

Study on the Application Effects of the Teach-Back Method Combined with WeChat Tutorials on Chronic Disease Self-Management in Patients with Chronic Obstructive Pulmonary Disease (COPD)

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Abstract: *Objective:* To study the application effects of teach-back method combined with WeChat education in patients with chronic obstructive pulmonary disease (COPD). *Methods:* Convenience sampling was used to select 103 patients with COPD hospitalized in the department of respiratory medicine of a tertiary-level hospital from March to June 2021 as study subjects. Randomized grouping was carried out using the random number table method. The routine care was given in the control group, and the teach-back method combined with WeChat tutorials on the basis of routine care was applied in the intervention group. In the follow-up three months after discharge, the changes in pulmonary function, self-care ability, and quality of life of patients in the two groups were observed and compared. *Results:* After the intervention, the pulmonary function indexes of both groups improved significantly, and the improvement effect was more significant in the intervention group ($P < 0.05$); after the intervention, the self-care ability scores of the patients in the intervention group were significantly higher than those of the control group ($P < 0.05$); the quality-of-life scores of the patients in the two groups decreased at 3 months after discharge, and the scores of the patients in the intervention group were significantly lower than those of the patients in the control group ($P < 0.05$). *Conclusion:* The teach-back method combined with WeChat education can effectively improve the pulmonary function, self-care ability, and quality of life of patients with COPD.

Keywords: Teach-back method; Chronic obstructive pulmonary disease; Self-care capacity; Quality of life

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1. Introduction

Teach-back method is also known as “primary teacher” or “after teaching,” that is, after health education is given to patients, the patients express their understanding of the educational information again, and the educator will explain the content of the patients’ misinterpretation of the information and provide repeated instructions until the patients fully understand and master it^[1,2]. WeChat, as a modern application, can push information and

communicate with each other at any time through video, voice, pictures, and other means of communication, thus effectively improving the efficiency and quality of nursing services in extended nursing services^[3]. The mortality rate of chronic obstructive pulmonary disease (COPD) is currently the fourth highest in the world^[4,5], which causes a serious burden on the global economy and society. Scientific and appropriate health education can delay the progression decline of lung function in patients with stable COPD, alleviate dyspnea symptoms, improve patients' daily life and self-care ability^[6], and improve quality of life. In this study, the teach-back method combined with WeChat tutoring was applied to the health education of patients with chronic obstructive pulmonary disease, and certain effects were achieved.

2. Study subjects and methods

2.1. Study subjects

Convenience sampling was used to select 103 patients with chronic obstructive pulmonary disease who were hospitalized in the Department of Respiratory Medicine of a tertiary-level hospital from March to June 2021 as the study subjects. Ethical requirements were met and informed consent was signed. All patients met the diagnostic criteria in the Guidelines for the Diagnosis and Treatment of Chronic Obstructive Pulmonary Disease, and experienced symptoms such as cough, shortness of breath, and recurrent sputum at the time of admission, and these symptoms lasted for 3 months or more each year. All patients were excluded from severe cardiovascular disease, respiratory failure, tuberculosis, and other diseases, and had no mental or cognitive dysfunction. Inclusion criteria were age ≥ 16 years; conscious and able to read or express themselves verbally with no communication barriers; those who cooperated with this study. Exclusion criteria were those with severe cardiovascular disease, combined with other lung diseases; those with combined malignant tumors. The selection of patients who meet the requirements was facilitated based on the inclusion and exclusion criteria, the numbering of patients was done according to the order of medical treatment, the random number table method was used for randomized grouping, and the health education nursing-related interventions were implemented. The age of the study subjects in the intervention group ranged from 62 to 81 years, with an average of 72.19 ± 11.24 years; the age of the study subjects in the control group ranged from 59 to 81 years, with an average of 73.08 ± 12.81 years. The differences between the two groups of study subjects in terms of gender, age, occupation, education level, disease severity, and treatment were not statistically significant ($P > 0.05$) and were comparable. During the intervention process, one case of the study subjects in the intervention group was transferred to other department, and there were 50 cases of study subjects in the intervention group and 52 cases in the control group.

2.2. Methods

2.2.1. Establishment of departmental health education group

The members of this group consist of one chief physician expert of the department, one head nurse of the ward, one master's degree nurse in charge, two senior nurses, all of them have rich experience in nursing care for chronic obstructive pulmonary disease; relatively rich experience in scientific research; and all of them are involved in the whole research stage of this topic. A respiratory medicine expert is mainly responsible for the preparation of disease health education and precautions, and the systematic training and assessment of the group members, in order to ensure that everyone passes the examination. A master's degree nurse supervisor was responsible for the questionnaire development and revision process, data collection, and data analysis.

