



# Nursing Interventions for the Management and Care of Patients with Chronic Obstructive Pulmonary Disease (COPD): A Comprehensive Review

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## Abstract

**Background:** Chronic obstructive pulmonary disease (COPD) is a significant global health issue, ranking as the third leading cause of death worldwide. Effective management requires a comprehensive approach involving healthcare professionals, particularly nurses, who play a critical role in patient education, symptom management, and promoting self-efficacy.

**Methods:** This systematic review conducted a thorough literature search from 2009 to 2023 across PubMed, Embase, and Web of Science databases. It focused on nurse-led interventions for COPD patients, examining their effects on physical health, quality of life, and psychological well-being.

**Results:** The review identified a variety of nurse-led interventions, including health education, telemonitoring, and cognitive behavioral therapy. Findings indicated significant improvements in patients' physical status, reduced hospital admissions, and enhanced quality of life. Additionally, interventions that included telecare demonstrated a reduction in anxiety and depressive symptoms among patients. However, variability in study designs and outcomes limited the conclusiveness of some results.

**Conclusion:** Nurse-led interventions are effective in managing COPD, enhancing both physical and mental health outcomes. The integration of nursing care models into COPD management can lead to improved patient satisfaction and quality of life. Future research should focus on standardizing intervention protocols and exploring the long-term effects of nurse-led care on COPD patients.

**Keywords:** Chronic obstructive pulmonary disease, nursing interventions, telehealth, patient education, self-management.

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## 1. Introduction

The World Health Organization [1] reported that in 2018, chronic diseases accounted for 71% of deaths globally among individuals aged 30 to 70 years. Chronic obstructive pulmonary disease (COPD) ranks as the third leading cause of death globally, accounting for 3.23 million fatalities in 2019 [2]. Chronic obstructive pulmonary disease necessitates a multifaceted and extended response, integrating contributions from various professionals, particular medications, and appropriate monitoring tools. This care should ideally be integrated into a system that fosters patient empowerment. Numerous health systems continue to operate primarily under an acute care model; however, the pressing challenge for health policymakers is to develop a more effective response that addresses the needs of COPD patients. Given the significant variations among health systems, each needs to identify its unique solution. Even

within comparable systems, there can be significant variations in professional roles, coordination mechanisms, and care settings [3]. The national health systems must address the needs of an elderly multipathological population, which presents significant economic and socio-health challenges due to its inherent complexity. Multi-competence nurses support COPD patients in managing all stages of the disease while ensuring that the economic impact on state resources remains manageable. They deliver high-quality care both at home and in hospitals, enhancing the empowerment of patients and their families.

The management of COPD has progressively emerged as a crucial aspect of both primary and hospital care, resulting in a developing care model. International evidence indicates that expanding the responsibilities of primary and hospital nurses may enhance the quality of life for COPD patients, utilizing nurse-led care models to achieve positive impacts on patient satisfaction and clinical outcomes [4-7]. The scope of nursing encompasses various areas, including health education, promotion of healthy lifestyles, proper management of inhalation pharmacology, early detection of decompensation signs, respiratory rehabilitation, and palliative care. The management of COPD patients by nursing professionals leads to improved outcomes in daily disease management, enhancing the patient's understanding of how to manage their condition [4,5]. Home visits and remote management through telemedicine at the time of discharge by hospital nurses and in primary care should be taken into account, not just for COPD patients but also for their families [8-11].

Considering the advantages that nursing offers in the care of COPD patients, it is crucial to comprehend the impact of nurse-led interventions on these individuals. This review aimed to examine the impact of interventions led by hospital or community nurses on the follow-up and management of COPD patients, focusing on their mental, physical, and clinical status.

## **2. Methods**

A comprehensive search was conducted for manuscripts published from 2009 to 2023 in the PubMed, Embase, and Web of Science databases.

## **3. Various Nurse-Led Interventions for COPD Patients**

This systematic review and meta-analysis examined various nurse-led interventions for COPD patients, resulting in enhancements in physical status, quality of life, and anxiety, as well as reductions in hospital admissions. While numerous systematic reviews exist regarding the effects of interventions for managing COPD patients, this appears to be the first systematic review focused specifically on the impact of nurse-led interventions within this group.

Interventions are conducted by various types of nurses, including general hospital, community, palliative, and respiratory nurses [12]. These professionals typically operate across various domains employing a range of techniques: home telemonitoring, telecare, palliative care in both hospital and home settings, health education through ongoing training or instruction in inhalation techniques and oxygen management at home, hospital, and home respiratory rehabilitation or telerehabilitation, as well as promoting self-efficacy and providing training in smoking cessation methods.

