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# Understanding emotional and practical challenges of initiating oxygen therapy in pulmonary fibrosis: insights from a patient-centered survey

Marjolein Drent<sup>1,2,3\*</sup>, Lian Trapman<sup>2†</sup>, Miranda Hennevelt-Leenen<sup>2</sup>, Jan C. Grutters<sup>2,4</sup> and Anne-Marie Russell<sup>5,6,7</sup>

## Abstract

**Background** Pulmonary fibrosis (PF) causes respiratory insufficiency due to progressive lung scarring and impaired gas exchange. Although no curative treatment exists, pharmacological therapies may slow progression, while oxygen therapy alleviates hypoxemia, improves functional capacity, and enhances well-being. This study explored psychosocial and practical barriers to oxygen initiation, and their prevalence, among patients with PF.

**Methods** We conducted a cross-sectional mixed-method survey in 2024, following the Consensus-Based Checklist for Reporting of Survey Studies (CROSS), co-developed with the Dutch Pulmonary Fibrosis Patient Association. The 26-item survey was distributed via patient support groups and interstitial lung disease (ILD) clinics in the Netherlands. Eligible participants had PF and were using oxygen therapy. Closed-ended responses were analyzed descriptively, and open-ended responses underwent thematic analysis to capture both measurable outcomes and patient experiences.

**Results** Among 314 respondents, 80% found oxygen therapy beneficial. Initiation was frequently emotionally challenging, eliciting feelings of shame, anxiety, and insecurity. For 40% of participants, oxygen symbolized disease progression and loss, contributing to distress. Practical difficulties included unclear instructions, adjusting flow rates, and managing equipment. Seventy-five percent reported side effects, mostly runny nose, nasal crusting and oral dryness. Notably, 20% experienced no clear benefit, highlighting the need for realistic expectations and ongoing support.

**Conclusion** Starting oxygen therapy imposes both emotional and practical burdens on patients with PF. Holistic care addressing clinical, practical, and psychosocial needs is essential to improve acceptance and optimize outcomes.

**Relevance to clinical practice** Nurses play a central role in reducing barriers to oxygen therapy by providing attentive listening, clear guidance, proactive side-effect management, psychological support, and coordination with physiotherapists and occupational therapists. Nurse-led, integrated interventions can enhance acceptance,

<sup>†</sup>Marjolein Drent and Lian Trapman contributed equally to this work.

\*Correspondence:  
Marjolein Drent  
m.drent@ildcare.nl

Full list of author information is available at the end of the article



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adherence, shared decision-making, autonomy and quality of life, highlighting the need for tailored, multidisciplinary, patient-centered care.

**Patient or public contribution** Patients and the Dutch Pulmonary Fibrosis Patient Association actively contributed to study design and participation.

