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Original Article

Appraisal of Clinical Application of Oxygen Prescription and Administration in Nigeria

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Abstract

Background: Oxygen is one of the world's most used therapies. Its safe and effective use requires a good knowledge of oxygen therapy guidelines. This study assessed the knowledge of oxygen prescription practices among health workers in Nigeria.

Methodology: This was a descriptive, cross-sectional survey among health workers in Nigeria. A self-administered, semi-structured electronic questionnaire was used to collect data. Data collected included sociodemographic details, awareness of oxygen therapy guidelines, knowledge of oxygen prescription practices, and challenges of oxygen administration. The outcome measures were to determine health workers' knowledge of safe oxygen prescription and to identify barriers to safe oxygen prescription and administration.

Results: A total of 133 responses were received, comprising 67 (50.4%) physicians and 66 (49.6%) nurses at all levels of public and private health facilities. All respondents have at least one year of working experience. Most respondents (60.9%) had prescribed and/or administered oxygen in the preceding month, but only 36.8% had received training after their basic qualification. Only 60.9% were aware of the existence of an oxygen therapy guideline. The mean percentage score on knowledge of oxygen therapy was 69.3 ± 12.7%. The score was significantly higher among doctors ($p < 0.001$). The average score for sections assessing oxygen delivery practices and factors affecting pulse oximetry was lower (55.1% and 55%, respectively) than that of the other sections. Cost was the most prominent barrier to oxygen administration. Only 17.3% of respondents reported having an oxygen prescription chart in their hospital. Respondents in public tertiary hospitals were less likely to have pulse oximeters readily available ($p = 0.003$).

Conclusion: Few healthcare professionals receive training on oxygen therapy. Although overall knowledge was fair, performance on questions assessing oxygen delivery practices was much lower. There is a need for regular in-service training on oxygen therapy for healthcare workers.

Key words: Oxygen, toxicity, prescription practices, oxygen therapy guidelines.

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Quick Response Code:

Introduction

Supplemental oxygen is one of the world's most widely used therapies, with the average hospital consuming approximately 350,000 L of oxygen per hospital bed annually.[1] Despite this huge usage, adequate knowledge of its appropriate administration is lacking.[2,3] There is a varying degree of gaps in knowledge and practice among health-care workers as regards oxygen therapy. Among nurses at four Ethiopian hospitals, Lemma reported that only a third of respondents had good knowledge of oxygen therapy.[4] Similarly, less than a third of professionals (doctors and nurses) in a study by Desalu et al in Ilorin, Nigeria, had good knowledge of acute oxygen therapy.[2]

Medical oxygen is an essential medicine that, when used appropriately, can reduce mortality; however, misuse can harm its recipients.[5] In view of its harmful effects, the World Health Organisation and some professional societies have developed guidelines to promote the safe use of oxygen, which, unfortunately, are unknown or underutilised by many healthcare workers, particularly in developing countries.[2,6] Graham et al.[7] In 2016 noted that none of the 12 hospitals surveyed in Southwestern Nigeria had clinical guidelines for the use of oxygen in children.

It has been noted that clinicians' practice is closely related to their knowledge, and that regular training in its appropriate use is vital to promoting safe oxygen administration.[3,8] Determining the baseline knowledge and gaps in oxygen prescription is therefore key to any educational campaign. Previous local studies on this subject were either institution or state-based.[2,3] This study aimed to assess the knowledge and practice of safe oxygen prescription among healthcare workers in Nigeria and to identify challenges to safe oxygen administration.

Materials and Methods

Study design

The study was a descriptive cross-sectional survey among healthcare workers (doctors and nurses) in Nigeria. Ethical approval was obtained from the University of Ibadan/University College Hospital Joint Ethics Committee, with registration number UI/EC/24/0331 on the 5th of August 2024. A self-administered, semi-structured electronic questionnaire was used to collect data. The link to the form was circulated on the social media platforms of relevant professional bodies for approximately three months. The initial section was a consent form, which was required to be completed before proceeding with the survey. The respondents could only submit one response. The responses were automatically saved on the Google Drive of one of the authors. This was password-protected and only accessible to the author.

