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Analysis of Obstructive Factors for Medical Staff to Implement Respiratory Rehabilitation Evidence Based on the Theoretical Domain Framework

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***A*bstract:** *Objective:* To explore the obstructive factors in the behavior of medical staff during the implementation of respiratory rehabilitation process, and to provide a basis for the rehabilitation management intervention of COPD. *Methods:* A descriptive nature research method was adopted. An interview outline was formulated based on the theoretical domain framework. From October to December 2024, 15 medical staff from the respiratory department of a tertiary hospital in Shaanxi Province were selected for semi-structured interviews. The interview data were analyzed using the Colaizzi 7-step analysis method. *Result:* The analysis of this study found that the obstructive factors for medical staff to implement respiratory rehabilitation include five theoretical domains. The problems are respectively the lack of knowledge about respiratory rehabilitation and insufficient training intensity, the insufficient self-recognition of implementing respiratory rehabilitation, the low awareness rate of patients and the low cooperation degree, the insufficient provision of instruments and facilities, the lack of rehabilitation training venues and respiratory rehabilitation clinics, and the lack of scientific and standardized respiratory rehabilitation management processes. *Conclusion:* There are many obstructive factors affecting the implementation of respiratory rehabilitation by medical staff. Clinical managers should take corresponding measures, continuously improve the rehabilitation management strategies for COPD, and promote the clinical application of the best evidence for respiratory rehabilitation.

Keywords: Apply evidence; COPD; Obstructive factors; Qualitative research; Respiratory rehabilitation; Theoretical domain framework

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1. Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable, and treatable chronic airway disease characterized by persistent airflow limitation. Its symptoms primarily include coughing, expectorating sputum, dyspnea, and fatigue, among others [1]. Respiratory rehabilitation therapy, as a crucial component of chronic respiratory disease management, is currently considered one of the most effective non-pharmacological treatment options for COPD patients [2,3]. Respiratory rehabilitation encompasses pulmonary function assessment, physical fitness assessment, respiratory training, exercise training, nutritional intervention, and psychosocial support. Studies have found that it can effectively alleviate symptoms of dyspnea and fatigue in patients, improve health-related quality of life and exercise tolerance, and enhance patients' perceived control over their disease [4-6] . Currently, scholars both domestically and internationally have published numerous evidence summaries on respiratory rehabilitation for COPD patients [7-11]. However, due to factors such as a lack of evidence-based concepts, the complexity of clinical work, and low patient awareness, there is a significant gap between evidence and clinical practice [12,13]. Therefore, it is particularly important to comprehensively analyze the practical barriers encountered by healthcare professionals during the clinical implementation of respiratory rehabilitation and explore ways to overcome these barriers.

The Theoretical Domains Framework (TDF), developed in 2005, incorporates 128 theoretical constructs from 33 behavior change theories, ultimately forming 12 theoretical domains [14,15]. It covers factors at social, organizational, and individual levels. As an interview framework or coding guide, it helps researchers comprehensively analyze the influencing factors (barriers and facilitators) of behavior change, demonstrating both practicality and scientific rigor.

This study, based on the TDF, employs a qualitative research method to analyze and explore the barriers faced by healthcare professionals in implementing respiratory rehabilitation behaviors, aiming to promote the effective application of evidence in clinical settings, optimize evidence-based respiratory rehabilitation practices, and thereby improve patients' pulmonary rehabilitation outcomes.

2. Subjects and methods

2.1. Subjects

October to December 2024, a purposive sampling method was used to select healthcare professionals from the respiratory department of a tertiary-level hospital in Shaanxi Province for interviews.

The inclusion criteria are as follows:

(1) Having worked in the specialized department for 5 years or more;

(2) Being familiar with the tasks involved in respiratory rehabilitation;

(3) Providing informed consent and voluntarily participating in this study.

The exclusion criteria are as follows:

(1) Medical staff on leave exceeding six months;

(2) Medical staff undergoing further education or interns.

The sample size adhered to the principle of information saturation, ultimately involving interviews with 15 medical staff members. General information about the participants is detailed in **Table 1**.

