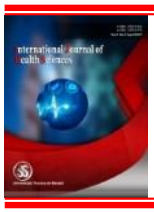

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Integrating psychological interventions into holistic management of chronic respiratory diseases: Update review

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Abstract

Chronic Respiratory Diseases (CRD), such as asthma, interstitial lung disease, and chronic obstructive pulmonary disease (COPD), have a significant negative influence on a patient's physical and mental health. Stress, anxiety, and depression are common psychological injuries that worsen lung function, and increase mortality, exacerbations, and healthcare utilization in patients with chronic respiratory disease (CRD). Pulmonary rehabilitation is a gold standard non-pharmacological management for CRD—where care delivery strategies are based on a bio-psycho-social model of integrated therapies. However, there are still issues since there are global differences in the way programs are designed and implemented, and there are no standardized psychological assessments or therapies available for patients with CRD. This review critically examines the challenges in standardizing pulmonary rehabilitation programs and the lack of health psychological assessment or interventions for patients with CRD. Additionally, it suggests necessary updates to respiratory physiotherapy curricula with the neuroscience of breathing in clarifying the relationship between psychological factors and inflammation in CRD. The review calls for an urgent need for increased global research funding to enhance psychological therapies as integrated respiratory care management and improve outcomes for patients with CRD.

Contents

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1 Introduction

Chronic respiratory diseases (CRD), including asthma, interstitial lung disease, and chronic obstructive pulmonary disease (COPD), impact both the physical and psychological health of an individual, projecting as the leading cause of morbidity and mortality worldwide (World Health Organization). In the European Union, COPD alone accounts for 56% of respiratory disease-related costs (Boers et al., 2023). Socioeconomic and environmental factors, including air pollution and education, exacerbate CRD mortality rates (Baptista et al., 2021). Psychological injuries such as stress, anxiety, and depression, are common among individuals with CRD and it worsens disease management (Pumar et al., 2014). Cognitive disorders, including memory and attention deficits, affect a higher percentage of individuals with COPD, with compounding risk factors like smoking and cardiovascular disease further reducing lung function (Morris et al., 2019; Higbee et al., 2021). Additionally, addictions such as vaping, often presumed as a relief for stress, increase respiratory complications (Rebuli et al., 2023). Despite these challenges, the Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2024 guidelines emphasize primarily pharmacological interventions and exacerbation prevention, with limited attention to psychological care, leaving a gap in integrated respiratory care management.

Chronic stress worsens immune function, increasing vulnerability to infections in individuals with CRD (Cohen et al., 1991). Health psychology connects the psychology of the human brain and socio developmental theories offering therapeutic interventions for psychological injuries. For example, the Health Belief Model and the Theory of Planned Behavior elucidate psychological beliefs and social influences that shape health behaviors and treatment adherence (Rosenstock, 1974; Ajzen, 1991). Further socioeconomic status and race, exacerbate psychological stress, affecting equity care and health outcomes (Adler & Stewart, 2010). Cognitive-behavioral therapy (CBT) and mindfulness-based stress reduction (MBSR), are proven psychotherapeutic interventions to treat anxiety, stress, and depression for individuals with CRD for improved quality of life and reduced healthcare utilization (Cuijpers et al., 2014; Williams et al., 2020). Despite these benefits, many pulmonary rehabilitation programs focus only on physical health and fail to address the emotional and cognitive challenges of individuals with CRD.

Despite growing evidence that chronic stress worsens inflammation in chronic respiratory disease (CRD) aggravating symptoms, respiratory physiotherapy- undergraduate training curricula fail to adequately address the connection between chronic stress and inflammation (Dantzer et al., 2011; Puteikis et al., 2021; Valkanova et al., 2013). Understanding this neuro-psycho-biological link is crucial for delivering effective care and patient outcomes, yet it remains less understood in many respiratory physiotherapy curriculum. Moreover, promoting interdisciplinary collaboration among physiotherapists, psychologists, psychotherapists, behavioral analysts, and social workers would promote a more integrated and effective approach to addressing the complex needs of individuals with CRD.

