

**ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF EMERGENCY MEDICINE**

**ASSESSMENT OF NURSES KNOWLEDGE, ATTITUDE AND
PRACTICE ABOUT OXYGEN THERAPY AT EMERGENCY
DEPARTMENTS OF ONE FEDERAL AND THREE REGIONAL
HOSPITALS IN ADDIS ABABA, ETHIOPIA**

Master of EM & CCN Research Thesis

Girma Lemma

Major Advisor : Dr. Assefu Weldetsadik (MD, Anesthesiologist)

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**Assessment of Nurses Knowledge, Attitude and Practice about Oxygen
Therapy at Emergency Departments of one Federal and three Regional
Hospitals in Addis Ababa, Ethiopia**

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ABBREVIATIONS AND ACRONYMS

1. O₂ = Oxygen
2. OT = Oxygen Therapy
3. SPO₂ = Oxygen Saturation
4. TASH = Tikur Anbessa Specialized Hospital
5. Yekatit 12 HMC = Yekatit 12 Hospital Medical College
6. Minillik II RH = Minillik II Referral Hospital
7. Zewditu MRH = Zewditu Memorial Referral Hospital
8. ABG = Arterial Blood Gas
9. Hct = Hematocrit
10. CXR = Chest X Ray
11. PR = Pulse Rate
12. BP = Blood Pressure
13. COPD = Chronic Obstructive Pulmonary Disease
14. MI = Myocardial Infarction
15. GI = Gastrointestinal
16. ED = Emergency Department
17. KAP = Knowledge, Attitude, Practice

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ABSTRACT

Background - Oxygen should be regarded as a drug. It is prescribed to prevent or treat hypoxemia. The concentration of oxygen prescribed aims to bring oxygen saturation (SpO₂) to normal or near normal oxygen saturation.

Objective - To assess knowledge, attitude and practices of nurses and factors associated with poor KAP about oxygen therapy at Tikur Anbessa Specialized Hospital, Yekatit 12 Hospital Medical College, Minilik II Referral Hospital and Zewditu Memorial Referral Hospital from February to May 2015.

Method – A cross-sectional descriptive study design was used. The target population was all nurses and midwives working in the emergency department/units of the above hospitals. Sample size determination formula was not applied since all nurses and midwives in EDs of the selected hospitals expected to respond a self administered questionnaire. Data was collected using structured questioners that measured nurses' knowledge, attitude and practice about oxygen therapy including associated factors in comparison with the widely used oxygen therapy guidelines in nursing standards. Data were coded and entered into a data base using SPSS version 20 and cleaned as well as edited before analysis.

Results - Among 152 nurses included in the study, 38.2% were males. The median age was found in the age category ranged from 26-30 years. The mean score on knowledge, attitude and practice were 3.03(SD= 1.6665), 13.76(SD= 2.102) and 3.0921(SD= 1.76183) respectively.

Level of knowledge, attitude and practice on oxygen therapy was poor and good in 97(63.8%) and 55(36.2%) for knowledge; 71(46.7%) and 81(53.3%) for attitude; 86(56.6%) and 66(43.4%) for practice respectively.

Factors associated with poor knowledge, attitude and practice on oxygen therapy were training Yes in 50(32.9%), No in 102(67.1%); availability of oxygen therapy guideline Yes in 36(23.7%), No in 91(59.9%), I do not know in 25(16.4%); adequate supply of oxygen and delivery devices Yes in 79(52.0%), No in 57(37.5%), I do not know in 16(10.5%); work load affects oxygen therapy Yes in 99(65.1%), No in 37(24.3%) and Unknown in 16(10.5%).

Conclusion and recommendation – This study showed that there is a clear knowledge, attitude and practice gap among nurses who were working in ED. The possible associated factors were also identified which includes lack of oxygen therapy training and guideline, work load, inadequate supply of oxygen and delivery devices. It is recommended that ED nurses must be given training on oxygen therapy and be updated. National oxygen therapy guideline or Hospital protocol must be developed. Oxygen supply and delivery devices should always be adequate and be used properly.

CHAPTER ONE

INTRODUCTION

1.1 Background

Since the introduction of oxygen as a therapeutic agent 76 years ago, much has been learned regarding the detrimental effects of hypoxemia and the beneficial impact of oxygen therapy. It 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 [1].

Oxygen therapy is a medical treatment used for tissue hypoxia. It is prescribed to improve oxygen supply and reduce the work of breathing. It has the potential to improve medical outcomes and save lives when used appropriately and to cause harm if used inappropriately.

No patient should be denied oxygen therapy in emergency situations. Patients in cardiac and/or respiratory arrest should be managed according to the guidelines for Basic & Advanced Life Support. For any other patient with suspected or known tissue hypoxia, oxygen therapy should be initiated without delay by the attending health care professional [2].

