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**Beyond breathlessness: unveiling chronic cough in interstitial lung diseases.
A pilot Portuguese cohort**

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Informed consent: digital informed consent were obtained from each participant.

Patient consent for publication: digital consent were obtained from each participant.

Availability of data and materials: data will be made available on request.

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Dear Editor,

Chronic cough (CC), lasting at least 8 weeks, is a prevalent symptom in individuals with interstitial lung disease (ILD), posing significant physical, psychological, and social challenges. It is associated with urinary incontinence, sleep disturbances, chest pain, and contributes to social embarrassment, depression, and anxiety. Clinically, CC serves as a predictor of ILD severity and progression. Additionally, it is linked to workplace productivity loss, with a 3% increase in productivity loss for each 1mm rise in cough severity on a 100mm visual analogue scale. Despite growing research interest in CC and ILD, global data on CC characteristics remain scarce. In Portugal, no studies or prevalence data exist. This study aimed to investigate CC prevalence, characteristics, and impacts on individuals' lives, as well as explore healthcare professionals' and patients' perspectives on CC assessment and management.

Two cross-sectional, internet-based surveys were conducted according to the Consensus-Based Checklist for Reporting of Survey Studies (CROSS) with healthcare professionals providing direct care to people with ILD and individuals with ILD in Portugal. Ethical approval from two committees and digital informed consent were obtained from each participant. One survey targeted people with ILD, while the other targeted healthcare professionals. Sociodemographics, health status, risk factors, characteristics, assessment, and management of CC were collected. Further details on data collection can be found in supplementary material A and both surveys are available upon request. Descriptive statistics were used to analyze the data. Prevalence was calculated by the number of individuals with ILD who reported CC divided by the total number of participants with ILD. In the healthcare professional survey, prevalence was estimated by the percentage of ILD patients with CC reported by respondents.

Sixty-nine healthcare professionals and 52 individuals with ILD provided valid responses. Healthcare professionals were primarily pulmonologists (55%), physiotherapists (17%), and rheumatologists (13%), with a median ILD-focused practice of 5.5 years. Individuals with ILD (58% female, mean age 64.3 years) had a median ILD duration of 5 years, with the most common diagnosis being connective tissue disease-associated ILD (25%). Sample characteristics are detailed in supplementary material B. CC prevalence in ILD ranged from 44% (reported by individuals with ILD) to 52% (reported by healthcare professionals). Both groups agreed that CC was predominantly dry, with an average duration of two years, and smoking was the most common trigger. The primary impact reported by both groups was reduced quality of life. However, while healthcare professionals cited fatigue and shortness of breath as the main associated symptoms, individuals with ILD more frequently reported sputum, wheezing, and hoarseness (Figure 1). Ninety percent of individuals with ILD deemed CC an important symptom that should be regularly assessed, and 91% had already discussed

their CC with a healthcare professional, mainly pulmonologists (100%) and family/general practitioners (42%). Similarly, 94% of healthcare professionals reported routinely assessing CC, and 86% reported managing it. Assessment was primarily conducted via medical history (91%) and lung function tests (54%), focusing on cough type (96%), duration (85%), impact (80%), triggers (78%), and frequency (76%). Management strategies included education for dry CC (73%) and airway clearance techniques for productive CC (80%) (Figure 2). While 92% of individuals with ILD preferred pharmacological treatment, they rated non-pharmacological treatments (e.g., breathing exercises, physiotherapy) as more effective (Figure 3).