Table 1. General information of participants (n = 15)

No.	Gender	Age (years)	Highest Degree	Professional Title	Years of Specialist Work
N1	Female	60	Bachelor's	Chief Physician	36
N2	Male	58	Master's	Chief Physician	29
N3	Male	42	Doctorate	Associate Chief Physician	14
N4	Female	40	Doctorate	Associate Chief Physician	11
N5	Female	34	Doctorate	Resident Physician	5
N6	Female	35	Doctorate	Resident Physician	7
N7	Female	49	Bachelor's	Associate Chief Nurse	26
N8	Female	45	Bachelor's	Senior Nurse	27
N9	Female	40	Bachelor's	Senior Nurse	20
N10	Female	34	Master's	Senior Nurse	9
N11	Female	35	Bachelor's	Senior Nurse	15
N12	Female	31	Bachelor's	Senior Nurse	10
N13	Male	27	Bachelor's	Nurse	5
N14	Female	28	Bachelor's	Nurse	5
N15	Female	28	Bachelor's	Nurse	6

2.2. Research methodology

2.2.1. Development of the interview outline

Based on a literature review, team members initially formulated an interview outline according to the research objectives and the TDF. Subsequently, they conducted pre-interviews with one doctor and one nurse, respectively, and finalized the interview outline after revising and adjusting certain sections. Details are provided in **Table 2**.

Table 2. Interview outline

Theoretical domain framework domain	Interview outline
Knowledge	Have you read and/or are you familiar with the guidelines for respiratory rehabilitation in COPD? If patients were to receive respiratory rehabilitation according to these guidelines, what aspects would be different from current clinical practices?
Skills	What difficulties do you anticipate in the clinical implementation of respiratory rehabilitation guidelines? What specific skills and professional training do you believe are necessary?
Social/professional role & identity	Do you see implementing these guidelines as compatible or in conflict with current clinical workflows? If there is conflict, please elaborate. Which clinical staff roles need to be involved for successful implementation?
Beliefs about capabilities (self-efficacy)	How confident are you in your ability to implement respiratory rehabilitation clinically?
Optimism (outcome expectations)	From your perspective, what are the potential benefits or drawbacks of implementing these guidelines for patients, the department, and healthcare staff?
Intentions (goals)	To what extent do you intend to implement these guidelines in clinical practice? What facilitating factors or barriers would encourage or discourage you from executing them?

Table 2 (Continued)

Theoretical domain framework domain	Interview outline
Memory, attention & decision processes	Under what specific circumstances do you think implementing the guidelines would be difficult? What are these difficulties? Please provide examples.
Environmental context & resources	What resources or equipment does your department currently provide for respiratory rehabilitation? What additional support do you think is needed?
Social influences	Which individuals or institutional norms within the department would influence your implementation of the guidelines? Whose opinions would encourage you, and whose would discourage you?
Emotion	How do you think implementing these guidelines would affect you emotionally? What would the psychological experience be like, and why?
Beliefs about consequences (norms)	What factors at the personal or departmental level would encourage or discourage you from implementing the guidelines in clinical practice?
Behavioral regulation	To promote the implementation of the guidelines, what aspects of the department do you think need to change (e.g., staffing, time, equipment)? Would you develop personalized respiratory rehabilitation training plans for patients?

2.2.2. Data collection, organization, and analysis

Data were collected through one-on-one, face-to-face semi-structured interviews. The two interviewers were nursing postgraduates who had undergone training in qualitative research methodology and possessed excellent communication skills. Prior to the formal interviews, the researchers contacted the participants, explaining the purpose and significance of the study. Upon obtaining consent, interviews were scheduled during the participants' free time in the department's demonstration classroom.

The interviews were conducted in a quiet environment and recorded. During the conversations, attention was paid to observing and recording the participants' facial expressions, tone changes, and body language. Each interview lasted between 30 and 60 minutes. Within 24 hours after the interviews, the audio recordings were transcribed into text, which was then sent back to each participant for verification, supplementation, or correction.

The two interviewers independently analyzed the data using Colaizzi's 7-step analysis method, categorizing specific themes and codes according to the relevant domains of the TDF. Finally, the text was further summarized and generalized. In cases of disagreement, team members discussed and reached a decision.

2.2.3. Quality control

Quality control was performed as outlined:

(1) All members of the research team hold a bachelor's degree or higher and have over ten years of experience working in respiratory departments, possessing extensive clinical experience in managing patients with COPD;

(2) The study adheres to the principle of maximizing differences, with interviewees varying in terms of work experience, educational background, and professional titles to ensure the representativeness of the data;

(3) During the interviews, the interviewers maintained neutrality, primarily focusing on listening, while following the interview outline and encouraging interviewees to express themselves actively;

(4) In the data analysis phase, the interviewers repeatedly read and deeply contemplated the textual data, prohibiting the inclusion of personal viewpoints.

3. Results

This study ultimately interviewed 15 participants, including 6 respiratory physicians and 9 respiratory nurses. Based on five domains (knowledge, social/professional roles and identity, motivation and goals, environmental factors, behavioral norms) out of the 12 domains in the TDF, the study analyzed the barriers faced by healthcare professionals in implementing respiratory rehabilitation in clinical settings.