Oxygen is commonly delivered in both chronic and acute patient care. In 2008, 18% of hospitalized patients in Great Britain received oxygen on a daily basis. The appropriate oxygen flow rate varies widely from one situation to the other. Patients with severely altered blood gas exchange may need a high inspiratory concentration of oxygen. In these situations, a Non Rebreather Mask (or reservoir mask) is typically used and requires oxygen flow rates as high as 12 to 15 l/min. For other patients, an oxygen flow rate between 2 to 10 l/min by nasal prongs or simple mask is generally sufficient to ensure appropriate oxygenation [3].

Maintenance of adequate oxygen delivery to vital organs often requires the administration of supplemental oxygen, sometimes at high concentrations. Although oxygen therapy is lifesaving, it may be associated with deleterious effects when administered for prolonged periods at high concentrations [4]. 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 hypercapnic respiratory failure.

The target saturation should be written (or ringed) on the drug chart). Oxygen should be administered by staff who are trained in oxygen administration.

These staff should use appropriate devices and flow rates in order to achieve the target saturation range.

Oxygen saturation and delivery system should be recorded on the patient's monitoring chart alongside the oximetry result. Oxygen delivery devices and flow rates should be adjusted to keep the oxygen saturation in the target range [5].

Oxygen is the most frequently used effective and essential drug for the care of the newborn. However, recent research reviewed in this monograph demonstrates that surprisingly short exposures to oxygen can alter long term biochemical indicators of oxidant stress and may adversely affect outcomes.

The use of oxygen thus has a risk to benefit equation just as for any other drug. Therefore, a balanced perspective of the scientific and clinical aspects of oxygen use is needed, especially for the preterm. Much of the data for oxidant injury and long term effects come from animal models, which inform us about what can happen, but do not establish what does happen to sick preterm infants [6].

1.2 Statement of the problem

There are significant gaps regarding oxygen therapy despite their frequent use. Maximum percent oxygen delivery and flow rates are particularly poor, with potential negative impact on patient care including delivering too little oxygen in emergencies with BVM and facemasks and head boxes leading to CO₂ retention[12].

Oxygen is thought to affect lung tissue. High concentration of oxygen could bring changes to the lung that causes oxygen toxicity. This high concentration of oxygen reduces the production of surfactant which in turn results in the collapse of alveoli. The subsequent collapse of alveoli diminishes the exchange of gas. The nurse should monitor oxygen therapy and reduce supplementary oxygen as soon as possible to prevent the risk of such occurrence.

Oxygen can easily dehydrate exposed membranes in the upper respiratory tract unless patients are orally rehydrated and/or mouth care is given and humidification which can mobilize secretions and enhance patient comfort [13].

1.3 Significance of the study

This study was done to identify the depth of knowledge, attitude and skill gap among nurses on oxygen therapy at emergency departments of Tikur Anbessa Specialized Hospital, Yekatit 12 Hospital Medical College, Minilik II Referral Hospital and Zewditu Memorial Referral Hospital. Why nurses have knowledge, attitude and skill gaps on oxygen therapy were discussed and the possible solutions were also be stated. The major area of failure to have best practice of oxygen therapy could be inconsistent use of globally accepted oxygen therapy guidelines was associated with lack of sustainable training on oxygen administration.

1.4 Objectives

General Objective

To assess knowledge, attitude and practice of nurses about oxygen therapy in emergency departments of one Federal and three Regional Hospitals in Addis Ababa, February to May 2015.

Specific Objectives

- 1) To determine nurses' knowledge on oxygen therapy
- 2) To identify nurses' attitude on oxygen therapy
- 3) To evaluate nurses' practice on oxygen therapy
- 4) To identify factors associated with poor KAP on oxygen therapy

CHAPTER TWO

LITERATURE REVIEW

Oxygen therapy is defined as oxygen given at concentrations greater than that found in the surrounding air. It is used as a treatment for respiratory failure (an inability of the lungs and respiratory apparatus to ensure adequate systemic oxygenation and/or carbon dioxide excretion). This is further classified by whether there is a failure of oxygenation (a low partial pressure of oxygen [PaO_2]) with a normal partial pressure of carbon dioxide (PaCO_2 , “type 1” respiratory failure), or whether the PaCO_2 is high (“type 2,” or hypercapnic, respiratory failure).

Another important variable is whether acidosis is present as a consequence of hypercapnia, suggesting an acute worsening without time for compensation via the renal axis, which usually occurs over hours to days. The usual arterial oxygen saturation (SaO_2) for a young adult breathing air at sea level is 94%–98%, corresponding to 89.3–110.5 mmHg, although this decreases with increasing age such that the range for those ≥ 64 years is 67.3–110.1 mmHg. While hypoxemia may be defined as any arterial PaO_2 below the normal lower limit, most authors suggest a value of 60 mmHg, or SaO_2 ,90%, as clinically hypoxemic because the risk of hypoxic tissue damage increases below this level.⁹ The normal range for PaCO_2 is 34–46 mmHg and type 2 respiratory failure is diagnosed where hypercapnia is present, even in the absence of hypoxia [14].

