

# EVALUATION OF KNOWLEDGE, ATTITUDE, AND PERCEPTION OF PATIENTS USING LONG-TERM OXYGEN THERAPY (LTOT)

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## ABSTRACT

**Objective:** To assess the knowledge, attitudes, and perceptions of patients with chronic lung diseases about long-term oxygen therapy (LTOT).

**Materials and Methods:** This cross-sectional study was conducted in the Pulmonology Department of MTI-Khyber Teaching Hospital, Peshawar, from January 1, 2023, to June 1, 2023. Patients with chronic lung diseases receiving LTOT were included, while terminally ill patients and those unable to communicate were excluded. Data were collected using a structured proforma that assessed demographics, indications, duration of LTOT, and knowledge, attitudes, and perceptions regarding LTOT.

**Results:** Among 50 patients studied, 42% used oxygen for more than 15 hours daily, 76% used it both day and night, 70% preferred oxygen concentrators over cylinders, and 68% were unaware of the potential hazards of oxygen therapy. Regarding benefits, 56% experienced improvement in dyspnea, and nine patients reported complete (100%) relief with LTOT.

**Conclusion:** The findings emphasize the importance of structured patient education programs and psychosocial support to improve the effectiveness and acceptability of LTOT. Customized interventions can enhance compliance, quality of life, and overall clinical outcomes for patients dependent on long-term oxygen therapy.

**Keywords:** LTOT, COPD, KAP, Long-term oxygen therapy

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## INTRODUCTION

Chronic respiratory diseases, including chronic obstructive pulmonary disease (COPD) and interstitial lung diseases, often lead to progressive hypoxemia that significantly impairs patients' quality of life and survival. Long-term oxygen therapy (LTOT) has been established as a life-extending treatment for patients with severe hypoxemia. It helps enhance exercise tolerance, sleep quality, and cognitive function by ensuring adequate tissue oxygenation.<sup>1-5</sup> Despite the clinical effectiveness of LTOT, patients often face challenges related to its daily use. These include physical limitations, lack of information on proper use, psychological discomfort, and social embarrassment. Such barriers can result in poor adherence and reduced therapeutic benefits.<sup>6-8</sup> Understanding patients' perspectives—particularly their knowledge, attitudes, and perceptions—regarding LTOT is crucial for designing interventions to improve compliance. Educating patients

and their caregivers about the purpose and safe use of LTOT, while addressing psychosocial concerns, can greatly improve its long-term success.<sup>9-13</sup>

This study was designed to assess patients' awareness, attitudes, and real-world experiences with LTOT to identify gaps in education and areas requiring intervention.

## MATERIALS AND METHODS

This cross-sectional descriptive study was carried out in the Pulmonology department of MTI-Khyber Teaching Hospital in Peshawar from January 1, 2023, to June 1, 2023. A convenience sampling method was employed, with informed consent obtained from all participants. Inclusion criteria included patients aged 18 or older, diagnosed with chronic respiratory diseases (e.g., COPD, interstitial lung disease), who had been on long-term oxygen therapy for at least 3 months. Patients with cognitive impairments or who were unable to provide informed consent were excluded. A structured questionnaire was created and validated through expert review. It included both closed and open-ended questions designed to assess three domains:

Knowledge – understanding of the purpose, duration, and benefits of LTOT.

Attitude – personal beliefs, emotional responses,

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and willingness to comply with therapy.

Perception – subjective experiences related to stigma, family support, and lifestyle disruptions.

The study was conducted in Urdu to ensure linguistic clarity for all participants. Face-to-face interviews were held during outpatient visits or hospital admissions.

Institutional ethical approval from the Ethical Committee and written informed consent were obtained from all participants. Confidentiality and anonymity were strictly maintained.

Data were entered into SPSS version 21.0 for analysis. Descriptive statistics, including frequencies and percentages, were used to summarize categorical variables.

## RESULTS

Fifty patients were studied with a mean age of 56 years. Fifty-two percent were females, and all were housewives. The males had various occupations, including drivers, farmers, carpenters, and factory workers, all of which involved exposure to dust and fumes. Most patients were uneducated. The majority belonged to the low socioeconomic group, with an average monthly income of PKR 32,000. Smoking was only observed in male patients. Demographic statistics are discussed in detail in Table 1.