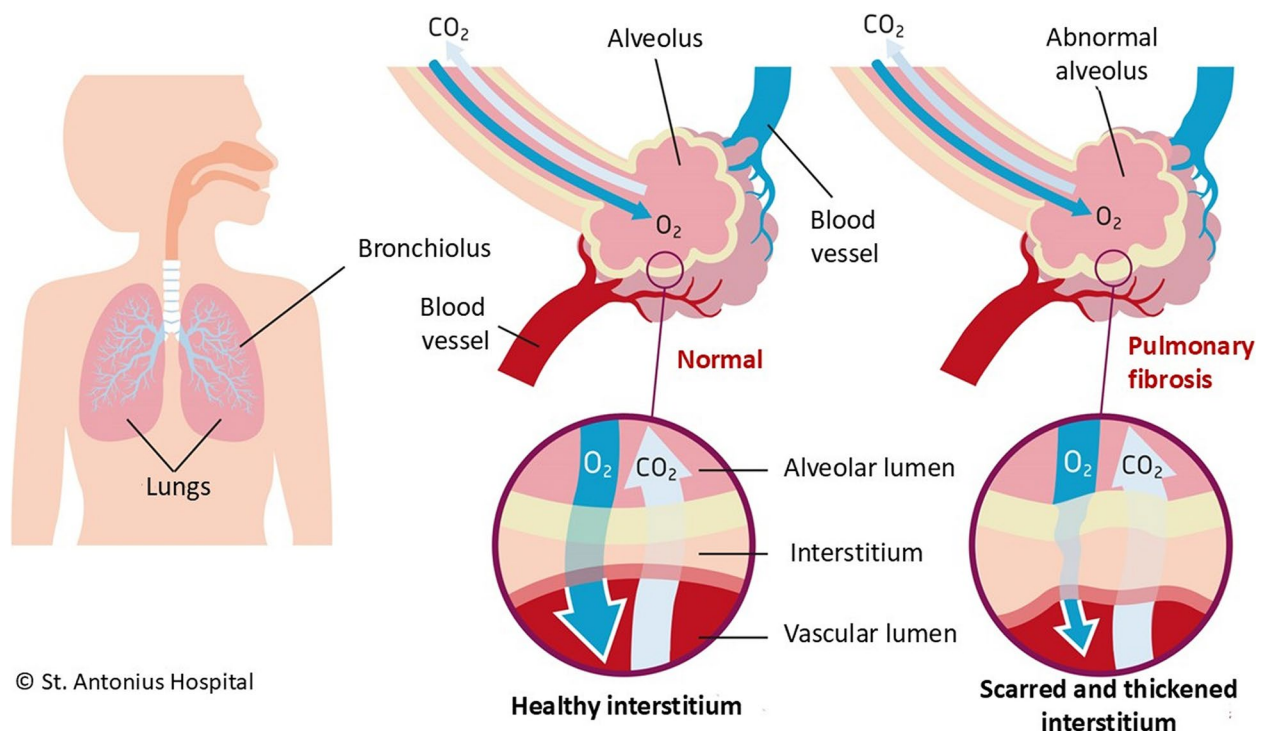
**Keywords** Pulmonary fibrosis, Oxygen therapy, Emotional barriers, Palliative care, Patient experiences, Quality of life, Breathlessness

## Introduction

Pulmonary fibrosis (PF) is a chronic, life-shortening interstitial lung disease (ILD) characterized by irreversible fibrotic remodeling of the lung parenchyma, resulting in impaired gas exchange, progressive dyspnea, functional decline, and respiratory insufficiency (Fig. 1) [1, 2]. Although no curative treatment exists, antifibrotic therapies such as nintedanib and pirfenidone have been shown to slow disease progression and reduce the rate of functional decline measured by forced vital capacity [3–6]. As the condition advances, patients often face worsening symptoms such as dyspnea, persistent cough, reduced exercise capacity, and increasing limitations in daily activities, all of which may profoundly impair quality-of-life (QoL) and overall well-being [7]. In addition, participation in social activities and maintaining interpersonal relationships may become increasingly difficult,

further exacerbating the emotional and psychosocial burden associated with the disease [8, 9].

Patients frequently experience a gradual decline in physical functioning, with their routine tasks such as dressing, bathing, or eating, becoming increasingly challenging over time. Breathlessness, in particular, often leads to activity avoidance and physical deconditioning, creating a vicious cycle of further disability [10]. While pulmonary rehabilitation and antifibrotic therapies are important components of disease management, exertional hypoxemia remains a common and difficult-to-manage symptom [11]. This can occur even in patients with normal oxygen levels at rest and may severely limit physical activity. Despite its clinical relevance, the role of ambulatory oxygen therapy in PF remains insufficiently studied, and evidence regarding its effects on symptom relief and daily functioning is limited.