2 Psychological Injuries in Chronic Respiratory Diseases

People with chronic respiratory disorders (CRD) have significant psychological injuries that negatively impact their overall health outcomes, leading to an increase in healthcare utilization. Studies affirm that anxiety, depression, and self-blame are common psychological injuries in individuals with CRD, even during stable phases of their illness (Volpato et al., 2023; Wang et al., 2023; Abrams et al., 2011; Andenæs & Kalfoss, 2004). These psychological injuries not only reduce quality of life but are also associated with increased

mortality, frequent exacerbations, and prolonged hospital stays (Pooler & Beech, 2014). The Eclipse Study found that 26% of COPD patients experience depression, comparatively higher than the 12% of smokers without COPD and the 7% of nonsmokers (Hanania et al., 2011). Depression is highly prevalent among females, current smokers, and those with severe COPD, highlighting the need for integrated psychological intervention in chronic respiratory disease management.

Another study, ASSESS study on 727 COPD patients, revealed that 90.5% reported daily symptoms like dyspnoea, cough, and chest tightness throughout the day associated with more frequent symptoms and exacerbations, emphasizing the importance of comprehensive symptom management (Miravitlles & Ribera, 2017). A critical link exists between reduced lung function and psychological well-being, calling for the urgency of integrating mental health therapies into CRD treatment plans (O'leary et al., 2002).

In Norway, the HUNT study on 2,076 participants, revealed that anxiety and depression fueled mortality risk by 21%. Depression did not exhibit a similar long-term effect compared to decreased anxiety, which highlights the importance of prioritizing mental health therapies in COPD care (Vikjord et al., 2020). Moreover, psychological injuries in CRD patients cost increased healthcare utilization. Even when physiological symptoms are less, anxiety and depression can heighten patients' perceptions of dyspnoea, causing unnecessary medical visits and more hospital admissions (Regvat, et al., 2011; Byng et al., 2019). In contrast to patients with depression, who frequently require hospitalization, individuals with anxiety are more likely to require community-based therapy for exacerbations (Laurin et al., 2012). These results highlight how critical it is to integrate psychological interventions to lower hospitalization rates and the economic burden of CRD on healthcare systems.

3 Pulmonary Rehabilitation: The Gold Standard

Pulmonary rehabilitation (PR) is popularly regarded as the gold standard non-pharmacological management for patients with CRD (Rochester et al., 2023). The American Thoracic Society/European Respiratory Society defines “Pulmonary rehabilitation as a comprehensive patient assessment followed by customized interventions such as exercise training, education, and behavior modification strategies, all to improve both physical and psychological health and promote long-term adherence to healthy behaviors” (Spruit et al., 2013). PR has demonstrated significant benefits, including improved social integration, mental health, exercise capacity, lung function, and general quality of life in a variety of demographics, including Western and Asian-Indian communities (Arnold et al., 2020; Bhadra et al., 2021; Cui et al., 2019).

Despite these advantages, PR is underutilized globally. Referral rates, for example, might be as low as 16% in the United Kingdom and 23% in Uganda, despite proven program benefits for patients with CRD (Stone et al., 2020; de Andrade et al., 2021; Katagira et al., 2021). A 2021 workshop report from the American Thoracic Society listed 27 preferred and 13 required elements for effective PR, with a focus on patient evaluation, program content, delivery systems, and quality assurance (Holland et al., 2021). In addition, there is still no consensus or sufficient money to include psychological therapies as a typical component of public relations, with traditional PR models frequently emphasizing fitness and education above psychological support.

Standardizing PR presents significant hurdles, including low knowledge among healthcare practitioners and heterogeneity in program implementation. For example, 61% of respiratory doctors in the United States were ignorant of PR, while 31% of German experts weren't convinced that PR was necessary for the treatment of moderate to severe COPD (Glaab et al., 2012). In the UK, general practitioners are more inclined to recommend patients who are depressed, have recently experienced exacerbations, or are former smokers. Furthermore, 83% of Sri Lankan medical practitioners were unsure of PR eligibility requirements (Perera et al., 2022). Cultural views and patient rights issues exacerbate the application of PR (Sami et al., 2021).

