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BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

SCHOOL OF HEALTH SCIENCES

DEPARTMENT OF Adult Health Nursing

Practice Of Oxygen Therapy And Its Associated Factors Among Nurses Working In Emergency And Intensive Care Unit In West Amhara Region Referral Hospitals, North West Ethiopia

By: Getnet Alayu (Bsc In Nursing)

A THESIS REPORT SUBMITTED TO DEPARTMENT OF ADULT HEALTH NURSING, SCHOOL OF HEALTH SCIENCES, COLLEGE OF MEDICINE AND HEALTH SCIENCES IN PARTIAL FULFILLMENT FOR THE REQUIREMENT OF MASTER DEGREE IN ADULT HEALTH NURSING

AUGUST, 2023

BAHIR DAR, ETHIOPIA

BAHIR DAR UNIVERSTY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

SCHOOL OF HEALTH SCIENCES

PRACTICE OF OXYGEN THERAPY AND ITS ASSOCIATED FACTORS AMONG NURSES WORKING IN EMERGENCY AND INTENSIVE CARE UNIT IN WEST AMHARA REFERRAL HOSPITALS, NORTH WEST, ETHIOPIA

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STUDY AREA	**WEST AMHARA REFERRAL PUBLIC HOSPITALS**	
STUDY PERIOD	**MARCH 17 TO MAY 4/2023G.C**	

AUGUST, 2023

BAHIR DAR, ETHIOPIA

Declaration form

Declaration

I the undersigned declared that this is my original work has never been presented in this or any other university and that all the resources and material used for the research proposal have been fully acknowledged.

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Signature:

Date: 14/07/2016

APPROVAL SHEET

This is to certify that the final result entitled with "practice of oxygen therapy and its associated factors among nurses working in emergency and intensive care unit west Amhara region public hospitals, North West, Ethiopia 2023: Institution based cross-sectional study" submitted by Getnet Alayu for the award of master's degree in Adult Health Nursing was carried out under our supervision and the final result has not been previously submitted in part or full for any degree or diploma for this or any other university.

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LIST OF ABBREVIATIONS AND ACRONYMS

FHCRH	Felege Hiwot Comprehensive Referral Hospital
ICU	Intensive Care Unit
LTOT	Long Term Oxygen Therapy
OT	Oxygen Therapy
SOT	Supplemental Oxygen Therapy
SPSS	Statistical Package for Social Sciences
TGSH	Tibebe Ghion Specialized Hospital
UOGCSH	University of Gondar Comprehensive Specialized Hospital
WHO	World Health Organization
WSUCST	Welayita Sodo University Comprehensive Specialized Teaching Hospital

ABSTRACT

Background: Oxygen is administered as a corrective treatment for conditions resulting in hypoxia (low level of oxygen in the blood). Oxygen therapy is most frequently used nursing procedure in developed and developing countries. However, there were significant practice gaps regarding oxygen therapy despite their frequent use. It is reported that maximum percent of oxygen delivery and flow rates are particularly poor, with potential negative impact on patient care including delivering too little oxygen in emergencies, leading to carbon dioxide retention. There is no study conducted about practice of oxygen therapy and associated factors in the study area particularly DMRH, TGSH,FHCRH, so this study will fill this gap.

Objective: To assesspractice of oxygen therapy and its associated factors among nurses working in emergency and intensive care unit in West Amhara referral public hospitals, North West Ethiopia 2023.

Methods: Facility based cross-sectional study design was conducted among 190 nurses from March 17 to May 4, 2023. Simple random samplings were employed and self-administered structured questionnaires, and observational check list was used to collect data. Data was edited and entered into EPI data version 4.6 and exported to SPSS version 27 for analysis. Binary and multiple logistic regression models were used to assess the association between predictors and practice of oxygen therapy. Significant independent variables were declared at 95% confidence interval and P-value of less than 0.05 as cut off point.

Results: This study showed 36.8 % of nurses had a good practice on supplemental oxygen administration. Good attitude [AOR=5.84, 95 % CI (1.93, 17.63)],Female nurses [AOR=3.03, 95% CI (1.24-7.37)], training (AOR 7.9, 95% CI (2.87-21.71)]guideline of oxygen therapy and [3.61, 95% CI (1.59-8.16)] had significant associations on oxygen therapy.

Conclusion and recommendation: oxygen therapy practice was low among nurses working in West Amhara referral hospitals. Attitude, training, sex, age and guideline of oxygen therapy were significant factors. Amhara health bureau should be consider expanding critical care medicine should engage in training practitioners and change nurses' attitude specially who provide care for critically ill patients.

KEY WORDS: Ethiopia, Nurse, Oxygen therapy, Practice

1. INTRODUCTION

1.1. BACK GROUND

Oxygen is a component of ambient air at 21% concentration. It makes up about 65.00% of human body mass and essential to all tissues of the body. It is listed as a core item on the World Health Organizations (WHO) model of essential medicines, which is a list of the most effective and safe. Oxygen therapy (OT) is the administration of oxygen at concentrations greater than that in the ambient air for treating or preventing hypoxia (1, 2).

Oxygen therapy is vital to sustain human life; it is one of the most widely prescribed drugs for patients with different health conditions. It is commonly used in the emergency and critical cases and first line treatment in many critical conditions. The decision to administer oxygen is based on the patients' needs, the medical staff's opinion, and the treatment plan they have recommended (3-5). Since oxygen has its own toxicity and is similar to a drug, it should only be taken as recommended and only when necessary. The prescription should include; dose, duration, method of delivery, device of delivery, defined target arterial oxygen saturation range (SaO2) and monitoring process. Like other drugs order, oxygen order must be included in a treatment chart before administration (6-8).

Oxygen supplementation is a lifesaving treatment in emergency conditions and is commonly used as a therapeutic agent in intensive care unit and emergency departments. Many patients cannot survive without additional oxygen treatment (9).Supplemental oxygen therapy (SOT) has a pivotal role in saving the lives of many patients with heart and lung diseases. Even if oxygen therapy is lifesaving agent, it can also cause adverse effects when given for long periods at high concentration (2,9,10).

When giving oxygen treatment, members of the health team exercise extreme caution because it should only be done in the presence of a nurse or physician. Nurses are essential in this situation because they work closely with patients undergoing oxygen therapy. Should be done regularly based on physician prescription and assessed carefully like arterial blood gas analysis, hemoglobin or hematocrit and chest X-ray.

Whenever a physician prescribes oxygen therapy, the nurses should be aware of it and check the physician prescription, which should include the patient's indications, the target oxygen saturation, the oxygen delivery device, the range of oxygen flow or percentage of inspired oxygen, and the time that oxygen is to be applied. The prescription should also be signed and dated by the physician (11).

