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ORIGINAL ARTICLE

ASSESSMENT OF PEDIATRIC RESIDENTS' KNOWLEDGE, ATTITUDE, AND PRACTICE REGARDING OXYGEN THERAPY AND ITS COMPLICATIONS AT TIKUR ANBESSA SPECIALIZED HOSPITAL AND ST. PAUL HOSPITAL MILLENNIUM MEDICAL COLLEGE, ETHIOPIA

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ABSTRACT

Background: *: Oxygen therapy is beneficial, but too much of it or any oxygen therapy errors could be dangerous. Proper knowledge, appropriate practice, and favorable attitudes are important aspects of treatment. Hence, this study aimed to assess the knowledge, attitude, and practice of pediatric residents about oxygen therapy, its complications, and associated factors.*

Methodology: *A cross-sectional study was conducted among pediatric residents at Tikur Anbessa Specialized Hospital and St. Paul Hospital, Millennium Medical College in Addis Ababa, Ethiopia, from June to August 2021. using a self-administered questionnaire. Level of knowledge, attitude, and practice was grouped by Bloom's original cut-off points. A multinomial logistic regression model was fitted to identify significant predictor variables at a 5% level of significance.*

Results*: Of 141 pediatric residents who responded, this study found 17.7%, 40.4%, and 19.1% prevalence of good knowledge, attitude, and practice, respectively. On the chi-square test, the total duration of service as a general practitioner and the year of residency were significantly associated with knowledge and attitude (P values = 0.027 and 0.037, respectively). Residents' knowledge level and year of residency were found to be independently associated with oxygen administration practice. The odds of residents with good knowledge having good practice than poor practice is 8 times (adjusted odds ratio: 7.90, 95% CI 1.15-45.25, P-value =0.035) higher than residents with poor knowledge levels and year of residency was also a significant predictor of practice level (adjusted odds ratio: 0.24, 95% CI 0.06-0.94, P-value =0.042).*

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Conclusions: - *The majority of participants had a positive attitude and had moderate to inadequate knowledge of oxygen administration. Their practice, on the other hand, was generally poor. Regular education and training in oxygen administration can help them improve their knowledge.*

Keywords: - knowledge, attitude, practice, oxygen administration, pediatric residents

Background

Almost all living things on the planet require oxygen to survive. Oxygen is used to treat a wide range of pathophysiological conditions, including pneumonia, heart failure, and hemorrhagic shock (1). It is also an important part of resuscitation, acute medical care, basic life support, anesthesia, and postoperative care. While oxygen therapy is beneficial, too much of it, as well as any errors in oxygen therapy, can be dangerous, worsening a patient's condition and even putting their life at risk (2).

The provision of oxygen to critically sick patients is one of the most crucial components of patient care. As a result, needed knowledge, appropriate practice, and favorable attitudes about oxygen delivery are important aspects of treatment. This allows them to analyze patients' health and provide tailored therapy to improve the patient's quality of life (3). The amount and type of oxygen administration that are appropriate for a patient are determined by their underlying medical condition and whether they have an acute or chronic disease. The optimal oxygen delivery equipment and oxygen flow rate are determined by a variety of parameters, including the patient's age, treatment objectives, and tolerance (4).

Although oxygen therapy is the most common therapy used for infants, inappropriate control of administered oxygen could lead to irrevocable damage to many newborns, particularly preterm infants. The commonest and most extensively studied complication is retinopathy of prematurity, which can lead to permanent damage to the retina and blindness. Supplemental oxygen helps to avoid hypoxemia, but if it is given improperly, the patient risks hypoxemia, respiratory failure, and even death (5 -7).

Oxygen therapy complications necessitate good coordination, adequate documentation, and the handing over of oxygen therapy-specific concerns (8). Oxygen should be treated as a medicine regardless of the situation in which it is administered. Its effectiveness in treating hypoxemia is frequently underestimated, and if used incorrectly, it can be fatal (9). This therapy must be administered in a manner that is suitable, safe, and comfortable for the patient. This is contingent on a thorough understanding of why oxygen is given, how it is given, and the nursing requirements of the patient receiving it (9, 10).