PR programs can differ widely, especially in the instructional component, which frequently deviates from best practices. PR can be administered through different modalities, including home-based, center-based, and telerehabilitation procedures, with research indicating that telerehabilitation frequently yields higher completion rates than traditional methods (Cox et al., 2021) Standardized health promotion approaches, such as stress management, nutrition education, and smoking cessation, have been found to increase patient compliance and results (Williams et al., 2024). However, there is a need for patient-centered, motivated

approaches, as well as additional research, to discover effective outcome measures that assess education-induced behavioral changes (Roberts et al., 2021).

4 Integrating Psychological Assessment in CRD Management

Recent advances in pulmonary rehabilitation (PR) highlight the importance of incorporating advanced psychological assessment methods into the treatment of chronic respiratory disorders (CRDs). These tools have shown significant gains in patient treatment and results (Anderson et al., 2024), and the expansion of telerehabilitation has added to these benefits by providing ongoing mental health assistance and increasing the reach of PR programs (Dai et al., 2024). Despite these advances, important gaps in the psychosocial care of CRDs persist, emphasizing the need for a more integrated and patient-centric approach.

Health psychology provides vital insights into CRD management by addressing psychological and behavioral aspects. However, there are important gaps, such as a lack of understanding of how certain psychological mechanisms influence CRDs. Research frequently ignores the diverse effects of psychological elements such as stress and coping techniques on illnesses such as asthma and chronic obstructive pulmonary disease (COPD) (Papava et al., 2016). Understanding these variances is critical for creating tailored psychological therapies.

Another key concern is the insufficient integration of psychological and medical treatment. Psychological assistance and medical treatment for CRDs are often provided independently, which can reduce total treatment effectiveness (Rzadkiewicz & Nasiłowski, 2019). Evidence suggests that combining mental health treatments and medical care improves patient outcomes by addressing both psychological and physical health at the same time (Alderwick et al., 2021). The absence of multidisciplinary collaboration between pulmonologists and psychologists leads to missed chances for comprehensive care, emphasizing the importance of integrated care models and collaborative frameworks (Pelone et al., 2017).

Current research frequently lacks a patient-centered approach, focusing on general therapies rather than specific patient needs (Engle et al., 2021). Treatment efficacy and adherence can be considerably improved by tailoring them to individual experiences, preferences, and cultural contexts (Mitchell et al., 2013). More research is needed to create and implement patient-centered solutions.

Several topics warrant additional investigation, including helpful coping techniques for CRD sufferers. While coping methods are important, there is little study on their practical implementation (Schrijver et al., 2022). Identifying the most effective coping methods for various CRDs may improve psychological treatments. Furthermore, additional study is needed on the effects of psychological factors such as social support and socioeconomic position on illness progression (Aldhahi et al., 2023). Longitudinal studies are critical for understanding the long-term psychological impacts of CRDs and the efficacy of ongoing psychological therapies.

5 Curriculum and Delivery in Respiratory Physiotherapy

As a physiotherapist and psychotherapist who has worked in multiple education training settings, the author's thorough evaluation of current respiratory physiotherapy courses reveals significant shortcomings, particularly in the incorporation of CRD patients' psychosocial assessments, which is a component of the bio-psychosocial paradigm. Respiratory Physiotherapy modules are typically limited and focused on physiological and physical symptom management rather than particular, personalized behavioral interventions for patients with chronic respiratory disease. Because of this gap in psychological skill development, many physiotherapists graduate without the skills required to manage their patient's emotional and cognitive concerns.

The European Respiratory Society (ERS) has emphasized the critical need for standardized education and training for respiratory physiotherapists (Stolz et al., 2021). Despite efforts to standardize training, curricula and teaching styles remain significantly different among regions. A key concern is a lack of strong scientific evidence backing several respiratory physiotherapy treatments, which adds to variations in their use and

training. According to research, including interdisciplinary learning and evidence-based methodologies in curricula can help practitioners handle complicated CRDs more effectively. However, increasing access to such education necessitates more resources and support.

The British Thoracic Society and other organizations call for more standardized and comprehensive training based on the most recent evidence-based techniques, as inconsistent integration of pulmonary rehabilitation into medical programs causes diversity in healthcare providers' skills (Man et al., 2023). Many programs provide minimal exposure to pulmonary rehabilitation, which is frequently incorporated within larger respiratory modules. This can lead to insufficient practical experience and comprehension of evidence-based approaches (Troosters et al., 2023).

