

## ORIGINAL

# Exploring the Knowledge and Practices of Health Professionals Regarding Oxygen Therapy: A Hospital-Based Study

*Exploración del conocimiento y las prácticas de los profesionales de la salud con respecto a la oxigenoterapia: un estudio hospitalario*

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**Introduction:** Oxygen therapy is a double-edged tool. On one hand, oxygen is vital for human survival. On the other hand, its administration can be toxic if the doses or methods used are not appropriate.

**Methods:** In this context, a study was conducted to assess the knowledge and practices of nurses regarding the appropriate administration of oxygen therapy at the Provincial Hospital Center in Ouarzazate. The study included 54 nurses, and data were collected through a questionnaire evaluating nurses' practices and knowledge.

**Results:** The results of the study showed that the majority of nurses had a good level of knowledge. However, there were knowledge gaps in areas such as indications, methods of assessing saturation, and symptoms of hyperoxia. Additionally, obstacles like the unavailability of therapeutic protocols and workload were mentioned by nurses, hindering the appropriate administration of oxygen therapy.

**Conclusions:** This study provides valuable insights to enhance the practice of oxygen therapy at the Provincial Hospital Center in Ouarzazate. By strengthening nurses' knowledge, establishing clear protocols, and addressing identified obstacles, it is possible to improve the quality of care and optimize outcomes for patients benefiting from this essential therapy.

**Key words:** Oxygen therapy, knowledge and practices, administration of oxygen, nursing, nurses.

**Resumen**

**Introducción:** La terapia de oxígeno es una herramienta de doble filo. Por un lado, el oxígeno es vital para la supervivencia humana. Por otro lado, su administración puede ser tóxica si las dosis o los métodos utilizados no son apropiados.

**Metodología:** En este contexto, se realizó un estudio para evaluar el conocimiento y las prácticas de las enfermeras con respecto a la administración adecuada de la terapia de oxígeno en el Centro Hospitalario Provincial de Ouarzazate. El estudio incluyó a 54 enfermeras y se recopiló datos a través de un cuestionario que evaluaba las prácticas y el conocimiento de las enfermeras.

**Resultados:** Los resultados del estudio mostraron que la mayoría de las enfermeras tenían un buen nivel de conocimiento. Sin embargo, hubo lagunas en áreas como las indicaciones, los métodos para evaluar la saturación y los síntomas de hiperoxia. Además, las enfermeras mencionaron obstáculos como la falta de protocolos terapéuticos y la carga de trabajo, lo que dificulta la administración adecuada de la terapia de oxígeno.

**Conclusiones:** Este estudio proporciona valiosas ideas para mejorar la práctica de la terapia de oxígeno en el Centro Hospitalario Provincial de Ouarzazate. Al fortalecer el conocimiento de las enfermeras, establecer protocolos claros y abordar los obstáculos identificados, es posible mejorar la calidad de la atención y optimizar los resultados para los pacientes que se benefician de esta terapia esencial.

**Palabras clave:** Terapia de oxígeno, conocimientos y prácticas, administración de oxígeno, enfermería, enfermeras.

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## Introduction

Oxygen therapy is one of the most common prescriptions in emergency settings and is considered a medical treatment primarily prescribed for hypoxic patients. A well-targeted therapeutic goal allows for balancing the benefits and risks, as well as better managing hospital expenses due to excessive oxygen consumption, especially in resource-limited countries<sup>1</sup>.

Oxygen therapy is a life-saving treatment. However, it is important to recognize that it can be misused, either by being administered at inadequate doses or by being inappropriately prescribed in situations where it is no longer necessary. To ensure its effectiveness, oxygen therapy must be properly applied regardless of the administration method used. Furthermore, its prescription in emergency cases must be prompt and tailored to the underlying cause of the medical problem and its identified etiology<sup>2</sup>.

A study conducted by Nam Kamran analyzed data on oxygen prescription and administration practices at Royal Perth Hospital (RPH) in Western Australia. A total of 65 patients received oxygen supplementation, and among them, 36 patients (55.4%) received oxygen saturation prescriptions established by physicians. However, 25% of the prescribed goals were deemed inappropriate. Overall, 49 patients (75.4%) were exposed to a potential risk related to oxygen therapy due to prescription and/or administration errors. A real risk was identified in 19 patients (29.2%) as they received oxygen at levels outside their medically indicated target range<sup>3</sup>. Hence, it is crucial for every nurse to be aware of the potential side effects and significant costs associated with oxygen therapy, just like any other treatment when administered incorrectly<sup>4</sup>.