It hasn't been studied in terms of oxygen treatment or pediatric residents' knowledge and practice of oxygen delivery. However, in previous research of nurses working in emergency departments in the two regions

of Ethiopia including Addis Ababa, ranging from 36.2%–to 61% and 33%–to 47% of nurses, respectively, had good knowledge and practice (11-13). According to a survey of Nigerian doctors and nurses, just 60% of doctors and 30% of nurses had a high level of knowledge, while half of both categories had low practice levels (14). Several studies have found that work overload, a lack of training and guidelines, work experience, and knowledge to determine practice are the main determinants of knowledge and attitude toward oxygen therapy (12-15).

Based on theoretical gaps and the fact that, to our knowledge, no research on oxygen therapy or associated knowledge and practice of pediatric residents for oxygen delivery in pediatric patients exists in our country, hence this study aimed to assess the knowledge, attitude, and practice of pediatric residents about oxygen therapy and its complications and associated factors in the pediatrics department of Tikur Anbessa Specialized Hospital (TASH) and St. Paul Hospital, Millennium Medical College (SPHMMC).

Method

Study design and setting

We conducted a cross-sectional study with 141 pediatric residents at TASH and SPMMC in Addis Ababa, Ethiopia, from June to August 2021, G.C. All pediatric residents working in hospitals were considered a source population. A simple random sampling method was used to select the study population from both institutions. A self-administered questionnaire was designed.

Sample size calculation

The total sample was determined using the single population formula with the following assumptions: 80 % power, 95 % confidence interval, margin of error = 5%, P = 50% since no other previous study was conducted with pediatric residents.

The following formula was used to calculate the sample size: -

$$= \frac{(Z\alpha/2)^2 \times P\,(1-P)}{d^2} \quad \frac{(1.96)^2 \times 0.5\,(1-0.5)}{0.05^2} \quad = \underline{\mathbf{384}}$$

Therefore, the total population in this study is less than 10,000, so using the reduction formula:

$$\mathbf{n} = \frac{\mathbf{no}}{\mathbf{1+\,no/N}} \quad \frac{\mathbf{384}}{\mathbf{1+\,384/192}} \quad = \underline{\mathbf{128}}$$

N is the total number of pediatric residents. TASH and SPHMMC have a total of 191 pediatric residents. The study's minimum sample size was calculated to be 128 individuals. After that, a 10% non-response rate was added to get a total sample size of 141.

Sampling technique and procedures

To select study participants from the two hospitals, simple random sampling was used. The total number of pediatric residents participating in the study was proportionally allocated based on the number of health professionals in each hospital and year of residency.

Data collection tool and measurements

A structured, self-administered questionnaire was prepared. The questionnaire included 19 questions on oxygen administration and complications that assessed knowledge, attitude, and practice level, as well as prior oxygen therapy training, availability of oxygen therapy guidelines in their facility, and sociodemographic characteristics (age, sex, place of work, year of residency, and service year as a general practitioner).

Bloom's cutoff point method was used to categorize the respondents' overall knowledge, attitude, and practice, which was then divided into three categories: good, moderate and poor. The key topics included in the assessment of pediatric residents' knowledge of oxygen therapy were indications and contraindications, normal oxygen saturation in newborns and young children, and fundamental physiology of the respiratory system. Three data collectors were assigned, and they were given training about the study. Before the actual data collection, a pre-test was undertaken to ensure that the structured questionnaire was valid. Before filling out the questionnaire, each resident received a brief explanation, and data collection included a detailed check of each completed questionnaire.

Operational definitions: -

Knowledge, attitude and practice score

Good: - if the score was between 80 and 100%.

Moderate: - if the score was between 60 and 79%,

Poor: - if the score was less than 60%.

Normal oxygen saturation (SpO2): - 90% and above.

