Review Article

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만성 폐질환에서의 자기 관리, 환자 교육 및 다학제적 치료: 폐 재활을 위한 통합적 접근

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Self-management, Patient Education and Multidisciplinary Care in Chronic Pulmonary Disease: An Integrated Approach to Pulmonary Rehabilitation

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Abstract

The management of chronic pulmonary disease (CPD) requires a holistic approach that extends beyond pharmacotherapy. This review examines the clinical evidence and strategic importance of self-management, patient education, and multidisciplinary care within the framework of pulmonary rehabilitation (PR). By reviewing recent international guidelines (Global Initiative for Chronic Obstructive Lung Disease [GOLD] 2023, American Thoracic Society [ATS] 2023) and relevant literature, this article analyzes key non-pharmacological interventions for optimizing CPD management. Current evidence suggests that effective self-management, increasingly supported by digital monitoring tools and written action plans, facilitates early recognition of exacerbations. Moreover, patient education strategies are shifting from simple information delivery to behavioral change, utilizing methods like "teach-back" to enhance self-efficacy, particularly in older adults with low health literacy. Additionally, a multidisciplinary team approach is identified as a key component to address complex conditions such as frailty, sarcopenia, and cardiovascular comorbidities through comprehensive assessment and individualized interventions. Ultimately, integrating self-management, structured education, and multidisciplinary care is essential for improving quality of life and reducing healthcare utilization in CPD patients. Future management strategies should incorporate telerehabilitation and personalized PR to ensure sustainable, long-term health outcomes in this multimorbid population.

Key Words

Chronic obstructive pulmonary disease, Pulmonary rehabilitation, Self-management, Patient education, Multidisciplinary care team

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Introduction

Chronic pulmonary diseases (CPD), including chronic obstructive pulmonary disease (COPD), are recognized as major chronic conditions causing high global prevalence and substantial socioeconomic burden [1], while leading to severe functional limitations and disability that require clinical assessment [2]. CPD is characterized by persistent dyspnea, cough, and sputum production. As the disease advances, it is frequently accompanied by physical and psychological comorbidities such as systemic inflammation, skeletal muscle dysfunction, cardiovascular disease, malnutrition, and anxiety or depression. These complex issues limit physical activity and trigger acute exacerbations of COPD (AECOPD), driving significantly reduced quality of life and recurrent hospitalizations, thereby generating substantial socioeconomic costs [3].

Conventional management of CPD has primarily focused on pharmacotherapy to control airway inflammation and induce bronchodilation; however, this approach alone is insufficient to fully address the systemic effects and functional decline associated with the disease. Consequently, major international guidelines have expanded treatment goals from simple improvement of lung function to symptom relief, enhancement of exercise capacity, improvement of quality of life, and prevention of acute exacerbations, underscoring the role of pulmonary rehabilitation (PR) as a core non-pharmacological intervention [4].

PR is a comprehensive multidisciplinary program that includes exercise training, nutritional and psychosocial interventions, and disease education, necessitating patient-centered individualized management [5]. In particular, three key components decisively influence the success and sustainability of rehabilitation programs: self-management, effective patient education, and multidisciplinary care. Self-management offers clinical benefits by improving quality of life and reducing the risk of respiratory-related hospitalizations in COPD patients, while also decreasing healthcare utilization through prompt responses to acute exacerbations [6]. Patient education enhances treatment adherence by increasing disease understanding and self-efficacy, while a multidisciplinary approach leads to optimal treatment outcomes by integrally managing complex comorbidities and psychological barriers.

This review aims to contribute to the qualitative improvement of PR programs for CPD patients by examining the clinical evidence of self-management, strategic methods of patient education for behavioral change, and the role of multidisciplinary teams for comprehensive assessment. Ultimately, this review proposes an optimal CPD management strategy that integrates these three complementary elements.