**Fig. 1** Gas exchange in normal lungs and in pulmonary fibrosis

In healthy lungs (left), oxygen (O<sub>2</sub>) easily moves from the alveoli into the blood, while carbon dioxide (CO<sub>2</sub>) is removed efficiently. In pulmonary fibrosis (right), the interstitium is thickened and scarred, making oxygen transfer to the blood much slower and less effective. This reduced oxygen uptake explains why patients with pulmonary fibrosis often need supplemental oxygen

Oxygen therapy plays a central role in the symptomatic management and palliative care of pulmonary fibrosis, a condition associated with progressive respiratory insufficiency and debilitating symptoms such as dyspnea and fatigue [7, 9, 10, 12]. While it does not modify the underlying disease process, oxygen therapy improves oxygenation, alleviates hypoxemia-related symptoms, and reduces cardiovascular strain. It may also enhance exercise tolerance, reduce breathlessness, and improve overall QoL [13, 14]. Although oxygen therapy can improve symptoms and QoL, patients may face emotional and practical challenges when starting and using oxygen in daily life [15].

Nurses play a pivotal role in supporting patients with interstitial lung diseases (ILD), an umbrella term that includes PF, by providing education and guidance on holistic care strategies, including the use of supplemental oxygen [10, 16]. Early, tailored support from healthcare professionals is essential to help patients make an informed choice when starting oxygen therapy, and to ensure that adaptation to oxygen therapy is effective and acceptable [4, 6, 17]. In the Netherlands, supplemental oxygen therapy is initiated through a structured care pathway. The pulmonologist determines the indication and discusses it with the patient, after which specialized suppliers deliver the oxygen directly to the patient's home. Depending on the healthcare organization and supplier, the degree of nurse involvement may vary; however, a specialized pulmonary nurse usually coordinates the process, arranges the prescription with the supplier, provides education on oxygen use and equipment, and supports initiation and follow-up. This nurse-led approach may shape patients' perceptions of both the practical and emotional aspects of starting oxygen therapy. The James Lind Alliance identified understanding the optimal timing and impact of oxygen therapy as one of the top ten research priorities in PF, underscoring its importance in preserving both quality and length of life [18]. A questionnaire was developed to systematically evaluate the challenges of initiating oxygen therapy and to inform targeted strategies for enhancing patient support.

This study aimed to explore the lived experiences of patients with PF during the initiation and use of oxygen therapy, with specific attention to the emotional and practical challenges they encounter. Study findings will be formulated into recommendations for improving patient-centered care.

## Methods

### Study design

This mixed-methods, cross-sectional study adheres to the Consensus-Based Checklist for Reporting of Survey Studies (CROSS). The questionnaire was developed

collaboratively with content experts, patients, nurses, physicians, and oxygen equipment suppliers. Key topics were identified through discussions, and the draft questionnaire was refined iteratively based on feedback from all stakeholders. Data were collected via a 26-item anonymous online questionnaire, collaboratively developed by the research team, patients suffering from PF, and the Dutch Pulmonary Fibrosis Patient Association. PF was defined as a physician-diagnosed fibrotic ILD for the purpose of this survey and self-reported by the patient. Survey drafts underwent iterative feedback and pilot testing to ensure clarity, relevance, usability, and clinical applicability, with final review by independent patients and pulmonologists. The questionnaire assessed patients' psychosocial and practical experiences when initiating oxygen therapy, including emotional barriers (e.g., stigma, visibility of equipment, fear of disease progression) and practical aspects (e.g., flow settings, information needs, side effects). Closed questions were analyzed descriptively (frequencies and percentages), while open-ended responses were analyzed thematically through independent coding and consensus discussions, allowing us to capture both measurable outcomes and in-depth patient perspectives.

### Study setting and recruitment

Participants were recruited between June 27 and September 11, 2024, via the Dutch Pulmonary Fibrosis Patient Association and multiple healthcare settings, including ILD outpatient clinics and specialized ILD referral centers throughout the Netherlands.

### Inclusion and exclusion criteria

Inclusion criteria were: (1) a self-reported diagnosis of PF; (2) current use of oxygen therapy at the time of participation; and (3) sufficient proficiency in Dutch to read, understand, and complete the questionnaire. Exclusion criteria included patients without experience of oxygen therapy use.