Any patient with suspected or known tissue hypoxia in emergency department should be given oxygen therapy. Patients in cardiac and /or respiratory arrest need to be managed according to Basic and Advanced Life Support guidelines by the attending doctor, nurse or midwife.

Patients who are already started on acute oxygen therapy should be monitored carefully and regularly. Initial investigations like ABG, Hgb or Hct and CXR should be done. Monitoring of PR, BP, RR, level of consciousness and pulse oximetry are mandatory.

After stabilizing the emergency situations oxygen therapy must be prescribed by a doctor or the appropriately authorized nurse. The prescription should include indications, target oxygen saturation, oxygen delivery device, range of oxygen flow or percentage of inspired oxygen and when oxygen is to be applied. The prescription should also be signed and dated.

All patients with severe COPD who require oxygen therapy need to be given oxygen with venturi mask at 24-28%. Oxygen requirements should be titrated to maintain an oxygen saturation of 88-98%.

Consider non-invasive ventilation in patients with hypercapnia and respiratory acidemia (PH < 7.35). Repeat ABG within 4 hours of the baseline. After stabilization with a venturi mask, maintain oxygen saturation of 88-92% using nasal cannulae at low flow rate of 0.5-4L/min.

If nebulised bronchodilators are required, the nebuliser is best driven by compressed air with oxygen therapy given concurrently by nasal cannulae at 2-4 L/min to maintain an oxygen saturation of 88-92%. If compressed air is not available, the nebuliser can be driven by oxygen at flow rate of 6-10 L/min for 3-4 minutes. [7].

Normal ranges of arterial blood gas [8]

Measurement	Arterial Blood	Clinical Notes
Acid-base Status (PH)	7.35 – 7.45	Most important value; detects acidosis or alkalosis
Partial pressure of carbon-dioxide (PaCO ₂)	35 – 45 mmHg	Measures adequacy of ventilation and respiratory contribution of acid-base abnormality (Respiratory acidosis)
Partial Pressure of Oxygen (PaO ₂) (Sea level)	80 – 100 mmHg	Indicates driving pressure that causes oxygen hemoglobin binding; varies with age and barometric pressure
Bicarbonate (HCO ₃)	21 – 28 mEq/L	Measures metabolic contribution to acid base abnormality (metabolic acidosis)
Base Excess (BE)	-2 to +2	Reflects deviation of bicarbonate concentration from normal
Saturation of hemoglobin	96 – 98%	Indicates abnormality of oxyhemoglobin association and dissociation; may be measured

with oxygen (SaO ₂)		directly from PO ₂ , PH and body temperature
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Oxygen should be considered as a drug that need to be prescribed to prevent or treat hypoxemia. A high percentage oxygen should be started in an emergency situations like cardiorespiratory arrest, peri-arrest conditions and critical illnesses such as sepsis without waiting for prescription.

ABG analysis must be made within an hour in hypercapnic risk patients. A written documentation is vital after giving high percentage oxygen.

Airway patency should always be checked prior to delivering oxygen therapy (Greater Manchester Acute Illness management (AIM) 2007). A target saturation should be between 94-98% for most acutely unwell patients or 88-92 % for hypercapnic (type II respiratory failure).

A pulse oximetry monitoring may have limitations that include Peripheral vasoconstriction (hypothermia, cardiac failure, fluid loss), Bright ambient light, patient motion, fitting sickle cell disease when in vaso-active crisis, false nails, nail varnish, some dyes, such as methylene blue. Such monitoring also affected in carbon monoxide poisoning, patients returning from smoking tobacco have misleadingly normal SpO₂ and not affected by jaundice, anemia: can be slightly altered with dark skin.

Pulse oximetry will not identify patients with Type II (high CO₂) respiratory failure. An acceptable SpO₂ will only inform of hypoxaemia (low oxygen tension in blood), not hypoxia (delivery of oxygen to tissues).

Normal oxygen saturations at rest; pre-term (36 weeks or less) neonates; 88-92%, Term (>36 weeks) neonates and children; greater than 94%. Adults less than 70 years of age; 96% - 98%. Aged 70 and above; greater than 94% Patients of all ages may have transient dips of saturation to 84% during sleep. Note that fingers, then earlobes, are more accurate than toes as measurement points.

