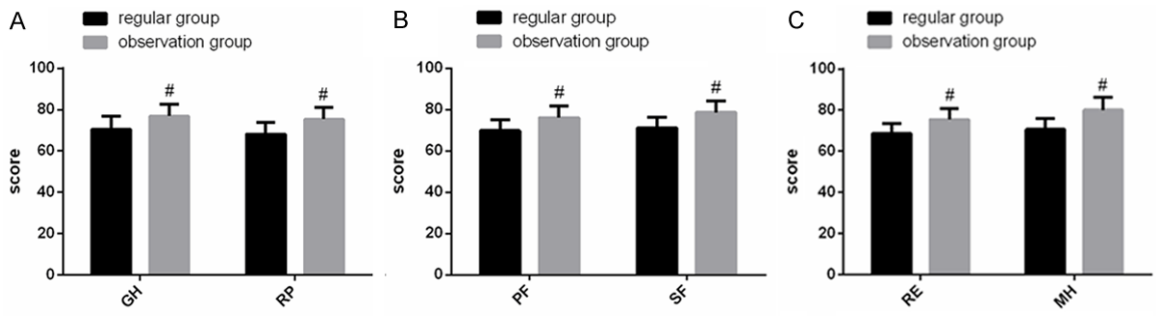

Figure 5. Comparison of the quality of life between the two groups. A. Comparison of the GH and RP scores between the two groups before and after the intervention. B. Comparison of the PF and SF scores between the two groups before and after the intervention. C. Comparison of the RE and MH scores in the two groups before and after the intervention. Note: # represents compared with the regular group, $P<0.05$.

First, with a good sense of rhythm, idioms are full of rich background stories and are widely applicable, so they can improve patients' interest and confidence in the training. Second, with idioms combined with situational training, different training programs are developed according to the patients' own conditions in the patients' room, making it easier for patients to perform the training and reduce their bad psychological emotions in the process of performing the training. Finally, this study evaluated the two groups' quality of life after the intervention. Unsurprisingly, the quality of life scores in the observation group were higher than they were in the regular group.

This study has verified that idioms combined with situational training intervention can promote the recovery of language function in patients with non-fluent NFA, but it has some limitations. First of all, idioms combined with situational training are only applicable to the patients with non-fluent NFA in China, and the patients receiving it are required to have a certain educational level, which limits the popularization of this method. Secondly, we did not evaluate the quality of life of the two groups before the intervention, which may result in biased results. In addition, this study has only explored the effect of idioms combined with situational training in treating non-fluent NFA, but it did not explore whether this method has significant benefits for other types of aphasia.

To sum up, idioms combined with situational training are of great significance in improving language function, cognitive function, self-efficacy, negative psychological states, self-care abilities, and the quality of life of NFA stroke patients, so it can be popularized in clinical practice.

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Disclosure of conflict of interest

None.

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