This study, the first of its kind in Portugal, aligns with international data showing CC prevalence in ILD ranges from 30% to 90%, depending on ILD subtype and reporting differences. No European studies report CC prevalence in ILD, but an Australian study found a 72% prevalence [1]. Variations may stem from recruitment methods, as our study used an open online questionnaire, including participants unaware of their ILD subtype (21.2%), whereas other studies focused on specific subtypes. Healthcare professionals and individuals with ILD largely agreed on CC characteristics and impacts. However, discrepancies arose regarding symptoms associated with CC, possibly due to differences in ILD subtypes encountered by healthcare professionals versus those participating in the study. Comorbidities in individuals with ILD may also contribute to a higher frequency of productive cough. These findings highlight the importance of effective communication between healthcare professionals and individuals with ILD. Differences in treatment strategies existed between those recommended by healthcare professionals and those followed by individuals with ILD. Notably, 81% of individuals with ILD and CC reported undergoing treatment, but only 70% adhered to healthcare professionals' recommendations, indicating a gap in treatment adherence. As previously reported, CC management strategies remain suboptimal, underscoring the need for tailored approaches that align with patients' needs and preferences.

Despite limited participation from various regions and low response rates, a notable proportion of responses were from specialized hospitals in Lisbon, Coimbra, and Porto. These hospitals, classified as level III Portuguese Hospital Centers, specialize in ILD care, suggesting that responses came from highly experienced professionals. The low response rate among individuals with ILD could be attributed to the aging demographic, limited technology familiarity, and restricted internet access. These findings highlight potential inequalities in access to care. Moreover, the results are supported by a limited sample size with mixed subtypes of ILD and inherently shaped by the Portuguese healthcare context and may not be generalizable to all individuals with ILD with CC, other countries or systems. This local scope reinforces the urgent need for broader, multicentre investigations to better understand chronic cough in ILD across diverse populations and healthcare settings. Future studies could benefit

from involving patient organisations and community representatives from the study beginning, which may help improve outreach and increase participant diversity.

This study reveals that CC affects 44% of individuals with ILD in Portugal, shedding light on both shared and distinct perspectives regarding its impact, symptoms, and management. Importantly, our prevalence numbers are significantly higher than those found in the Portuguese general population, where CC prevalence ranges between 7% and 14% [2,3]. Understanding these differences will allow healthcare professionals to better address CC in ILD, leading to improved patient care. Future research should aim for broader regional representation and further investigation into CC prevalence and characteristics across ILD subtypes.

