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Perspective

Transforming long-term oxygen therapy in India: Bridging gaps and pioneering solutions

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The burden of chronic respiratory diseases in India has risen significantly, with their contribution to the total disability-adjusted life years (DALYs) increasing from 4.5% (95% UI: 4.0–4.9) in 1990 to 6.4% (5.8–7.0) in 2016. Notably, India accounted for 32.0% of the total global DALYs from chronic respiratory diseases in 2016, reflecting a disproportionately high burden. This escalating contribution to the overall disease burden, particularly in the less developed low epidemiological transition level (ETL) states, underscores the critical need for targeted policy interventions and healthcare strategies to mitigate the substantial health loss associated with chronic respiratory diseases in India.¹ Long-term oxygen therapy (LTOT), or home oxygen therapy, remains a cornerstone in the management of severe hypoxemia, particularly for individuals with chronic respiratory diseases. In India, Chronic Obstructive Pulmonary Disease (COPD), Interstitial Lung Disease (ILD), and Post-Tuberculosis Lung Disease (PTLD) are among the most common conditions warranting LTOT. Pulmonary impairment following tuberculosis ranges from 18% to 87%, depending on the population studied, highlighting the significant burden of post-TB morbidity in high tuberculosis prevalence countries such as India.^{2,3} The latest evidence-based recommendations for home oxygen therapy in adults with

chronic lung diseases are outlined in Table 1.

A recent study by Ekström et al. has demonstrated that 15 hours of oxygen therapy in patients with severe hypoxemia is as effective as 24 hours of therapy, suggesting that a reduced duration may suffice for certain patients, thereby optimizing resource utilization.⁶ However, clinicians must consider a range of additional critical factors when prescribing oxygen therapy to ensure a comprehensive, individualized approach. Notably, Ekström et al. emphasize the importance of regularly reassessing patients on long-term oxygen therapy (LTOT), as studies show that 30–50% of patients may no longer require oxygen therapy after three months of treatment.^{6,7} Routine follow-ups are essential to evaluate the ongoing necessity of LTOT, avoid unnecessary treatments, and reduce healthcare costs. This is especially crucial in resource-constrained settings such as India, where regular monitoring via in-person visits or telemedicine consultations can ensure effective management. Furthermore, smoking cessation plays a pivotal role in LTOT management, as smoking exacerbates respiratory conditions and significantly impairs therapeutic outcomes.^{4,7} In India, where smoking prevalence remains high, integrating targeted smoking cessation programs into LTOT care pathways is vital.^{8,9} Public health campaigns combined with cessation support can substantially improve long-term outcomes for LTOT patients, mitigating the risks associated with continued tobacco use.

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Table 1: Current recommendations on home oxygen therapy for adults with chronic lung disease^{4,5}

Condition	Recommendation	Indication
COPD - Severe Chronic Resting Room Air Hypoxemia ⁴	Prescribe long-term oxygen therapy (LTOT) for at least 15 hours per day.	Severe hypoxemia defined as: 1) PaO ₂ < 55 mm Hg (7.3 kPa) or SpO ₂ < 88%. 2) PaO ₂ = 56–59 mm Hg (7.5–7.9 kPa) or SpO ₂ = 89% plus one of the following: edema, hematocrit > 55%, or P pulmonale on an ECG.
COPD - Moderate Chronic Resting Room Air Hypoxemia ⁴	Do not prescribe LTOT.	SpO ₂ = 89–93%.
COPD - Severe Exertional Room Air Hypoxemia ⁴	Prescribe ambulatory oxygen.	Severe exertional hypoxemia.
ILD - Severe Chronic Resting Room Air Hypoxemia ⁴	Prescribe LTOT for at least 15 hours per day.	Severe chronic resting room air hypoxemia.
ILD - Severe Exertional Room Air Hypoxemia ⁴	Prescribe ambulatory oxygen.	Severe exertional hypoxemia.
Post TB Lung Disease ⁵	Prescribe long-term oxygen therapy (LTOT) for at least 15 hours per day.	Severe Hypoxemia defined as: Pao ₂ < 55 mmHg, Spo ₂ < 88% on room air, Pao ₂ between 56 and 59 mmHg associated with cor pulmonale, and/or hematocrit > 55%.
Chronic Lung Disease - Mobile Patients with High Oxygen Flow Requirement ⁴	Prescribe portable liquid oxygen (LOX).	Requirement of continuous oxygen flow > 3 L/min during exertion.
Home Oxygen Therapy Education and Safety ⁴	Provide instruction and training on the use and maintenance of oxygen equipment, including safety and smoking cessation.	Instructions to be given to all patients prescribed home oxygen therapy

In India, however, the accessibility of LTOT remains a critical challenge. The high costs of oxygen concentrators, combined with limited insurance coverage, make it difficult for many patients to access home-based oxygen therapy. (7) Currently, many patients who require LTOT face a stark choice: remain hospitalized for an extended period, which increases the risk of complications and infections, or go without oxygen therapy at home due to its prohibitive cost. By advocating for insurance reimbursement for home oxygen therapy, the government and policymakers can significantly improve access to care and reduce the burden on hospital infrastructure.

Oxygen banks, an innovative approach to address oxygen shortages, facilitate access to life-saving oxygen therapy for patients with respiratory illnesses by enabling the rental or provision of oxygen concentrators. These concentrators extract oxygen from ambient air, offering a cost-effective and decentralized solution for patients requiring LTOT at home. During the COVID-19 pandemic, this concept proved particularly vital in reducing the strain on overwhelmed healthcare systems while providing continuous oxygen support to patients in home isolation. A notable example is Rajasthan's Oxygen Concentrator Banks initiative, introduced by the state government to ensure equitable access to medical oxygen. With a network spread across districts, these banks house thousands of concentrators, available on a rental basis with minimal security deposits. Patients with a doctor's prescription can access these concentrators, which are

delivered to their homes, along with operational training for family members. This initiative has alleviated pressure on hospitals, minimized infection risks, and improved respiratory care for patients with conditions like COVID-19, COPD, and silicosis.¹⁰ Rajasthan's model underscores the potential for scalability to other states, offering a template for addressing oxygen needs in rural and underserved areas while enhancing healthcare delivery efficiency.

To realize the full potential of LTOT in India, it is imperative to address critical gaps, including the widespread availability of oxygen concentrators, the expansion of insurance coverage for LTOT, the integration of robust smoking cessation programs, and the establishment of regular reassessment protocols for LTOT patients. Embracing patient-centered, adaptable approaches to oxygen therapy, reinforced by innovative, community-driven initiatives such as Oxygen Concentrator Banks, offers a transformative pathway to improving the standard of care for individuals with chronic respiratory diseases. By alleviating the burden on overextended hospital systems and ensuring equitable access to life-saving resources, India stands poised to make significant strides in mitigating the escalating public health challenge posed by respiratory illnesses, thereby fostering a more resilient and inclusive healthcare infrastructure.


Conflict of Interest

None.

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