Study Population

The study population included healthcare workers (doctors and nurses) in Nigeria. A convenience sampling technique was utilised. All doctors and nurses currently practising in Nigeria were eligible to participate.

The survey tool

The questionnaire items were derived from previous studies.[5,9] The acute oxygen therapy questionnaire (AOTQ) is a validated tool developed by a panel of experts consisting of pulmonologists, anaesthetists, paediatricians, epidemiologists and health educationists and is said to be a reliable and valid tool for assessing knowledge of acute oxygen therapy among doctors and nurses. [5] This tool has a global content validity index of 0.85 with good test-retest reliability.[5] The knowledge was assessed in 5 sections – general knowledge of oxygen, recognition of hypoxaemia, indications for oxygen therapy, oxygen prescription and oxygen delivery practice. We included a section on factors affecting the accuracy of pulse oximetry as this was essential for monitoring therapy. There were a total of 34 questions, and each correct answer was scored 1 point. We ranked knowledge as good, fair or poor based on a percentage score > 75%, 50-75% or < 50%, respectively.

Outcome measures

1. To determine the knowledge of safe oxygen administration among clinical health care workers.
2. To determine the current oxygen therapy practices of clinical healthcare workers.
3. To determine the usage and compliance with guidelines on oxygen therapy.
4. To identify barriers to safe oxygen prescription and administration.

Data analysis

Data was analysed using the IBM Statistical Product and Service Solutions (SPSS) version 25 (SPSS Inc., Chicago, Illinois, USA). Qualitative variables were presented as frequencies and percentages, while quantitative variables (e.g., percentage scores) were presented as mean ± standard deviation. The level of statistical significance was set at $p < 0.05$.

Results

Sociodemographic characteristics

One hundred and thirty-three respondents completed the survey. The mean age of the respondents was 35.14 ± 8.35 years. Sixty-seven (50.4%) of these respondents were doctors, while sixty-six (49.6%) were nurses. Table 1 summarises the respondents' sociodemographic details. The majority of respondents (54.1%) practised in a public tertiary hospital and in the southwestern region of the country (68.4%).

Table 1: Sociodemographic characteristics of respondents.

Variables	Response	N (%)
Hospital setting	Public Tertiary	72 (54.1)
	Public Secondary	13 (9.8)
	Private Secondary	44 (33.1)
	Public Primary	4 (3)
Region of practice	South West	91 (68.4)
	South East	7 (5.3)
	South South	7 (5.3)
	North	28 (21.1)
Doctors' area of specialisation	Anaesthesia	26 (38.8)
	Obstetrics and Gynaecology	3 (4.5)
	Surgery	8 (11.9)
	Medicine	3 (4.5)
	Family Medicine	5 (7.5)
	General Practice	13 (19.4)
	Community Medicine	3 (4.5)

	Emergency Medicine	1 (1.5)
	Ophthalmology	2 (3)
	Paediatrics	3 (4.5)
Nurses' area of specialisation	Critical Care	19 (28.8)
	Operating Theatre	8 (12.1)
	Surgical	2 (3)
	Medical	14 (21.2)
	Emergency	5 (7.6)
	Mixed	11 (16.7)
	Clinic	4 (6.1)
	Paediatric	1 (1.5)
	Obstetrics/Gynaecology	2 (3)
Duration of practice (in years)	<1	9 (6.8)
	1 – 5	44 (33.1)
	6 – 10	37 (27.8)
	11 – 20	33 (24.8)
	>20	10 (7.5)
Current job designation	General Nursing/Midwife	48 (36.1)
	Specialist Nurse	18 (13.5)
	Medical Officer	20 (15)
	Resident	39 (29.3)
	Consultant	8 (6)

Oxygen prescription practices

Table 2 shows that most respondents frequently prescribe or administer oxygen (82% within the last 6 months). Only 49 persons (36.8%) have received training in oxygen therapy after their basic qualification. Figure 1 highlights the common sources of information on oxygen therapy. The most common source was medical/nursing school (73.7%).