Physiology of the lung: - those who said ventilation in response to a question, movement of air into and out of the lung is.

Respiratory system Physiology: - For those who said expiration in response to a question, the passive process in respiratory physiology is.

Data management and analysis

IBM SPSS version 25 was used to enter, clean, and analyze the collected data. In tables and graphs, descriptive statistics for categorical data were given using frequency and percentage. A Chi-square or Fisher exact test was used to make a comparison between groups, as appropriate. Then, to identify predictor variables, a multinomial logistic regression model was fitted and checked for model fitting information. An Adjusted Odds Ratio (AOR) with a 95% confidence interval and a P-value of 0.05 was used as statistically significant.

Result

Sociodemographic characteristics and Factors on oxygen therapy

The study included 141 pediatric residents. Of those, 85 (60.3%) were male, and more than three-quarters (77.3%) were aged 30 or below. Of those, 82 (58.2%) were from Tikur Anbessa hospital, and the remaining 59 (41.8%) were from St. Paul hospital. The majority of the residents, 112 (78.7%), were in their first or second year. Around 80% worked

as general practitioners (GP) for 1-3 years. Regarding attendance at training courses, around 78% of the respondents have never attended any short or long-course training about oxygen administration, and only 14.9% of the respondents are aware that there is a guideline in the facility where they are working. Around 70% of residents reported that there is a shortage of oxygen supplies and 85% of participants agreed on the effect of workload on oxygen therapy (Table 1).

Table 1: Socio-demographic and clinical experience characteristics and Participants' responses to the practice of oxygen administration among residents at TASH and SPHMMC.

Variables and category		**n (%)**
Age	≤30	109 (77.3)
	31-35	32 (22.7)
Sex	Male	85 (60.3)
	female	56 (39.7)
Hospital currently working	Tikur Anbessa	82 (58.2)
	St. Paul	59 (41.8)
Year of residency	First-year	56 (39.7)
	Second-year	55 (39.0)
	Third-year	30 (21.3)
The total duration of service as a general practitioner	1-3 years	112 (79.4)
	4-6 years	29 (20.6)
Have you trained in oxygen therapy/ administration?	Yes	32 (22.7)
	No	109 (77.3)
Is there a guideline for oxygen therapy in the current working emergency room?	Yes	21 (14.9)
	No	63 (44.7)
	I don't know	57 (40.4)
Using too little oxygen in the emergency room may contribute to carbon dioxide re-	Yes	62 (44)
	No	79 (56)
Is there an adequate supply of oxygen and delivery systems in emergency room?	Yes	43 (30.5)
	No	98 (69.5)
Do you think workload/ burden affects oxygen therapy in emergency room?	Yes	120 (85)
	No	21 (15)

Knowledge of pediatric residents on oxygen administration and complications

Only 64.6% correctly identify oxygen indications; 49.6% correctly identify the normal range of oxygen saturation in infants and young children, and 93.6% correctly identify respiratory system physiology. (Table 2)

Attitude of pediatric residents on oxygen administration and its complications

Seventy four percent correctly answered the question about whether oxygen is a type of medicine that should be administered by a medical officer. Only 50.4% managed to provide a good answer about how people with

severe lung disease are managed. Only 12.8% managed to provide a good answer in comparing continuous oxygen administration and intermittent oxygen therapy. When delivering oxygen treatment to adult critically sick patients, 70.2% of those polled were able to correctly identify whether or not oral and nose hygiene, as well as normal saline drops, should be performed. (Table 2)

Table 2: Response on the level of knowledge, attitude and practice among residents at TASH and SPHMMC.