Studies conducted in various countries have generally shown a significant knowledge deficit among nurses regarding the correct use of oxygen. For example, studies conducted in Ethiopia have shown that only one-third of nurses had the necessary practical knowledge to use oxygen. Furthermore, nurses who had good practical knowledge of administering supplemental oxygen were 12 times more likely (AOR = 12.25, 95% CI = 6.48-32.93) to have good practice in administering supplemental oxygen than those with poor knowledge<sup>5</sup>. Another study conducted in Saudi Arabia also showed a lack of adequate knowledge among nurses regarding the therapeutic use of oxygen, particularly regarding indications for oxygen therapy. According to their findings, high workload and lack of local guidelines were the main causes<sup>6</sup>.

Conducting a study to assess nurses' knowledge of oxygen therapy has several significant advantages. This type of study helps identify existing gaps in nurses' knowledge of oxygen therapy. It raises awareness of specific areas where improvements are needed and focuses training efforts on these key aspects. By identifying areas that require additional training, the study

facilitates the design of tailored training programs. These programs can target the specific gaps highlighted by the study, providing nurses with the knowledge and skills needed to improve their practice. The training programs developed as a result of the study can contribute to enhancing nursing practice in oxygen therapy. By providing nurses with the necessary information and tools, they can strengthen their understanding and ability to properly administer oxygen therapy, thus reducing errors and risks to patients.

In this context, this study aims to evaluate the knowledge of nurses working at the Provincial Hospital Center of Ouarzazate regarding normobaric oxygen therapy, as well as the factors associated with it.

## Material and methods

### Study design, participants and sampling method

This is a cross sectional, study aiming to assess the knowledge of nurses regarding oxygen therapy. The target population for this study comprised nurses working at the Provincial Hospital Center in Ouarzazate, focusing on specific departments, including (a) the emergency department, (b) the intensive care unit, (c) the surgery department, (d) the medicine department, (e) the pediatrics and pediatric surgery department, (f) the maternity department, (g) the postpartum unit, and (h) the operating room. These departments were chosen due to their frequent use of oxygen therapy compared to other departments. A total of 54 nurses were included in this study through an exhaustive sampling method.

### Data Collection Instrument

Data for this study were collected using a questionnaire that was developed based on an extensive review of the existing literature. The instrument consisted of a set of questions to gather participants' socio-demographic data, theoretical knowledge related to oxygen therapy, and practices of nurses during its administration. A score was calculated for each component by awarding one point for each correct answer. Then, an overall score was obtained by summing up the scores of theoretical and practical knowledge. Data collection was carried out from April 15, 2023, to May 23, 2023. Once the questionnaire was tested and validated, it was distributed to nurses and collected on the same day to avoid information exchange between participants.

### Data Analysis

The collected data were analyzed using the "SPSS 21.0" software. A p-value of 0.5 was considered. Quantitative variables were expressed as mean  $\pm$  standard deviation, while qualitative variables were presented in tables as frequencies. The t-test and ANOVA were used to study the associations between variables.

## Ethical considerations

The researchers adhered to ethical guidelines by seeking permission from the administration to conduct the study, providing a clear explanation of the study's purpose to participating nurses, ensuring the participants' anonymity, obtaining their consent, and maintaining strict confidentiality of the collected data.

## Results

The study examined the results of a questionnaire that was distributed to 98 nurses from various hospital departments. Out of the 98 distributed surveys, a total of 54 responses were obtained, yielding a response rate of 55.1%.

### 1. Description of Demographic Characteristics of Nurses Participating in the Study

The distribution of the sample by gender demonstrates the predominance of females, accounting for 70.4% compared to 29.6% males. Furthermore, the distribution of the sample by age reveals that the age group between 20 and 25 years is the most dominant (38.9%), followed by the age group between 26 and 35 years (25.9%), while the age group of 46 years and older constitutes only 11.1%.