Different systems are used for oxygen therapy such as face mask, oxygen tent, nasal cannula, venturi-mask, partial re-breather mask, non-re-breather mask, oxygen hood, face tent, trans-tracheal catheter and nasal catheter (12). The optimal amount and method of oxygen delivery varies depending on patient's underlying medical condition. The selection of appropriate oxygen delivery device and oxygen flow rate depends on many factors including patient's age, therapeutic goals and patient's tolerance (13). Oxygen should be prescribed to achieve a target saturation of 94-98% for most acutely ill patients or 88-92% for those at risk of hypercapnia respiratory failure (14, 15).Oxygen should be administered by trained staff. Nurses are the primary healthcare personnel who monitor oxygen therapy and can contribute to reduce adverse effects of supplemental oxygen therapy (16).

Oxygen therapy has challenges that nurses may encounter while providing it. These difficulties may be attributed to nurses due to their ignorance or lack of awareness of the various oxygen equipment. Other challenges may be related to the hospital, such as a lack of ongoing training regarding the process of oxygen treatment, a lack of correctly running oxygen therapy equipment or supplies, or a lack of an oxygen therapy protocol. There are also some other obstacles that may be related to the prescription itself, such as unclear prescriptions from doctors regarding dosage, devices that should be utilized in accordance with patients' conditions, and unclear patient follow-up procedures (18). Lack of experience in oxygen therapy, a high workload, a scarcity of oxygen and delivery devices, qualifications, and a lack of local standards were the key contributors to the substandard practice (1, 11, 17, 18).

1.2. STATEMENT OF THE PROBLEM

OT is projected that there are close to 800,000 patients receiving long-term oxygen therapy (LTOT) in the United States, at a cost of approximately $1.8 billion annually (19). The length of oxygen delivery was correlated with incidence of retinopathy in infants (20). Poor practice of oxygen lead to major changes in prescription and provision of domiciliary oxygen therapy, principally the provision of clinical standards for initial assessment and subsequent patient management (21). Despite implementation of these changes, problems continue (22). In United States increased supraphysiological oxygen administration during surgery was associated with a higher incidence of kidney, myocardial, and lung injury.It has been estimated that >80% of patients undergoing general anesthesia are exposed to oxygen administration in excess of that required to maintain normal blood oxygen levels (23-25). The majority of ICU physicians admit that prolonged exposure to hypoxia may be harmful and that they have a low tolerance for high oxygen levels. However, in actual clinical practice, a large proportion of patients in ICU were exposed to higher arterial oxygen levels than self-reported target ranges (26). Practice and perceived concerns regarding oxygen therapy are highly variable and factors are not consistently associated with years of experience or location of practice. The majority of nurses were incorrectly managing a hypoxia patient in type I respiratory failure due to concern about administering a high fraction of inspired oxygen (FiO2)(27).

Uncontrolled oxygen administration, mainly when delivered at high concentrations, can result in a worsening of hypercapnia which is primarily caused by hypoxic vasoconstriction (28). OT is important when performed with appropriate dosage; however, it has significant adverse effects in addition to its therapeutic characteristic when performed inappropriately. Hypoventilation, atelectasis, pulmonary oxygen toxicity, retrolental fibroplasia, irritation and discomfort were a few of these negative outcomes (29, 30). OT is one of the most widely used resuscitation methods. If used incorrectly, it was dangerous to patients. Oxygen induced hypercapnia, inflammation, and infection were the most frequent side effects of oxygen therapy (2, 15, 29). But there are also well-described potentially harmful side effects of supplementary oxygen delivery, such as the production of reactive oxygen species that alter cellular lipids, DNA, and

proteins, vasoconstriction in cardiac and cerebral tissue beds, and suppression of intracellular signaling pathways that confer cellular protection during ischemia and reperfusion (31, 32).

Previous studies have reported varying degree of gaps in knowledge and practice among health-care professionals regarding oxygen therapy (11, 33, 34). Studies demonstrate that there was a clear gap of practice among health care professionals related to OT supplementation. The possible associated factors for this gap included shortage of training programs, unavailability of national OT guideline and excessive workload (1, 35, 36).Based on research studies conducted in countries like Riyadh, Nepal, British, Australia, Addis Ababa and Debre Tabor, there is a knowledge and practice gap on oxygen therapy among practicing nurses in hospitals.This gap may be caused by a lack of OT practice training, a lack of hospital and national OT guidelines, and an excessive amount of nurse effort (1, 11, 16, 18, 37, 38).

The most frequent obstacles to safe oxygen therapy practices were lack of training programs, absence of equipment that is in good working order, and incomplete written prescriptions for oxygen therapy (35).The unavailability of well-functioning equipment and poor maintenance of nonfunctional oxygen machines are the most serious and additional burdens of nurses with practice of oxygen therapy (41).

Even though there were some researches done in Ethiopia, they did not investigate the variables associated to the outcome variable and done only in specific working unit (Emergency and ICU) in one hospital which is not enough to generalize (42). To the best of my knowledge, no study has been done in the study area, thus there isn't much information about how nurses actually practice administering oxygen. As a result, this study was carried out to assess practice of oxygen therapy and factors associated with it among nurses working in public hospitals in West Amhara referral public hospitals.

1.3. SIGNIFICANCE OF THE STUDY

It is essential to evaluate nurses practices and factors related to oxygen treatment in order to administer it safely and effectively for better patient outcome. It helps nurses to perform oxygen therapy better and will be utilized as important evidence for interventions that will be strengthen the capacity of the healthcare system for oxygen therapy and monitoring. This study will be served as the basis for future researchers and potential intervention to address the gap for healthcare professionals, managers, nurse educators, and health policymakers.

2. LITERATURE REVIEW

2.1. NURSES PRACTICE TOWARDS OXYGEN THERAPY

According to study conducted in Iran, in Southwest Nigeria, University Teaching Hospital of Kigali Rwanda educational hospitals in Cairoand Orotta National Referral Hospital (ONRH)in Eritreashowed that the proportion of poor practice related to oxygen therapy among nurses was 25 %, 80%, 25.5%, 82% and 55%respectively (17, 40,39,33, 35).

According to the study conducted in Ethiopia; Welayita Sodo University Comprehensive Specialized Teaching,Public Hospitals of Harari Region Hospital ,Addis Ababa public hospital nurses, University of Gondar Comprehensive Specialized Hospital, and Debra Tabor General Hospital showed that the proportion of poor practice towards oxygen therapy were 26.1%, 53% ,56.6%, 52.5%, 77 %, and respectively (41,42,11, 36,67). The recent studies in University of Gonder comprehensive specialized hospital and South Gonder Zone public hospitals revealed that 37.3% and 34.9% of nurses had poor practice regarding to oxygen therapy respectively (43, 44).

2.2. ASSOCIATED FACTORS OF PRACTICE OF OXYGEN THERAPY

2.2.1. Socio-demographic and other factors

The study in Nepal showed that there was a significant association between the practice level and 20-35 age category, BSc nurse and more than 5 years' experience of the respondents(37).Similar study in South West Nigeria showed that BSc nurse had significant association with level of practice of oxygen therapy (40).

The study conducted in Eritrea, North East Africa, Orotta National Referral Hospital (ONRH) showed that majority of the nurses who had 5 years and above experience and those who were single had good practice on oxygen therapy (35).

