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Original Article

Effects of Intervention Strategies-Based on Positive Psychology on the Emotional Cognition, Mental Health, and Recovery of Speech Function in Speech Disabilities

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Abstract

Background: Compared with able-bodied people, speech disabilities are more prone to various mental health problems. We aimed to explore the impact of positive psychology-based intervention strategies on emotional cognition, mental health, and recovery of speech function in speech disabilities.

Methods: In May 2023, 306 cases of speech disabilities were selected from 112 village committees and 129 neighborhood committees in Jingmen City, China. The control group was given routine speech rehabilitation training, and the observation group was given an intervention strategies-based on positive psychology based on the above training. The Symptom Checklist-90 (SCL-90), Chinese Facial Emotion Test (CFET), Comprehensive Function Assessment for Disabled Children (CFADC), and Boston Diagnostic Aphasia Examination (BDAE) were used to evaluate the two groups of patients before and after intervention.

Results: After the intervention, the mental state scores (psychotic, obsessive-compulsive symptoms, somatization, paranoia, terror, hostility, anxiety, and depression) of the observation group were lower than those of the control group (P<0.05). The correct emotional scores in the observation group were higher than those in the control group were. However, the remote error scores of the observation group were lower than those of the control group were. The difference was also statistically significant (P<0.05). The cognitive function score, speech function score, and BDAE score (retelling, writing, fluency, and reading comprehension) of the observation group were all higher than those of the control group (P<0.05).

Conclusion: The intervention strategies-based on positive psychology could promote the improvement of health problems and speech function in speech disabilities.

Keywords: Positive psychology; Speech disability; Mental health; Emotional cognition

Introduction

Disability refers to the abnormal or loss of certain organizational functions in the human body, physiology, and psychological structure and the partial or complete loss of the ability to live a normal life. China divides disabilities into multiple disabilities, mental disabilities, intellectual disabilities, physical disabilities, speech disabilities, hearing disabilities, visual disabilities, and others. Speech disability mainly refers to different degrees of speech barriers caused by various fac-

tors, making communicating normally difficult or impossible. The results of China's first national survey of disabled people show that more than 17.7 million people have hearing and speech disabilities, accounting for 34%, and some patients with other disabilities have different degrees of speech impairment. In addition, cerebral palsy, cerebrovascular disease, and other factors caused by stuttering, speech retardation, and aphasia are far higher than the previously mentioned statistics (1). In recent years, the number of speech disabilities in most regions has shown a downward trend (2), but the incidence rate remains relatively high. The mental health of the disabled is significantly worse than that of the able-bodied, and the former is more prone to various mental health problems. With the development of the society, the pace of life is gradually accelerating. The pressure on the speech disabled is also increasing, and mental health problems are aggravating. Developing countries, represented by China, are transitioning to a modernized society, and attention to the mental health issues of people with disabilities is in its early stages and has become an urgent problem to be solved.

The latest development and rise of positive psychology not only benefit the mental health of healthy people but also provide new methods and ideas about interventions for the mental health of disabled people. Personalized psychological care can effectively improve negative emotions such as anxiety and depression in patients with cerebral infarction and speech dysfunction (3). Psychological intervention can promote the recovery of speech function in post-stroke patients with speech disorders, improve their emotional problems, and enhance their service acceptance (4). Home-based psychological care could effectively improve the psychological status of people with speech disabilities (5). The music therapy intervention project could effectively improve the psychological status of people with speech disabilities, and effectively improve the mental health of disabled people (6). Some positive psychological intervention programs can improve the mental health level of patients with speech dysfunction (7). Psychological care could promote the emotional cognitive ability of patients with speech dysfunction (8). A nursing plan based on positive psychology could improve cognitive function in patients with speech dysfunction (9), and enhance the fluency, writing, and retelling abilities of patients with speech dysfunction (10). Speech training combined with psychological intervention could effectively improve cognitive and speech function in patients with cognitive impairment (11).