Regarding the distribution of the sample by specialty, generalist nurses represent the majority with a percentage of 53.7%, followed by midwives with a percentage of

24.1%, while nurses specializing in anesthesia and intensive care account for 16.7% and emergency and critical care nurses make up 5.6% of the sample. Nurses with a seniority of 0-5 years constitute 46.3% of the sample, followed by nurses with a seniority of 11-15 years (16.7%), and those with a seniority of 6-10 years and 21 years and above participate with percentages of 14.8% and 11.1%, respectively.

According to the table, the majority of nurses have a basic training background (74.1%), 1.9% have received continuing education, while 24.1% have not received any training on oxygen therapy. **Table I.**

### 2. Theoretical knowledge according to nurses' characteristics

The results reveal that younger nurses with less than 10 years of experience have, on average, a higher level of knowledge compared to their colleagues with over 10 years of experience. However, this correlation did not reach statistical significance. Additionally, no statistically significant relationship was found between the level of theoretical knowledge of the studied sample and factors such as sex, age, specialization, department of practice, and receiving training on oxygen therapy. These results indicate that these factors do not appear to have a direct impact on the nurses' theoretical knowledge level. **Table II.**

**Table I:** Socio-demographic characteristics of the nurses targeted by the study.

	N = 54
<b>Sex</b>	
Male	16 (29.6%)
Female	38 (70.4%)
<b>Age (Years Old)</b>	
20 - 25	21 (38.9%)
26 - 35	14 (25.9%)
36 - 45	13 (24.1%)
> 46	6 (11.1%)
<b>Specialty</b>	
Generalist nurse	29 (53.7%)
Nurse in anesthesia and intensive care	9 (16.7%)
Nurse in emergency and intensive care	3 (5.6%)
Midwife	13 (24.1%)
<b>Seniority (Years)</b>	
<10	35 (41.7%)
>10	19 (22.6%)
<b>Department</b>	
Emergency department	7 (13.0%)
Intensive Care Unit	7 (13.0%)
Internal medicine	6 (11.1%)
Pediatric surgery	5 (9.3%)
General surgery department	5 (9.3%)
Pediatrics	6 (11.1%)
Maternity unit	6 (11.1%)
Postpartum unit	5 (9.3%)
Operating room	7 (13.0%)
<b>Oxygen administration Training</b>	
Basic training	40 (74.1%)
Continuing training	1 (1.9%)
No training	13 (24.1%)

**Table II:** Presentation of Theoretical Knowledge Results Based on Nurse Characteristics.

	Mean	SD	T-test	Sig
<b>Sex</b>				
Male	9.23	1.16	1.34	0.18
Female	8.51	1.74		
<b>Protocol availability</b>				
Yes	8.78	1.66	0.58	0.56
No	8.64	1.54		
	Mean	SD	F	Sig
<b>Age (Years Old)</b>				
20 - 25	8.56	1.45	2.00	0.13
26 - 35	9.50	1.95		
36 - 45	8.00	1.41		
> 46	9.40	1.14		
<b>Specialty</b>				
Generalist nurse	8.90	1.26	0.50	0.68
Nurse in anesthesia and intensive care	9.00	2.58		
Nurse in emergency and intensive care	9.00	0.00		
Midwife	8.25	1.65		
<b>Seniority (Years)</b>				
<10	8.92	1.69	0.95	
>10	8.43	1.45		0.34
<b>Department</b>				
Emergency department	8.71	0.95	0.55	0.80
Intensive Care Unit	8.20	1.30		
Internal medicine	9.75	1.50		
Pediatric surgery	7.50	0.70		
General surgery department	9.25	0.95		
Pediatrics	9.25	1.25		
Maternity unit	8.33	1.63		
Postpartum unit	8.40	1.94		
Operating room	9.00	3.08		
<b>Oxygen administration Training</b>				
Basic training	9.00	1.70	1.61	0.21
Continuing training	8.00	0.04		
No training	8.00	1.05		

The vast majority of individuals who participated in the study had good knowledge of oxygen therapy, particularly in areas related to hypoxemia, hypoxia, and respiratory pathologies. An intriguing observation to highlight is that 90.7% of nurses fully agree that excessive oxygen supply can cause toxicity, yet only 27.8% know the signs and symptoms of this toxicity. Similarly, most nurses (81.5%) answered incorrectly regarding the indications for oxygenation, with only 27.8% correctly identifying hypoxemia as an indication, and only 18.5% were able to mark all the indications correctly. Furthermore, the results also reveal a gap in the participants' knowledge regarding methods of oxygen saturation assessment, with only 20.4% knowing all the methods, and the majority of participants selecting the answer "pulse oximeter".