2.2.2. Intervention methods in intervention group

The intervention group adopted the method of teaching-back and health education in the micro-blogging group.

For the health education content (including knowledge guidance of chronic obstructive pulmonary disease, lung function exercise (pursed-lip breathing, abdominal breathing, balloon blowing), nutrition and diet, aerobic exercise, daily life care, etc.), the research team members carefully assessed the patients' and their families' literacy, communication, and understanding, and prepared easy-to-understand and individualized education content to be shown in the form of video, pictures, and text, respectively. Lastly, a list of targeted feedback teaching question phrases was developed, as shown in **Table 1**.

Table 1. Feedback teaching question phrases

Phases	Questions
During the first education	(1) Health education “To make sure that you have understood what I have just said, can you repeat it in your own words (according to the specific content of the education)?” “Why is it important to manage chronic diseases?” “Why do we need chronic disease management?” “You can do it yourself.” “Why must you master these contents, if the patient in the next bed asks you about chronic disease management knowledge, how do you talk to them?” (2) Health tips “To make sure that I have demonstrated method clearly, can you talk me through it now?” Ask family members to demonstrate
During re-education	Repeat the question again for specific content by changing the expression for the patient's mastery of the content.
At the end of education	“Do you have any other questions?” or “Are you still unclear?”

The research team rationalized and rearranged the content and method of education to the patient's level of understanding. The intervention time was one-on-one guidance in the hospital to ensure that each patient is followed-up at least three times during hospitalization, with an average of 20–30 minutes each time. Pre-discharge communication was done to understand the family situation; post-discharge telephone guidance was done once a week, with an average of at least 20 minutes each time; WeChat group was used at any time to exchange guidance. The specific implementation steps include four aspects.

- (1) Delivering information: The educator demonstrates the educational content to the patient in person and one-on-one, and pays attention to the precautions and the specific operation method according to the patient's different literacy level using different methods of targeted and detailed explanation.
- (2) Repeating the information: The educator asks targeted questions based on the educational content delivered by the educator, and guides the patient to repeat or demonstrate it in his/her own words. **Table 1** shows the specific questioning method, the whole process should be relaxed and pleasant, without causing psychological pressure to the patient.
- (3) Evaluating the effect: The researcher uses the Plan-Do-Check-Act (PDCA) model to evaluate the content of the patient's recapitulation, subsequently examining the patient's understanding of the content and proficiency, and providing individualized help. If the patient's retelling is not detailed or inaccurate, a new round of intervention guidance needs to be carried out starting from the delivery of the content. If the understanding is accurate and comprehensive, and the demonstration is in place, this round of education is completed. If the patient still does not understand after several rounds, the researcher should look to applying new educational methods, and can utilize other tools such as well-filmed videos (abdominal breathing, pursed-lip breathing), illustrated schematics, etc., to provide guidance.

- (4) Open-ended questioning at the end: When the patient understands and grasps the educational content, open-ended questioning can be used in the study to evaluate the patient's information comprehension level again ^[7]. When the patients and their families can answer the researchers' questions comprehensively or carry out self-care accurately, it indicates that they have completely mastered the content of the health education, and the current round of education ends.

After the patients were discharged from the hospital, the continuity health education based on WeChat group including pictures, videos, texts, and scientific knowledge were regularly sent to the WeChat group every week.

- (1) Disease knowledge: Etiology of COPD, clinical manifestations, treatment, predisposing factors, complications, etc. ^[8]
- (2) Lung function exercise: Pursed-lip breathing, abdominal breathing, total body respiratory gymnastics, the use of respiratory function exercisers, the method of effective coughing, etc.
- (3) Nutrition and diet: Eating more fresh fruits and vegetables, cereals, fish, and other easy-to-digest high-protein, high-vitamin foods, avoiding high-calorie diets, eating less and more meals
- (4) Aerobic exercise: Patients with good activity endurance and lung function can take slow walks, Tai Chi, Baduanjin, and other exercise methods, upper limb exercise or bedside lower limb exercise, with the intensity of the exercise and the activity time set according to the patient's body
- (5) Daily self-management: Strengthening exercise, changing smoking and other bad habits, avoiding respiratory infections, and using home oxygen therapy.