### Data analysis

Quantitative data from closed survey questions were analyzed using descriptive statistics (frequencies and percentages) to summarize participant characteristics and responses. Qualitative data from open-ended questions were analyzed using content and thematic analysis. The open-text responses were analyzed using inductive thematic analysis, as previously described by Braun and Clarke [19]. Initial coding was done by one researcher (MHL), who reviewed all responses and assigned codes based on recurring patterns and meanings. These codes were then discussed with a second researcher (LT), and collaboratively grouped into overarching themes. To ensure consistency and reliability, the proposed themes

were subsequently reviewed and finalized in consultation with the full research team.

A patient study advisory group, members of the Dutch Pulmonary Fibrosis Patient Association, was consulted to validate the thematic structure and interpretation of findings. This mixed-methods analytic approach enabled integration of measurable outcomes with rich patient narratives, providing a comprehensive understanding of the emotional and practical barriers to oxygen therapy initiation.

### Ethical considerations

This study was conducted in accordance with the Declaration of Helsinki and its subsequent amendments. The Medical Ethics Committee of St. Antonius Hospital, Nieuwegein, the Netherlands was consulted for ethical advice and concluded that formal ethical approval was not required under the Dutch Medical Research Involving Human Subjects Act (WMO), as no interventions or patient-identifiable data were involved. Before participation, all respondents were informed about the study's aims and data handling procedures. Participation was voluntary and anonymous, and completion of the questionnaire indicated informed consent [20].

### Rigor and reflexivity

To ensure rigor, triangulation was applied through collaboration among patients, clinicians, and researchers during questionnaire development and data interpretation. Reflexivity was promoted through regular team discussions to challenge assumptions and enhance transparency in the coding and analysis process.

### Results

A total of 500 Dutch patients with PF who had initiated oxygen therapy were invited to complete the survey, of whom 314 participated in the online survey, resulting in a response rate of approximately 68%. The majority were male (63%;  $n=197$ ), with a median age of 73 (35–92) years. Most participants (71%;  $n=222$ ) had received their diagnosis more than two years prior to survey participation. Table 1 summarizes the participants' demographic and clinical characteristics.

The majority of patients perceived oxygen therapy as beneficial ( $n=252$ ; 80%); of whom 71% indicated that they were able 'to do more.' A smaller proportion reported that they could sustain physical activity for longer and recover more quickly (8%), and a few reported improved mental clarity (1%). 20% ( $n=63$ ) reported no improvement. Additional stratified analyses by duration of oxygen therapy ( $\leq 1$  year vs.  $> 1$  year) revealed comparable perceived benefit and similar types and frequencies of reported challenges (data not shown). Those who had been using oxygen therapy for more than one year (53%)

**Table 1** Summary of the characteristics of participants with pulmonary fibrosis

Self-reported diagnosis of pulmonary fibrosis	Total $n=314$
	<b>100 (314)</b>
Age, median (range)	73 (35–92)
Sex, male: % (n)	63 (197)*
Time since diagnosis	
< 6 months, % (n)	4 (11)
6 months–1 year, % (n)	7 (22)
1–2 years, % (n)	18 (57)
>2 years, % (n)	71 (222)
Start oxygen supplementation	
< 1 year, % (n)	47 (147)
$\geq 1$ year, % (n)	53 (167)
Oxygen median O <sub>2</sub> l/min. (range O <sub>2</sub> l/min.)	2–3** (1–12)
Oxygen use	
nocturnally and during physical exertion, % (n)	20 (64)
only during physical exertion throughout the day, % (n)	41 (129)
continuously, 24 h a day, % (n)	39 (121)

\* 2 missings

\*\*median in rest 2 and during physical exertion 3

required 0–2 L of oxygen per minute at rest, increasing to 2–4 L per minute during physical activity. Only 20% ( $n=64$ ) used oxygen therapy during the night as well as during physical exertion, 39% ( $n=121$ ) day and night, and 41% ( $n=129$ ) of participants did not use oxygen therapy nocturnally. Analysis of patients' experiences with oxygen therapy revealed several key considerations.