Table 2: Oxygen administration and prescription practices

Variables	Response	N (%)
Last administered/prescribed oxygen	<1 month	81 (60.9)
	1 - 6 months	28 (21.1)
	>6 months	22 (16.5)
	I never had to	2 (1.5)
Last training on oxygen (n=49)	<1 year	29 (59.2)
	1 - 5 years	14 (28.6)
	>5 years	6 (12.2)
Awareness of oxygen therapy guidelines	Yes	81 (60.9)
	No	52 (39.1)
Institutional use of oxygen therapy guidelines	Yes	79 (59.4)
	No	38 (28.6)
	Not sure	16 (12)

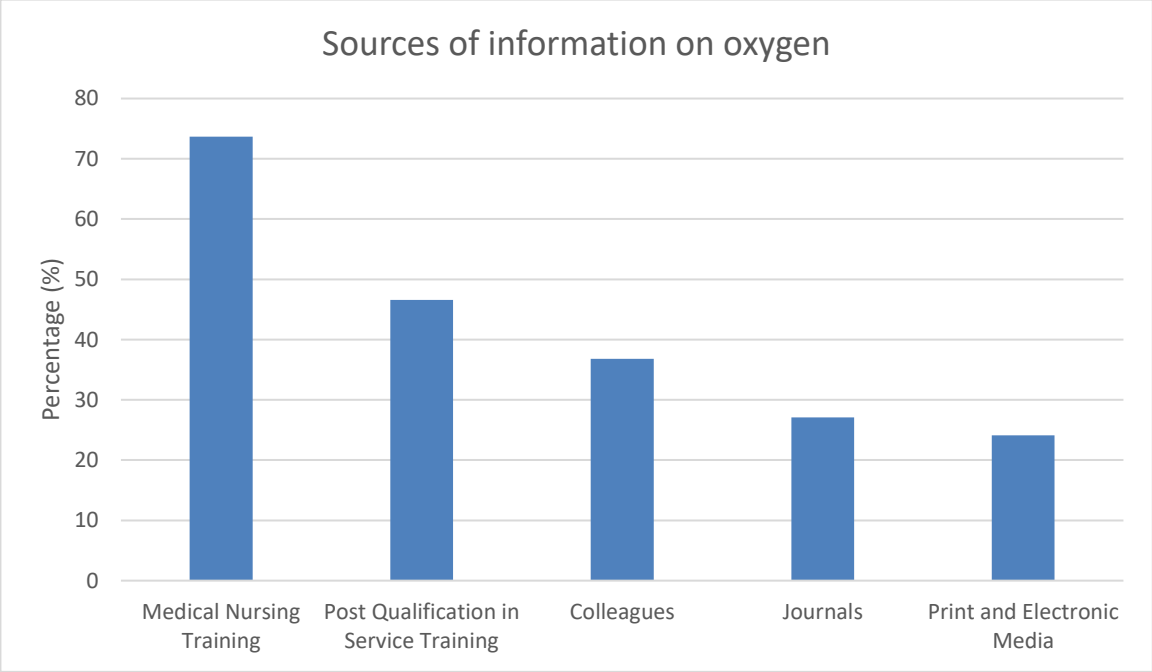

Figure 1: Sources of information on oxygen therapy.

Only 60.9% of respondents were aware of the existence of oxygen therapy guidelines. Awareness was higher among nurses than among doctors (67.2% vs 53.7%), but the difference was not significant ($p = 0.088$). Significantly more nurses claim to apply an oxygen therapy guideline in their practice ($p < 0.001$). There was no statistical difference in the application of the oxygen therapy guideline across different hospital settings ($p = 0.427$). The summary of these exploratory analyses is shown in Appendix 1.