Positive psychology advocates treating all people with an appreciative and open perspective, focusing on emphasizing the positive qualities of people, affirming their values and abilities, and creating an optimistic and positive living environment for them (12). An intervention program based on positive psychology could effectively improve the psychological quality of speech-disabled people through multidisciplinary cooperation and psychological means and methods according to the psychological and physical development characteristics of different age groups and types of speech-disabled people. It could improve their physical and mental health holistically. Intervention for speech disabilities is particularly important. At present, conventional psychological intervention combined with speech rehabilitation training is often used in clinical intervention. Although it can improve the mental health and speech function of patients to a certain extent, the effect is not good. The cooperation and compliance of patients are relatively poor, so patients are not very motivated. Therefore, choosing a positive and effective psychological intervention method is crucial. Positive psychology pays more attention to the cultivation of self-emotional management ability and individual adaptability, emphasizes people's subjective experience, stimulates positive energy, provides strong psychological support for individuals, and improves the mental health of patients.

We explored the impact of intervention strategies-based on positive psychology on the emotional cognition, mental health, and recovery of speech function in speech disabilities, aiming to provide a reference for rehabilitation interventions for speech disabilities.

Materials and Methods

Research object

In May 2023, 306 cases of speech disabilities were selected from 112 village committees and 129 neighborhood committees in Jingmen City, China through multi-stage stratified random cluster sampling. They were randomly divided into two groups, the control group, and the observation group, with 153 cases in each group. The control group had 98 males and 55 females, aged 18-45, with an average age of (32.55±2.69) years. There were 92 married cases, 61 unmarried cases, 106 urban residents, 47 rural residents, 38 congenital disabilities, and 115 acquired disabilities. The observation group consisted of 100 males and 53 females, aged 18-48 years, with an average age of (32.78±2.71) years. There were 98 married cases, 55 unmarried cases, 108 urban residents, 45 rural residents, 43 congenital disabilities, and 110 acquired disabilities. No significant difference was observed in general information such as age, gender, marital status, and disability type between the two groups (P>0.05).

All research subjects possessed disability certificates and voluntarily participated in this study. This study was approved by the Municipal Ethics Committee (No. 20220319).

Method

The control group was given routine speech rehabilitation training, specifically as follows:

1) Auditory stimulation: Instruct the speech disabled to intervene repeatedly in speech signals by listening to music, reading newspapers, watching TV, and listening to the radio to stimulate their auditory language, thereby producing certain feedback responses to reinforce correct responses.

2) Speech articulation training: Guide the speech disabled to control the movement of the throat, lips, teeth, and oral muscles through mouth shapes and sounds. Train their speed and clarity of speech, pitch, and volume. Instruct them to perform exercises such as whistling, retracting the tongue, drumming the cheeks, and clearing the throat.

3) Daily communication training: Conduct speech-assisted gesture training for phrases such as walking, sleeping, drinking, and eating in life to improve speech function.

The observation group added an intervention program based on positive psychology based on the above training. The details are as follows:

1) Establish a professional psychological intervention team: The team leader is an associate chief physician or above, selects experienced nurses, collects and sorts out the relevant data of patients with speech disabilities, and formulates effective strategies based on positive psychology. Intervention programs need to meet individual personality traits, positive social environment, and positive emotional experience. The team members collected and compiled the patient's psychological changes and disease development into a book, and handed it over to the team leader. The team leader formulated a corresponding psychological intervention plan based on the gathered information.

2) Conduct a simulation exercise: To verify the effectiveness and feasibility of the plan, nurses will act as patients to simulate the formulated plan, and then summarize and discuss it to improve continuously the plan.

3) Finalize the contents of the program: First, establish communication with family members and patients, gain a deep understanding of the patient's psychological thinking, analyze the main factors that cause speech disorders, and explain prevention and solution measures to them so that patients can fully understand. When necessary, psychological counseling and lectures can be used to mobilize their self-awareness, help them find their inner strengths and energy, enhance their confidence in overcoming the disease, and gain their cooperation and trust. Second, through music and video, help patients with the good things they have encountered and helped in the past to alleviate the inner changes of patients and induce the enthusiasm of verbal expression. Third, instruct patients with speech disabilities to thank family members for their understanding, toler-

ance, and care through words and hugs; promote communication; and gain strong psychological support from family members. Finally, regularly invite some patients who have improved their mentality to share their experiences or organize patient exchange meetings. Through mutual encouragement and understanding, these patients can awaken other's yearning for the future and inspire them to eliminate negative emotions, face life with an optimistic attitude, and cooperate with related psychological interventions. The intervention program for the two groups of patients was thrice a week, and intervention training was carried out for three months.