The average duration of the disease was 10 years. The most common diagnosis was COPD. Patients used LTOT for an average of 2.5 years. Most patients used an oxygen concentrator for LTOT. Many patients arranged LTOT on their own. Descriptive statistics are discussed in detail in Table 2.

Fifty-two percent of patients knew that LTOT was recommended for their respiratory condition. Most patients were unaware of the hazards associated with oxygen therapy. Detailed descriptive statistics are provided in Table 3. Most patients used LTOT for 3-10 hours, mainly due to power outages. Only 22% of patients used it for more than 15 hours—many used oxygen around the clock.

The most common delivery method was a nasal cannula. Sixty percent of patients used a pulse oximeter—38% considered 88-92% oxygen saturation to be optimal. “Walking test” was recommended for only 36% of patients before starting LTOT. Most patients preferred the oxygen concentrator over the oxygen cylinder. Detailed descriptive statistics are presented in Table 4.

Most patients were able to go outside their homes without needing oxygen. The majority experienced more than 75% improvement in breathlessness with LTOT. All patients were satisfied with LTOT, with 56% reporting improved dyspnea. Common issues faced by patients included machine noise, its heavy weight, and mask discomfort. Descriptive statistics are discussed in detail in Table 5.

## DISCUSSION

The findings of this study highlight significant gaps in knowledge and attitudes among patients receiving LTOT, which may impair therapeutic adherence and overall benefits. While LTOT is recognized to enhance survival in hypoxemic patients, its effective use largely depends on patient awareness, psychosocial comfort, and daily integration.<sup>14-20</sup>

A limited understanding of LTOT’s purpose—such as its necessity during sleep or rest—was common, reflecting global findings that education remains a vital part of chronic respiratory care. Additionally, adverse emotional reactions like embarrassment and perceived dependency continue to impact adherence, especially in cultures where visible signs of illness may carry stigma. Practical issues also present significant barriers, including a lack of portable devices, insufficient training, and emotional discomfort in public settings. Prior research indicates that targeted education and community support can enhance

**Table No 1: Descriptive Statistics of Patients’ Demographic Characteristics.**

Characteristic (n=50)	Prevalence n (%)
Age in years (mean±SD)	56.30±13.22
Gender	
Male	24 (48%)
Female	26 (52%)
Occupation	
Male	
Driver	6 (12%)
Farmer	5 (10%)
Labourer	3 (6%)
Carpenter	1 (2%)
Factory worker	1 (2%)
Farmer	1 (2%)
Forest officer	1 (2%)
Other department officer	1 (2%)
Sanitary worker	1 (2%)
Shopkeeper	1 (2%)
Student	1 (2%)
Unemployed	2 (4%)
Female	
Housewife	26 (52%)
Education	
Educated	13 (26%)
Uneducated	37 (74%)
Males	
Smoker	10 (41.67%)
Non-smoker	14 (58.33%)
Females	
Smoker	0
Non-smoker	26 (100%)
Smoking in years (mean±SD)	17.60±12.85

**Table No 2: Descriptive Statistics of Long-term Oxygen Therapy (LTOT) of patients**

Characteristic (n=50)	Prevalence n (%)
Duration of illness in years (mean±SD)	10.65±8.66
Types of illness	
Chronic Obstructive Pulmonary Disease (COPD)	23 (46%)
Interstitial Lung Disease (ILD)	16 (32%)
Bronchiectasis	8 (16%)
Kyphoscoliosis	3 (6%)
Duration of LTOT in years (mean±SD)	2.46±2.45
Types of LTOT	
Oxygen Concentrator	31 (64%)
Oxygen Cylinder	12 (24%)
Both	7 (14%)
How did Patients got LTOT	
Self-Purchase	33 (66%)
From Zakat / Bait-ul-Mal	11 (22%)
From Donation	6 (12%)