Oxygen therapy is indicated in acute hypoxemia (Eg. pneumonia, shock, asthma, heart failure, pulmonary emboli), ischemia (Eg. MI if associated with hypoxemia), abnormal Hgb (Eg. acute GI blood loss or carbon monoxide poisoning). Carbon monoxide poisoning is the only condition to aim for a SpO₂ over 98%.

Other indications include pneumothorax in which oxygen may increase rate of resolution of pneumothorax. In post operative state following thoracic or abdominal surgery. Reduced oxygen concentration also indicated for oxygen as there is concentration of atmospheric oxygen at sea level is 21%. [8].

The risks associated with hypoxaemia are well recognized, but there is growing evidence that prolonged hyperoxia should also be avoided, as high fractions of inspired oxygen may cause damage to the lungs and have other detrimental systemic effects.

Estimated inspired oxygen concentration			
Nasal cannulae		Face mask	
Flow rate (L/min)	Estimated FIO ₂ (%)	Flow rate (L/min)	Estimated FIO ₂ (%)
1	24%	5	30%
2	28%	6	35%
3	32%	7	40%
4	36%	8	45%
5	40%	9	50%
6	44%	10	55%

FiO₂ = fraction of inspired oxygen.

[15].

A failure in knowledge transfer on oxygen therapy in COPD patients shown due to limited advancements in technology as well as slow knowledge transfer remains elusive. In emergency conditions and during pre-hospital transport excess mortality due to over oxygenation reasons are likely multifactorial but mainly under appreciation of the problem.

The frequency and impact of respiratory acidosis assessed during exacerbations in 983 COPD patients admitted in ED. Respiratory acidosis on arrival was 20% of patients and was strongly correlated with the partial pressure of arterial oxygen, and significantly increased the risk of hospital death (6.9% versus 12.1% in patients without versus with respiratory acidosis. [9]

Supplemental oxygen is used excessively especially in cardiac patients to maintain oxyhemoglobin saturations close to 100%, unknowingly many of these patients are exposed to significant periods of hyperoxia.

This occurs for three main reasons: 1) many medical staff (including physicians) don't recognize that oxygen is a vasoactive substance; 2) when transcutaneous blood oxyhemoglobin saturation approaches 100%, further increases in blood oxygen tension are not detected; and 3) oxygen tension isn't adequately monitored especially in the setting of high flow oxygen therapy [10].

Supplemental oxygen is a well-established therapy with clear evidence for benefit in patients with COPD and severe resting hypoxemia, which is defined as a room air PaO₂ ≤ 55 mm Hg or ≤ 59 mm Hg with signs of right-sided heart strain or polycythemia.

Oxygen was the first treatment shown to prolong life in people with COPD. Current recommendations for prescribing LTOT (Table below) based on results from two randomized trials in patients with COPD published almost 34 years ago.

Current Indications for Continuous Oxygen Use in COPD [16]	
Based on Randomized Controlled Clinical Trials	Based on Less Evidence
Continuous oxygen use	Intermittent oxygen use
Resting PaO ₂ ≤ 55 mm Hg	Desaturation (SpO ₂ ≤ 88%) with activity
Resting PaO ₂ of 56-59 mm Hg with any one of the following:	Desaturation (SpO ₂ ≤ 88 at night
<ul style="list-style-type: none"> • Dependent edema 	
<ul style="list-style-type: none"> • P pulmonale on the electrocardiogram (P wave exceeding 3 mm in standard lead II, III, or aVF) 	
<ul style="list-style-type: none"> • Polycythemia (hematocrit, >56%) 	

CHAPTER THREE

MATERIALS AND METHODS

Study Area and Period

TASH, Yekatit 12 HMC, Minillik II RH and Zewditu MRH selected for the study area during the periods scheduled from January 19 – February 13, 2015 in the emergency department/units. All of the above mentioned hospitals are located in the capital city of Ethiopia Addis Ababa.

Study Design

A cross-sectional descriptive design was employed.

Source Population

There are a total of 1247 nurses, in TASH (567), Yekatit 12 HMC (235) Minillik II RH (206) and Zewditu MRH (239) was used as a source population.

Study Population

Among a total of 1247 nurses all of nurses and midwives who were working in emergency departments were the study population.

Inclusion Criteria

All Bsc nurses, diploma nurses and midwives (Bsc and diploma) who were working in ED were included in the study.

Exclusion Criteria

Nurses and midwives who were having incomplete response to the questionnaire and also nurses on annual, maternity and sick leave during the study period were excluded.

Sample Size Determination

All nurses that were working in ED of the study area were included as a sample size.

Sampling Procedure

No sampling technique was applied. All nurses were working in EDs of the study areas were the actual study subjects.

Data collection Procedure

A self administered and structured questionnaire was prepared; enumerators or data collectors were trained from each study areas on the structured questionnaire. Details about the questionnaire was discussed during training. The questionnaires were developed to meet the specific objectives of the study. English language was used in a structured questionnaire.