Main Text

1) Self-Management in Chronic Pulmonary Disease

(1) Definition and Clinical Importance of Self-Management

Self-management is a core concept that has fundamentally shifted the approach to managing CPD. It refers to the patient's capacity to manage symptoms, treatments, and physical and psychosocial impacts, representing an ongoing, active process in daily life in collaboration with healthcare providers [7,8]. Beyond simple knowledge acquisition, it focuses on developing key skills-such as problem-solving, decision-making, and resource utilization—to drive behavioral change.

The clinical importance of self-management stems from the nature of CPD. The disease requires lifelong management, and acute exacerbations serve as primary drivers of disease progression. A patient's self-management competency is critical for recognizing risks and initiating early responses without immediate medical intervention. A systematic review confirmed that self-management interventions significantly improve quality of life (QoL) in COPD patients and help reduce the risk of respiratory-

related hospitalizations, a key clinical outcome [6]. Therefore, self-management offers dual benefits of improving QoL and reducing healthcare costs, making it an essential component for the sustainability of modern PR programs.

(2) Action Plan for Acute Exacerbations

Early recognition and rapid response to AECOPD are the most practical aspects of self-management, implemented through personalized action plans. An action plan is a written strategy instructing patients on how to monitor symptom changes and when to adjust medications or seek medical care [9]. Using a symptom-based multi-stage approach, these plans guide patients to recognize early signs of exacerbation and promptly initiate self-care [10].

The clinical effectiveness of action plans has been proven by a Cochrane systematic review. They effectively reduce respiratory-related emergency visits and hospitalizations, especially when combined with telephone follow-up [9]. Furthermore, action plans facilitate the appropriate use of rescue medications, such as steroids and antibiotics, enabling patients to start early treatment without direct medical intervention. Ultimately, this early intervention reduces exacerbation severity, shortens recovery time, and fosters self-efficacy-the confidence to control one's condition [9,10].

(3) Key Components of Self-Management Programs

Effective self-management programs yield the best results when implemented as multicomponent interventions where elements complement each other [11,12]. According to prior research and international guidelines, self-management for CPD comprises four domains: structured education, symptom monitoring and early recognition of exacerbations using digital tools, practical skills training, and ongoing support for long-term behavior maintenance. These elements enhance self-efficacy, enable early response to exacerbations, and consequently improve QoL. This review summarizes these four key components in Table 1 and Fig. 1.

2) Patient Education for Promoting Behavioral Change

(1) Goals and Scope of Patient Education

Patient education is defined not merely as information delivery but as a structured learning process designed to induce behavioral change [5,13]. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2023, American Thoracic Society (ATS) 2023 guidelines

Table 1. Core Components of Self-Management Programs in Chronic Pulmonary Disease

Core component	Key references	Brief description
Education	[8, 13–16]	Provides structured knowledge on disease mechanisms, medication and inhaler use, triggers, and vaccinations to improve treatment adherence and self-efficacy.
Early recognition & monitoring	[13, 14, 16]	Encourages daily observation and recording of symptoms/sputum changes, early identification of exacerbation signs, and timely execution of the individualized action plan.
Skills training	[8, 15, 17]	Teaches practical techniques including breathing, coughing/sputum management, energy conservation, and problem-solving/decision-making to strengthen daily self-management capabilities.
Ongoing support	[13, 14, 16]	Utilizes scheduled follow-up (telephone, outpatient, or digital platforms) to maintain behavior change, provide reinforcement, and support long-term continuity.

CPD: Chronic pulmonary disease, COPD: Chronic obstructive pulmonary disease, PR: Pulmonary rehabilitation