Knowledge on Oxygen therapy

Overall knowledge of oxygen therapy was fair, with a mean percentage of 69.31±12.7%. Most respondents (61.7%) scored between 50% and 75%; 33.1% scored over 75%; and only 5.3% scored below 50%. The mean score was significantly higher among doctors than among nurses (74.9±10.9% vs 63.6±12%, $p < 0.001$). Among doctors, anaesthetists had the highest mean score, but this difference wasn't statistically significant ($p = 0.078$). There was also no significant difference in scores between hospital settings, practice duration, and the interval since the last training on oxygen (Table 3). Appendix 2 summarises the logistic regression analysis, which further confirms that profession was associated with the percentage knowledge score.

Table 3: Comparison of percentage knowledge score across several categories

Variables		Mean percentage ± SD	P value
Profession	Doctor	74.9±10.9	< 0.001*
	Nurse	63.6±12	
Hospital category	Public Tertiary	71.5±11.4	0.416
	Public Secondary	68.8±13.3	
	Private Secondary	67.4±13.6	
	Public Primary	52.2±11.9	
Years of practice	<1 year	69.3±11.0	0.450
	1 - 5 years	65.9±14.7	
	6 - 10 years	69.4±11.8	
	11 - 20 years	73.7±10.9	
	>20 years	69.4±11.5	
How long ago did you administer/prescribe oxygen to a patient	<1 month	72.4±12	0.049
	1 - 6 months	64.6±9.8	
	>6 months	65.4±14.8	
	I never had to	52.9±20.8	
What year did you receive the update/training	<1 year	72.1±14.	0.584
	1 - 5 years	72.5±14.4	
	>5 years	74.0±12.5	
For doctors. What is your area of speciality	Anaesthesia	81.9±8.5	0.078
	Obstetrics and Gynaecology	69.9±11.9	
	Surgery	69.9±12.7	

	Medicine	68.6±6.8	
	Family Medicine	68.8±2.6	
	General Practice	75.1±7.9	
	Community Medicine	58.8±16.4	
	Emergency Medicine	79.4	
	Ophthalmology	60.3±10.4	
	Paediatrics	73.5±2.9	
For nurses. What ward/unit do you work in?	Critical Care	68.9±11.5	0.228
	Operating Theatre	64.3±10.9	
	Surgical	76.5±25	
	Medical	61.8±10.9	
	Emergency	61.8±4.7	
	Mixed	59.1±14.3	
	Clinic	55.1±8.1	
	Paediatric	55.8	
	Obstetrics/Gynaecology	60.3±6.2	

Appendix 3 summarises the percentage of correct answers to each question. The highest score was for recognising central cyanosis as an indication for oxygen (97.7%), while the lowest score was for ambient light as a factor affecting pulse oximetry (26.3%). Only 60.2% recognised oxygen as a drug. The majority noted that it has adverse effects when given inappropriately (90.2%), and know pulse oximetry (94.7%) and arterial blood gas (ABG) machine (94%) help monitor hypoxaemia. Knowledge of the contents of an ideal oxygen chart was good, with respondents scoring over 70% on most factors, except for oxygen volume. The average scores for the sections on general knowledge, oxygen delivery practices and factors affecting pulse oximetry (59.7%, 55.1% and 55%, respectively) were lower than those for the other sections.

Challenges of oxygen therapy

Figure 2 summarises the challenges of oxygen therapy as highlighted by the respondents. The top reasons were its cost, poor equipment maintenance, and unavailability (47.4%, 42.1%, and 41.4%, respectively).

