



**ASSESSMENT OF KNOWLEDGE AND PRACTICE OF NURSES REGARDING
OXYGEN THERAPY IN ELMAK NIMIR UNIVERSITY HOSPITAL**

Abdal Hafeez Osman Mahmoud*¹, Hamed Alzain Hamed Fadl Alseed¹, Higazi Mohammed Ahmed Abdallah Awad¹, Abeer Hassan Ahmed² and Gamal Eldin Mohamed Osman Elhussein²

¹Faculty of Medicine, Shendi University, Shendi, Sudan.

²College of Medicine, University of Hail, KSA.

*Correspondence for Author: Abdal Hafeez Osman Mahmoud

Faculty of Medicine, Shendi University, Shendi, Sudan.

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ABSTRACT

Background: Oxygen therapy is the administration of oxygen as a medical intervention, which can be for a variety of medical conditions. Assessment of need for oxygen in most instances is a nursing responsibility. Therefore, the aim of this study was to assess knowledge and practise of nurses regarding oxygen therapy. **Methodology:** This is a descriptive, hospital-based study, conducted in Emek Nimir University hospital, at Shendi city. The study covered 50 nurses in the hospital, standard closed ended questionnaire was used to collect the data. **Results:** Of the 50 studied nurses, 25/50(50%) nurses know that hypoxemia is an indication of oxygen therapy. Moreover, 58% of the nurses depend on doctor order and selection of appropriate oxygen delivery device, 20% depend on partial pressure of O₂ (Pao₂), 10% depend on guidelines, and 12% depend on patient condition. **Conclusion:** Knowledge and practice of nurses regarding oxygen therapy in Elmak Nimir University Hospital is relatively poor. Implementation of educational programs will enhance nurses' knowledge and practice.

KEYWORDS: Oxygen therapy, nurses, Elmak Nimir University Hospital.

INTRODUCTION

Oxygen therapy is the introduction of increased oxygen to the air available for respiration to prevent hypoxia, a condition in which sufficient oxygen isn't available for the cells of the body. The administration of supplemental oxygen is an essential element of appropriate management for a wide range of clinical conditions; crossing different medical and surgical specialities.^[1]

Oxygen is an atmospheric gas necessary for survival of all living things; denoted by letter O₂. The presence of "air" is vital for survival of human was documented in the ancient Greek as well as in Vedic Hindu literature more than 2000 years ago.^[2,3] It was only in the 18th century that gas was isolated by Joseph Priestley and its significance in respiratory physiology by Antoine Lavoiser.^[4] The problems of oxygen deficiency as well as need and indications for oxygen therapy were subsequently known. Shortly oxygen came to be known as "cure all" medicine; used for conditions varying from cholera, arthritis, anemia, and syphilis to glaucoma, epilepsy, diabetes, and cancers. It was around the second decade of 20th century and later that oxygen therapy was implemented for indications based on firm scientific foundations.^[5]

Medical staff to discuss with nursing staff and identify patients that require continuous saturation monitoring.

This must be recorded in the medical / nursing notes. Nurse in charge / team leader should review all patients requiring saturation monitoring daily. This to be communicated to the nurse looking after the patient and documented in the care plan and discussed with doctors re. discontinuing saturation monitoring on patients identified. It is the nurse's responsibility to act on the information appropriately by informing the medical staff, assessing and reviewing the patient. All nursing staff that record oxygen saturation must have had appropriate training on how to use the saturation monitor and where to record results.^[6]

Though, regardless of the setting in which oxygen is delivered, it should be regarded as a drug. Its potency in treating hypoxaemia is often underestimated and, if given inappropriately, it can be lethal.^[7] Patients must receive this therapy in an appropriate, safe and comfortable way. This depends on a sound understanding of why oxygen is being delivered, the methods of oxygen delivery and the nursing needs of the patient receiving it. Therefore, the aim of this study was to assess knowledge and practise of nurses regarding oxygen therapy.

MATERIALS AND METHODS

This was a descriptive, cross-sectional hospital-based study, which was conducted to assess nurse's knowledge

and practice regarding oxygen therapy in Elmak Nemir university hospital in Shendi city, river Nile state, Sudan. The study was conducted during the period from May to November 2014. Shendi city is located in the north of Khartoum about 176 Km, with a population of 100000 persons.