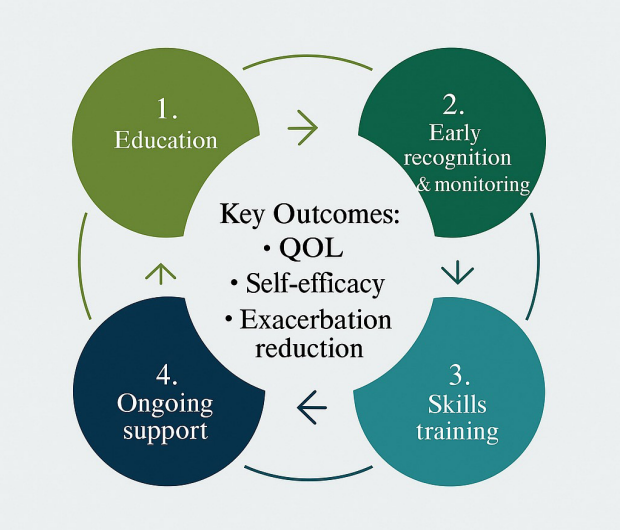

Fig. 1. Conceptual framework linking four core components of self-management to key outcomes in chronic pulmonary disease.

clearly identify patient education and self-management as essential elements of PR, aimed at improving disease understanding, ensuring appropriate responses to symptoms, and promoting treatment participation [4,14]. The scope of education encompasses multidimensional elements, including pathophysiology, medication use, exacerbation prevention, exercise strategies, and nutritional management [6,12]. In COPD, inhaler technique, early recognition of exacerbations, and energy conservation are central. For patients with low health literacy, literacy-sensitive strategies such as audiovisual materials and the "teach-back" method are required [15]. Ideally, educational content should be personalized according to the patient's disease stage, motivation, and preferences [14,16].

(2) Effective Educational Strategies and Theoretical Basis

Effective patient education maximizes clinical outcomes when designed based on behavior change theory [14]. Based on social cognitive theory emphasizing self-efficacy and behavioral reinforcement, COPD self-management interventions have been shown to reduce hospital utilization and improve outcomes [16].

In clinical practice, the "teach-back" technique is strongly recommended. Given the prevalence of low health literacy in older adults with cardiopulmonary disease, asking patients to repeat instructions in their own words is the most practical method to verify understanding and correct misconceptions. Additionally, iterative correction of inhaler technique, problem-solving training, and peer support should be integrated [6,12]. Recent studies also report that digital education and mobile app-based monitoring positively impact maintaining behavioral changes [17,18].

(3) Enhancing Self-Efficacy through Education

Self-efficacy is a core factor determining self-management behavior in CPD patients and is a central goal of education [12,16]. Defined as the belief in one's ability to "cope with symptoms" or "sustain exercise," self-efficacy is closely linked to PR adherence [13]. Enhancing self-efficacy is achieved through mastery experience, vicarious experience, supportive feedback, and physiological regulation of dyspnea [16]. For instance, experiencing immediate dyspnea reduction after breathing techniques or receiving positive feedback on inhaler use strengthens self-efficacy [6]. A meta-analysis confirmed that education-based self-management programs improve self-efficacy, emotional well-being, and disease knowledge [12].

3) Multidisciplinary Care for Optimal Outcomes

(1) Multidisciplinary Team Composition and Roles

PR programs consist of complementary contributions from various experts. Physicians oversee diagnosis, medication, and safety; physical therapists lead exercise and respiratory training; nurses handle inhaler education and symptom monitoring; and dietitians address nutritional issues like sarcopenia. Psychologists address emotional factors such as anxiety and depression, while social workers support daily living needs. Recent studies consistently indicate that multidisciplinary team-based

rehabilitation yields greater improvements in clinical indicators such as 6-minute walk distance (6MWD), COPD Assessment Test (CAT)/St. George's Respiratory Questionnaire (SGRQ) scores, and readmission risk compared to single-discipline approaches [14,19].

(2) Comprehensive Assessment and Individualized Intervention

Initial comprehensive assessment is crucial for designing individualized interventions. GOLD 2023 and ATS 2023 guidelines propose common essential elements: exercise capacity, QoL, mental health, inhaler use, nutrition/body composition, and comorbidities [4,14]. Exercise capacity is typically assessed using the 6-minute walk test (6MWT), cardiopulmonary exercise testing (CPET), and Short Physical Performance Battery (SPPB). Frailty affects 19–63% of COPD patients and is an independent prognostic factor for mortality and functional decline [20]. Sarcopenia is found in 21-40% of patients; resistance training combined with protein supplementation is the most effective strategy [21]. Accordingly, ATS 2023 recommends screening for frailty and sarcopenia to guide progressive exercise prescriptions [14].