Evaluation indexes

The Symptom Checklist-90 (SCL-90) was used to evaluate the mental health of patients (13). The scale has nine items, including psychosis, obsessive-compulsive symptoms, somatization, paranoia, terror, hostility, anxiety, and depression. Each item consists of 10 items, and each item is evaluated by the four-level Likert scoring method. The worse the patient's mental health is, the higher the score is.

Chinese Facial Emotion Test (CFET) was used to evaluate the patient's emotional cognition (14). The test included 180 face photos, mainly based on joy, anger, sadness, surprise, fear, and disgust. For reference, through the image software, according to the ratio of 10:90, 30:70, 50:50, 70:30, and 90:10, the adjacent relationship of happiness-anger-disgust-sorrow-fear-surprise is dissolved combined to form 30 continuously changing emotional photos. They are used to mark the six basic emotions. The patient was tested by two professionally trained staff. The photos appeared randomly on the computer, and the patient distinguished them according to the six basic emotions. Six tests were conducted. The first time was not scored, and the 50:50 fusion pictures were excluded. Regarding scores, statistical variables included remote error score (maximum score of 20), correct score of emotional face recognition (maximum score of 20 points), and related total score (maximum score of 120 points). The Cronbach's α coefficient of the CFET emotion test system was 0.86, and the construct validity KMO was 0.89.

According to the relevant instructions on the speech function and cognitive function items in the Comprehensive Function Assessment for Disabled Children (CFADC), the speech function and cognitive function of the speech disabled in the text were evaluated (15). The scale mainly includes five items, namely, social adaptation, self-care, sports, speech, and cognition. It has 50 items in total, and the score range is 0-100 points. 0 points for unachievable, 0.5 points for completion of small parts, 1.5 points for most of the completion, and 2 points for completion. The more robust the cognitive and verbal functions, the higher the scores.

Boston Diagnostic Aphasia Examination (BDAE) includes four items, namely, fluency, writing, reading comprehension, and retelling, with a total of 167 points (16).

Statistical analysis

Statistical analysis was performed with SPSS 20.00 software (IBM Corp., Armonk, NY, USA). The measurement data were represented by $\bar{x} \pm s$. The two groups were compared by *t*-test, and the data between groups were compared by independent sample t-test. The enumeration data were represented by the number of cases, and the x^2 test was carried out. $P<0.05$ was regarded as statistically significant.

Results

Changes in the mental state of the two groups of patients before and after the intervention

No significant difference was noted in the mental state scores between the two groups before and after the intervention ($P>0.05$). After the intervention, the mental state scores of the two groups were all reduced ($P<0.05$). The scores of the observation group were lower than those of the control group were after the intervention ($P<0.05$) (Table 1).

Table 1: Changes in the mental state of the two groups of patients before and after intervention

Variable	*Control group*		*Observation group*	
	Before inter-vention	After inter-vention	Before inter-vention	After inter-vention
Psychotic	1.59±0.22	1.43±0.29*	1.61±0.19	1.12±0.18*#
Obsessive-compulsive symptoms	2.31±0.32	2.05±0.25*	2.33±0.28	1.69±0.21*#
Somatic	1.80±0.32	1.68±0.25*	1.83±0.29	1.43±0.22*#
Paranoid	1.83±0.30	1.41±0.25*	1.85±0.29	1.22±0.18*#
Fear	1.51±0.26	1.28±0.19*	1.53±0.24	1.05±0.18*#
Hostility	2.21±0.26	1.68±0.20*	2.25±0.23	1.35±0.16*#
Anxiety	2.31±0.25	1.89±0.22*	2.33±0.21	1.49±0.15*#
Depression	2.21±0.30	1.84±0.21*	2.25±0.27	1.58±0.19*#

Note: Compared with before treatment, *P<0.05, Compared with the control group after treatment, #P<0.05.

Changes in emotional cognition scores of the two groups of patients before and after intervention

No significant difference was found in emotional cognition scores between the two groups before and after the intervention (P>0.05). After the intervention, the emotional distance error scores of the two groups decreased and increased. The scores in the observation group were higher than those in the control group were after the intervention (P<0.05). After the intervention, the emotional correct scores of the two groups decreased, and the scores of the observation group were lower than those of the control group were after the intervention (P<0.05), as shown in See Table 2.