Elmak Nemir University hospital was established since 2002. And it's the second university hospital in Sudan. The hospital provides most types of medical services (medicine, surgery, Obstetrics, Gynaecology, and paediatric). Beside these there are cardiac, renal, and oncology centres). In the hospital there is a big theatre complex in which most types of general operations can be done (caesarean, GIT surgery and orthopaedic surgery, etc.). There was two diabetic outpatient clinics in the hospital established since 2009, one for adult and other for children, which composed of three rooms, laboratory, doctor and nursing follow-up care room which provide care, follow up and teaching for the diabetic patients. In this clinic there are nurses rotate the duty among them, doctors and physician, the clinic work every Thursday from eight o'clock to midday. The hospital system for work, for nursing staff, morning shift for 8 hours in duration, and afternoon, evening shift for 16 hours, and is the distribution of nursing staff according to need of hospital departments, nurses they will rotated frequently without fixed intervals according to the need.

Study subjects: 50 nurses were selected included all nurse's staff members during the time of the study.

Data collection: Two tools were used; firstly standard closed ended filled questionnaire was developed composed of (16) questions.

Part one: contain question about demographic data (level of education, experience years, area of work, training courses).

Part two: question about nurses knowledge about indication, contraindication, caution, equipment, level of administration, etc).

Observational check list have been modified by the researcher rated by

- Proper for standard nursing practice and scored by 2 mark
- Improper for nonstandard nursing practice scored by 1 mark
- Not done scored by zero mark

Data collection procedure: The data was collected daily during three weeks and the three shift. The nurses were allowed to fill the questionnaire themselves, it look about (5-8) minutes, no one refuse to participate and there was no missing.

Data analysis: The data was analysed using computer software (statistical package for social sciences (SPSS)

(version 16) and frequencies and percentages and cross tabulations were produced.

Ethical consent

The proposal was approved by the scientific committee board, and then permission was taken from general hospital manger and the head of nursing department. The purpose of the study was explained verbally clearly to participants before giving of the questionnaire and they all agreed to participate.

RESULTS

Out of the 50 studied nurses, 41/50(82%) were having bachelor degree and 5/50(10%) were having master degree and the remaining 4/50(8%) were with diploma level of education, as indicated in Fig1.

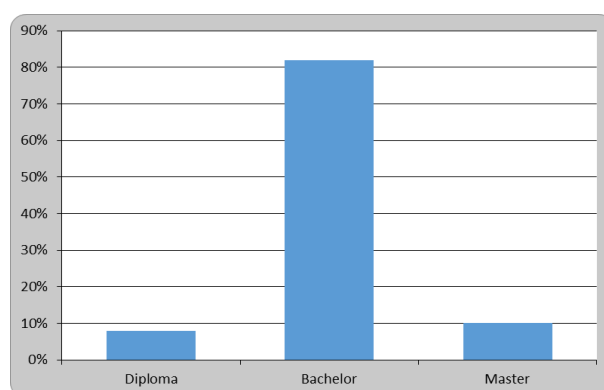


Figure 1. Description of nurses by level of education.

Most of the nurses were with experience range of 1-2 years representing 19/50(38%) followed by 3-5 years and more than 5 years constituting 15/50(30%) and 9/50(18%), respectively as indicated in Fig 2.

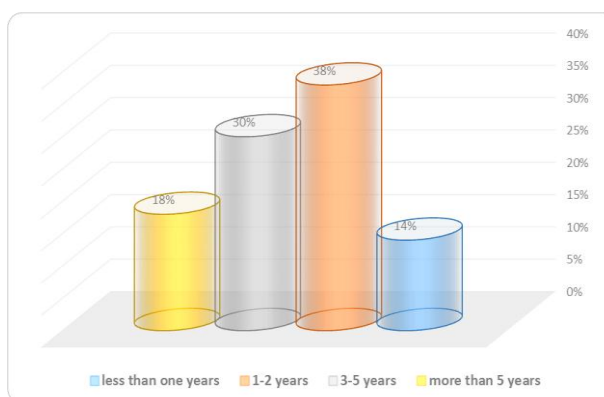


Figure 2. Description of nurses by working experience.