More than 40% ( $n=125$ ) reported experiencing various obstacles when initiating oxygen therapy (see Table 2).

From the responses to the open ended questions, five themes were identified (see Table 3 for illustrative quotes).

### Confrontation with disease progression

For many patients, starting oxygen therapy marked a turning point in their illness. It was perceived as a visible sign of disease progression and an undeniable

**Table 2** Prevalence of reported difficulties when initiating oxygen therapy

Reason	
Total number participants who experienced difficulties	40 (125)
Feeling of increasing deterioration	32 (100)
Shame due to the visibility of the condition	25 (78)
Emotional, confronting, and uncertainty	20 (63)
Oxygen use is challenging and a hindrance to daily activities	18 (56)
Fear of dependency, loss of independence	5 (15)
Other	8 (25)

Data are expressed in percentage with number in parentheses

**Table 3** Themes from patient experiences with initiating oxygen therapy, illustrated by representative quotes

Theme	Description	Illustrative patient quotes
Confrontation with disease progression	Oxygen therapy was perceived as a visible marker of disease worsening and loss of former abilities.	"It was very confronting because that's when I realized just how sick my lungs are." "Not getting better at a young age, and now it's visible."
Loss of former identity and independence	Patients described oxygen use as symbolizing a break with their previous life and autonomy.	"It feels like your life changes forever from that moment; you lose your old, familiar life." "It felt like a step backward, like being less capable."
Visibility and stigma	The visibility of oxygen equipment evoked feelings of shame and altered social interactions.	"People start looking at you differently, which is not always pleasant." "Using oxygen is a public statement of being chronically ill."
Emotional distress and uncertainty	Initiation of oxygen therapy triggered sadness, fear, and uncertainty about the future.	"The very first time you have to step over a 'threshold.' "Admitting that there's no turning back is very confronting." "Not getting better at a young age, and now it's visible."
Practical burden of oxygen therapy	Managing equipment and planning daily activities with oxygen was perceived as restrictive.	"I have to keep thinking about having enough oxygen supply with me."

confirmation that improvement was no longer possible. This realization was deeply confronting and often accompanied by feelings of loss.

#### Loss of former identity and independence

Oxygen therapy was described as symbolizing a break from patients' previous lives and autonomy. The need for continuous oxygen support led patients to fear losing the ability to manage daily activities independently.

#### Visibility and stigma

The visibility of oxygen equipment in public settings evoked feelings of shame and altered social interactions. Patients felt exposed and perceived that others viewed them differently, which was often distressing.

#### Emotional distress and uncertainty

Initiating oxygen therapy triggered a range of emotions, including sadness, fear, and uncertainty about the future. Patients described the experience as crossing a threshold, acknowledging that there was no turning back.

**Table 4** Frequency of patient-reported side effects of oxygen therapy

Overall side effects	75 (235)
Nose	
Runny nose	40 (126)
Nasal crusting	35 (110)
Dry nose	28 (88)
Nosebleeds	14 (45)
Mouth/Throat/Respiratory tract	
Dry mouth/throat	28 (89)
Oral pain	2 (5)
Coughing and expectorating mucus	0.6 (2)
Pressure points from tubing	
Under the nose	15 (47)
Behind the ears	12 (39)
On the cheekbones	4 (13)
Other	
Hoarseness	14 (43)
Change in taste and/or smell	10 (34)
Headache	5 (17)
Back pain from carrying heavy oxygen tanks	0.3 (1)
Nausea	0.3 (1)

Data are expressed in percentage with number in parentheses

#### Practical burden

Beyond the emotional impact, patients experienced the practical aspects of oxygen therapy as restrictive. Managing equipment and planning daily activities around oxygen supply added stress and complexity to daily life.