Knowledge questions	**Responses**	**n (%)**
Indication of Oxygen administration	Correct	91 (64.6)
	Incorrect	50 (35.4)
Proper use of oxygen	Correct	114 (80.9)
	Incorrect	27 (19.1)
The normal oxygen saturation at rest for infant and young children	correct	70 (49.6)
	Incorrect	71 (50.4)
Contraindication to oxygen administration	Correct	24 (17)
	Incorrect	117 (83)
Physiology of lung	Correct	132 (93.6)
	Incorrect	9 (6.4)
Respiratory system physiology	Correct	94 (66.7)
	Incorrect	47 (33.3)
Sign of oxygen toxicity	Correct	107 (75.9)
	Incorrect	34 (24.1)
Overall knowledge score	Good knowledge	25 (17.7)
	Moderate knowledge	97 (68.8)
	Poor knowledge	19 (13.5)
Attitude question	**Responses**	**n (%)**
Oxygen is a drug that should be given only when ordered by a medical officer or a registered nurse-initiated order in an emergency	Strongly agree	104 (73.8)
	Agree	27 (19.1)
	Neutral	2 (1.4)
	Disagree	4 (2.8)
	Strongly disagree	3 (2.1)
Oral and nasal hygiene and normal saline drops as necessary should be done when giving oxygen to children	Strongly agree	99 (70.2)
	Agree	39 (27.7)
	Neutral	3 (2.1)
	Disagree	0 (0.0)
	Strongly disagree	0 (0.0)
Continuous oxygen administration is more beneficial than intermittent oxygen therapy	Strongly agree	18 (12.8)
	Agree	42 (29.8)
	Neutral	40 (28.4)
	Disagree	38 (27)
	Strongly disagree	1 (0.7)

Humidification is the best practice to prevent dryness of the mucus membrane of upper respiratory tract causing soreness	Strongly agree	88 (62.4)
	Agree	49 (34.8)
	Neutral	4 (2.8)
	Disagree	0 (0.0)
	Strongly disagree	0 (0.0)
Persons with severe lung disease need to be maintained at the prescribed oxygen saturation range	Strongly agree	71 (50.4)
	Agree	57 (40.4)
	Neutral	6 (4.3)
	Disagree	3 (2.1)
	Strongly disagree	4 (2.8)
Since oxygen is a drug, its administration to the patient is not safe, and also, it's very dangerous	Strongly agree	23 (16.3)
	Agree	40 (28.4)
	Neutral	28 (19.9)
	Disagree	32 (22.7)
	Strongly disagree	18 (12.8)
A child on oxygen therapy indicates that the patient is critically ill	Strongly agree	7 (5)
	Agree	55 (39)
	Neutral	31 (22)
	Disagree	39 (27.7)
	Strongly disagree	8 (5.7)
Overall attitude score	Good attitude	57 (40.4)
	Moderate attitude	82 (58.2)
	Poor Attitude	2 (1.4)
Questions on oxygen practice	**Responses**	**n (%)**
Use of pulse oximetry for monitoring	Correct	32 (22.7)
	Incorrect	109 (77.3)
Factors obstructing oxygen delivery tube	Correct	62 (44)
	Incorrect	79 (56)
Methods of optimizing fast delivery of oxygen	correct	98 (69.5)
	Incorrect	43 (30.5)
Proper use of Nasal cannula	Correct	107 (75.9)
	Incorrect	34 (24.1)
Patient discomfort while using oxygen delivery devices	Correct	22 (15.6)
	Incorrect	119 (84.4)
Overall practice score	Good practice	27 (19.1)
	Moderate practice	49 (34.8)
	Poor practice	65 (46.1)

Practice of pediatric residents on oxygen administration and its complications

Table 2 shows that only 32 (22.7%) have best practice pulse oximetry. Also, 62 (44%) of respondents demonstrated good practice on the effects of a collection of water in a tube and the best practice that helps oxygen travel easily; 98 (69.5%) managed to prove their aptitude for good practice thereto. The respondents who are aware of providing appropriate oxygen concentration using a nasal cannula turn around 107 (75.9%), and to the question

related to providing appropriate oxygen concentration using a facial mask, only 22 (15.6%) have information on the difficulty of tolerating and constantly struggling to remove the oxygen when using a face mask for oxygen therapy. (Table 2)

Blooms cut off points

According to the results in the figure below, the majority of residents 116 (82.3 %) had poor or moderate knowledge about oxygen administration, while the rest 25 (17.7%) had a high level of knowledge. More than half of the residents, 82 (58.4%) and 57 (40.0%), respectively, had a moderate or good attitude on oxygen administration and related complications, while just two (1.4%) had a poor attitude. Only 27 individuals (19.1%) had a good level of practice in oxygen administration, while the remaining 49 (34.8%) and 65 (46.1%) had moderate and poor levels of practice, respectively (Figure 1).