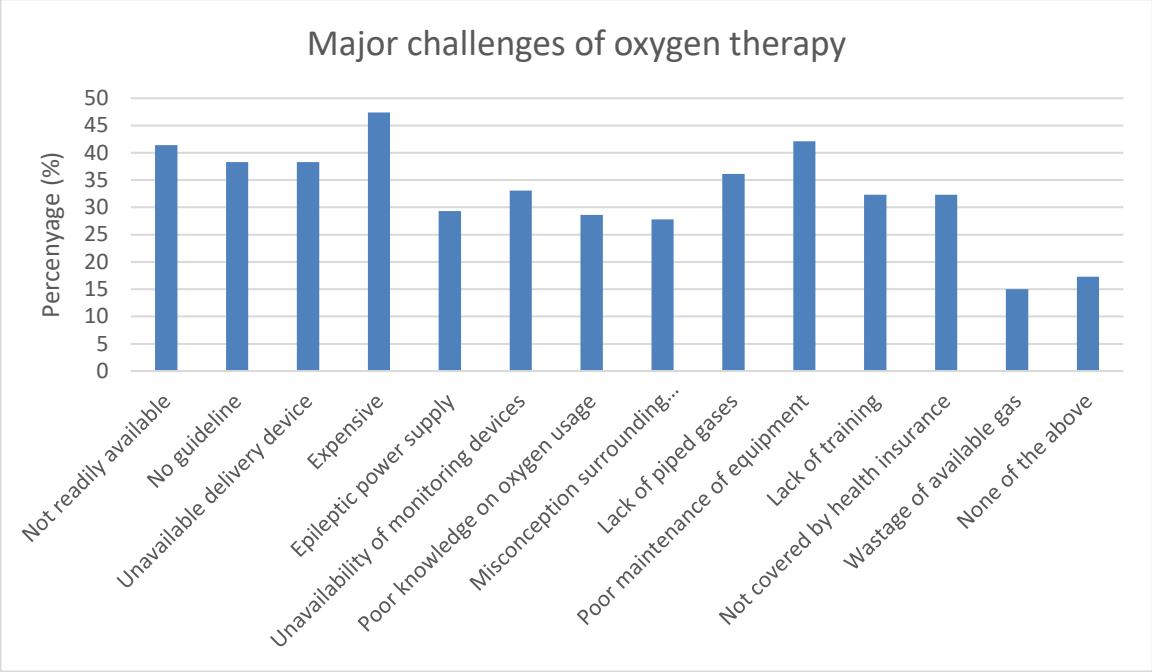

Figure 2: Challenges of oxygen therapy

An oxygen prescription chart was not used in most centres, as reported by 69.9% of respondents, and there was no significant difference across hospital settings (p = 0.144). Only 102 (76.7%) and 45 (33.8%) respondents had a pulse oximeter or an ABG machine readily available in their hospital, respectively. Pulse oximeters were least readily available in public tertiary hospitals, and this was statistically significant (p < 0.003) – Table 4.

Table 4: Comparison of availability of oxygen prescription chart, pulse oximeter and ABG machine across various hospital settings.

	Response	Public tertiary (n=72)	Public secondary (n=13)	Private secondary (n=44)	Public primary (n=4)	Total (n=133)	P value
Availability of an oxygen prescription chart	Yes	9 (12.5)	2 (15.4)	10 (22.7)	2 (50)	23 (17.3)	0.144
	No	56 (77.8)	10 (76.9)	25 (56.8)	2 (0)	93 (69.9)	
	Not Sure	7 (9.7)	1(7.7)	9 (20.5)	0 (0)	17 (12.8)	
Availability of pulse oximeters	Yes	45 (62.5)	11 (84.6)	43 (97.7)	3 (75)	102 (76.7)	0.003*
	No	26 (36.1	2 (15.4)	1 (2.3)	1 (25)	30 (22.6)	
	Not Sure	1 (1.4)	0 (0)	0 (0)	0 (0)	1 (0.8)	
Availability of an ABG machine	Yes	11 (15.3)	3 (23.1)	31 (70.5)	0 (0)	45 (33.8)	<0.001*
	No	54 (75)	9 (69.2)	10 (22.7)	4 (100)	77 (57.9)	
	Not Sure	7 (9.7)	1 (7.7)	3 (6.8)	0 (0)	11 (8.3)	