The study conducted in Eritrea, North East Africa, Orotta National Referral Hospital (ONRH), public hospitals in the Harari region and University of Gondar Comprehensive Specialized Hospital showed that male and single nurses and majority of the older nurses

with age 25 years and above were found to have good practice on oxygen therapy (35, 36, 42). Similar study in South Gondar hospitals showed that work experience of less than 5 years have a good level of practice for oxygen therapy (AOR- 3.41, 95%CI- (1.58-7.35).(44).

2.2.2. Knowledge

The study in Nepal and China revealed that among nurses the prevalence of poor knowledge among nurse on oxygen therapy were 74.4% and 41.72% respectively (37, 45).The study in the Southwest Nigeria and other study in debretabor referral hospital Ethiopian knowledge of the respondents on oxygen therapy is significantly associated with their practices of oxygen administration; implying that those with good knowledge do better in the area of practice (18,44).

According to study conducted in educational hospitals in Cairo, Asmara Eritrea, North East Africa Orotta National Referral Hospital (ONRH), Rwanda, 11 district hospitals in eastern Ugandan and showed that the prevalence of poor knowledge among nurses related to oxygen therapy were 74.4% , 56.7% , 26.2%, 50.5% and 24% respectively (33, 35, 39, 40, 46).

According to the study conducted in Ethiopia; Addis Ababa public hospital nurses, WSUCST hospital and in the Public Hospitals of Harari Region, Debre Tabor General Hospital, Ethiopia showed that 63.8%, 44.4% , 38.6% and 52 % of nurses had poor knowledge towards oxygen therapy respectively (11, 18, 41, 42).

The recent study conducted in University of Gondar Comprehensive Specialized Hospital and South Gondar zone public hospitals showed that 46.7% and 45.4% of nurses had poor knowledge towards oxygen therapy (43, 44).

2.2.3. Attitude towards oxygen therapy

The study conducted in Nepal and Eritrea, North East Africa, Orotta National Referral Hospital (ONRH) showed thatsignificant associations between nurse attitude and oxygen practice (37,35).

According to the study conducted in Ethiopia; Addis Ababa public hospital nurses, Welayita Sodo university comprehensive specialized Teaching hospital (WSUCST) and South Gondar zone public hospitals showed that the positive attitude towards oxygen therapy of nurses were 53.3% , 60.8% and 54.5% respectively (11, 41, 44). The recent study conducted in University of Gondar Comprehensive Specialized Hospital showed that 56.1% of study participants had favorable attitudes towards oxygen administration practice (43).

2.2.4. Healthcare facility related factors

The study in study conducted in Turkey showed that there were significant associations between the level of practice on oxygen therapy and working in ICU(47).But Nepal revealed that there was no association between levels of practice with working unit and training (37).

The study conducted in Riyadh King Khalid University Hospitalshowed that lack of oxygen therapy training and guideline, workload, inadequate supply of oxygen and delivery devices were associated factors on poor practice of oxygen therapy (1). the study in educational hospitals in Cairo and Eritrea, North East Africa, Orotta National Referral Hospital (ONRH)showed that lack of training courses, lack of equipment/supplies, lack of periodic maintenances,incomplete written prescriptions for oxygen therapy, not well functioning equipment, and unavailability of standardized protocol for oxygen therapy related with poor practice of oxygen therapy to their patients (33, 35).

The study conducted in WSUCST hospital, Addis Ababa public hospital, Debre Tabor General Hospital, public hospitals in the Harari region and showed that lack of oxygen therapy training and guideline, workload, inadequate supply of oxygen and delivery devices were associated factors on poor practice of oxygen therapy (41,11,42,18).

According to study conducted in South Gondar zone hospitals revealed that presence of periodic maintenance, having training about oxygen therapy and availability of oxygen therapy guidelines or protocol in the working area and presence of supply of oxygen therapy devices were strongly associated with good practice level of health care professionals towards oxygen therapy (44).

3. CONCEPTUAL FRAMEWORK

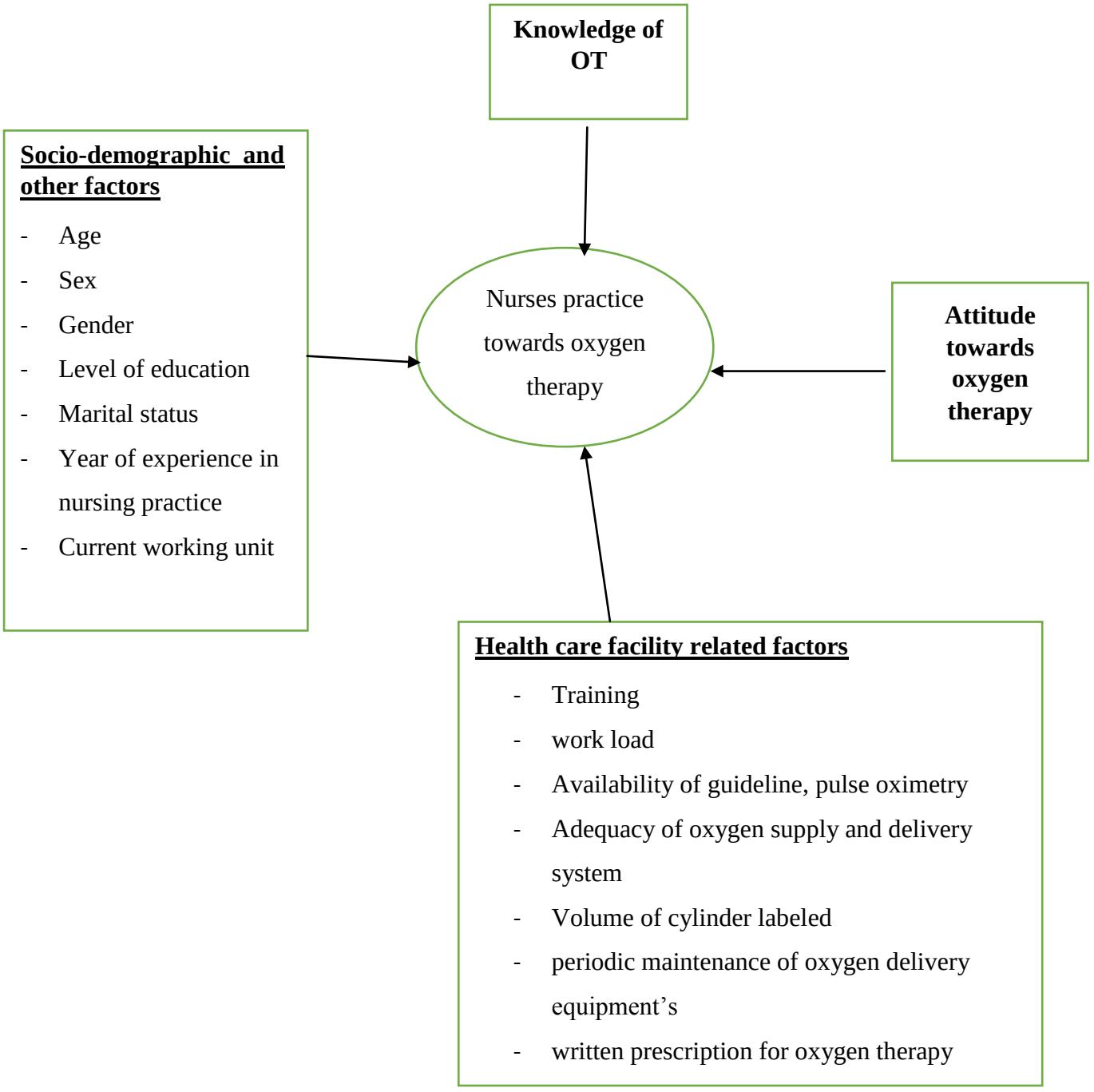

Figure 1: A conceptual framework for Nurses Practice regarding oxygen therapy working at emergency and ICU departments in west Amhara referral hospitals, 2023.