#### Side effects

75% of participants ( $n = 235$ ) reported experiencing at least one side effect from oxygen therapy, with the most common being runny nose (40%;  $n = 126$ ), nasal crusting (35%;  $n = 110$ ) and oral or throat dryness (28%;  $n = 89$ ) (see Table 4).

The high prevalence of side effects highlights the need for increased attention and preventive efforts to mitigate their impact. At flow rates above 5 L at rest, patients were more likely to experience nasal complications.

#### Experienced effect of oxygen therapy

Nearly 20% of participants reported no noticeable positive effect from their oxygen therapy. This suggests there is a need to discuss expectations prior to treatment and regularly evaluate the effectiveness of supplemental oxygen therapy.

#### Satisfaction with information and equipment and experienced challenges

At the initiation of oxygen therapy, 19% ( $n = 60$ ) of participants reported the information provided by the

attending nurse was perceived as inadequate. Common shortcomings included a lack of clear instructions on the operational aspects of oxygen therapy, such as appropriate flow settings (liters per minute), timing and duration of use, and available equipment. An absence of written information and follow-up after the initial explanation was often reported. Additionally, there was uncertainty regarding risks such as excessive oxygen use, and patients experienced difficulties in monitoring their progress.

Beyond nursing care, concerns were also raised regarding the information provided by suppliers. 10% ( $n=30$ ) of participants reported dissatisfaction with the service. Key concerns included unclear instructions regarding equipment maintenance, battery usage, and other functionalities, as well as a lack of clear and patient-friendly communication. Further, 11% ( $n=34$ ) of participants reported dissatisfaction with the equipment initially provided. Patients relying on non-portable oxygen devices reported lower satisfaction.

Patients who were initially provided with a mobile concentrator or a home filling system reported higher levels of satisfaction with their equipment (90% and 92%, respectively) compared with those who used liquid oxygen or cylinders (67% and 63%, respectively).

Of all participants, 32% ( $n=100$ ) reported a perceived deterioration in their health status upon initiation of oxygen therapy. Feelings of shame related to the visibility of oxygen use were reported by 25% ( $n=78$ ) of respondents, while 20% ( $n=63$ ) described emotional challenges, including confrontation with their illness and uncertainty about the future. More than half, 18% ( $n=56$ ), experienced practical difficulties, such as the burden of equipment and interference with daily activities. A smaller proportion, 5% ( $n=15$ ), expressed concerns about becoming dependent on oxygen and losing independence.

## Discussion

This study provides a comprehensive overview of emotional, practical, and informational challenges experienced by patients with pulmonary fibrosis using supplemental oxygen therapy. Although oxygen therapy was perceived as beneficial by the majority of respondents (80%), a substantial minority reported limited or no perceived benefit, highlighting the importance of managing expectations and providing ongoing support. These findings align with previous qualitative studies showing that oxygen therapy may simultaneously alleviate symptoms while introducing new burdens into daily life [14, 21, 22].

### Core findings in relation to previous literature

Our findings replicate and extend earlier work describing ambivalent patient experiences with oxygen therapy.

Earnest et al. demonstrated that oxygen use can both improve symptom control and reinforce illness identity, contributing to emotional distress [23]. Similarly, Khor et al. reported that patients with fibrotic lung disease experience oxygen therapy as a trade-off between physical relief and social restriction [15]. Graney et al. emphasized the impact of oxygen therapy on QoL, autonomy, and daily functioning [24]. The present study adds to the existing literature by quantifying the prevalence of specific emotional and practical barriers in a large national cohort. In line with previous reports, our results further demonstrate that oxygen therapy is often perceived as a visible marker of disease progression, evoking shame, sadness, and anxiety in a substantial proportion of patients [21].