Respiratory symptoms and QoL are assessed using CAT, SGRQ, and modified Medical Research Council (mMRC) dyspnea scale, serving as key patient-reported outcome (PRO) measures. The Pulmonary Rehabilitation Core Outcome Set (COS-PR) established international consensus on essential outcomes: exercise capacity, limb muscle function, physical activity experience, and health-related quality of life (HRQoL) [22]. Mental health assessment is also essential. A 2025 meta-analysis confirmed that depression and anxiety significantly negatively impact COPD prognosis [23]. Consequently, multidimensional strategies integrating cognitive behavioral therapy (CBT) are recommended [14]. Inhaler errors occur in 60–80% of patients and are linked to exacerbations [24]. Repeated assessment using the teach-back approach is the most effective correction strategy [25]. Additionally, management of polypharmacy is crucial to prevent adverse drug events in older adults [26]. Nutritional status is assessed via BMI and fat-free mass index (FFMI). Low BMI and reduced FFMI are risk factors for poor prognosis [4]. These assessments directly shape personalized PR strategies, which have shown superior results in adherence and long-term effectiveness compared to traditional models [14,22].

(3) Integrated Models for Comorbidity Management

The majority of CPD patients have multimorbidity, impacting mortality and QoL [27,28]. Common comorbidities include cardiovascular diseases (heart failure, coronary artery disease), metabolic diseases, musculoskeletal problems, and mental health disorders [20,21,23,27,28]. In particular, dyspnea in CPD patients may coexist with cardiac issues such as heart failure; thus, differential diagnosis and concurrent management are essential. Therefore, the multidisciplinary team must systematically assess cardiovascular risk and medication use. An integrated care pathway involving cardiology and other specialties shows greater effects in reducing hospitalizations than PR alone [19,27]. Table 2 summarizes common comorbidity clusters and integrated management strategies.

4) Future Directions in Chronic Pulmonary Disease Management

Future CPD management is expected to evolve through digital-based models and personalized PR. Telehealth has demonstrated clinical potential in remote monitoring and improving adherence, contributing to reduced readmission risks [18,29]. Telerehabilitation is gaining attention as an essential alternative to overcome physical constraints, providing uninterrupted services to end-stage patients or those with limited access. Furthermore, personalized PR, reflecting the patient's frailty profile and behavioral characteristics, is becoming a standard strategy. Shifting from uniform programs to context-based prescriptions

Table 2. Common Comorbidity Clusters, Clinical Impact, and Integrated Management Strategies in COPD

Comorbidity cluster / condition	Major impact	Integrated management strategy	References
Cardiovascular diseases (CAD, HF, PH)	Increased mortality, reduced exercise capacity, higher exacerbation risk	Cardiovascular risk assessment, medication optimization, referral to cardiology	[27, 28]
Metabolic diseases (diabetes, obesity)	Increased systemic inflammation, higher exacerbation frequency	Glycemic and weight management, nutritional counseling, structured physical activity programs	[27]
Musculoskeletal problems (frailty, sarcopenia)	Functional decline, increased fall risk	Resistance/strength training, protein supplementation, fall-prevention strategies, pain management	[20, 21, 31]
Mental health disorders (anxiety, depression)	PR dropout, reduced physical activity	CBT, breathing-based relaxation, peer-support interventions	[23]
Polypharmacy	Higher adverse events, poorer adherence	Medication review, deprescribing strategies, pharmacist collaboration	[26]

CAD: Coronary artery disease, HF: Heart failure, PH: Pulmonary hypertension, CBT: Cognitive behavioral therapy, PR: Pulmonary rehabilitation

has been validated in recent clinical studies [30,31]. Additionally, adopting the COS-PR will ensure consistency in outcome measures, enhancing quality control [22]. In conclusion, the evolution toward digital and personalized approaches serves as a foundation for a sustainable, patient-centered management system.