ABG – Arterial blood gas

Discussion

This study assessed healthcare workers' knowledge and practices regarding oxygen therapy. Our main findings are that oxygen is frequently prescribed or administered by many doctors and nurses. Only 60.9% of health workers were aware of the existence of oxygen therapy guidelines. Overall knowledge of oxygen therapy was fair, with a mean percentage of 69.31±12.7%, but the average scores for the sections on oxygen prescription practices and factors affecting pulse oximetry were lower than those for the other sections. Cost, poor maintenance of oxygen therapy equipment and unavailability were the top barriers to oxygen administration. Similarly, most hospitals do not have an oxygen prescription chart.

Proper training is crucial to ensuring the safe use of oxygen; however, very few healthcare workers receive training in oxygen therapy after completing their basic qualifications. The literature indicates that this is a persistent problem.[2,3,10,11] In 2021, Adeniyi et al.[3] reported that 79% of healthcare workers in Ondo State, Nigeria, had not received training on oxygen therapy, and about half were unaware of the existence of oxygen therapy guidelines. They also noted that respondents' knowledge of oxygen therapy was significantly related to their practices of oxygen administration, suggesting that those with better knowledge perform better in practice. Bahig Anwr Akl et al.[12] in Egypt, also noted this improvement in practice after the implementation of a competency-based training on oxygen administration for paediatric critical care nurses and recommended its incorporation into continuing education programs. To encourage the safe use of oxygen, several international professional bodies have established guidelines, yet many healthcare workers in Nigeria are unaware of these guidelines or lack institutional guidelines for oxygen therapy.[2,6,13,14] The lack of institutional and national guidelines and the lack of training on oxygen therapy may contribute to its inappropriate use.

Supplemental oxygen is a frequently used therapy, as indicated in our survey: 82% of respondents have prescribed/administered oxygen within the last 6 months. Despite the extensive use of oxygen, doctors and nurses often only have average knowledge of the practical aspects of oxygen therapy, which can result in inappropriate use. Oxygen, though an effective medication, is associated with toxicity when given inappropriately; thus, a good knowledge is essential. This survey showed that many healthcare workers still don't recognise oxygen as a drug, which is in keeping with previous surveys.[2,15] This knowledge gap can lead to inappropriate and potentially harmful administration practices, including over- or under-oxygenation, prescription errors, and an increased risk of adverse outcomes.

The lack of training undoubtedly contributed to the poor performance in this survey. Research has shown that most healthcare workers receive no formal training on oxygen therapy after their basic qualification.[2,15] Considering the enormous usage, postgraduate refresher courses are needed to promote safe practices. Employing a structured approach, as is being done for Basic Life Support (BLS), may be worthwhile. The score was better among doctors than among nurses. Previous surveys in Nigeria had also noted better scores among doctors.[2] Although significantly more nurses claim to have read and applied an oxygen therapy guideline, their knowledge was lower than that of the physicians, casting doubt on the supposed awareness.

The respondents performed better in sections assessing their knowledge of recognising hypoxaemia, indications for oxygen therapy, and the contents of an oxygen prescription. This pattern is similar to the findings of Desalu et al.[2] and Awad et al.[15] Performance on the questions assessing oxygen delivery practices and factors affecting pulse oximetry accuracy was poor. These sections assessed knowledge of how to institute and wean patients off supplemental oxygen, which are key aspects of therapy. Similarly, understanding the factors that affect pulse oximetry is crucial for its proper use. It is particularly worrisome that nurses who are primarily responsible for patient monitoring scored poorly in this section. Our findings suggest that although many healthcare workers know when supplemental oxygen is required, they are unable to provide appropriate therapy. Training on oxygen therapy should incorporate these practical elements.