4. OBJECTIVES

4.1. GENERAL OBJECTIVE

To assess practice of oxygen therapy and its associated factors among nurses working in emergency and intensive care unit in West Amhara referral public hospitals, North West Ethiopia 2023.

4.2. SPECIFIC OBJECTIVES

- To determine practice of oxygen therapy among nurses at west Amhara referral hospitals, 2023.
- To identify factors associated with practice of oxygen therapy among nurses in west Amhara referral hospitals, 2023.

5. METHODS AND MATERIALS

5.1. STUDY AREA AND PERIOD

The study was conducted in west Amhara referral hospitals from March 17 to May 4,2023G.C. FHCSH andTGSH in Bahir Dar city is a capital city of Amhara regional state of Ethiopia. It is located in North west Ethiopia, about 565 Kms far away from Addis Ababa capital city of Ethiopia,University of Gondar Comprehensive Specialized Hospital is located in North Gondar administrative zone, Amhara National Regional state, Ethiopia which is about738 km Northwest of Addis Ababa,DebreTabor Referral hospital in South Gondar which is located 660 km far from Addis Ababa, the capital city of Ethiopia and Debre Markos town is located 300km far from Addis Ababa, the capital city of Ethiopia and 265 km far from Bahir Dar,the capital city of Amhara Region.

5.2. STUDY DESIGN

Intuitional-based cross-sectional study was conducted.

5.3. POPULATION

5.3.1. Source population

All nurses who were working in the public hospitals in west Amhara referral hospitals.

5.3.2. Study population

All nurses who were working in emergency and ICU department in public hospitals in West Amhara referral public hospitals and present during the data collection period.

5.4. ELIGIBILITY CRITERIA

5.4.1. Inclusion criteria

All nurses who were worked for 6 months and above were included

5.4.2. Exclusion criteria

Those nurses on annual, maternity and sick leave during the study period were excluded.

5.5. Sample size determination

The single population proportion formula is used to determine the sample size. It is calculated by considering 95% CI, a 5% margin of error, and 62.7% as a proportion of good practice of nurses towards oxygen therapy in previously study at UOGCSH(43).

$$(Z(a/2)\text{^}2\,PQ)/(\ \ d\text{^}2\ )=\ (3.84(0.627*0.373))/[\![(0.05)]\!]\text{^}2\ =359.22=360$$

Where; n = is the desired sample size

z = is the standard normal distribution usually set as 1.96 (corresponds to a 95% confidence level); p = population proportion (62.7%)

d = degree of accuracy desired (the marginal error is 5% (0.05)

Using the above formula, the calculated sample size is 360. Since the source population is less than 10,000 populations (354). So, correction formula is used and the sample size becomes 180.

$$n/(1+n/N)=\frac{360}{1+\frac{360}{354}}=180$$

By considering 10% non-response rate the final sample size becomes 197 nurses from in West Amhara referral public hospitals.

5.6. Sampling technique and procedure

The representative 197 samples were selected by using simple random sampling technique from the total of 354 nurses who were working at west Amhara referral hospitals. Attendance sheet of the human resource, payroll and duty time table were used as a sampling frame.

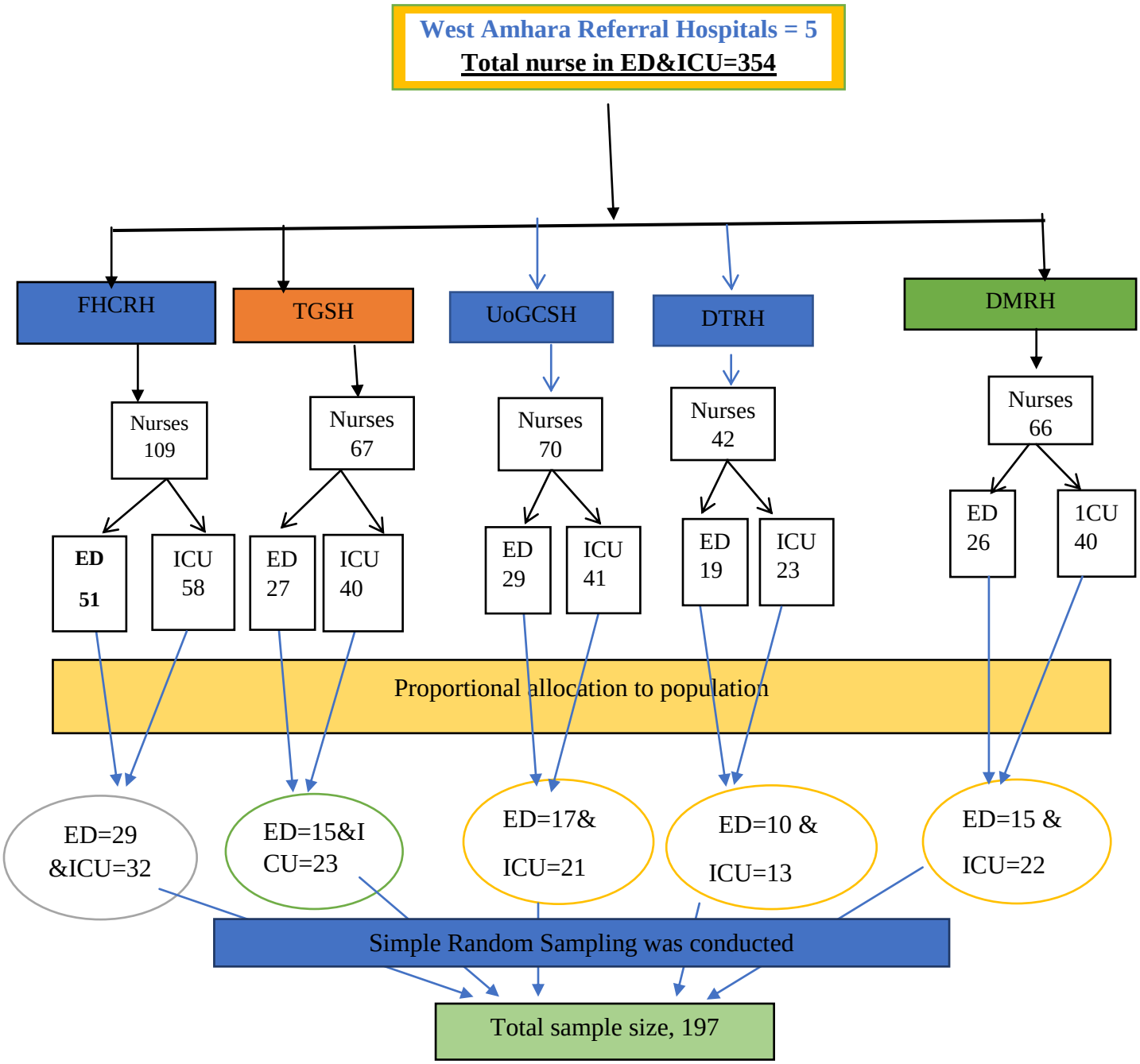

Figure 2: Schematic presentation of sampling procedure of Nurses practice regarding oxygen therapy in west Amhara referral hospitals, 2023.