**Table III.**

### 3. Practical knowledge according to the characteristics of nurses

Concerning the nurses' practices based on their characteristics, no significant variance was observed between the nurses' practice level and their years of experience, specialization, training, and age. However, a statistically significant relationship was found between the practice level and the department of practice ( $P$  value = 0.007).

**Table IV.**

The majority of participants in the study demonstrated good practices during the administration of oxygen therapy. The practical questions specifically focused on the best practices to be followed before, during, and after administering oxygen therapy. It is interesting

**Table III:** Theoretical Knowledge of Oxygen Therapy Among Nurses.

Questions	Correct response	Incorrect response
Indications for oxygen therapy	18.5%	81.5%
Methods of assessing blood oxygen saturation	20.4%	79.6%
Monitoring pulse oximetry	5.6%	92.6%
Complications of excessive oxygen delivery	90.7%	9.3%
Symptoms of oxygen toxicity	27.8%	63.0%
Side effects of oxygenation	90.7%	9.3%
Recommendations for oxygen concentrations in children with pneumothorax	83.3%	5.6%
Shortness of breath is not always a sign of hypoxemia	88.9%	11.1%
In severe anemia, heart failure, and brain injuries, providing oxygen to patients with an SpO <sub>2</sub> <94% is more appropriate	63.0%	35.2%
Prescription of oxygen should be based on a target SpO <sub>2</sub> range rather than a fixed dose	81.5%	16.7%
Hypoxia can be clinically detected	83.3%	16.7%
Blood gas analysis is useful to confirm hypoxemia	79.6%	18.5%
The administration of concentrated oxygen leads to the creation of surfactant on the surface of the lungs	42.6%	50.0%
The target level of SpO <sub>2</sub> in patients with COPD is generally set between 88% and 92%.	70.4%	24.1%

to note that 61.1% of participants strongly agreed that sterilizing the equipment with an antiseptic solution is sufficient, while in reality, the equipment used should be disposable. Furthermore, 53.7% of participants indicated that they do not place gauze pads under the tubing, even when necessary. This preventive measure seems to be neglected by the majority of nurses.

**Table V.**

**Table IV:** Practical knowledge according to the characteristics of nurses.

	Mean	SD	T-test	Sig
<b>Sex</b>				
Male	8.71	1.81	-0.38	0.70
Female	8.91	1.67		
<b>Protocol availability</b>				
Yes	9.18	1.16	0.70	0.48
No	8.77	1.81		
	Mean	SD	F	Sig
<b>Age (Years Old)</b>				
20 - 25	9.00	1.55	1.16	0.33
26 - 35	9.23	1.58		
36 - 45	8.08	2.10		
> 46	9.16	1.32		
<b>Specialty</b>				
Generalist nurse	8.67	1.96	1.07	0.37
Nurse in anesthesia and intensive care	9.77	0.97		
Nurse in emergency and intensive care	8.50	2.12		
Midwife	8.66	1.30		
<b>Seniority (Years)</b>				
<10	9.09	1.54		1.19
>10	8.44	1.96		
<b>Department</b>				
Emergency department	7.33	1.86	3.14	0.007
Intensive Care Unit	10.33	0.51		
Internal medicine	8.00	1.67		
Pediatric surgery	9.20	1.30		
General surgery department	9.80	1.09		
Pediatrics	7.83	2.40		
Maternity unit	8.16	1.32		
Postpartum unit	9.75	0.50		
Operating room	9.71	1.11		
<b>Training</b>				
Basic training	8.75	1.68	0.39	0.67
Continuing training	10.00			
No training	9.07	1.80		

**Table V:** Practical Knowledge of Oxygen Therapy Among Nurses.

Questions	Correct response	Incorrect response
The disinfection of the equipment with an antiseptic solution is sufficient	61.1%	38.9%
Explain the procedure to the patient	94.4%	5.6%
Disinfect your hands	68.5%	31.5%
Wear disposable gloves	61.1%	38.9%
Evaluate the patient's oxygen saturation	100%	0.0%
Assess the patient's respiratory status	96.3%	3.7%
Fill the humidifier with distilled water	94.4%	5.6%
Place gauze pads under the tubing, if necessary	42.6%	53.7%
Dispose of used oxygen mask and tubing	74.1%	5.6%
Document the date and time of oxygen therapy administration	94.4%	5.6%
Evaluate the patient's condition before and after the intervention to assess any improvement	96.3%	3.7%

#### 4. Obstacles to the appropriate use of oxygen therapy reported by nurses

The studied nurses mentioned certain obstacles to the appropriate use of oxygen therapy. Indeed, 66.7% of the studied sample identified the unavailability of a standardized protocol for oxygen therapy as a major obstacle. Additionally, 61.1% of the nurses highlighted that workload and time constraints impact the administration of oxygen therapy to their patients.