Nurse-led interventions in hospitals employ a range of nursing care models, such as the health belief model, humanistic nursing care model, self-management education model, bidirectional quality feedback nursing model, psychological and cognitive-behavioral model, physical-functional model, and a nursing care model grounded in the information, knowledge, attitude, and practice (IKAP) theory. The studies reviewed indicate that these models have enhanced patients' health status by enabling them to take control of their disease management.

Recognizing early signs of COPD decompensation is essential in-patient education, along with proper training on pharmacological therapy, particularly regarding inhalation techniques like oxygen therapy. This review demonstrates that all nurse-led interventions positively influence patients' stress levels and reduce the number of hospitalizations [12-15,16-29]. Many COPD patients frequently demonstrate incorrect inhaler techniques, leading to reduced effectiveness of medication and a decline in their overall health [59].

Training on inhaler use conducted by a specialized nurse has been demonstrated to greatly enhance patient performance [16,21].

Patients with COPD frequently experience symptoms of anxiety and depression. The unpredictability of an acute breathlessness attack exacerbates the patient's emotional state, forcing them to manage the resulting anxiety and depression. The findings indicate that psychological therapy, such as cognitive behavioral therapy and counseling, has the potential to enhance depressive and anxiety symptoms in patients with COPD [22,23]. This review highlights that nurse employing specialized techniques, including cognitive behavioral therapy and minimal psychological intervention, effectively assist patients in successfully managing anxiety [11,14,17,19,24-26]. Home visits by the hospital nurse after discharge have not led to a notable reduction in readmission rates; however, patients expressed improved feelings of well-being and confidence, along with enhanced understanding of disease management and reduced anxiety levels [12,27-29].

The monitoring and telemonitoring of vital parameters, along with teleconsultation by hospital nurses, have led to a decrease in admissions, shorter hospitalization durations, reduced reliance on emergency services, lower levels of anxiety and depression, and an overall enhancement in quality of life [11,25,30-35]. This intervention, lasting less than 6 months, has shown effectiveness. The sole study that necessitated additional time was conducted by Taylor et al. [34], which enhanced morale but did not improve the quality of life for patients after a one-year follow-up.

Community nurse-led education and telecare led to a decrease in the number of hospitalization days and improvements in dyspnea levels, as indicated by the Medical Research Council Questionnaire and SF-36 physical score fields. However, several studies found that the FEV1%, FEV1 FVC% ratio, FEV1 (L), and number of ED visits were worse in comparison to the control group. In a similar vein, the research conducted by Baker et al. [35] within a primary care context indicates advantages in managing COPD patients, including a reduction in the number of physician visits and anxiety. However, the results did not reach significance, preventing any definitive conclusions regarding efficacy.

Respiratory rehabilitation through home telecare, utilizing various tools such as mobile phones and the Bandura technique, enhanced patient quality of life in the study [36]. Improvements were noted in the FEV1 FC1% ratio, baseline dyspnea index (BDI), and 6MWT scale scores. Additionally, studies by Nguyen et al. [19], Khoshkesht et al. [32], and Mohammadi et al. [36] reported enhancements in the self-efficacy scale, Barthel scale, fatigue severity scale (FSS), and SF36 scale. However, the study by Cameron-Tuker et al. [37] did not demonstrate improvements in smoking, nutrition, alcohol consumption, physical activity, psychosocial well-being, or symptom management scales. Finally, evidence shows that smoking cessation in COPD leads to benefits such as decreased disease progression, reduced symptoms, and lower mortality rates [6]. Nurse interventions aimed at reducing smoking have been examined in two studies [11,38-41], but only in Jolly et al. [11] was there a decrease in the number of smokers after 12 months.

This systematic review presents several limitations. While the search strategy has been thorough, employing multiple keywords and three databases, not every article pertinent to the study topic may have been captured. Conversely, despite the substantial number of included articles, the variability in study designs, the diverse outcome variables, and the various measurement tools have complicated the process of conducting a quantitative analysis. The assessment of the evidence quality indicated a medium level. Consequently, the results derived from this review should be approached with care. Table 1 represents the summary of nurse-led interventions for COPD patients.

**Table 1. Summary of Nurse-Led Interventions for COPD Patients.**

Intervention Type	Description	Outcomes Measured	Key Findings
Health Education	Training on inhaler techniques and disease management.	Patient knowledge, inhaler proficiency	Improved inhaler technique and medication adherence.