2.2.3. Intervention methods in control group

The control group was given routine nursing measures of explaining COPD precautions in the department, and including the printing of "chronic management of chronic obstructive pulmonary disease" for patients and their families to read at any time and review the preview content. The health education content generated cell phone application QR code was posted in the health education bulletin boards of nurses' station, in order to guide the patients and their families to download the education content, and they can consult the staff at any time if they do not understand.

2.3. Effect evaluation

The effects were evaluated as follows.

- (1) The forced expiratory volume in 1st second and the ratio of forced expiratory volume in 1st second of the two groups of patients at the time of admission and before discharge were observed and compared.
- (2) Self-care ability measurement scale using Exercise of Self-Care Agency (ESCA) ^[9]: This includes four dimensions of self-responsibility, health knowledge level, self-care as a concept, self-care skills, with a total of 43 entries, using a 5-point scale rating method. The higher the score, the higher the self-care ability.
- (3) Quality-of-life evaluation criteria: The Chinese version of the Chronic Obstructive Pulmonary Disease Assessment Test (CAT) ^[10,11] was used. There were 8 entries, assessed in 8 aspects: cough level, sputum volume, chest tightness, shortness of breath when going upstairs, tolerance of daily activities, tolerance of going out, sleep and energy, and higher scores represented poorer quality of life of patients.

2.4. Statistical analysis

SPSS18.0 software was used for statistical processing, data were expressed as mean \pm standard deviation (SD), χ^2 test was used for comparison of count data, *t* test was used for comparison of measurement data, and the difference was considered statistically significant with $P < 0.05$.

3. Results

3.1. Comparison of pulmonary function changes between the two groups of patients

The results showed that at the time of admission, there was no statistically significant difference between the pulmonary function indexes of the two groups of patients ($P > 0.05$). After nursing intervention, the pulmonary function indexes of both groups of patients at the time of discharge were significantly improved, and the improvement was more significant in the intervention group ($P < 0.05$). The results are shown in **Table 2**.

Table 2. Comparison of pulmonary function changes in the two groups (points)

Group	Number of cases	Forced expiratory volume in 1st second (L)		Ratio of forced expiratory volume in 1st second (%)	
		At admission	At discharge	At admission	At discharge
Intervention group	50	1.53 ± 0.34	2.45 ± 0.32	54.21 ± 13.26	77.43 ± 9.12
Control group	52	1.50 ± 0.36	1.67 ± 0.23	53.52 ± 12.08	65.77 ± 9.13
<i>t</i>		0.37	13.56	0.08	5.84
<i>P</i>		> 0.05	< 0.05	> 0.05	< 0.05

3.2. Comparison of patients' self-care ability in the two groups

The results showed that at the time of admission, there was no statistically significant difference between the self-care ability scores of patients in the two groups ($P > 0.05$). After nursing intervention, there was no significant change in the self-care ability scores of the patients in the control group, and the self-care ability scores of the patients in the intervention group 3 months after discharge were significantly higher than those of the control group and the pre-intervention period ($P < 0.05$). The results are presented in **Table 3**.

Table 3. Comparison of self-care ability scores between the two groups (points)

Group	Number of cases	Pre-intervention	Post-intervention
Intervention group	50	57.24 ± 2.98	81.65 ± 5.28
Control group	52	58.05 ± 3.09	57.65 ± 4.75
<i>t</i>		1.332	16.625
<i>P</i>		0.212	0.000

3.3. Comparison of quality-of-life scores between the two groups of patients

The results showed that at the time of admission, there was no statistically significant difference between the CAT scores of the two groups of patients ($P > 0.05$). After nursing intervention, the CAT scores of patients in both groups were significantly reduced at discharge and 3 months after discharge, and the CAT scores of patients in the intervention group were significantly lower than those of the control group in the period of at discharge and 3 months after discharge ($P < 0.05$), as shown in **Table 4**.

Table 4. Comparison of quality-of-life scores between the two groups (points)

Group	Number of cases	At admission	At discharge	3 months after discharge
Intervention group	50	26.71 ± 7.88	16.55 ± 4.52	15.56 ± 4.21
Control group	52	26.69 ± 7.85	22.32 ± 4.45	20.23 ± 4.15
<i>t</i>		1.32	6.68	5.81
<i>P</i>		> 0.05	< 0.05	< 0.05

4. Discussion

Chronic Obstructive Pulmonary Disease (COPD) is a common disease of the respiratory system, especially among the elderly, which is prone to recurrent attacks. At present, the nursing care for patients with COPD is relatively single, only with medication and examination as the main nursing content, which lacks specificity and systematicity, and easily leads to recurrent attacks and decline of lung function. Further progression of COPD will cause the deterioration of the patient's lung function, the decline of the body's immunity, coupled with poor resistance and self-care ability^[12], and in severe cases, it even leads to prolonged bed rest and loss of work ability, which seriously affects the patient's quality of life. Therefore, it is necessary to adopt the teach-back method of health education intervention management.