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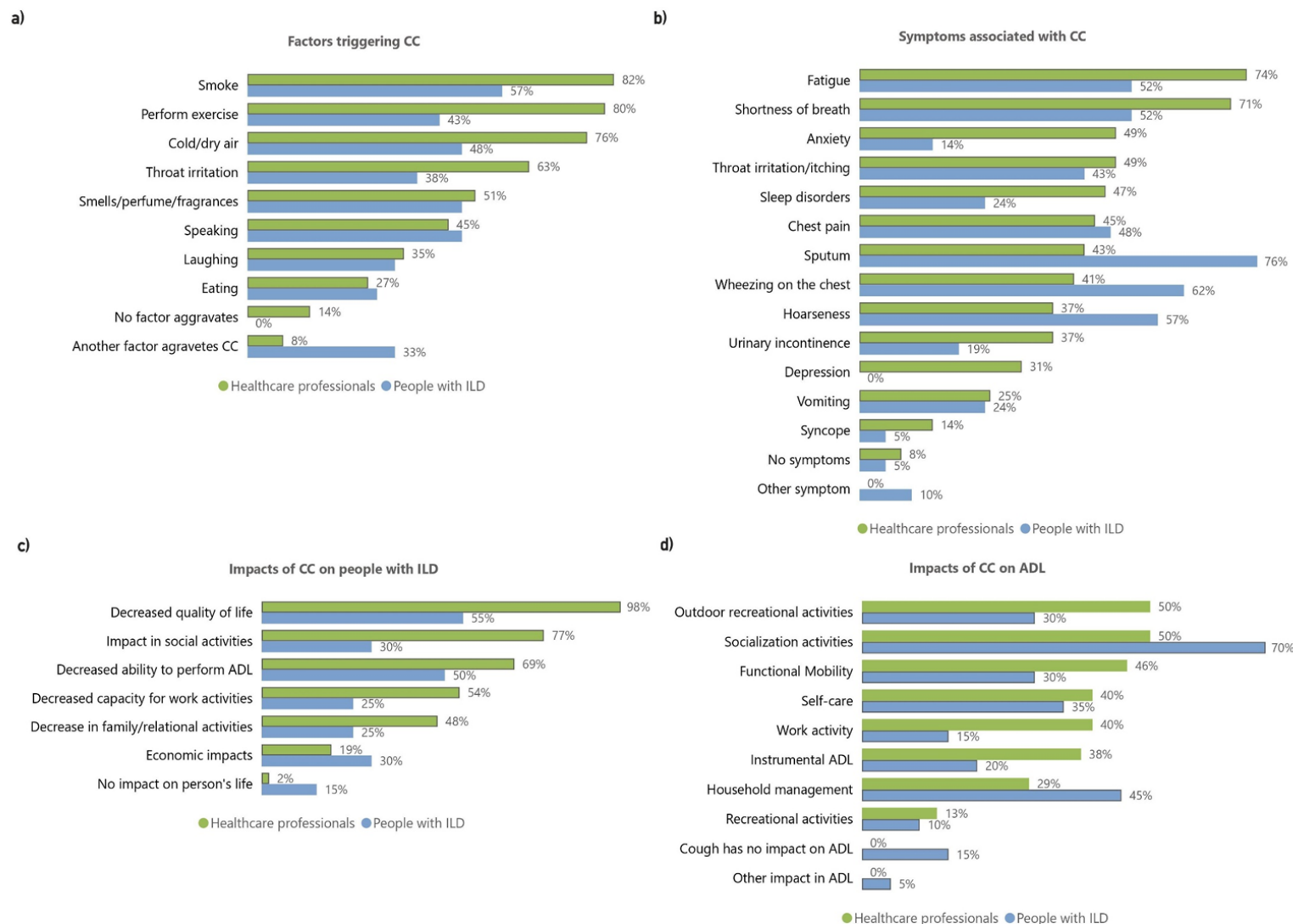


Figure 1. Characteristics and impacts of chronic cough (CC) reported by healthcare professionals, in green, and people with interstitial lung disease (ILD), in blue. a) Factors triggering CC according to healthcare professionals (n=49) and people with ILD (n=21); b) Symptoms associated with CC according to healthcare professionals (n=49) and people with ILD (n=21); c) Impacts of CC on people with ILD as reported by healthcare professionals (n=48) and people with ILD (n=20); and d) Impacts of CC on activities of daily living (ADL) as reported by healthcare professionals (n=48) and people with ILD (n=20). Other ADL include transport weights/purchases.