**Table No 3: Knowledge of Patients about Long-term Oxygen Therapy (LTOT)**

Characteristic (n=50)	Prevalence n (%)
Why has oxygen been prescribed to you?	
Respiratory disease	26 (52%)
Shortness of breath	42 (32%)
Oxygen deficiency	3 (6%)
Do you know hazards of Oxygen Therapy?	
Yes	16 (32%)
No	34 (68%)

patient confidence and help reduce stigma related to oxygen use.<sup>24, 25</sup> There is an established role for automated oxygen titration during walking.<sup>26-32</sup> The same applies to the role of monitoring pulse oximetry.<sup>33-35</sup> Glittre ADL-test is another promising tool for LTOT.<sup>36</sup>

This study highlights the importance of structured patient education and caregiver involvement. Regular reinforcement of oxygen use protocols, hands-on demonstrations, and addressing emotional well-being should be integrated into the management of chronic respiratory diseases.

The present study evaluated knowledge across five elements: 1) Understanding of LTOT, including patients' comprehension of its purpose, benefits, and proper use; 2) Oxygen Therapy Devices, covering patients' familiarity with different types of oxygen concentrators, tanks, and masks; 3) Dosage and Regimen, involving patients' knowledge of prescribed oxygen flow rates, treatment schedules, and duration; 4) Side Effects and Complica-

**Table No 4: Oxygen utilization and adherence by patients**

Characteristic (n=50)	Prevalence n (%)
Total hours of oxygen utilization	
3-5 hours	6 (12%)
6-10 hours	15 (30%)
11-15 hours	18 (36%)
16-20 hours	4 (8%)
21-24 hours	7 (14%)
Time of oxygen utilization	
Day time	3 (6%)
Night time	9 (18%)
Both	38 (76%)
Oxygen delivery method	
Nasal cannula	30 (60%)
Simple mask	5 (10%)
Venturi mask	9 (18%)
All	6 (12%)
Use of "pulse oxymeter" for monitoring oxygen	
Yes	30 (60%)
No	20 (40%)
Limit of "pulse oxymeter" for monitoring oxygen	
More than 92%	3 (6%)
88% to 92%	19 (38%)
80% to 87%	7 (14%)
None	21 (42%)
"Walking Test" advised before LTOT	
Yes	18 (36%)
No	32 (64%)
Preference of oxygen via:	
Cylinder	15 (30%)
Concentrator	35 (70%)

tions, highlighting patients' awareness of side effects like dry mouth, nosebleeds, and oxygen toxicity; and 5) Lifestyle Adjustments, focusing on patients' understanding of necessary lifestyle changes such as travel, exercise, and medication management.

This study found that patients' knowledge was limited due to barriers in comprehension and insufficient education and support. Language barriers between patients and healthcare providers lead to poor communication. Cultural and socioeconomic factors influence patient understanding, resulting in poor adherence to long-term oxygen therapy and patient disengagement or lack of motivation to manage their chronic condition.

This study assessed adherence in terms of 1) compliance, i.e., patients' willingness to follow the prescribed oxygen therapy regimen; 2) motivation, i.e., patients' level of enthusiasm and commitment to managing their condition; 3) fear and anxiety, i.e., patients' emotional response to the diagnosis, treatment, and potential complications;

**Table No 5: Effect of Long-term oxygen therapy (LTOT) on patients**

Characteristic (n=50)	Prevalence n (%)
Can you go outside home without oxygen	
Yes	28 (56%)
No	22 (44%)
How much improvement in breathlessness with LTOT	
25%	1 (2%)
50%	17 (34%)
75%	23 (46%)
100%	9 (18%)
Not at all	0
What is good about oxygen therapy	
Feeling good	8 (16%)
Improve breathing	12 (24%)
Improve dyspnea	28 (56%)
Improve symptoms	2 (4%)
What is bad about oxygen therapy	
Heavy for movement	10 (20%)
Make Noise	16 (32%)
Mask Problem	6 (12%)
Social stigma	1 (2%)
Others	17 (34%)

4) dependence on oxygen, i.e., patients' perception of reliance on oxygen therapy and its impact on daily life; and 5) quality of life, i.e., patients' perspective on how LTOT affects their overall well-being and daily activities.

This study found that many factors influence adherence to LTOT, including 1) patient education and understanding of LTOT benefits and proper use; 2) healthcare provider communication, instructions, regular follow-up, and support; 3) patient comfort with oxygen therapy devices and ease of use; 4) affordability and access to oxygen therapy devices and supplies; 5) social support from family, friends, and caregivers; and 6) patient physical ability to use oxygen therapy devices.