While there is rising recognition of the benefits of simulation-based education and practical training, these methods are not yet commonly used due to resource restrictions (McCarthy et al., 2015). Additional research is required to develop and validate effective teaching strategies for pulmonary rehabilitation, including investigations on the long-term influence of diverse educational approaches on clinical practice (Blervaque et al., 2021).

To remedy this gap, respiratory physiotherapy curricula should include multidisciplinary modules from psychology and neuroscience, as well as an active teaching methodology based on simulation and clinical placements. This comprehensive strategy will not only lower healthcare expenditures, but would also improve the management of CRD's physical and psychological impacts, thereby enhancing patient well-being.

6 Neuroscience Insights on Respiratory Disease

Several noteworthy findings have emerged from research on the interface of brain and respiratory health. Neuroscience has shed insights on the inflammatory mechanisms that underpin respiratory illnesses and their link to psychological consequences, emphasizing the importance of therapies that target both the psychological and physical elements of chronic respiratory diseases (CRDs) (Al-Shair et al., 2011). Pulmonary rehabilitation (PR) has been demonstrated to have neuroprotective properties, improving cognitive function by boosting neurotransmitter release from the cerebral cortex, which improves memory and cognition in a variety of populations (Bonnevie et al., 2020; France et al., 2021; Andrianopoulos et al., 2021).

Slow breathing techniques have been shown to improve autonomic and psychological flexibility by increasing heart rate variability and modifying brain activity, such as increasing alpha power and decreasing theta power, in EEG investigations (Zaccaro et al., 2018). This shows that controlled breathing can improve emotional regulation and psychological well-being. Pulmonary neuroendocrine cells (PNECs), which are essential for respiratory function and airway-nerve communication, respond to environmental stimuli by releasing neuropeptides and neurotransmitters that affect both respiratory and brain processes. Because of their involvement in inflammation and cholinergic activity, PNECs have been linked to illnesses such as asthma and neurodegenerative disorders (Thakur et al., 2024). Furthermore, different breathing protocols, such as spontaneous or slow breathing, can modify neuronal activity in multiple brain areas, affecting biochemical and physiological factors like oxygen supply and cerebral blood circulation (Goheen et al., 2023).

7 Psychological Interventions and Brain Health

Research investigating the effect of psychological therapies on brain health in chronic respiratory diseases (CRD) has yielded encouraging results. CBT and mindfulness-based therapies have been shown to increase brain function and reduce psychological distress in CRD patients (Davies et al., 2023). Integrating neuroimaging with personalized therapy in pulmonary rehabilitation can improve treatment, especially for COPD, by changing the brain's reaction to dyspnoea (Herigstad et al., 2017; Fuller & Mitchell, 2017). These findings show the necessity of including psychological therapy in pulmonary rehabilitation for patients with CRD to improve health outcomes.

The WHO Executive Board's recommendation to develop global rehabilitation systems is consistent with the need to integrate psychological interventions in pulmonary rehabilitation into the national health plans (Seijas et al., 2023). This integration helps to achieve SDG 3, which promotes universal health and well-being.

However, developing countries confront enormous obstacles, as pulmonary rehabilitation is frequently underfunded and inaccessible. Marginalized communities, particularly those impacted by socioeconomic status and geographic isolation, face additional challenges to access. To address these difficulties, countries must prioritize pulmonary rehabilitation by devoting resources, training healthcare workers, and improving access to neglected communities.

8 Conclusion

Integrating psychological assessments into pulmonary rehabilitation is critical for meeting the complex needs of patients with chronic respiratory disorders (CRD). Standardizing program content with psychological interventions, delivery methods, and health promotion tactics will enhance treatment effectiveness and patient outcomes. Emerging research on the association between psychological factors and inflammation emphasizes the importance of a multidisciplinary approach, with therapies such as CBT and mindfulness providing considerable advantages. In line with WHO recommendations and the Sustainable Development Goals, there is an urgent need to incorporate psychological interventions and pulmonary rehabilitation into global health systems, addressing issues such as underfunding and accessibility. Furthermore, revamping respiratory physiotherapy curricula to include psychological assessments and breathing neuroscience would result in better long-term clinical practice and patient care.

Authors' Conflict of Interest
There is no known conflict of interest.

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