The traditional health education model is a single form of one-way information transfer mode of indoctrination, and there is no timely evaluation and feedback as to whether the patient really understands and grasps the information transferred^[13]. On the other hand, the teach-back method is a face-to-face and one-on-one two-way information transfer process that is ready to solve the doubts. If the recipients do not have a good understanding of the content of the transmission, the researcher will repeat the content or change a way to ensure that they understand and master the content, this process allows the recipients to restate (in their own language) to express their understanding of what they have learned. The process of teaching not only increased the participants' understanding of the disease, their self-confidence in overcoming the disease, and their trust in medical personnel, but also made them more actively involved in the self-management of the disease. At present, this method has been widely applied to patients' health education in foreign countries and achieved better results^[14,15]. In terms of improving patient compliance, in the intervention study of type 2 diabetes mellitus patients with low literacy carried out by Negarandeh *et al.*^[16], the method of teaching-back can significantly improve the patient's knowledge of the disease, and the patient's adherence to medication and diet. In domestic research, Huang *et al.*^[17] studied 50 cases of esophageal cancer open thoracic surgery patients' respiratory function exercise compliance using teach-back method, and achieved significant results. Li *et al.*^[18] also achieved great results when they applied the teach-back method to the study of diabetes-related health literacy of elderly people in nursing institutions. In this study, the use of the teach-back method combined with the application of WeChat in the chronic disease management of patients with chronic obstructive pulmonary disease achieved good results.

4.1. Teach-back method in combination with WeChat education can improve self-care of patients with COPD

Self-care refers to self-care behaviors adopted by individuals to ensure survival, maintain, and promote health and peace of mind. Effective self-care can delay the progressive decline of lung function and control the disease progression in patients with COPD^[5]. Recurrent episodes and progressive aggravation of chronic obstructive pulmonary disease can cause physiological and psychological pressure in patients, and they are prone to negative uncooperative emotions, thereby seriously affecting the patients' ability to self-care. The traditional health education is only a one-sided indoctrination of the patient, which did not pay attention to the patient's degree of understanding and emotional changes, the patient is faced with a long-term chronic disease, increased mental stress, psychological vulnerability, and so on, there is also the absence of systematic self-management methods to help patients to establish the courage and confidence to live, thus patients are under greater pressure both physically and psychologically. Caplin *et al.*^[19] proposed the four steps of the teach-back method: explanation, assessment, clarification, and comprehension, which increases the awareness of self-care and improves self-care ability by allowing patients to repeat or demonstrate the content of the health education^[20]. The results of this study showed that after 3 months of intervention, the

self-care ability scores of the patients in the intervention group were higher than those of the control group ($P < 0.05$), and the patients in the intervention group mastered the professional knowledge of self-care for COPD, increased their awareness of self-care, and improved their self-care skills.

4.2. Teach-back method combined with WeChat education can improve the quality of life of COPD patients

The results of this study showed that the quality of life of patients with chronic obstructive pulmonary disease was significantly improved after applying the teach-back method of education. The previous education mode tends to let patients fill in the passive acceptance of information, in which patients were instilled with the information of the mission and the degree of mastery is not emphasized, while the teach-back method allows patients to actively participate in the reception, exchange, and practice of information. There are more opportunities for communication and mutual understanding between the medical staff and the patients, and more available answers to problems encountered in their lives. Regular assessment and supervision by the medical staff reduce the inertia of the patients and make them more cooperative in their daily self-management, and the level of patients' mastery of knowledge about the disease and its practical application naturally improves^[21], and the constant encouragement of the medical staff helps the patients to build their confidence in managing the disease. In the process of communication with patients' family members, the compliance of family members was also improved, and the assistance of family members further contributed to the improvement of patients' compliance. The improvement of compliance indicates that the educated patients gained better self-management ability in chronic disease management, and positive motivation in participating in self-care. The patients' quality of life is effectively improved, the nurse-patient relationship is harmonized, the patients' satisfaction is enhanced, and the patients' psychological health and sense of well-being are also effectively improved.

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Disclosure statement

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