Table 2: Changes in emotional cognition scores of patients in the two groups before and after intervention

Variable	*Control group*		*Observation group*	
	Before intervention	After intervention	Before intervention	After intervention
Anger correct scores	13.21±4.51	14.96±4.25*	13.28±4.46	17.56±5.21*#
Anger distance error scores	2.36±0.21	1.55±0.15*	2.42±0.19	0.54±0.06*#
Disgust correct scores	9.21±1.59	12.35±1.89*	9.25±1.51	14.65±2.11*#
Disgust distance error scores	0.86±0.11	0.71±0.09*	0.89±0.10	0.60±0.06*#
Sadness correct scores	11.32±2.65	14.65±2.87*	11.24±2.76	17.59±3.52*#
Sadness distance error scores	2.16±0.36	1.65±0.21*	2.21±0.38	0.52±0.15*#
Fear correct scores	5.26±1.62	8.63±1.95*	5.31±1.58	12.69±2.41*#
Fear distance error scores	1.65±0.33	1.12±0.21*	1.69±0.29	0.83±0.06*#
Shock correct scores	13.56±3.21	15.23±3.58*	13.68±3.18	17.69±3.22*#
Shock distance error scores	0.66±0.08	0.45±0.06*	0.69±0.09	0.12±0.03*#
Happiness correct scores	15.21±3.65	17.04±2.56*	15.02±3.52	18.62±4.02*#
Happiness distance error scores	0.62±0.07	0.42±0.04*	0.65±0.09	0.16±0.03*#
Total correct scores	68.54±8.72	81.69±9.23*	68.95±8.69	98.69±9.32*#
Total distance error scores	8.20±0.53	5.86±0.46*	8.43±0.62	2.73±0.21*#

Note: Compared with before treatment, *P<0.05, Compared with the control group after treatment, #P<0.05.

Comparison of cognitive function and speech function between the two groups before and after intervention

No significant difference was observed in the scores of cognitive function and speech function between the two groups before and after intervention (P>0.05). After the intervention, the scores of cognitive function and speech function in the two groups were all reduced (P<0.05). The scores of the observation group were lower than those of the control group were (P<0.05) (Table 3).

Table 3: Comparison of cognitive function and speech function between the two groups before and after intervention

Variable		*Cognitive function*	*Speech function*
Control group	Before intervention	4.32±0.31	6.58±0.29
	After intervention	6.21±0.43*	8.29±0.45*
Observation group	Before intervention	4.29±0.33	6.66±0.35
	After intervention	8.02±0.49*#	10.49±0.53*#

Note: Compared with before treatment, *P<0.05, Compared with the control group after treatment, #P<0.05

5) Comparison of BDAE scores before and after intervention between the two groups

No significant difference in BDAE scores between the two groups before and after intervention (P>0.05). After the intervention, the BDAE scores of both groups increased (P<0.05), and the scores of the observation group were higher than those of the control group were after the intervention (P<0.05), as shown in Table 4.

Table 4: Comparison of BDAE scores before and after intervention in the two groups

Variable		*Repetition*	*Write*	*Fluency*	*Reading comprehension*
Control group	Before intervention	11.48±2.36	27.15±3.66	14.21±3.08	16.97±2.11
	After intervention	15.32±3.09*	43.29±3.51*	19.65±3.22*	23.19±2.43*
Observation group	Before intervention	11.59±2.48	27.30±3.61	14.08±3.01	16.85±2.18
	After intervention	19.53±3.15*#	50.92±4.05*#	25.31±3.52*#	29.63±2.89*#

Note: Compared with before treatment, *P<0.05, Compared with the control group after treatment, #P<0.05.