### Emotional and psychosocial impact

Initiation of oxygen therapy was frequently described as a confronting milestone, symbolizing irreversible disease progression [24]. Approximately 40% of participants reported emotional distress at initiation, including feelings of shame, sadness, and uncertainty, which patients often found particularly challenging or confronting. This confirms earlier qualitative reports that the visibility of oxygen equipment alters social interactions and self-perception [21]. An open discussion about the benefits and limitations of oxygen therapy—such as improving QoL and prolonging mobility without altering disease progression—may help reduce anxiety and support acceptance [15, 24]. Psychological or peer support can assist patients in processing grief, fear, and loss of identity associated with disease progression [4, 23, 25].

### Practical challenges and side effects

In addition to emotional barriers, patients reported substantial practical challenges, including equipment burden, unclear instructions, and side effects. Runny nose, nasal crusting and oral dryness were common and often underestimated. At low oxygen flow rates, passive humidification is frequently ineffective, a finding consistent with clinical practice and prior reports [4, 26]. Carborer-based water gels may alleviate mucosal dryness by providing local moisture and protection, though formal evidence is limited. Importantly, oil-based creams, salves, or ointments should not be used intranasally, irrespective of oxygen therapy, due to the risk of impaired mucociliary clearance and potential aspiration [27]. Water-based products, including saline sprays and water-based nasal ointments (sometimes containing medical-grade honey for moisturizing properties), are preferred. Management of oral dryness should follow palliative care recommendations, including exclusion of fungal infection, stimulation of salivary flow, and the use of saliva substitutes [4, 16, 28]. Currently, evidence-based guidelines for the

management of nasal dryness are absent. Clear guidance from healthcare professionals, combined with proactive management and education, is therefore essential to prevent inappropriate use of intranasal products and ensure safe and effective management of nasal side effects.

#### **Managing expectations and shared decision-making**

Nearly 20% of patients experienced no clear benefit from oxygen therapy, underscoring the need for realistic expectation-setting. These findings support earlier observations that mismatches between patient expectations and perceived effects of oxygen therapy may lead to frustration or disengagement [24]. Healthcare professionals play a crucial role in aligning expectations through clear communication, shared decision-making, and individualized follow-up. Oxygen therapy should be framed as a supportive measure aimed at symptom relief rather than disease modification [4–6, 29].

#### **Role of nurses and implications for clinical practice**

Nurses play a central and multifaceted role in supporting patients initiating oxygen therapy. Beyond providing clear instructions and technical guidance, they address the emotional and psychosocial challenges that often accompany oxygen initiation, including anxiety, shame, and feelings of disease progression. Through attentive listening, reassurance, and proactive side-effect management, nurses help patients build confidence in using oxygen therapy and improve adherence. Collaboration with physiotherapists, occupational therapists and other healthcare professionals ensures that oxygen therapy is integrated into daily routines in a practical and patient-centered way. Patients with PF face both emotional challenges—such as shame, anxiety, and fear of disease progression—and practical difficulties, including equipment management and therapy-related side effects when starting oxygen therapy. These challenges highlight the importance of nurse-led, multidisciplinary care that combines empathetic communication, tailored patient education, proactive side-effect management, clear safety guidance, and accessible follow-up to facilitate acceptance, support informed decision-making, and optimize outcomes [30, 31]. In parallel, physiotherapy and the promotion of an active lifestyle remain essential to preserve physical fitness and functional capacity [11, 32, 33]. Currently, evidence-based guidelines for the management of certain oxygen therapy-related side effects are absent [18]. Providing clear, structured guidance on common oxygen therapy-related issues—such as nasal and/or oral dryness, nasal crusting, and rhinorrhea—together with education and competency frameworks for ILD nurses enables safe, consistent, and patient-centered care, thereby improving adherence, safety, QoL, and overall patient outcomes within specialist ILD clinics [4, 7, 26].