5.7. STUDY VARIABLES

5.7.1. Dependent variable

Practice towards oxygen therapy (good/poor)

5.7.2. Independent variables

Socio-demographic characteristics and other factors: Age, gender, level of education, marital status, year of experience in nursing practice and current working unit.

Knowledge towards OT

Attitude towards oxygen therapy

Health care facility related factors: Training, work load, availability of guideline, pulse oximetry, adequacy of oxygen supply and delivery system, volume of cylinder labeled, maintenance of oxygen delivery equipment's, written prescription for oxygen therapy

5.8. OPERATIONAL DEFINITIONS

Good practice: nurses who scored the correct response or answer to practice questions above the mean result.

Good knowledge: nurses who scored the correct response or answer to knowledge questions above the mean result

Favorable attitude: nurses who scored the correct response or answer to attitude questions above the mean result.

Poor practice: nurses who scored the correct response or answer to practice questions below the mean result.

Poor knowledge:nurses who scored the correct response or answer to knowledge questions below the mean result.

Unfavorable attitude:nurses who scored the correct response or answer to attitude questions below the mean result.

5.9. DATA COLLECTION TOOLS

Data were collected by structured self-administered questionnaire and observational check list. A questionnaires were adapted from previous literatures (1, 40, 41, 43, 44, 47). The questionnaire has five parts. Part one socio-demographic (7 items), part two health care facility related questions (10 items), part three of OT knowledge (19 items), part four OT attitude (10 items) and part five OT practice (15 items). For attitude questions: five-point Likert responses was used with choices of strongly agree, agree, neutral, disagree and strongly disagreehaving value of 1, 2, 3, 4, and 5 respectively.

5.10. DATA COLLECTION PROCEDURE

Four data collectors and two supervisors whose profession is BSc nurses. The principal investigator (PI) was provide a one-day training session for supervisors and data collectors on the goals of the study, methods of data collecting, requests, and data handling. The data collectors invited the respondents to participate voluntarily by explaining the rationality of the study during the course of data collection. The data collections were carried out through structured self-administered questionnaires and observational check list. Oral consent was obtained from study participant.The data collectors were asked to submit their collected data every day to the supervisor. The data's consistency and completeness were checked by the supervisors and PI to any errors was corrected every day.

5.11. DATA PROCESSING AND ANALYSIS

Data were checked for completeness and consistency. It were entered to EPI data version 4.6 and exported to SPSS version 27 for analysis. Descriptive statistical analysis such as simple frequencies, measures of central tendency, and variability measures were used to describe the characteristics of participants. Then the information was presented using tables, figures and texts. Initially, binary logistic regression was carried out to see the association of each independent variable with the outcome variable and all variables with p-value less than 0.25 were entered to multiple logistic regressions to identify associated factors of practice towards oxygen therapy. Hosmer and lemeshow test was done to test model fitness and significant association between independent variables and outcome

variable were declared at 95% confidence interval and P-value of less than 0.05 as cut off point.

5.12. DATA QUALITY ASSURANCE

Pretest was done on 5% (10) of the total sample size at Finote selam hospital. One day training was given for data collectors and supervisors on the questionnaire and data collection process. Close supervision were done by the PI and supervisors throughout the data collection period. The supervisors were checked the data collectors and the completeness of each tool every day during data collection time. Contented validity checked before final data collection through pretest at Finote selam general hospitaland Reliability test was done to ensure the internal consistency of items using cronbach alpha (α) with score of ≥0.7. The collected data were checked for completeness, accuracy, and clarity on the day of data collection before being entered into the database by the PI.

5.13. ETHICAL CONSIDERATIONS

Ethical clearances were obtained from the Ethical review board of Bahir Dar University College of medicine and Health Sciences, School of health sciences. Communications with the different institutions were made through formal letter obtained from university. Official permission was obtained from chief executive officers of hospitals. Individual oral consent was taken during data collection period. Confidentiality was assured for study participants.

6. RESULT

6.1. Socio-Demographic Characteristics of Nurses

A total of 190 nurses working in west Amhara public referral hospitals, North West Ethiopia were enrolled for this study, with a response rate of 96%.Regarding sex of respondents, 98(51.6%) were males. Age of respondents 130 (68.4%) were in the group 20-29 and the mean (+SD) age of respondents was 27.91 (±4.4).most participants 167 (88.5%) had first degree and 86 (45.3%) of respondents were found to have < 5years of total experience as a nurse and the mean (+SD) experience of respondents was 6.5 (±3.8)**(Table-1).**

Table 1: Socio-demographic characteristic of nurses working in ED&ICU at west Amhara public referral hospitals, north west Ethiopia 2023.

Characteristics	Category	Frequency	%
Age	20-29	130	68.4
	30-39	58	30.5
	>40	2	1.1
Sex	Male	92	48.4
	Female	98	51.6
Educational Status	Diploma nurse	7	3.2
	BSc nurse	167	88.5
	MSc nurse	16	8.4
Marital status	Single	81	42.6
	Married	98	51.6
	Divorced	11	5.8
	Widowed	0	0
Working experience	Work experience <5	86	45.3
	Work experience 6-10	75	39.9
	Work experience >11	29	14.7
Working department	ICU	108	56.8
	ED	82	43.2

6.2. Nurses' Knowledge and attitude toward oxygen therapy

The majority of nurses had good knowledge106 (76.8%) and 108(55.8) had favorable attitude**(Table 2).**

Table 2: Nurses knowledge and attitude on oxygen therapy working inED& ICU at west Amhara public referral hospitals, Ethiopia, 2023.