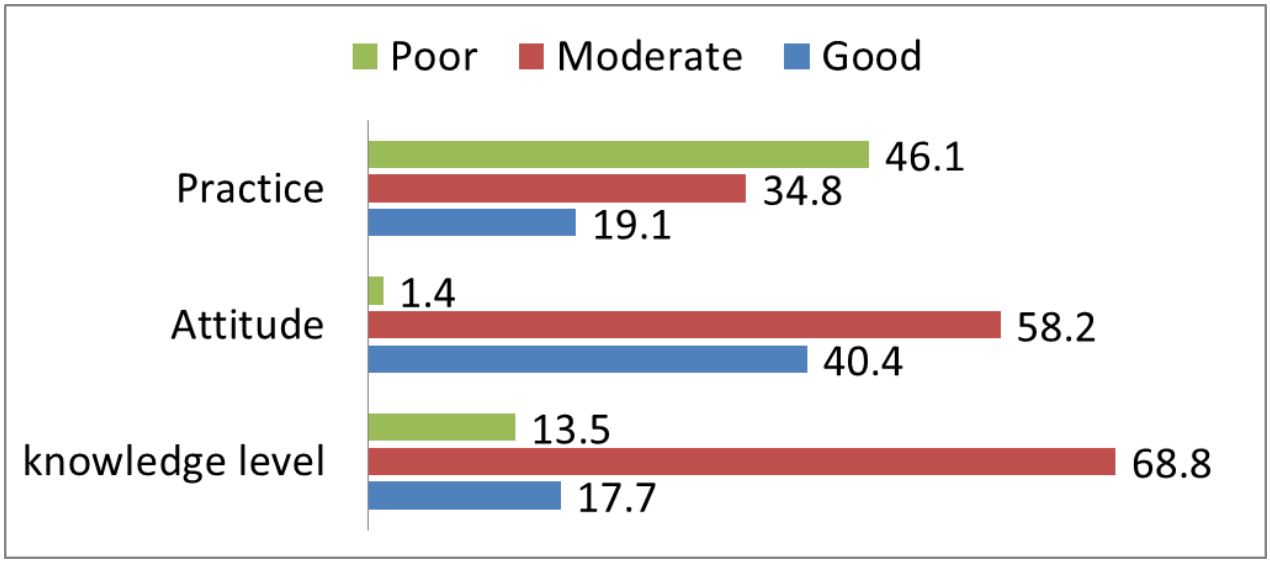

Figure 1: Participants' knowledge, attitude, and practice level (n = 141)

The chi-square test table depicts the association between participant characteristics and oxygen administration knowledge, complications, and practices. The entire period of service as a GP was significantly associated with the residents' knowledge of oxygen administration and complications (P-value = 0.027). The year of residency had also a significant impact on the residents' oxygen administration practice (P-value = 0.037) (Table 3).

Table 3: Chi-square comparison of characteristics of knowledge and practice levels.