A combination of factors affects the institution of safe oxygen practices.[2] The top three challenges in our survey were cost, poor maintenance culture and unavailability. Others are the absence of guidelines, paucity of delivery devices, epileptic power supply, unavailability of monitoring devices, poor knowledge, lack of training, etc. A previous survey by the 'Every Breath Counts coalition' had also noted these concerns.[16,17] Other barriers to safe oxygen prescription include unfamiliarity with oxygen delivery devices, poor understanding of the dangers of oxygen toxicity, staff time constraints, resistance to change, and communication difficulties, amongst others.[6]

Although pulse oximeters are now widely used across many settings, our survey found that availability remains a concern, particularly in public tertiary hospitals. In these large facilities, this challenge might be due to an imbalanced distribution of devices, a poor maintenance culture, and a failure to replace or repair damaged devices. Many healthcare personnel are now familiar with pulse oximeters, which are noninvasive and simple tools that aid the recognition and monitoring of hypoxaemia.[16,18] It is recommended to be made available in every acute health facility.[16,18]

Medical oxygen, though vital for sustaining life, can cause adverse effects when administered indiscriminately.[19] A significant proportion of our respondents showed they were aware of this fact. It is recommended that oxygen, like any medication, be prescribed in writing before administration, except in emergencies.[13,14,20] This prescription should indicate the dose (flow rate/FiO_2), delivery device, duration, target oxygen saturation and monitoring intervals.[13,21] Unfortunately, our study shows that many centres in Nigeria do not have an oxygen prescription chart. An adequately completed oxygen prescription chart is key to promoting safe oxygen use, as it ensures proper administration, monitoring, and documentation of oxygen therapy.[21] A survey by Devathangam et al. showed that nurses often comply with oxygen prescription orders.[22] Where these orders are absent, oxygen is likely given indiscriminately, increasing the risk of toxicity.

Limitations

Though this was a national survey, most responses came from the southwestern region. Similarly, a significant percentage of the responses were from public tertiary hospitals, Anaesthetists and Critical care nurses. Although our study did not show a significant difference between groups, these individuals are likely to possess a higher level of knowledge about the subject than the general population of healthcare workers. Furthermore, the survey tool was self-administered, and some responses may have been guesswork. The convenience sampling technique employed might have also introduced a selection bias.

Conclusion/Recommendations

Despite high medical oxygen consumption, many healthcare workers only have a fair knowledge of oxygen therapy and often receive no formal training beyond their basic medical/nursing qualifications**. We recommend r**egular in-service training on safe oxygen practices, the implementation of institutional/national guidelines on oxygen therapy, and the promotion of routine use of an oxygen prescription chart. we also recommend improved access to pulse oximeters.

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Appendices

Appendix 1: Comparison of the application of the oxygen therapy guideline.

Variable		Yes N (%)	P-value
Profession	Physicians	26 (38.8)	<0.001*
	Nurses	45 (68.2)	
Hospital setting	Public Tertiary	39 (54.2)	0.427
	Public Secondary	6 (46.2)	
	Private Secondary	31 (70.5)	
	Public Primary	3 (75)	

Appendix 2: Logistic Regression Analysis of the influence of (profession, hospital setting, years of practice and training on oxygen therapy) on adequate knowledge of oxygen

Variables	***Odds ratio***	***Confidence interval***		***P value***
		Lower	***Upper***	
Profession	*0.243*	*0.111*	*0.535*	*0.001**
Hospital setting	*0.825*	*0.567*	*1.201*	*0.315*
Years of practice	*1.348*	*0.956*	*1.900*	*0.089*
Training on oxygen therapy	*1.815*	*0.863*	*3.817*	*0.116*

Appendix 3: Questions assessing knowledge on oxygen (proportion of correct answers)