Characteristics	Category	Frequency	%
Knowledge	Good	146	76.8
	Poor	44	23.2
Attitude	Favorable	108	55.8
	Unfavorable	82	43.2

Table3: Distributions of health care facility related factors on oxygen therapy in west Amhara public referral hospitals, Ethiopia, 2023

Items	**Category**	**Frequency**	**(%)**
guideline of oxygen therapy in the unit you are currently working unit	yes	120	63.1
	No	70	36.8
Guide lines or protocols used by all staffs	yes	38	32.5
	No	81	67.5
Guide lines or protocols are accessible in your working unit	yes	36	36.6
	No	76	63.2
Training on oxygen therapy/administration	Yes	102	53.7
	No	88	46.3
adequate supply of oxygen and delivery systems in your working unit	Yes	120	63.2
	No	70	36.8
work load/ burden affects oxygen therapy	Yes	149	78.4
	No	41	21.6
volume of oxygen cylinders is labeled	Yes	107	56.3
	No	83	43.7
maintenance of oxygen delivery equipment's or devices timely when they are nonfunctional	Yes	74	38.9
	No	116	61.1
Pulse oximetry is available in every ward	Yes	105	55.3
	No	85	44.7
clear and complete written prescription for oxygen therapy	Yes	135	72.1
	No	55	27.9

6.3. Practice of nurses towards oxygen therapy

From all of the participants 120(63.2%) (95% CI (55.8-69.9) had poor practice towards oxygen therapy **(figure 3).**

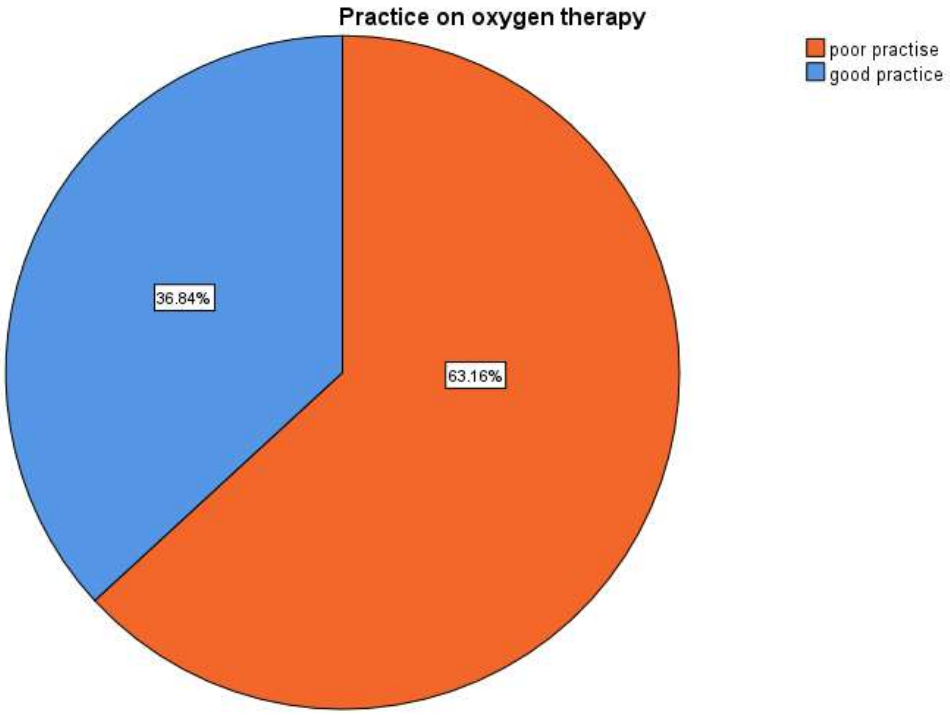

Figure 2:Nurses practice on oxygen administration working in ED& ICU at west Amhara public referral hospitals, Ethiopia, 2023

6.4. Regression analysis of nurses' practice towards oxygen therapy

Among the variables considered in bivariable logistic regression, age, sex, guideline of oxygen therapy, trained on oxygen therapy, clear and complete written prescription for oxygen therapy, knowledge on oxygen therapy, and educational qualification. After entering the above variables to multivariable logistic regression sex, training on oxygen therapy, working experience, guideline of oxygen therapy, clear and complete written prescription and attitude were all found to have statistically significant correlation with oxygen therapy practices at p-value<0.05 with 95% CI.

Keeping other variables constant, nurses who had good attitude of OT were 6-times (AOR=5.84 95 % CI (1.93-17.63)) more likely to have good practice of supplemental oxygen administration than those who had poor attitude of OT. Female nurses were three times [AOR=3, 95% CI (1.24-7.37)) more likely to good OT than male nurses. Nurses who had working experience between 5-10 years 11-times (AOR=11.34, 95% CI (3.77-13.58)) more likely to have good practice of oxygen administration than those who had <5 yearsworking experience,Availability oxygen guideline were four times (AOR=3.61, 95% CI (1.597-8.161)) more likely to good OT than unavailability oxygen guideline

Nurse who had a clear prescription practiced OT seven times better than who had no a clear prescription (AOR=7.45, 95% CI (2.40-23.09)and other finding and nurses who took training had five times better practice compared to nurses who did not take training (AOR 4.97,95% CI (2.02-12.25)**(Table5).**

Table 4: Association between factors with practice of nurses working in ED&ICU at west Amhara public referral hospitals, Ethiopia, 2023

Variable		Practice of oxygen therapy		COR (95%)	AOR (95%)	P Value
		Good	Poor			
Sex	Male	25	67	1	1	
	Female	45	53	2.27 (1.24-4.17)	3.03 (1.24-7.37)*	.015
Working experience	<5	34	52	1	1	
	5-10	31	42	1.17 (.62-2.20)	11.34 (3.77-13.58)*	.001
	>10	7	24	0.33(0.115-0.95)	3.36 (.71-15.78)	.125
Knowledge	Poor	8	36	1	1	
	Good	62	84	3.32 (1.4-7.64)	1.312 (0.89-19.91)	.495
guideline of oxygen therapy						
Yes		58	62	4.52(2.20-9.26)	3.61 (1.59-8.16)*	.002
No		12	58	1	1	
Training on oxygen therapy						

Yes	49	53	2.9 (1.57-5.51)	4.97 (2.02-12.25)*	.001
No	21	67	1	1	
Clear and complete written prescription					
Yes	65	72	8.6 (3.25-23.09)	7.45 (2.40-23.09)*	.001
No	5	48	1	1	
Attitude					
Good attitude	49	59	2.41 (1.29-4.50)	5.84(1.93-17.63)*	.002
Poor attitude	21	62	1	1	

7. DISCUSSION

This study aimed to assess practice of oxygen therapy and its associated factors among nurses working in emergency and intensive care unit in West Amhara referral public hospitals, North West Ethiopia 2023.

Our finding showed that 70 (36.8%) 95% CI (30.5-43.2) nurses had good practices for oxygen therapy. This finding is consistent with the reports of studies done in Debre Tabor, Ethiopia 33 %(18).This finding is greater than the studies conducted in educational hospitals in Cairo (18%) (33) and Southwest Nigeria (20%) (40).This variation can be explained by different contributing factors like differences in study participants, sample size, study area and study period, study unit,study design and unavailability of oxygen administration guidelines.

But our finding was less than the studies done in WSUCSH (59 %) (41),Public Hospitals of Harari Region (47%) (42), Addis Ababa public hospital (43.4 %) (11), University of Gondar Comprehensive Specialized Hospital (47.5 %) (36), South Gonder Zone public hospitals (65.1% (44), Orotta National Referral Hospital (45%) (35), University Teaching Hospital of Kigali Rwanda (74.5%) (39) and Iran (74.5 %) (17) Had good practice. These variations may result from different contributing factors like differences in study participants, sample size, Study period, study design ,study working unit, lack of training of nurses on oxygen therapy and difference in socioeconomic background.