3.1. Knowledge domain: Lack of respiratory rehabilitation knowledge and insufficient training

Healthcare professionals demonstrated inadequate familiarity with the summarized evidence-based practices of respiratory rehabilitation and lacked clinical experience. They were unclear about the specific operational steps for fitness assessment, respiratory muscle strength assessment, aerobic exercise, resistance training, and airway clearance techniques.

N6: "I have a basic understanding of respiratory rehabilitation knowledge, but I don't conduct many exercise training programs for patients, and the training methods are relatively limited." Two-thirds of the interviewees were unclear about the content of respiratory rehabilitation assessments for COPD patients and did not understand the purpose and significance of these assessments.

Over half of the interviewees simply interpreted respiratory rehabilitation as pursed-lip breathing and diaphragmatic breathing.

N10: "I often come across airway clearance techniques in the literature I read. I have a general understanding of what it entails, but when it comes to actually guiding patients, I'm at a loss and don't know which method to choose."

N13 and N15 indicated that they were only aware of the existence of airway clearance techniques but were unfamiliar with their principles and contents.

N11 and N12 said, "Monthly departmental learning and training sessions primarily focus on the treatment and nursing of respiratory diseases, with limited training on respiratory rehabilitation."

3.2. Social/professional roles and identity: Insufficient self-recognition among healthcare professionals in implementing respiratory rehabilitation

Due to limitations in medical resources, most respiratory departments in domestic hospitals currently lack specialized rehabilitation therapists to provide respiratory rehabilitation guidance to patients. Consequently, healthcare professionals face issues such as ambiguous professional boundaries and a lack of confidence when implementing respiratory rehabilitation guidelines in clinical practice.

N5 stated, "Respiratory rehabilitation should ideally be conducted by professionally trained rehabilitation therapists. During health education sessions with patients, we only teach them some basic breathing exercises, making it difficult to provide in-depth guidance."

N10 expressed that she always felt hesitant when conducting breathing exercises with patients.

N11 said, "When performing pulmonary function assessments and respiratory muscle strength evaluations, I worry that incorrect guidance methods may lead to inaccurate results."

The three nurses with lower seniority all believed that their current professional expertise was limited and that they were unable to apply guideline evidence to provide professional rehabilitation training guidance to patients in clinical settings.

3.3. Motivation and goals: Low patient awareness and poor compliance in respiratory rehabilitation hinder the implementation of best evidence

During the process of adhering to respiratory rehabilitation evidence-based practices, healthcare professionals must tailor specific exercise prescriptions according to patients' wishes and needs. However, the majority of COPD patients are elderly, with low awareness and poor compliance regarding respiratory rehabilitation, which to some extent hinders the implementation of respiratory rehabilitation.

N7 stated, "Compared to respiratory rehabilitation, patients rely more on the therapeutic effects of medications. Whenever I visit the ward, patients most frequently ask about the functions of the medications. When I conduct health education and disseminate knowledge about respiratory rehabilitation, they only listen perfunctorily."

N10 expressed, "Respiratory rehabilitation requires long-term commitment.

Since most patients do not see immediate results, they become skeptical about respiratory rehabilitation, let alone persist with it."

3.4. Environmental factors: Inadequate instrumentation and facilities, as well as a lack of rehabilitation training venues and respiratory rehabilitation clinics

Environmental factors such as incomplete rehabilitation equipment, a lack of rehabilitation training venues, and the absence of respiratory rehabilitation clinics hinder the translation and application of evidence-based respiratory rehabilitation practices by healthcare professionals.

N2 stated, "Respiratory rehabilitation training encompasses a wide range of content, but due to insufficient instrumentation, currently, our department can only conduct inspiratory muscle training and airway clearance. Techniques such as inhaler guidance, diaphragmatic nerve electrical stimulation therapy, and cardiopulmonary exercise testing cannot yet be implemented."

N8 remarked, "Ideally, patients should be provided with a well-equipped, quiet, comfortable, and spacious rehabilitation training venue for a comprehensive physical fitness assessment and professional rehabilitation training guidance. However, due to departmental constraints, we can only conduct these in the ward, which indirectly affects the accuracy of assessment results and the adherence to rehabilitation training."

N3 and N4 expressed the hope for establishing a specialized respiratory rehabilitation clinic to provide convenient respiratory rehabilitation training guidance and continuous home follow-up management for patients with chronic respiratory diseases.

3.5. Behavioral norms: Lack of scientific and standardized respiratory rehabilitation management processes

Establishing a complete and scientific respiratory rehabilitation management flowchart can clearly define the responsibilities and roles of healthcare professionals and implement regular quality control supervision, effectively enhancing the level of respiratory rehabilitation services. However, the department has not yet established a standardized respiratory rehabilitation management process based on the best available evidence.