Variables		**Knowledge level**			**X^2**	**P-value**
		Good	Moderate	Poor		
Age	≤30	16 (14.7%)	80 (73.4%)	13 (11.9%)	4.85	0.073
	31-35	9 (28.1%)	17 (53.1%)	6 (18.8%)		
Hospital currently	TASH	10 (12.2%)	62 (75.6%)	10 (12.2%)	4.94	0.084
	SPMMC	15 (25.4%)	35 (59.3%)	9 (15.3%)		
Year of residency	First-year	8 (14.3%)	39 (69.6%)	9 (16.1%)	1.19	0.863
	Second-year	11 (20.0%)	38 (69.1%)	6 (10.9%)		
	Third-year	6 (20.0%)	20 (66.7%)	4 (13.3%)		
The total duration of	1-3 years	16 (11.3%)	83 (74.1%)	13 (11.6%)	7.28	0.027*
	4-6 years	9 (31.0%)	14 (48.3%)	6 (20.7%)		
Training in oxygen	Yes	5 (15.6%)	24 (75.0%)	3 (9.4%)	0.85	0.747
	No	20 (18.3%)	73 (67.0%)	16 (14.7%)		
Variables		Practice level			X^2	P-value
		Good	Moderate	Poor		
Age	≤30	21 (19.3%)	35 (32.1%)	53 (48.6%)	1.63	0.442
	31-35	6 (18.8%)	14 (43.8%)	12 (37.5%)		
Hospital currently	TASH	12 (14.6%)	30 (36.6%)	40 (48.8%)	2.58	0.275
	SPMMC	15 (25.4%)	19 (32.2%)	25 (42.4%)		
Year of residency	First-year	11 (19.6%)	17 (30.4%)	28 (50.0%)	10.18	0.037*
	Second-year	6 (10.9%)	26 (47.3%)	23 (41.8%)		
	Third-year	10 (33.3%)	6 (20.0%)	14 (46.7%)		
The total duration of	1-3 years	25 (22.3%)	35 (31.3%)	52 (46.4%)	4.76	0.091
	4-6 years	2 (6.9%)	14 (48.3%)	13 (44.8%)		
Training in oxygen	Yes	5 (15.6%)	12 (37.5%)	15 (46.9%)	0.36	0.863
	No	22 (20.2%)	37 (33.9%)	50 (45.9%)		
Knowledge level	Good	9 (36.0%)	6 (24.0%)	10 (40.0%)	6.79	0.197
	Moderate	16 (16.5%)	37 (38.1%)	44 (45.4%)		
	Poor	2 (10.5%)	6 (31.6%)	11 (57.9%)		

In a multinomial logistic regression model, variables having a P-value < 0.3 in bivariate analysis were included. There was no significant factor detected in multinomial logistic regression to determine knowledge level. Residents' knowledge level, on the other hand, was found to be a significant determinant of oxygen administration practice. The odds of residents with a good knowledge level having a good practice than poor practice is 8 times

Table 4: Multinomial regression table showing factors associated with Knowledge level.

Knowledge	Variables		COR (95% CI)	AOR (95% CI)	P-value
Good	Age	≤30	0.82 (0.23-2.91)	0.86 (0.20-3.68)	0.847
		31-35	1	1	
	Hospital currently working	TASH	0.60 (0.18-2.00)	0.60 (0.17-2.10)	0.431
		SPMMC	1	1	
	Year of residency	First-year	0.59 (0.12-2.88)	0.65 (0.12-3.42)	0.614
		Second-year	1.22 (0.24-6.11)	1.28 (0.23-6.85)	0.773
		Third-year	1	1	
	The total duration of service as a GP	1-3 years	0.82 (0.23-2.91)	0.97 (0.23-4.09)	0.968
		4-6 years	1	1	
	Training in oxygen therapy	Yes	1.33 (0.27-6.44)	1.21 (0.23-6.41)	0.81
		No	1	1	
Moderate	Age	≤30	2.17 (0.72-6.52)	1.87 (0.53-6.59)	0.330
		31-35	1	1	
	Hospital currently working	TASH	1.59 (0.59-4.29)	2.07 (0.75-5.93)	0.174
		SPMMC	1	1	
	Year of residency	First-year	0.86 (0.23-3.16)	0.89 (0.23-3.62)	0.879
		Second-year	1.26 (0.32-5.01)	1.97 (0.44-8.75)	0.368
		Third-year	1	1	
	The total duration of service as a GP	1-3 years	2.73 (0.82-8.39)	3.02 (0.83-0.96)	0.092
		4-6 years	1	1	
	Training in oxygen therapy	Yes	1.75 (0.47-6.54)	1.98 (0.48-8.17)	0.343
		No	1	1	

The reference category is poor knowledge.