This study also identified the significant factors that associated with oxygen therapy. Nurses who had 5-10 years' experience 11-times more likely to have good practice of oxygen administration than those who had less than 5 years working experience. This finding was consistent with study conducted in University of Gondar Comprehensive Specialized hospital, public hospitals in the Harari region public hospital, Eritrea, North East Africa, Orotta National Referral Hospital (ONRH) and Nepal South West Nigeria, Hospital (36, 42, 35, 40).The reason they practice better when they get senior is because the work experience that comes with their work experience is also considered as maturity when a person gets seniority.

Female nurses were three times more likely to practice good OT than male nurses. But previous studies show that male nurses have a better practice conducted in University of Gondar Comprehensive Specialized Hospital, public hospitals in the Harari region andEritrea, North East Africa, Orotta National Referral Hospital (ONRH) (36, 42, 35).The reason they may be women may contribute to this because it is based on the practice of their daily life.

Nurses who took training had 5- times more likely to have good practice compared to nurses who did not take training. this finding is in agreement with reports from the study done in Debre Tabor General Hospital, Addis Ababa public hospital, public hospitals in the Harari region, WSUCST, educational hospitals in Cairo and Eritrea, North East Africa, Orotta National Referral Hospital (ONRH)and Riyadh King Khalid University Hospitals Found that lack of oxygen therapy training was decreased good practice of oxygen therapy to their patients (18, 11, 42, 41, 35, 33, 1). As a result, continuing up-to-date with training and essential sources of information may contribute to successful practice.

Availability of oxygen guide line Nurses who had 4-times more likely to have good practice compared to nurses who had unavailabilityoxygen guide line. This finding is in agreement with reports from the study done educational hospitals in Eritrea, North East Africa and Orotta National Referral Hospital and Cairo(35.33).

Nurse who had Clear and complete written prescription 7-timesmore likely to have good practice compared to nurses who had incomplete prescriptions. This finding is in agreement with reports from the study done in educational hospitals in Cairo,and Eritrea, North East Africa, Orotta National Referral Hospitaland Rwanda (35, 33, 39).

Nurses who had good attitude 6-times more likely to have good practice of oxygen administration than those who had poor attitude. This finding is in agreement with reports from the study done Eritrea, North East Africa, Orotta National Referral Hospitaland Nepal (35, 37).The reason they may be attitude essential component of for good practice.

8. STRENGTH AND LIMITATION

The strengths of this study are that the nurses who were studied were directly observed by observational check list day to day facing oxygen practice, conducted on multi centered and the sample was taken in an observational way and the amount of sample was better compared to the observational studies sothis gives clues and alarms other research to identify the gaps

Limitations this study was done with insufficient sample size and since many people are busy during their usual work hours, they might not have read with full attention, which could have caused certain answers to be under- or over-reported onthe self-administer questionnaire and the time period in which this research was done was short to observe the overall performance of 197 nurses in OT

9. CONCLUSION

The finding of this study reveals that 36.8% of participants have a good level of practice towards oxygen therapy. It was found that practice had statistically significant association with, working experience, clear and complete written prescription, training on oxygen therapy, guideline of oxygen therapy and nurse attitude on.

10. RECOMMENDATION

Amhara health bureau should bepreparing of awareness creation programs about the consequences of malpractice towards OT. Even as the government of Ethiopia, non-governmental organizations and other stakeholders grapple with the problem of health service coverage some effort should be directed towards quality of care. Education programs on the occupational use of OT through conferences, workshops, research and lectures are needed to raise the awareness of health care workers about OT andensure accessibility of oxygen therapy guidelines.

Public hospitals in west Amhara should focus more on improving oxygen therapy practices in emergency and intensive care units to provide high-quality critical medicine care through optimal oxygen therapy services. ICU and ED directors should collaborate to deliver quality OT care to critically sick patients while also focusing on the relevant related factors for a better outcome.

Nurses should engage themselves in continuous medical education towards OT so as to update themselves of optimal oxygen therapy practices.Finally recommend for other researcher to study oxygen practice in government hospitals and private hospitals, as well as teaching and non-teaching oxygen practice, were not explored in this study.

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12. ANNEX

12.1. ANNEX I: INFORMATION SHEET

Title of the Research: To assess practice of oxygen therapy and its associated factors among nurses in west Amhara region of public hospitals, 2023: Facility -based cross-sectional study

Introduction: This information sheet is prepared for west Amhara region public hospital nurses. This form aims to make the above-concerned office clear about the purpose of research, data collection procedures and get permission to conduct the research.

Procedure: To achieve the above objective, information that is necessary for the study was be taken from nurses by self-administered questionnaires.

Risk and /or Discomfort: there is no any harm on the study participants. The name or any other identifying information was not be recorded on the questionnaire and all information is taken from nurses was be kept strictly confidential and in a safe place.

Benefits: Your participation from this study contributed to clinical practice improvement and patient care.

Confidentiality: The name or any other identifying information was not be recorded on the questionnaire and all information is taken from nurses was be kept strictly confidential and in a safe place except the investigator and the advisors.

Person to contact:if you have any questions, you can contact the investigator with the following address.

Name of investigator: Getnet Alayu

Phone: +251924 52 44 33 E-mail: alayugetnet55@gmail.com

Institution: BDU, College of Medicine and Health Sciences, School of health sciences, Department of Adult health nursing.

12.2. ANNEX II: QUESTIONNAIRE

Greetings

Dear Participant:

My name is _____ and I am here to collect data on assessment of nursing practice regarding to oxygen therapy among nurses at public hospitals in west Amhara region. I am a final year Post Graduate Adult Health Nursing Student at BDU. I would like to ask questions related to nursing practice regarding to oxygen therapy. I assure you that whatever information you provide was only be used for the purpose of this research and was not be made available to anyone. I appreciate you too much for your wasingness and support to respond the interview. I also assure that the interview process was not bring any harm to you and your family. Your participation is voluntary. If you choose not to answer a particular question, that is your right. You are also permitted to withdraw any time from the study when you feel uncomfortable with it.

If you have any question and confusion regarding the questions, you have the right to ask me at any point or you can contact me on the following address.

Name of investigator: Getnet Alayu

Phone: +251- 924 52 44 33

E-mail: alayugetnet55@gmail.com

Therefore, to participate in this study

You: • Agree ☐ • Not agree ☐

SECTION 1: Questions related to socio-demographic characteristics

INSTRUCTION: Please circle and put your choice of the answer for the following questions.