#### **Limitations**

This study has inherent limitations related to its cross-sectional, survey-based design, which precludes assessment of changes over time or causal inferences. Due to the anonymous survey design and lack of access to medical records, specific ILD subtypes and formal confirmation of consensus-based progressive pulmonary fibrosis (PPF) criteria could not be independently verified; diagnostic information was therefore based on patient self-report. Recruitment through the Dutch Pulmonary Fibrosis Patient Association and specialized ILD care settings may have introduced selection bias toward more engaged or health-literate patients. All data were self-reported, carrying the risk of recall bias and subjective interpretation. The qualitative component relied on a limited number of open-ended survey questions, restricting depth compared with in-depth interviews. Future studies employing more in-depth qualitative methods, such as semi-structured interviews or open-ended, benefit-focused questions, may provide a more balanced and nuanced understanding of both benefits and challenges of oxygen therapy from the patient perspective. Although the questionnaire was co-developed with patients and clinicians and pilot-tested for clarity, it was not formally psychometrically validated. Furthermore, as the study was conducted within the Dutch healthcare system, generalizability to other healthcare contexts may be limited. Nevertheless, the large sample size and the integration of quantitative and qualitative findings provide robust, clinically relevant insights into patient experiences.

#### **Conclusion**

The survey among patients with pulmonary fibrosis highlights the need for a holistic approach to oxygen therapy that addresses both medical and psychosocial aspects. Experiences from this group likely apply to other European countries and other ILDs. Early education, personalized guidance, and practical support—including side-effect management—can improve acceptance and adherence. Recommended measures, such as healthcare provider training, physiotherapy support, and informational brochures, empower patients, reduce stigma, and enhance therapy management. Collaboration between providers and suppliers is essential to ensure a holistic and patient-centered care aimed to improve QoL.

#### **Supplementary Information**

The online version contains supplementary material available at <https://doi.org/10.1186/s12890-026-04143-z>.

Supplementary Material 1.

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#### Authors' contributions

Marjolein Drent and Lian Trapman contributed equally to this work. All listed authors have contributed substantially to the manuscript in the following ways: M.D.: conceptualization, methodology, investigation, formal analysis, supervision, writing – original draft, writing – review and editing. L.T.: conceptualization, methodology, investigation, formal analysis, supervision, writing – original draft, writing – review and editing. M.H.L.: conceptualization, methodology, investigation, writing – review and editing. J.C.G.: review. A-M.R.: conceptualization, writing – review and editing. All authors agree to be held accountable for all aspects of work, ensuring integrity and accuracy.

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#### Data availability

Anonymized data can be made available to investigators upon request to the corresponding author.

#### Declarations

##### Ethics approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki and its subsequent amendments. The Medical Ethics Committee of St. Antonius Hospital, Nieuwegein, the Netherlands was consulted for ethical advice and concluded that formal ethical approval was not required under the Dutch Medical Research Involving Human Subjects Act (WMO), as no interventions or patient-identifiable data were involved. Before participation, all respondents were informed about the study's aims and data handling procedures.

##### Consent for publication

Not applicable.

##### Competing interests

The authors declare no competing interests.

##### Supplementary Information

The online version contains supplementary material available at: [Link Supplementary Material Survey with instructions](#).

Participation was voluntary and anonymous, and completion of the questionnaire indicated informed consent. (The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.)

##### Author details

<sup>1</sup>Department of Pharmacology and Toxicology, Faculty of Health, Medicine and Life Sciences, Maastricht University, Maastricht, Netherlands

<sup>2</sup>Interstitial Lung Diseases Center of Excellence, Department of Pulmonology, St Antonius Hospital, Nieuwegein, Netherlands

<sup>3</sup>ild care foundation research team, Ede, Netherlands

<sup>4</sup>Division of Heart and Lungs, University Medical Center Utrecht, Utrecht, Netherlands

<sup>5</sup>School of Health Sciences, University of Birmingham, Birmingham, UK

<sup>6</sup>Birmingham Regional NHS Interstitial and Occupational Lung Disease Service, University Hospitals Birmingham NHS Foundation Trust, Birmingham, UK

<sup>7</sup>Faculty of Health and Medical Sciences, University of Adelaide, Adelaide, South Australia, Australia

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