This study evaluated perceptions across five elements, including 1) Benefit-Risk Perception, which refers to patients' assessment of the benefits and risks related to LTOT; 2) Treatment Effectiveness, meaning patients' views on how well LTOT manages their symptoms and improves their condition; 3) Impact on Daily Life, or patients' evaluation of how LTOT influences their daily routines, relationships, and activities; 4) Self-Efficacy, which is patients' confidence in managing their condition and using LTOT properly; and 5) Support and Resources, reflecting patients' perceptions of the availability and quality of healthcare support, education, and resources.

Patients should understand both the benefits and risks of LTOT. Benefits include 1) Improved breathing: Re-

lief from shortness of breath and better respiratory function; 2) Increased energy: More energy and less fatigue; 3) Better sleep: Improved sleep quality and longer duration; 4) Enhanced quality of life: Better daily functioning and overall well-being; and 5) Greater independence: Easier performance of daily activities. Risks include 1) Device-related issues: Potential malfunctions or complications with the oxygen device; 2) Oxygen toxicity: Risks of oxygen overuse or toxicity; 3) Financial concerns: Costs related to oxygen therapy equipment and supplies; 4) Social stigma: Possible negative reactions from others to wearing oxygen devices; and 5) Dependency on oxygen: Worry about reliance on oxygen therapy.

This study found that our patients were unaware of the benefits and risks of oxygen therapy. Patients had fewer concerns about the proper use, dosing, and handling of oxygen devices. Most patients had low socioeconomic status, so the focus was on the device's cost and on reducing usage to avoid overburden and dependence on oxygen. Perceptions of LTOT were low due to poor communication and education by healthcare providers.

Factors Influencing Knowledge, Attitude, and Perception include 1) Healthcare Provider Communication, i.e., the effectiveness of healthcare provider-patient communication and education; 2) Patient Education: Quality and comprehensiveness of patient education materials and programs; 3) Support System: Presence and support of family, friends, and caregivers; 4) Cultural and Socio-economic Factors: Influence of cultural background, socioeconomic status, and access to healthcare resources; and 5) Patient Characteristics: Individual patient factors, such as age, cognitive function, and prior experience with oxygen therapy.

The study highlights significant gaps in patient knowledge and acceptance of long-term oxygen therapy, despite its clinical benefits. Many patients face emotional, social, and logistical challenges that hinder adherence. To improve treatment outcomes, healthcare providers must focus on patient education, empower caregivers, and implement strategies to reduce stigma. Customized educational programs and support systems are essential for improving quality of life and ensuring treatment compliance among patients relying on LTOT.

We hereby recommend the following five steps in this regard:

Comprehensive Education – to provide clear, concise, and ongoing education to patients on LTOT, its benefits, and potential side effects

Patient-centred Care – to foster a supportive and empowering environment, addressing patients' concerns and promoting self-efficacy

Regular Monitoring – to assess patients' knowledge, attitude, and perception, and thus identify areas for improvement

Collaborative Care – to promote effective commu-

nication among healthcare providers, patients, and caregivers, ensuring comprehensive care, and

Cultural Sensitivity – to consider cultural and socioeconomic factors while providing education and support.

## CONCLUSION

The findings highlight the need for structured patient education programs and psychosocial support to enhance the efficacy and acceptability of LTOT. Tailored interventions can improve compliance, quality of life, and overall clinical outcomes for patients relying on long-term oxygen support.

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**Authors Contribution:**

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Farooqi RJ	✓	✓	✗	✗	✓	✗
Ahmed H	✓	✗	✓	✓	✓	✗
Saeed U	✓	✓	✗	✗	✗	✓
Umar J	✓	✗	✓	✓	✓	✗
Sadat S	✓	✓	✗	✗	✗	✓
Ashraf S	✓	✗	✓	✓	✓	✗

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

**Ethical Approval:**

**This Manuscript was approved by the Ethical Review Board of Khyber Teaching Hospital, Peshawar. Vide No. 922/DME/KMC.**

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