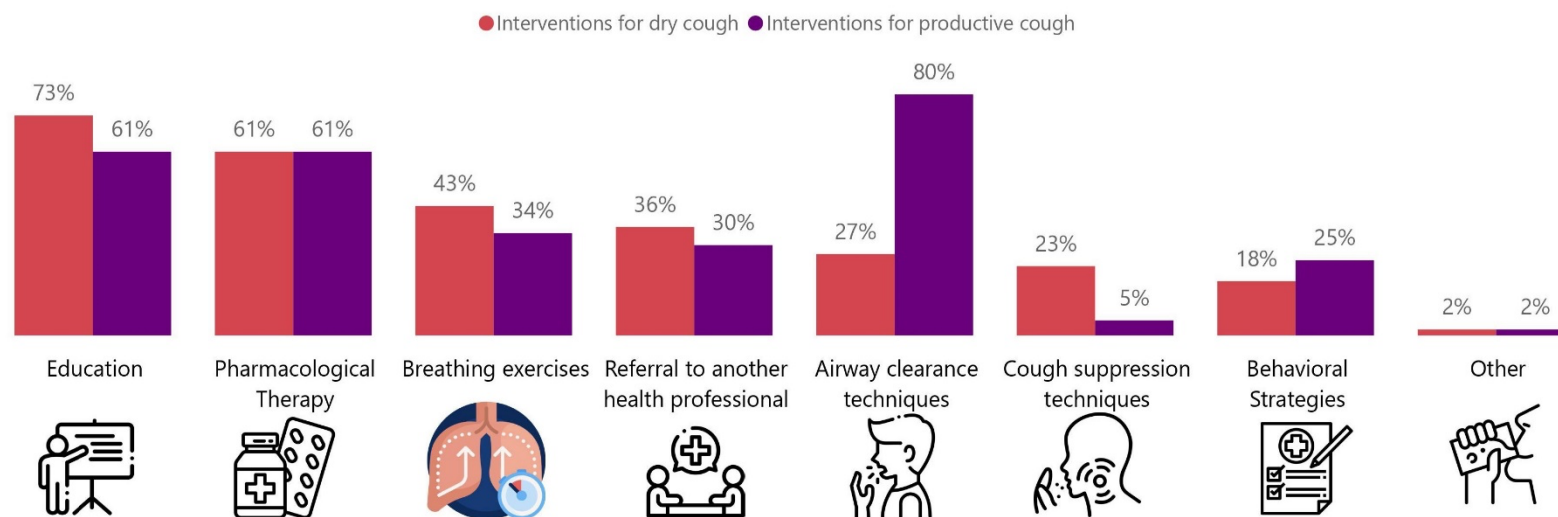


Figure 2. Chronic cough management reported by healthcare professionals (n=44) for dry cough (in pink) and productive cough (in purple).

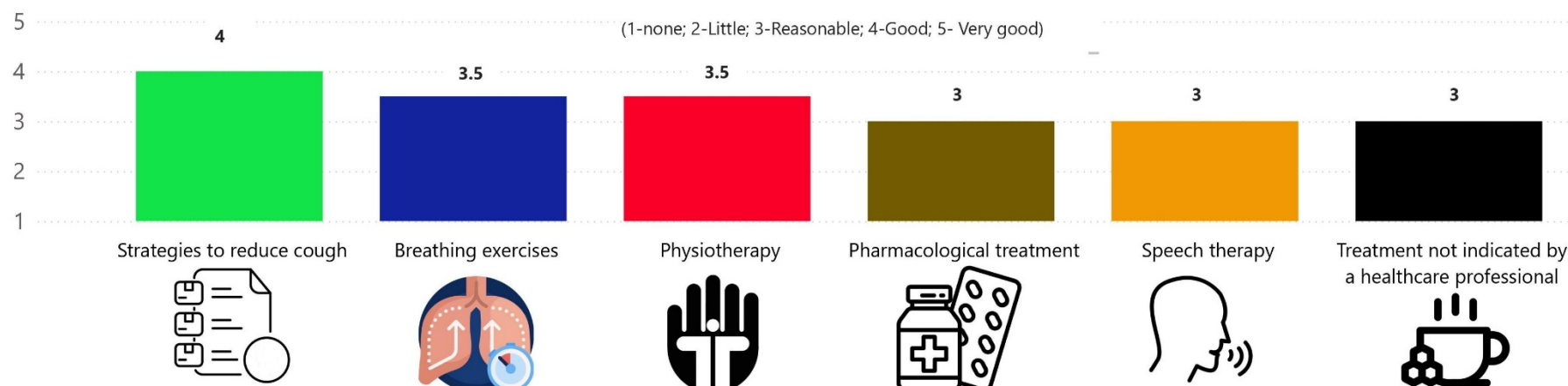


Figure 3. Ranking of success of different treatments in Chronic cough (CC) reported by people with interstitial lung diseases (n=17). Strategies to reduce cough (n=5) include drinking water, avoid factors that worsen coughing; Breathing exercises (n=2); Physiotherapy (n=2); Pharmacological treatment (n=11); Speech therapy (n=1); Treatment not indicated by a healthcare professional (n=8).