Table 5: Multinomial regression table showing factors associated with practice level.

Practice	Variables		COR (95% CI)	AOR (95% CI)	P-value
Good	Age	≤30	0.79 (0.26-2.38)	0.59 (0.15-2.24)	0.443
		31-35	1	1	
	Hospital currently working	TASH	0.50 (0.20-1.24)	0.46 (0.17-1.27)	0.138
		SPMMC	1	1	
	Year of residency	First-year	0.55 (0.18-1.60)	0.40 (0.12-1.36)	0.146
		Second-year	0.36 (0.10-1.22)	0.24 (0.06-0.94)	0.042*
		Third-year	1	1	
	The total duration of service as a GP	1-3 years	3.12 (0.65-14.92)	7.46 (0.97-39.36)	0.051
		4-6 years	1	1	
	Training in oxygen therapy	Yes	0.75 (0.24-2.34)	0.41(0.11-1.53)	0.187
		No	1		
	Knowledge level	Good	4.95 (0.85-28.63)	7.90 (1.15-45.25)	0.035*
		Moderate	2.00 (0.39-10.02)	2.40 (0.44-13.81)	0.303
		Poor	1	1	
Moderate	Age	≤30	0.56 (0.23-1.36)	0.57 (0.21-1.55)	0.278
		31-35	1	1	
	Hospital currently working	TASH	0.98 (0.46-2.11)	0.93 (0.41-2.09)	0.871
		SPMMC	1	1	
	Year of residency	First-year	1.14 (0.45-4.38)	1.67 (0.50-5.54)	0.399
		Second-year	2.63 (0.87-7.99)	2.67 (0.82-8.66)	0.101
		Third-year	1	1	
	The total duration of service as	1-3 years	0.62 (0.26-1.48)	0.74 (0.27-2.03)	0.564
		4-6 years	1	1	
	Training in oxygen therapy	Yes	1.08 (0.45-2.58)	1.28 (0.49-3.36)	0.610
		No	1	1	
	Knowledge level	Good	1.10 (0.26-4.54)	0.95 (0.22-4.10)	0.951
		Moderate	1.54 (0.52-4.57)	1.68 (0.53-5.36)	0.376
		Poor	1	1	

The reference category is poor practice.

Discussion

A total of 141 pediatric residents took part in the study, with 82 from TASH and 59 from SPHMMC. About 17.7% have a good level of knowledge, while 19.1% have a good practical level of oxygen therapy and its complications. Residents' knowledge level and year of residency were found to be independently associated with oxygen administration practice level (P = 0.035 and 0.042).

Knowledge of pediatric residents on oxygen administration

Physicians and nurses should be aware of oxygen treatment indications and normal oxygen saturation at various ages, as well as normal breathing rates, according to world health organization, Western Australian Hospitals, British Thoracic Society, and Allied Health provincial multi-disciplinary group standards (5, 16).

To the best of our knowledge, this was the country's first study of its kind on pediatric residents. As evidenced by the various analyses conducted, the majority of pediatric residents had poor to moderate knowledge of oxygen administration. The level of education and lack of fundamental practical knowledge that may be acquired by various training, workshops, and exposures to scientific papers are likely to contribute significantly to the observed weakness. The number of participants scoring at the low level of knowledge was 13.5%, with just 25 individuals scoring at the high level of knowledge, representing 17.7% of the total, with a standard deviation of 2.3.

In this study, 17.7% of residents had good knowledge of oxygen therapy and its complications. This conclusion contradicts from a result obtained from a study in southwest Nigeria on doctors and nurses, which revealed that 49.5% had good knowledge. Also differ from a study in Rwanda that found just 3.1% of intensive care unit (ICU) health care staff had good knowledge. This disparity might be due to the different types of professionals investigated. The Rwanda study looked at midwives and nurses. (14, 17).