**Table VI.**

**Table VI:** Obstacles to the proper use of oxygen therapy.

Obstacles	N = 54
<b>Limited availability of oxygen in sufficient and regular quantity</b>	
Yes	14 (25.9%)
No	40 (74.1%)
<b>Insufficient training and education for medical and nursing staff</b>	
Yes	21 (38.9%)
No	33 (61.1%)
<b>Lack of understanding of the effects, role, and dangers of oxygen therapy</b>	
Yes	23 (42.6%)
No	31 (57.4%)
<b>Lack of equipment, supplies, and monitoring devices</b>	
Yes	24 (44.4%)
No	30 (55.6%)
<b>Lack of familiarity with the use of different oxygen therapy devices</b>	
Yes	19 (35.2%)
No	35 (64.8%)
<b>Workload and time constraints</b>	
Yes	33 (61.1%)
No	21 (38.9%)
<b>Lack of staff motivation</b>	
Yes	24 (44.4%)
No	30 (55.6%)
<b>Unclear and incomplete oral/written prescription for oxygen therapy</b>	
Yes	21 (38.9%)
No	33 (61.1%)
<b>Difficulties in changing long-established behavior</b>	
Yes	16 (29.6%)
No	38 (70.4%)
<b>Patients transferred from other services or departments with existing oxygen therapy in place</b>	
Yes	8 (14.8%)
No	46 (85.2%)
<b>Unavailability of a protocol for oxygen therapy</b>	
Yes	36 (66.7%)
No	18 (33.3%)

## Discussion

Excessive oxygen consumption can result from improper patient assessment or inappropriate administration, potentially leading to health deterioration, respiratory complications, or other adverse effects. Conversely, insufficient access to oxygen or inadequate equipment may limit treatment efficacy and compromise the well-being of patients in need. Therefore, it is essential for healthcare professionals to be well-informed about appropriate oxygen therapy protocols and accurately

assess each patient's individual needs. In this regard, the objective of this study was to evaluate the level of knowledge of nursing staff regarding oxygen therapy.

The present study indicated that slightly over half of the studied sample (60.45%) demonstrated a good level of theoretical knowledge concerning oxygen therapy administration. This finding is comparable to research conducted in Ethiopia at Debre Tabor General Hospital, where 52% of participants reported having good knowledge, while 48% of nurses had poor knowledge of oxygen therapy<sup>5</sup>. Similarly, in Egypt, at one of Cairo's university hospitals in 2018, the majority of the studied sample had a satisfactory level of knowledge regarding the purpose of oxygen therapy administration (54%), different methods used to assess blood oxygen saturation (58%), precautions to take during oxygen therapy administration (80%), and nursing interventions related to oxygen therapy administration (50%)<sup>7</sup>. In contrast to our results, previous studies conducted in Turkey and Nigeria demonstrated that nurses had poor knowledge of oxygen therapy<sup>8</sup>. However, the results of this study indicate that the majority of nurses had a low level of knowledge concerning the indications for oxygen therapy. Only 18.5% of nurses answered correctly, which is similar to a study conducted by Amairah Fahad Aloushan in Riyadh in 2017, where only 12.4% of nurses accurately knew the indications<sup>6</sup>.

Furthermore, this study reported that most participants (92.6%) had inadequate knowledge regarding pulse oximetry monitoring, and (79.6%) responded incorrectly to questions about methods of saturation assessment. These results could be attributed to a lack of training and unawareness of the seriousness of oxygen therapy. Such knowledge gaps among nurses may have detrimental consequences on patients' health, especially in critical situations where oxygen therapy is crucial. Improper administration or incorrect usage of oxygen therapy can lead to severe complications and compromise patient safety. In line with this finding some authors<sup>9,10</sup>. In their studies emphasized that to ensure safe and effective oxygen therapy administration, nurses must possess appropriate knowledge and understanding of the subject. The relevance of continuous training is crucial in this context. A recent study conducted by Ait Ali et al. in 2022 in Morocco demonstrated that a significant majority of nurses (57%) do not participate in continuous training sessions, attributing this behavior, among other reasons, to the themes not being applicable to their daily practice<sup>11</sup>.