To measure the standard of the structured questionnaire a pre-test was given to the data collectors before the actual data collection. The role of a supervisor was assurance of data completeness, consistency and clarity during data collection. One enumerator collected on an average data of 5 nurses self administered questionnaire each day.

Quality Control Measures

A brief orientation or training was given to enumerators and during data collection the supervisor monitored closely on each day of data collection.

- **Dependent Variables**

KAP and associated factor questioners

- **Independent Variables**

Sex, category of age, marital status, type of nursing profession, name of hospital, total nursing service, ED experience.

Data Management and Analysis

Data were entered to the SPSS soft ware to be analyzed depending on the objectives of the study.

Ethical Issues

After a legal supporting letter from AAU College of Health Sciences Department of Emergency Medicine obtained and permission from TASH, Yekatit 12 HMC, Minillik II RH and Zewditu MRH was assured.

Dissemination of Results

The study process and results are ready be disseminated to relevant organizations namely AAU College of Health Sciences Department of Emergency Medicine, TASH, Yekatit 12 HMC, Minillik II RH and Zewditu MRH.

Operational Definitions

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

Good attitude - nurses who scored the correct response or answer to attitude questions above the mean result.

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

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

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

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

CHAPTER FOUR

Results

Age categories ranged from 20-25, 26-30, 31- 35 were 55(36.2%), 56(36.8%), 19(12.5%) respectively and the rest were found 36-40 years 8(5.3%), 41-45 years 6(3.9%), and =>51 years 8(5.3%). The median age was found in the age category of ranged from 26- 30 years. Marital status of nurses found to be single 107(70.4%), married 41(27%), divorced 3(2%) and widowed 1(0.7%).

Table1. Socio-demographic characteristics of nurses & midwives in EDs of TASH, Yekatit 12 HMC, Minillik II RH and Zewditu MRH from Jan 19 – Feb 13, 2015.

	Frequency	Percent	Valid Percent	Cumulative Percent
Category of Age				
20-25 years	55	36.2	36.2	36.2
26-30 years	56	36.8	36.8	73.0
31-35 years	19	12.5	12.5	85.5
36-40 years	8	5.3	5.3	90.8
41-45 years	6	3.9	3.9	94.7
=>51 years	8	5.3	5.3	100.0
Total	152	100.0	100.0	
Sex				
Female	94	61.8	61.8	61.8
Male	58	38.2	38.2	100.0
Total	152	100.0	100.0	
Marital Status				
Single	107	70.4	70.4	70.4
Married	41	27.0	27.0	97.4
Divorced	3	2.0	2.0	99.3
Widowed	1	.7	.7	100.0
Total	152	100.0	100.0	

Among 152 nurses and midwives the type of nursing profession were diploma nurses 27(17.8%), Bsc nurses 104(68.4%), diploma midwives 7(4.6%) and Bsc midwives 14(9.2%) distributed in one Federal Hospital and three Regional Hospitals in Addis Ababa shown in the table 2.

Table 2. Types of nursing profession and Nurses by health facility distribution in EDs of TASH, Yekatit 12 HMC, Minillik II RH and Zewditu MRH from Jan 19 – Feb 13, 2015.

	Frequency	Percent	Valid Percent	Cumulative Percent
Type of Nursing Profession				
Diploma Nurse	27	17.8	17.8	17.8
Bsc Nurse	104	68.4	68.4	86.2
Diploma Midwife	7	4.6	4.6	90.8
Bsc Midwife	14	9.2	9.2	100.0
Total	152	100.0	100.0	
Name of Hospital				
Tikur Anbessa Specialized Hospital	64	42.1	42.1	42.1
Yekatit 12 Hospital Medical College	32	21.1	21.1	63.2
Minillik II Referral Hospital	11	7.2	7.2	70.4
Zewditu Memorial Referral Hospital	45	29.6	29.6	100.0
Total	152	100.0	100.0	

The total nursing experience and emergency service were as shown in table 3.

Table3. Total nursing service by year and emergency service in months in EDs of TASH, Yekatit 12 HMC, Minillik II RH and Zewditu MRH from Jan 19 – Feb 13, 2015.

	Frequency	Percent	Valid Percent	Cumulative Percent
Total Service				
<1 year	35	23.0	23.0	23.0
2-5 years	74	48.7	48.7	71.7
6-9 years	20	13.2	13.2	84.9
10-13 years	9	5.9	5.9	90.8
>=14 years	14	9.2	9.2	100.0
Total	152	100.0	100.0	
Emergency Service				
<=6 months	54	35.5	35.5	35.5
7-12 months	47	30.9	30.9	66.4
13-18 months	33	21.7	21.7	88.2
19-24 months	6	3.9	3.9	92.1
>24 months	12	7.9	7.9	100.0
Total	152	100.0	100.0	

The level of knowledge assessment was found good 55(36.2%) and poor 97(63.8%). Assessment of attitude was good 81(53.3%) and poor 71(46.7%). Practical assessment found to be good 66(43.4%) and poor 86(56.6%). Mean and standard deviation for knowledge, attitude and practice were found 3.03(SD= 1.6665), 13.763(SD= 2.1024) and 3.09(SD= 1.7618) respectively as shown in table 4.