Part one Socio-demographic

No.	Socio-demographic Variables	Answer	Remark
101	How old are you (at last birthday in years)?	_____Years	
102	What is your gender?	1. Male 2. Female	
103	What is your marital status	1. Single 2. Married 3. Divorced 4. Widowed	
104	In which department are you working currently?	_____	
105	What is your educational status?	1. diploma nurse 2. B.Sc. Nurse 3.MSc nurse 4.Other specify_____	
106	Name of the hospital currently working	1. FHCRH 2. TGSH 3. Abdis Alam district hospital	
107	For how many years you have experience as a health care worker?	_____	
SECTION 2. Questions to assess factors affecting nurses practice in oxygen therapy			
Instruction: Please choose the appropriate answer for the following questions			
No.	**Part two Healthcare facility related factors**	Answer	

101	Is there guideline of oxygen therapy in the unit you are currently working unit?	1. Yes 2. No 3. 3) not sure	If your answer is No, Jump to QO. No. 104
102	Are the Guide lines or protocols used by all staffs?	1. Yes 2. No	
103	Are the Guide lines or protocols are accessible in your working unit?	1. Yes 2. No	
104	Have you trained on oxygen therapy/administration?	1. Yes 2. 2. No	
105	Is there adequate supply of oxygen and delivery systems in your working unit?	1. Yes 2. No	
106	Do you think work load/ burden affects oxygen therapy?	1. Yes 2. No	
107	Do you get the volume of oxygen cylinders is labeled?	1. Yes 2. No	
108	Is there maintenance of oxygen delivery equipment's or devices timely when they are nonfunctional?	1. Yes 2. No	
109	Pulse oximetry is available in every ward?	1. Yes 2. No	
110	Is there clear and complete written prescription for oxygen therapy?	1. Yes 2. No	
Part three Knowledge questionnaires on oxygen therapy			
301	The normal oxygen saturation at rest for adults < 70 years is----	1. 88 – 92% 2. < 90% 1. 96 – 98% 2. 86 – 88% 3. None	
302	Oxygen therapy is indicated for which of the following?	1. Acute hypoxemia in pneumonia, shock, asthma, heart failure and pulmonary embolus	

		2. Pneumothorax 3. Carbon monoxide poisoning 4. Post thoracic and abdominal surgery 5. All 6. None	
303	The normal breathing rates in a child is	1. 12 – 20 breath/ min 2. 40 – 70 breath/min 3. 15 - 30 breath/ min 4. 25 – 50 breath/ min 5. All	
304	Which is the normal breathing rate of adult?	1. 15 - 30 breath/ min 2. 25 – 50 breath/ min 3. 12 – 20 breath/ min 4. All	
305	Supplemental oxygen is contraindicated for untreated pneumothorax.	4. Yes 5. No	
306	Non-rebreathing oxygen face mask with a reservoir bag is used to deliver higher oxygen concentration than a nasal prong.	1. Yes 2. No	
307	Pulse Oximetry is useful in detecting and monitoring hypoxemia.	1. True 2. False	
308	SpO2 level < 90 % in adults define hypoxemias.	1. True 2. False	
309	Breathlessness is not always a sign of hypoxemias.	1. True 2. False	
310	Blood Gas Analysis is useful for confirming hypoxemia.	1. True 2. False	
311	Hypoxemia can be recognized by clinical signs.	1. Yes 2. No	
312	Humidifier reduces the risk of dry oxygen and its side effects.	1. Yes 2. No	
313	Which of the following conditions affect pulse-oximetry reading?	1. Patient motion or fitting 2. False nails, nail varnish	

		3. Carbon-monoxide poisoning 4. Jaundice and anemia 5. All
314	Which of the following oxygen delivery device can provide 60 – 90% of oxygen used for short term treatment during trauma?	1. Nasal catheter 2. Tracheostomy masks 3. Venturi masks and adapters 4. Non- rebreathing oxygen mask 5. All
315	Which of the following is sign and symptom of oxygen toxicity?	1. Non-productive cough 2. Substernal chest pain 3. Nausea and vomiting 4. Fatigue
316	Which of the following is a potential adverse effect of oxygen therapy?	1. Oxygen toxicity 2. Retinopathy of prematurity 3. Depression of ventilation on selected population
317	Humidification is essential for patients receiving oxygen through one the following device?	1. Endotracheal tube or a tracheostomy 2. Nasal Prong 3. Face mask
318	A 12-year-old boy had type 1 respiratory failure, select one correct initial concentration of oxygen to achieve a target saturation of 94-98%?	1. FiO2 of 60% 2. FiO2 of 20% 3. FiO2 of 150%
319	A 72-year-old farmer with COPD has carbon dioxide retention (type II respiratory failure), which of this device is appropriate for oxygen delivery to achieve a target saturation of 88-92%?	1. Nasal catheter at 1-2 L/min/ in the absence of Venturi masks 2. Nasal catheter at 16 L/min 3. Oxygen mask with reservoir 6-9L/min

Part four: Question to assess nurses' attitude on oxygen therapy						
No.	**Statements**	1.Strongly	2. Agree	3. Neutral	4. Disagree	5. Strongly

		agree				disagree
401	Oxygen is a drug that should be given only when prescribed by a doctor or a registered nurse during an emergency.					
402	Oral &nasal hygiene and normal saline drops as necessary should be done when giving oxygen therapy.					
403	Intermittent oxygen therapy is more beneficial than continuous oxygen administration.					
404	The best practice to prevent dryness of the mucus membrane of the upper respiratory is humidification.					
405	Persons with severe lung disease need to maintain at the prescribed oxygen saturation range.					
406	Since oxygen is a drug its administration to the patient is not safe &very dangerous.					
407	A patient on oxygen therapy indicates that the patient is at the end stage of life.					
408	Since oxygen is a vasoactive substance,excessive supplementation leads to hyperoxia.					
409	High fractions of FiO2 cause lung damage.					
410	Oxygen saturation and delivery system should be recorded on the patient monitoring chart routinely.					

Part five practice observational cheek list of nurses on oxygen administration			
1	The nurse verifies physician prescription before administration?	1. Yes 2. No	
2	The nurse washes his/her hands before oxygen administration?	1. Yes 2. No	
3	The nurse wear disposable glove before oxygen administration?	1. Yes 2. No	
4	The nurse assesses oxygen saturation and vital sign before oxygen administration?	1. Yes 2. No	
5	The nurse fills humidifier with suitable amount of distilled water?	1. Yes 2. No	
6	The nurse assesses oxygen saturation during administration?	1. Yes 2. No	
7	The nurse checks the device before oxygen administration?	1. Yes 2. No	
8	The nurse collects all necessary equipment before oxygen administration?	1. Yes 2. No	
9	The nurse follows oxygen saturation and the patient's vital signs during oxygen administration?	1. Yes 2. No	
10	The nurse adjusts the flow rate according to prescribed rate?	1. Yes 2. No	
11	The nurse does mouth and nasal care before oxygen administration?	1. Yes 2. .No	
12	The nurse place gauze pad on ear beneath the tubing?	1. Yes 2. No	
13	The nurse discard used equipment	1. Yes 2. No	
14	The nurse washes his/her hands after procedure?	1. Yes 2. No	
15	The nurse document date and time of initiating oxygen Therapy	1. Yes 2. No	

Thank you very much for your kindness!!