The findings of our study revealed a lack of knowledge about oxygen therapy, such as knowledge of normal oxygen saturation. Approximately half of the respondents (49.6%) provided the correct answer. A. F. Aloushan et al. show 72.7% are aware of normal oxygen saturation (15). The reported low levels could be attributed to a lack of training, as reported by the majority (78%) of respondents who had not completed a training course. This implies the responsibility of hospital management for not providing the staff skills development program, while updating the knowledge of the pediatric residents is a paramount factor in professional performance.

Attitude of pediatric residents on oxygen administration

The poor attitude or negative attitude score for oxygen therapy was determined to be quite low in our study which is 1.4%, and 40.0 % have a positive attitude. This is low compared

with a local study involving physicians from South Gonder hospitals found that 54.6% had a favorable attitude (18). Even though the majority of residents are positive about oxygen therapy, considerably greater understanding and relevant updates are critical to professional performance success.

Oxygen is recognized as a drug by 73 % of residents, implying that right indication and dose with order are required for its administration, resulting in better patient care, minimal complications, and less unnecessary usage. A study in Rwanda also found that 54% of people think that oxygen should be used as a drug (17).

Practice of pediatric residents on oxygen administration

According to our findings, 27 respondents (19.1%) have good oxygen utilization practice, whereas 46.1% had poor practice. This is analogous to Adeniyi et al.'s report, which found that 48.2% of doctors had poor practice. On the contrary, research done in the Gonder and Harari regions, Ethiopia (47.0%) and Kigali, Rwanda (46.2%) had very high practice levels compared to the current study (19.1%) (11, 17, 19). To save the lives of many emergency patients, a standard guideline for oxygen delivery and monitoring state that physicians and nurses should be trained in the best practices for pulse oximetry, humidification attachment, and the use of various oxygen devices (9, 14).

In the chi-square test, our study revealed that duration of service was significantly associated with residents' knowledge regarding oxygen administration and complications. This is in line with a study reported by Demilew BC et al (18). Residents' knowledge level was a significant determinant of oxygen administration practice in multivariate analysis. Residents with good knowledge levels have 8 times more likelihood of having good practice than those with poor knowledge levels. This finding is comparable to that of Zeleke et al. and Getahun et al., who reported that good practice of oxygen therapy is significantly associated with good knowledge in a local study of nurses working in a general hospital (12, 19).

The study's limitation is that the obtained data was self-administered, so there may be an information bias. Despite this limitation, the study's strength is that it was conducted in two of the country's main referral and teaching hospitals, and it could be considered representative of other hospital settings as well. It is also the first of its kind among pediatric residents that we are aware of.

Conclusion

In conclusion, pediatric residents in the capital's two main hospitals had a gap in their knowledge and practice of oxygen therapy. As a result, extensive oxygen therapy education and training programs are required to improve awareness among healthcare professionals.

Recommendation

Residents should be given access to the available oxygen therapy guidelines. Workshops and training for should be held regularly.

Furthermore, regular practical training sessions for health personnel should be planned to keep them up-to-date on the most recent guidelines on oxygen therapy.

Declarations

Ethics approval and consent to participate.

TASH gave their ethical permission after receiving a legal supporting letter from the AAU College of Health Sciences, Department of Pediatrics and Child Health, institutional research and ethics review committee (458/13) on July 13, 2021. After that, each study participant signed a formal informed consent form before the start of data collection.

Consent for publication

Not applicable

Availability of data and materials

All data from this study will be available in this published article.

Competing interests

There were no conflicting interests stated by the authors.

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Authors' contributions

RAK, HG, and KB conception and designed the research. KB performed the research and data collection. KB and EKE analyzed data, and interpretation and wrote the paper.

All authors read and approved the final manuscript

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