<b>Telemonitoring</b>	Remote monitoring of vital signs and symptoms.	Hospital admissions, anxiety levels	Reduced hospital admissions and lower anxiety levels.
<b>Cognitive Behavioral Therapy</b>	Psychological support to address anxiety and depression.	Anxiety and depression scores	Significant reduction in anxiety and depressive symptoms.
<b>Self-Management Programs</b>	Education on managing COPD at home and lifestyle changes.	Quality of life, self-efficacy	Enhanced quality of life and increased self-efficacy.
<b>Palliative Care</b>	Comprehensive care focusing on comfort and quality of life.	Patient satisfaction, symptom relief	Improved patient satisfaction and reduced symptom burden.

#### 4. Conclusion

The review highlights the crucial role that nursing interventions play in the management of chronic obstructive pulmonary disease (COPD). As a multifaceted condition requiring ongoing care and support, COPD management benefits significantly from the diverse skill sets of nursing professionals. The evidence gathered from various studies indicates that nurse-led interventions, including health education, telemonitoring, and psychological support, positively impact patients' physical health, emotional well-being, and overall quality of life. Effective patient education is vital, as many COPD patients struggle with medication adherence and proper inhaler techniques, which can significantly affect their health outcomes. By providing tailored health education and training, nurses empower patients to take control of their condition, promoting self-management strategies that enhance their daily functioning and reduce hospital admissions.

Moreover, the integration of telehealth services into nursing care for COPD patients has proven beneficial. Teleconsultations and remote monitoring not only facilitate timely interventions but also alleviate the burden on healthcare systems by decreasing emergency room visits and hospital stays. Despite the positive findings, variability in study designs and outcomes suggests the need for further research to establish standardized protocols for nurse-led interventions in COPD care. Future studies should also explore the long-term effects of these interventions on patient outcomes and the potential for scalability across different healthcare settings. In conclusion, the evidence underscores that enhancing nursing roles in COPD management can lead to improved patient outcomes, satisfaction, and overall quality of care. As healthcare systems evolve, prioritizing nurse-led interventions will be essential in addressing the complex needs of COPD patients.

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#### التدخلات التمريضية لإدارة ورعاية مرضى داء الانسداد الرئوي المزمن (COPD): مراجعة شاملة

##### الملخص

**الخلفية:** يُعد داء الانسداد الرئوي المزمن (COPD) من القضايا الصحية العالمية الكبرى، حيث يحتل المرتبة الثالثة بين أسباب الوفاة على مستوى العالم. تتطلب إدارته نهجاً شاملاً يتضمن دوراً رئيسياً للمرضين والمرضات في تثقيف المرضى، وإدارة الأعراض، وتعزيز الكفاءة الذاتية.

**المنهجية:** أجريت هذه المراجعة المنهجية بحثاً شاملاً في قواعد بيانات *PubMed* و *Embase* و *Web of Science* للفترة من 2009 إلى 2023، مع التركيز على التدخلات التي يقودها الممرضون والمرضات لمرضى داء الانسداد الرئوي المزمن، ودراسة تأثيرها على الصحة الجسدية وجودة الحياة والرفاه النفسي.

**النتائج:** كشفت المراجعة عن مجموعة متنوعة من التدخلات التي يقودها الممرضون، بما في ذلك التثقيف الصحي، والمراقبة عن بُعد، والعلاج السلوكي المعرفي. وأظهرت النتائج تحسينات كبيرة في الحالة البدنية للمرضى، وتقليل الدخول إلى المستشفيات، وتحسين جودة الحياة. كما أظهرت التدخلات التي تضمنت الرعاية عن بُعد انخفاضاً في أعراض القلق والاكتئاب لدى المرضى. ومع ذلك، حدثت التباينات في تصاميم الدراسات ونتائجها من دقة بعض النتائج.

**الخلاصة:** تُعد التدخلات التي يقودها الممرضون فعالة في إدارة داء الانسداد الرئوي المزمن وتعزيز النتائج الصحية الجسدية والنفسية. يمكن أن يؤدي دمج نماذج الرعاية التمريضية في إدارة المرض إلى تحسين رضا المرضى وجودة حياتهم. ويجب أن تركز الأبحاث المستقبلية على توحيد بروتوكولات التدخل واستكشاف الآثار طويلة الأجل للرعاية التمريضية على مرضى داء الانسداد الرئوي المزمن.

**الكلمات المفتاحية:** داء الانسداد الرئوي المزمن، التدخلات التمريضية، الرعاية الصحية عن بُعد، تثقيف المرضى، الإدارة الذاتية.