Table 4. Level of Knowledge, Attitude and Practice on oxygen therapy in EDs of TASH, Yekatit 12 HMC, Minillik II RH and Zewditu MRH from Jan 19 – Feb 13, 2015.

	Frequency	Percent	Valid Percent	Cumulative Percent
Knowledge				
poor knowledge	97	63.8	63.8	63.8
good knowledge	55	36.2	36.2	100.0
Total	152	100.0	100.0	
Attitude				
poor attitude	71	46.7	46.7	46.7
good attitude	81	53.3	53.3	100.0
Total	152	100.0	100.0	
Practice				
Poor practice	86	56.6	56.6	56.6
Good practice	66	43.4	43.4	100.0
Total	152	100.0	100.0	

	Knowledge	Attitude	Practice
Mean	3.03	13.76	3.0921
Std. Deviation	1.665	2.102	1.76183

Associated factors of knowledge, attitude and practice found to be as shown in table 5.

Table5. Frequency distribution of nurses' response associated factors in EDs of TASH, Yekatit 12 HMC, Minillik II RH and Zewditu MRH from Jan 19 – Feb 13, 2015.

	Responses	Frequency	Percent
Oxygen therapy training	Yes	50	32.9
	No	102	67.1
Availability of OT guideline	Yes	36	23.7
	No	91	59.9
	I do not know	25	16.4
Adequate supply of O ₂ & delivery system	Yes	79	52.0
	No	57	37.5
	I do not know	16	10.5
Work load affects OT	Yes	99	65.1
	No	37	24.3
	Unknown	16	10.5

CHAPTER FIVE

Discussion

Good knowledge among nurses who were working in ED was found to be 55(36.2%) whereas nurses with poor knowledge were 97(63.8%) which is lower than the mean score of 3.03(SD= 1.6665). Assessment of nurses' knowledge on oxygen therapy was mainly focused on indications of oxygen therapy, normal oxygen saturation and rate of respiration in children. The guidelines from Western Australian Hospitals[2], British Thoracic Society[5], Nottingham University Hospitals[8], Ipswich Hospital[13] and Royal United Hospitals[18] stated that nurses should have the knowledge of oxygen therapy indications, normal oxygen saturation at different ages including normal respiration rates. This study approved that nurses who were working in the EDs during the study period and at the study areas have knowledge gap on oxygen therapy.

Good attitude or positive attitude was found to be 81(53.3%) with mean score of 13.763(SD= 2.1024) where as poor attitude or negative attitude for oxygen therapy was 71(46.7%). The guideline for oxygen therapy and delivery devices for pediatrics[7] describes nurses should have encouraging attitude to the needs of oral and nasal hygiene in children, use of humidification devices when administering oxygen therapy. Even if more than half of nurses have positive attitude for oxygen therapy much more awareness should have to be done.

Assessment of good practice on oxygen therapy was found to be 66(43.4%) with mean score of 3.09(SD= 1.7618) and poor practice was 86(56.6%) which is lower than the mean score. Practical questioners was focused on best practices on pulse oximetry, humidification device attachment and usage of nasal cannula and facemasks. The guidelines from Nottingham University Hospitals[8], City Hospital/Queens Medical Centre – Nursing practice guidelines for the administration of oxygen[17] and Royal United Hospitals[18] and standard guidelines for oxygen administration and monitoring[19] explained that nurses should have to be skilled on the best practices on pulse oximetry, humidification attachment, use of different oxygen devices to save the life of many emergency patients. ED nurses were asked about the administration of too little oxygen in ED can contribute to carbon-dioxide retention, 54(35.5%) answered correctly as it contributes when using facemasks, 53(34.9%) replied incorrectly which is approximately equivalent to those who replied correct, and the rest 45(29.6%) did not have the idea of giving too little oxygen in ED can contribute to carbon-dioxide retention. The study showed that nurses

who were working in the EDs of the study areas and period have skill gap on oxygen therapy that must be improved.

A similar study on assessment of KAP on oxygen therapy among ED nurses was not done, that's why this study was not compared. Many of the literature review references are guidelines that could not be discussed with this study.