Questions	**Profession**		**Total (n=133)**	**P-value**
	Physician (n=67)	**Nurse (n=66)**		
General knowledge of oxygen				
Oxygen is like any other medication	49 (73.1)	31 (47)	80 (60.2)	0.002*
Oxygen is not a medication but a supportive therapy	41 (61.2)	13 (19.7)	54 (40.6)	<0.001*
Oxygen, like any other medication, has adverse effects when given inappropriately	65 (97)	55 (83.3)	120 (90.2)	0.017*
Oxygen should only be given after a prescription	10 (14.9)	26 (39.4)	36 (27.1)	<0.001*
Oxygen promotes combustion	63 (94)	44 (66.7)	107 (80.5)	<0.001*

Section average (%)			59.7	
Recognition of hypoxaemia				
Hypoxaemia can be recognised by clinical signs	63 (94)	62 (93.9)	125 (94)	1.000
Blood gas analysis is useful for confirming hypoxaemia	66 (98.5)	59 (89.4)	125 (94)	0.084
Breathlessness is not always a sign of hypoxaemia	56 (83.5)	32 (48.5)	88 (66)	<0.001*
Pulse oximetry is useful in detecting and monitoring hypoxaemia	62 (92.5)	64 (97)	126 (94.7)	0.208
SpO_2 level < 90% in adults define hypoxaemia	55 (82.1)	60 (90.9)	115 (86.5)	0.309
Section average (%)			87	
Indications for oxygen therapy				
Central cyanosis	67 (100)	63 (95.5)	130 (97.7)	0.119
Asymptomatic anaemia	64 (95.5)	34 (51.5)	98 (73.7)	< 0.001*
Eclampsia	42 (62.7)	37 (56.1)	79 (59.4)	0.483
Restlessness and convulsion in children	46 (68.7)	43 (65.2)	89 (66.9)	0.715
Section average (%)			74.4	
Contents of an oxygen prescription chart				
Oxygen volume	23 (34.3)	19 (28.8)	42 (31.6)	0.577
Oxygen flow rate/FiO_2	66 (98.5)	60 (90.9)	126 (94.7)	0.062
Oxygen diffusion rate	54 (80.6)	51 (77.3)	105 (78.9)	0.675
Oxygen solubility	61 (91)	58 (87.9)	119 (89.5)	0.585
Oxygen source and delivery device	55 (82.1)	40 (60.6)	95 (71.4)	0.007*
Oxygen density	62 (92.5)	56 (84.8)	118 (88.7)	0.182
Oxygen odour	65 (97)	65 (98.5)	130 (97.7)	1.000
Frequency of administration	52 (77.6)	52 (78.8)	104 (78.2)	1.000
Oxygen and nitrogen concentration	57 (85.1)	61 (92.4)	118 (88.7)	0.273
Section average (%)			79.9	
Oxygen delivery practices				

Device selection in type 2 respiratory failure	30 (44.8)	15 (22.7)	45 (33.8)	0.010*
Choosing oxygen concentration	40 (59.7)	38 (57.6)	78 (58.6)	0.861
Weaning off oxygen	62 (92.5)	56 (84.8)	118 (88.7)	0.182
Humidification essential	24 (35.8)	28 (42.4)	52 (39.1)	0.480
Section average (%)			55.1	
Factors affecting the accuracy of oxygen saturation				
Nail polish	56 (83.6)	33 (50)	89 (66.9)	< 0.001*
Hypothermia	59 (88.1)	36 (54.5)	95 (71.4)	< 0.001*
Carbon monoxide poisoning	54 (80.6)	36 (54.5)	90 (67.7)	0.002*
Anaemia	18 (26.9)	31 (47)	49 (36.8)	0.020*
Tissue hypoperfusion	53 (79.1)	42 (63.6)	95 (71.4)	0.056
Shivering	38 (56.7)	21 (31.8)	59 (44.4)	0.005*
Ambient light	29 (43.3)	6 (9.1)	35 (26.3)	< 0.001*
Section average (%)			55	

FiO_2 – Fraction of inspired oxygen, * - Statistically significant