N9 said, "For COPD patients, there should be a unified operational standard based on the best evidence regarding what training can be conducted during the acute exacerbation phase, what training can be done during the stable phase, as well as the duration and intensity of exercise."

N3 stated, "Quality control management should be implemented during pulmonary function assessment and

physical fitness assessment, and managers should regularly supervise the rehabilitation training guidance process to enhance the professional skills of healthcare professionals in respiratory rehabilitation."

4. Discussion

4.1. Strengthen respiratory rehabilitation knowledge reserves and create a favorable learning atmosphere

This study found that most healthcare professionals possess weak knowledge of respiratory rehabilitation and have a low level of understanding of the evidence-based practices in respiratory rehabilitation. They also lack confidence and communication skills when guiding patients through rehabilitation training.

These findings are consistent with those reported by Emma et al. and represent the primary obstacles to the implementation and promotion of respiratory rehabilitation services [16]. Domestic scholars, such as Sun et al. conducted a survey of 112 community nurses in Beijing and found that nurses had poor mastery of the concepts and specific operations of COPD respiratory rehabilitation nursing and expressed a desire to participate in respiratory rehabilitation-related training [17]. Additionally, research by Abdulelah et al. pointed out that the lack of well-trained respiratory therapists is the most common reason affecting patients' access to respiratory rehabilitation referral services [18] .

In response, the following measures are recommended:

(1) Strengthen the cultivation of professionals in respiratory rehabilitation by selecting key medical staff from departments for external advanced studies;

(2) Incorporate knowledge of evidence-based practices in respiratory rehabilitation into daily departmental training and learning, develop systematic and detailed training plans, and conduct practical exercises in respiratory rehabilitation to create a favorable learning environment;

(3) Teaching team leaders should strengthen supervision and guidance, regularly conduct quality assessments of medical staff to enhance the effectiveness of respiratory rehabilitation training.

4.2. Encourage the participation of patients' family members

This study reveals that most patients have limited knowledge and poor comprehension of respiratory rehabilitation, making it challenging to persuade them of its importance. They also struggle to adhere to training during home-based rehabilitation, which, to some extent, undermines the confidence of healthcare professionals and hinders the implementation of evidence-based practices in respiratory rehabilitation.

The reasons for this include:

(1) Disruption of patients' previous treatment habits, compounded by smoking status and time constraints, leading to reluctance to continue rehabilitation training;

(2) Limited social support from family and friends;

(3) Psychological factors such as anxiety and depression, which affect self-management abilities.

Research has found that support from family members influences patient compliance [19]. Xie et al. developed a family-involved respiratory rehabilitation program for COPD patients based on evidence-based practices [20]. The results showed that a family-centered empowerment model for intervening with patients and their families effectively promoted the implementation of respiratory rehabilitation plans.

Therefore, encouraging the participation of patients' family members can enhance patients' awareness of

respiratory rehabilitation skills, provide them with psychological and social support, thereby improving their adherence to rehabilitation and facilitating the smooth implementation of evidence-based respiratory rehabilitation practices.

4.3. Improving hardware facilities and establishing scientific and standardized respiratory rehabilitation management processes

This study found that insufficient investment in hardware facilities such as respiratory rehabilitation assessment tools, rehabilitation training equipment, and environmental factors, as well as the lack of specific and clear operational standards, also hindered the clinical translation and application of evidence-based respiratory rehabilitation practices. In response, departmental management can coordinate internal resources to improve hardware facilities and equipment, such as the 6-minute walk test system, cardiopulmonary exercise testing equipment, precise diaphragm assessment and training systems, and external electrical stimulation technology.

Furthermore, respiratory rehabilitation clinics should be established, and remote medical services should be expanded in the future. Research by Shih-Ying et al. has shown that a web-based exercise management system can benefit COPD patients in terms of respiratory rehabilitation and continuous tracking [21]. Additionally, departments should develop respiratory rehabilitation management processes that align with their specific circumstances based on evidence-based respiratory rehabilitation practices, clarifying the responsibilities and divisions of labor among healthcare professionals, standardizing specific operational requirements for patients' aerobic exercise, resistance training, airway clearance, etc., and ensuring the sustained and long-term effective implementation of the best evidence.

5. Conclusion

Based on the TDF, this study analyzed and identified five barriers affecting the clinical implementation of evidence-based respiratory rehabilitation practices by healthcare professionals and proposed three recommendations to provide references for the standardized clinical management of respiratory rehabilitation. The limitation of this study lies in the fact that the respondents were from the same department and failed to reflect the behavioral and psychological changes of healthcare professionals during the clinical implementation of respiratory rehabilitation evidence. Future longitudinal qualitative research can be conducted to continuously optimize the clinical application of evidence.

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