Associated factors on oxygen therapy were evaluated whether these points was affecting nurses knowledge, attitude and practice on oxygen therapy. In this study among 152 nurses who were only 50(32.9%) where as the rest 102(67.1) were not trained. Lack of training on oxygen therapy affected nurses' knowledge, attitude and practice.

Participants were also asked about the availability of oxygen therapy guideline in ED, 36(23.7%) said yes there is guideline 91(59.9%) nurses replied no oxygen therapy guideline was available in ED and the rest 45(29.6%) nurses did not know whether it is available or not. As the majority of nurses evidenced no oxygen therapy guideline were available this is also caused the gaps seen on poor knowledge, attitude and practice on oxygen therapy.

The supply of adequate oxygen and delivery systems were requested 79(52%) said yes adequate, 57(37.5%) not adequate and 16(10.5%) did not know whether the supply is adequate or not. Inadequate supply of oxygen and delivery system particularly affects the quality and outcome of oxygen therapy. In other words whenever there is shortage of oxygen supply and delivery devices nurses forced to share with inappropriate devices that should be discouraged and it needs to done as per the guideline or protocols stated.

Participants were asked whether work load affecting oxygen therapy said yes 99(65.1%), no 37(24.3%) and unknown 16(10.5%). Whenever there is more and more work load monitoring and follow up of patients on oxygen therapy could be affected at large.

Limitations

The study limitations were research analysis and interpretation lectures being inadequate, the time given for writing analysis and general write up was very short and lack of similar study have been the challenges.

CHAPTER SIX

Conclusion

This study showed that there is a clear knowledge, attitude and practice gap among nurses who were working in ED. The possible associated factors were also identified that lack of oxygen therapy training and guideline contributed much to the challenges on oxygen therapy.

Recommendations

1. ED nurses should be given training on oxygen therapy and be updated.
2. National oxygen therapy guideline must be developed.
3. Oxygen supply should always be adequate and be used properly.

CHAPTER SEVEN

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CHAPTER EIGHT

Appedix I

ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

DEPARTMENT OF EMERGENCY MEDICINE

Masters student in Emergency Medicine & Critical Care Nursing Self Administered Questionnaire for Nurses and Midwives

This is a self administered research questionnaire designed for nurses and midwives who are currently working in the emergency departments of Tikur Anbessa Specialized Hospital, Saint Paul's Specialized Hospital, Yekatit 12 Hospital Medical College, Minillik II Referral Hospital and Zewditu Memorial Referral Hospitals to assess nurses knowledge, attitude and practice on oxygen therapy.

Your active participation in this study has its own significant importance to identify nurses' knowledge, attitude and practice gaps on oxygen therapy and to develop possible solutions and recommendations.

Each question has one answer and choose your own response. To complete this questionnaire on average it takes about 20 minutes. DO NOT WRITE YOUR NAME. You have a right to discontinue responding at any point. Therefore I request your participation very kindly and thank you in advance.

Your signature please -----

Page to +2519-13 - 07- 64 - 16 or use email gimmylemma@gmail.com for any doubts.

IDENTIFICATION

1. Sex

- A. Female
- B. Male

2. Age

- A. 20 – 25 years
- B. 26 – 30 years
- C. 31 – 35 years
- D. 36 – 40 years
- E. 41 – 45 years
- F. 46 – 50 years
- G. \geq 51 years

3. Marital Status

- A. Single
- B. Married
- C. Divorced
- D. Widowed

4. Your category of profession is

- A. Diploma Nurse
- B. Bsc Nurse
- C. Diploma Midwife
- D. Bsc Midwife

5. Name of the hospital currently working

- A. Tikur Anbessa Specialized Hospital
- B. St. Paul's Specialized Hospital
- C. Yekatit 12 Hospital Medical College
- D. Minilik II Referral Hospital
- E. Zewditu Memorial Referral Hospital

6. Total service in nursing

- A. $<$ 1 year
- B. 2 – 5 years
- C. 6 – 9 years
- D. 10 – 13 years
- E. \geq 14 years

7. Total duration of Emergency Department experience

- A. \leq 6 months
- B. 7 - 12 months
- C. 13 – 18 months
- D. 19 – 24 months
- E. $>$ 24 months

QUESTIONNAIRES

Knowledge questionnaires on oxygen therapy

1. Oxygen is administered to

- A. Treat hypoxia
- B. Prevent hypoxia
- C. Acute myocardial infarction
- D. A and B
- E. All

2. Oxygen is not administered to

- A. Carbon monoxide poisoning with oxygen saturation 99%
- B. Critical illness such as sepsis
- C. Cardiopulmonary arrest
- D. All
- E. None

3. The normal oxygen saturation at rest for adults < 70 years is

- A. 88 – 92%
- B. 96 – 98%
- C. 86 – 88%
- D. < 90%
- E. None

4. Oxygen therapy is not indicated

- A. Acute hypoxemia in pneumonia, shock, asthma, heart failure and pulmonary embolus
- B. Pneumothorax
- C. Carbon monoxide poisoning
- D. Post thoracic and abdominal surgery
- E. None