Conclusion

The management of CPD is limited by pharmacotherapy alone due to disease complexity and high comorbidity burden. As discussed, strengthening self-management, implementing behavioral science-based education, and adopting a multidisciplinary approach are core components of PR that substantially support functional recovery and exacerbation reduction. In particular, structured education enhances self-efficacy, while personalized interventions based on comprehensive assessment are essential for diverse patient populations. Future strategies must integrate telerehabilitation and personalized PR reflecting frailty and sarcopenia profiles to ensure sustainability. Given the high prevalence of older adults and multimorbid patients in CPD, this integrated approach is a strategic necessity. Ultimately, the modern rehabilitation model anchored by the triad of Self-management, Education, and Multidisciplinary Care will provide a pivotal foundation for improving long-term health outcomes.

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REFERENCES

1. Wang Z, Lin J, Liang L, Huang F, Yao X, Peng K, et al. Global, regional, and national burden of chronic obstructive pulmonary disease and its attributable risk factors from 1990 to 2021: an analysis for the Global Burden of Disease Study 2021. Respir Res 2025;26:2.
2. Bui KL, Nyberg A, Maltais F, Saey D. Functional tests in chronic obstructive pulmonary disease, part 1: clinical

relevance and links to the international classification of functioning, disability, and health. Ann Am Thorac Soc 2017;14:778-84.

3. Pham HQ, Pham KHT, Ha GH, Pham TT, Nguyen HT, Nguyen THT, et al. Economic burden of chronic obstructive pulmonary disease: a systematic review. Tuberc Respir Dis (Seoul) 2024;87:234.
4. Agustí A, Celli BR, Criner GJ, Halpin D, Anzueto A, Barnes P, et al. Global initiative for chronic obstructive lung disease 2023 report: GOLD executive summary. J Pan Afr Thorac Soc 2022;4:58-80.
5. Holland AE, Cox NS, Houchen-Wolloff L, Rochester CL, Garvey C, ZuWallack R, et al. Defining modern pulmonary rehabilitation. An official American Thoracic Society workshop report. Ann Am Thorac Soc 2021;18:e12-29.
6. Schrijver J, Lenferink A, Brusse-Keizer M, Zwerink M, van der Valk PD, van der Palen J, et al. Self-management interventions for people with chronic obstructive pulmonary disease. Cochrane Database Syst Rev 2022;1:CD002990.
7. Barlow JH, Bancroft GV, Turner AP. Self-management training for people with chronic disease: a shared learning experience. J Health Psychol 2005;10:863-72.
8. Lorig KR, Holman HR. Self-management education: history, definition, outcomes, and mechanisms. Ann Behav Med 2003;26:1-7.
9. Howcroft M, Walters EH, Wood-Baker R, Walters JA. Action plans with brief patient education for exacerbations in chronic obstructive pulmonary disease. Cochrane Database Syst Rev 2016;12:CD005074.
10. Jalota L, Jain VV. Action plans for COPD: strategies to manage exacerbations and improve outcomes. Int J Chron Obstruct Pulmon Dis 2016;11:1179-88.
11. Nohra RG, Serhal RB, Sacre H, Salameh P, Rothan-Tondeur M. Effective components of self-management programs for chronic obstructive pulmonary disease patients: scoping review. Adv Respir Med 2020;88:223-32.
12. Wang T, Tan JY, Xiao LD, Deng R. Effectiveness of disease-specific self-management education on health outcomes in patients with chronic obstructive pulmonary disease: an updated systematic review and meta-analysis. Patient Educ Couns 2017;100:1432-46.
13. Garvey C. Pulmonary rehabilitation in persons with COPD. Respir Care 2023;68:983-97.
14. Rochester CL, Alison JA, Carlin B, Jenkins AR, Cox NS, Bauldoff G, et al. Pulmonary rehabilitation for adults with chronic respiratory disease: an official American Thoracic Society clinical practice guideline. Am J Respir Crit Care Med 2023;208:e7-26.
15. Shnaigat M, Downie S, Hosseinzadeh H. Effectiveness of health literacy interventions on COPD self-management outcomes in outpatient settings: a systematic review. COPD 2021;18:367-73.
16. Bourbeau J, Julien M, Maltais F, Rouleau M, Beaupré A, Bégin R, et al. Reduction of hospital utilization in patients with chronic obstructive pulmonary disease: a disease-specific self-management intervention. Arch Intern Med 2003;163:585-91.
17. Jolly K, Sidhu M, Bates E, Majothi S, Sitch A, Bayliss S, et al. Systematic review of the effectiveness of community-based self-management interventions among primary care COPD patients. NPJ Prim Care Respir Med 2018;28:44.
18. Park HY, Kong S, Lee M, Ryu H, Yasuda Y, Luppi F, et al. Digital health technologies for improving the management of people with chronic obstructive pulmonary disease. Front Digit Health 2025;7:1640585.
19. McCarthy B, Casey D, Devane D, Murphy K, Murphy E, Lacasse Y. Pulmonary rehabilitation for chronic obstructive pulmonary disease. Cochrane Database Syst Rev 2015;2:CD003793.
20. Yan LC, Lu HY, Wang XY, Xiao G, Chang Y, Yuan P, et al. Prevalence and risk factors of frailty in patients with chronic obstructive pulmonary disease: systematic review and meta-analysis. Eur Geriatr Med 2023;14:789-802.
21. Benz E, Trajanoska K, Lahousse L, Schoufour JD, Terzikhan N, De Roos E, et al. Sarcopenia in COPD: a