Another result of this study is that most nurses are aware of the side effects of oxygenation, and (90.7%) know that excessive oxygen supply can cause toxicity; however, only (27.8%) are aware of the signs and symptoms of this toxicity. In this context, it is interesting to note that the observed knowledge gaps among nurses concerning oxygen toxicity could be attributed to a lack of awareness of its status as a medication. It is essential to emphasize

that oxygen therapy should be considered as a full-fledged medication, requiring precise administration and appropriate dosages to ensure patient safety and optimize therapeutic benefits.

The results of this study also provide valuable insights into the relationships between theoretical knowledge and the seniority within the studied sample. Traditionally, experience is considered a fundamental pillar for gaining solid knowledge and proficiency. However, this research highlights a different observation: there is a slight difference in favor of younger nurses with less than 10 years of experience, but this experience/knowledge level relationship is not statistically significant ( $p=0.34$ ). Furthermore, the results demonstrated that there was no statistically significant correlation between participants' knowledge level and other socio-demographic characteristics.

Regarding nurses' practice level, our study indicates that the majority of nurses had good practice (78.27%). However, research conducted in different contexts reported lower percentages of good practices among nurses. In the study conducted at Debre Tabor Hospital<sup>5</sup>, only 33% of nurses had good practice. Similarly, in hospitals in Addis Ababa, 43.4% had a good level of practice<sup>5</sup>, and 47.5 % in Eritrean hospitals<sup>12</sup>.

The questions evaluating nurses' practices specifically focused on best practices before, during, and after oxygen therapy administration. The results of practical knowledge before oxygenation administration in this study are higher than those of the Egyptian hospital study, where only 18.7% of the studied sample performed all nursing interventions before oxygen therapy administration<sup>7</sup>.

Despite 77.8% of participants reporting the unavailability of standardized oxygen therapy protocols, this study confirmed that nurses had sufficient practical knowledge. It was found that participants' practice had a statistically significant relationship with their working department ( $p=0.007$ ). Regarding other demographic characteristics studied, such as gender, tenure, and specialty, no statistically significant correlation was observed with participants' practice level.

The results of this study provide valuable insights into specific knowledge and practice gaps identified among nurses regarding oxygen therapy. These findings can serve as a valuable tool for planning and implementing

targeted continuous training programs. However, this study has some limitations to consider. Firstly, the study was conducted using a limited sample size. Additionally, it was a single-center study, and the research results are limited to the hospital where it was conducted, making it necessary to exercise caution when generalizing the results to other hospitals. Furthermore, the subjectivity of participants' responses to the study (in the case of the questionnaire) means that the results were measured by self-reporting and may be biased. Lastly, it is important to acknowledge that the level of nurses' knowledge evaluated in this study is limited to their responses to the questions provided in the questionnaire, which may not comprehensively reflect their actual knowledge or clinical practice. Thus, it is crucial to consider these limitations when interpreting the study's results.

## Conclusion

Oxygen therapy is a vital medical treatment to ensure adequate oxygenation in various medical or surgical conditions. The health of patients can be greatly influenced by their oxygen supply, whether it is excessive, insufficient, or absent, which largely depends on the level of competence and attitude of healthcare professionals towards oxygen therapy.

The results of this study evaluating the knowledge of nurses regarding oxygen therapy at the Provincial Hospital Center in Ouarzazate demonstrated that most nurses have a good level of theoretical and practical knowledge. However, when addressing obstacles that could affect the safe administration of oxygen therapy, the majority of nurses reported the lack of clear protocols to follow. Additionally, they emphasized that workload was the most serious obstacle they faced.

Given the vital importance of oxygen therapy, it is imperative to promote research in this field to address knowledge gaps and explore new approaches or technologies that could enhance both the effectiveness and safety of this essential treatment.

## Conflict of interest

The authors affirm that they have no conflicts of interest to disclose.

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