5. Movement of air into and out of the lungs is

- A. Inhalation
- B. Ventilation
- C. Exhalation
- D. Inspiration
- E. Expiration

6. The passive process in respiratory physiology is

- A. Inhalation
- B. Inspiration
- C. Expiration
- D. Ventilation
- E. All

7. The normal breathing rates in a child is

- A. 12 – 20 breath/ min
- B. 15 - 30 breath/ min
- C. 25 – 50 breath/ min
- D. 40 – 70 breath/min
- E. All

Attitudinal questionnaires on oxygen therapy

Answer questions from 8 to 14 by writing “ X “ according to your response.

No	Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
8	Oxygen is a drug that should be given only when ordered by a medical officer, or a registered nurse initiated order in an emergency situation.					
9	Oral and nasal hygiene and normal saline drops as necessary should be done when giving oxygen therapy in children.					
10	Continuous oxygen administration is more beneficial than intermittent oxygen therapy.					
11	Humidification is the best practice to prevent dryness of mucus membrane of upper respiratory tract causing soreness.					
12	Persons with severe lung disease need to be maintained at the prescribed oxygen saturation range.					
13	Since oxygen is a drug its administration to the patient is not safe and also it is very dangerous.					
14	A patient on oxygen therapy indicates that the patient is at the end stage of life.					

Practical questionnaires oxygen therapy

15. Pulse oximetry monitoring is not affected by

- A. Patient motion or fitting
- B. Carbon-monoxide poisoning
- C. Jaundice and anemia
- D. False nails, nail varnish
- E. All

16. The best practice on pulse oximetry

- A. The wave form and/or signal strength must be optimal before a reading can be accepted
- B. A blood pressure cuff on the arm of probe will lead to a false SPO₂ reading
- C. A blood pressure cuff on the arm of probe will lead to a correct oxygen saturation reading
- D. A and B
- E. A and C

17. To reduce the risk of side effects associated with dry gas administration and to promote patient comfort

- A. Use face mask
- B. Use nasal cannula
- C. Attach humidification device
- D. Attach pulse oximeter probe
- E. All

18. Collection of water in the tubing during oxygen administration

- A. Can partially or completely occlude the flow of oxygen
- B. Empty the collected water in the tubing as needed
- C. Facilitates flow of oxygen and promote patient comfort
- D. A and B
- E. B and C

19. Oxygen cannot travel easily through wet secretions, so optimize their removal by

- A. Sitting the patient up, or out in a chair
- B. Ensuring mouth is kept moist
- C. Providing tissues and/or a sputum cup
- D. Regularly assessing if a patient can take a deep breath and cough
- E. All

20. Nasal cannulae

- A. Are suitable for patients with nasal polyps and nasal edema
- B. May cause headaches or dry mucous membranes if flow exceeds 4L/min
- C. Should not be used for those needing over 40% (> 4L/min)
- D. A and B
- E. B and C

21. Your patient may have difficulty of tolerating and constantly struggling to remove the oxygen delivery device. Most probably this device is

- A. Nasal cannulae
- B. Oxygen mask
- C. Nasal catheter
- D. Nasal prongs
- E. All

22. High percentage of oxygen 60 – 90% used for short term treatment in trauma achieved by using a device

- A. Nasal catheter
- B. Venturi masks and adapters
- C. Non- rebreathing oxygen mask
- D. Tracheostomy masks
- E. All

23. Which nursing care is not appropriate during oxygen therapy

- A. Mouth care
- B. Encourage adequate fluid intake
- C. Apply water based cream if lips or nose become dry
- D. Apply petroleum jelly to minimize inflammation of lips and nose
- E. None

Associated factors questionnaires on oxygen therapy

24. Have you trained on oxygen therapy/administration?

- A. Yes
- B. No

25. Is there a guideline of oxygen therapy in the currently working emergency department?

- A. Yes
- B. No
- C. I do not know

26. Do you know that using too little oxygen in emergency room may contribute to carbon dioxide retention?

- A. Yes
- B. No
- C. I have no idea

27. Is there adequate supply of oxygen and delivery systems in emergency department?

- A. Yes
- B. No
- C. I do not know

28. Do you think work load/ burden affects oxygen therapy in emergency department?

- A. Yes
- B. No
- C. Unknown

29. Do those your patients administered oxygen paid/charged for the procedure?

- A. Yes
- B. No

30. Do you get the amount of oxygen cylinders equivalent to the label written?

- A. Yes
- B. No

THANK YOU VERY MUCH FOR YOUR TIME AND RESPONDING COMPLETELY!!