systematic review and meta-analysis. Eur Respir Rev 2019;28:190049.

22. Souto-Miranda S, Saraiva I, Spruit MA, Marques A. Core outcome set for pulmonary rehabilitation of patients with COPD: results of a modified Delphi survey. Thorax 2023;78:1240-7.
23. Wu K, Lu L, Chen Y, Peng J, Wu X, Tang G, et al. Associations of anxiety and depression with prognosis in chronic obstructive pulmonary disease: a systematic review and meta-analysis. Pulmonology 2025;31:2438553.
24. Halpin DM. Clinical management of COPD in the real world: can studies reveal errors in management and pathways to improve patient care? Pragm Obs Res 2023;14:51-61.
25. Marko M, Pawliczak R. Inhalation technique-related errors after education among asthma and COPD patients using different types of inhalers–systematic review and meta-analysis. NPJ Prim Care Respir Med 2025;35:15.
26. Kurczewska-Michalak M, Lewek P, Jankowska-Polańska B, Giardini A, Granata N, Maffoni M, et al. Polypharmacy management in the older adults: a scoping review of available interventions. Front Pharmacol 2021;12:734045.
27. Dos Santos NC, Miravitlles M, Camelier AA, De Almeida VDC, Maciel RRBT, Camelier FWR. Prevalence and impact of comorbidities in individuals with chronic obstructive pulmonary disease: a systematic review. Tuberc Respir Dis (Seoul) 2022;85:205-15.
28. Burke H, Wilkinson T. Unravelling the mechanisms driving multimorbidity in COPD to develop holistic approaches to patient-centred care. Eur Respir Rev 2021;30:210049.
29. Rezende LC, Ribeiro EG, Parreiras LC, Guimarães RA, Reis GM, Carajá AF, et al. Telehealth and telemedicine in the management of adult patients after hospitalization for COPD exacerbation: a scoping review. J Bras Pneumol 2023;49:e20220067.
30. Wouters EF, Wouters BB, Augustin IM, Houben-Wilke S, Vanfleteren LE, Franssen FM. Personalised pulmonary rehabilitation in COPD. Eur Respir Rev 2018;27:180010.
31. van Bakel SI, Gosker HR, Langen RC, Schols AM. Towards personalized management of sarcopenia in COPD. Int J Chron Obstruct Pulmon Dis 2021;16:25-40.