Discussion

The results in Table 1 show that after the intervention, the mental state score of the observation group was lower than those of the control group were. This result indicates that the intervention strategies-based on positive psychology can effectively improve the mental state of patients with speech disabilities. This finding is similar to that reported by Zhao et al. (17). This may be because the intervention strategies-based on positive psychology is mainly based on the theory of positive psychology. The leading idea is to focus on the inner changes of patients and carry out targeted interventions in a dialectical way to stimulate the potential of patients more effectively. In addition, it aims to establish better hope and confidence in life to induce patients to cooperate with treatment actively and optimistically and improve health behavior and awareness (18). The inter-

vention plan-based on positive psychology in this study involves communication with family members and patients to gain a deep understanding of the patient's psychological thinking, obtain the cooperation and trust of the patient, analyze the main factors that cause speech impairment, and explain the prevention and solution measures. Instructing patients with speech disabilities to record or recall certain good things in life is of great benefit to building their confidence in fighting the disease, thereby alleviating the inner changes of the patients and inducing enthusiasm for verbal expression. Finally, the intervention plan aims to strengthen the communication between family members and patients through mutual encouragement and understanding and inspire patients to awaken their longing for the future, eliminate negative emotions such as anxiety and depression, and face life with an optimistic attitude.

The results in Table 2 show that after the intervention, the emotional distance error score of the observation group was higher than that of the control group, and the emotional correct score was significantly lower than that of the control group. This outcome indicates that the intervention program based on positive psychology can effectively promote the improvement of the emotional state of patients with speech disabilities. This finding is similar to that reported by Chen et al. (19). This may be because intervention strategies-based on positive psychology can stabilize patients' emotions, give them support and encouragement, better improve their cognitive functions, and enhance their emotional cognition (20). Most patients with speech disabilities are intervened through rehabilitation training, but most patients display cognitive impairment and speech impairment at the same time. Their orientation, thinking operations, cognitive impairment and ability of spatial structure are relatively poor, affecting their writing, reading and spontaneous speech to a certain extent. Simple speech rehabilitation can no longer solve the problem fundamentally (21). Therefore, the intervention plan in this study makes patients use words and hugs to thank the family members for their understanding, tolerance and care, promote communication, and gain strong psychological support from the family members. Intervention by combining intervention programs based on positive psychology, like music and video, can help patients with the good things they have encountered and helped in the past. Such combinations can alleviate the inner changes of patients, induce the enthusiasm for verbal expression, and improve the way of thinking and cognitive function as well as emotional cognition.

The results in Tables 3 and 4 show that after the intervention, the BDAE score of the observation group was higher than that of the control group, and the cognitive function and speech function scores were significantly lower than that of the control group. This outcome indicates that the intervention strategies-based on positive psychology can effectively promote the cognition of patients with speech disabilities. Improvement in function and language function is also reported by McCarthy et al. (22). This may be because the intervention strategies-based on positive psychology centers on the psychological changes of patients, satisfying individual personality traits, positive social environment, and positive emotional experience; formulating targeted intervention programs; giving patients support, comfort, and encouragement; and achieving other benefits. Cooperation and trust can enhance the confidence to overcome the disease; improve the ability to retell, write, reading comprehension and fluency; and improve cognitive function and language function (23). The intervention plan-based on positive psychology in this study can also allow patients to fully understand themselves by deeply understanding the patient's psychological thinking, analyzing the main factors that cause speech impairment, and explaining prevention and solution measures. When necessary, psychological counseling and lectures can be used to mobilize patients' self-awareness, assist them in finding their inner strengths and energy, improve their cognitive ability and confidence in speech training, improve cooperation and compliance, and promote the recovery of their speech function (24). The BDAE scale is a commonly used

evaluation form for clinical evaluation of speech dysfunction. It includes speech function and non-verbal function examination. It can conduct qualitative and quantitative analysis of the patient's speech communication level at the same time and clarify the severity and category of the patient's speech dysfunction. It has high credibility. The psychological intervention program in this study can improve patient's retelling, writing, and reading comprehension abilities.

However, for patients with speech disabilities of different gender and age, this study is still lack of differentiated psychological intervention program design. In future research, the BDAE scale can be further used to evaluate the speech dysfunction of patients with different genders and ages, and propose differentiated intervention programs.

Conclusion

The intervention program based on positive psychology focuses on improving the mental health of patients with speech disabilities, improving their positive emotional experience and health level. It is helpful to improve the mental state of patients and induces them to carry out in-depth reflection. With a high level of self-awareness, patients can enhance their emotional cognition, cognitive function, and speech function. The intervention strategies-based on positive psychology can fully stimulate the enthusiasm of verbal expression.

Journalism Ethics considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of Interest

The authors declare that there is no conflict of interests.

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