According to the department of working, the biggest number of nurses were working at obstetrics and gynaecology representing 16/50(32%) followed by ICC and CCU representing 12/50(24%) and 10/50(20%) in this order, as indicated in Fig 3. When asking them whether they have previous training courses, all (100%), claimed never have such courses.

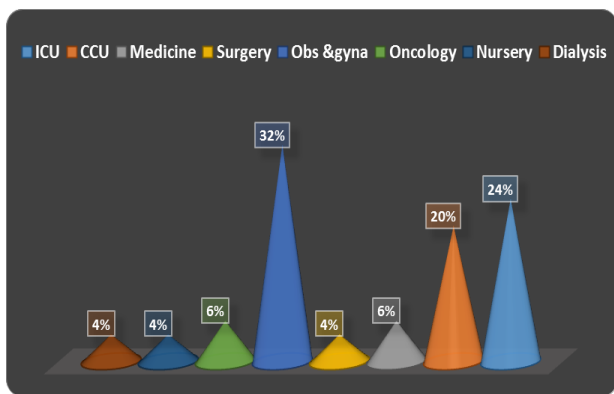


Figure 3. Description of nurses by department

Table 1. Indicates the distribution of nurses according to the knowledge about indication of oxygen therapy. Almost 25/50(50%) of nurses know hypoxemia as indication, 6/50(12%) increased work of breathing, 12/50(24%) increased myocardial and 7/50(14%) pulmonary hyperventilation as indication of O₂ therapy.

Table 1. Distribution of nurses according to the knowledge about indication of oxygen therapy.

Indication of oxygen therapy	Frequency	Percent
Hypoxemia	25	50%
Increased work of breathing	6	12%
Increased myocardial work	12	24%
Pulmonary hyperventilation	7	14%
Total	50	100%

In regard to the knowledge of nurses about the contraindication of oxygen therapy, 23/50 (46%) said chronic carbon dioxide retention, 12/50(24%) fire hazard, 10/50(20%) related to danger of hypoxia as contraindication of oxygen therapy and 5/50(10%) of the nurses know no absolute contraindication, as indicated in Table 2.

Table 2. Distribution of nurses according to the knowledge about contraindication of oxygen therapy.

Contraindication of oxygen therapy	Frequency	Percent
No absolute contraindication	5	10%
Chronic carbon dioxide retention	23	46%
Fire hazard	12	24%
Related to danger of hypoxia	10	20%
Total	50	100%

In regard to distribution of nurses according to the knowledge about selection of appropriate oxygen delivery device, 29/50(58%) of the nurses based on doctor order, 10/50(20%) of the nurses know based on pao₂, 6/50(12%) on patient condition and 5/50(10%) based on guideline, as shown in Table 3.

Table 3. Distribution of nurses according to the knowledge about selection of appropriate oxygen delivery device.

Selection of appropriate oxygen delivery device	Frequency	Percent
Based on pao ₂	10	20%
Based on guideline	5	10%
Based on doctor order	29	58%
Patient condition	6	12%
Total	50	100%

In regard to the knowledge of nurses about oxygen administered by right rate, percentage and level, 18/50(36%) indicated percentage, 17/50(34%) indicated rate and 15/50 (30%) indicated level.

In regard to the knowledge of nurses about caution in oxygen therapy, 15/50(30%) of nurses had knowledge about carefully assesses its effect, 10/50(20%) oxygen is medication, and 19/50(38%) prescribed by physician and 6/50(12%) the nurse assess the patient frequently, as indicated in Table 4. For distribution of nurses according to the knowledge about method of oxygen therapy, 24/50(48%) of the nurses had knowledge about low flow system and 26/50(52%) high flow system. For method of oxygen therapy, 24/50(48%) of the nurses had knowledge about low flow system and 26/50(52%) high flow system.

Table 4. Distribution of nurses according to caution in oxygen therapy

Caution in oxygen therapy	Frequency	Percent
Carefully assesses its effect on each patient	15	30%
Oxygen is a medication	10	20%
Prescribed by physician	19	38%
The nurse assesses the patient frequently	6	12%
Total	50	100%

In regard to the knowledge of nurses about oxygen equipment, most of nurses know Nasal Cannula, constituting 19/50(38%) followed by Mask representing 18/50(36%), as shown in Fig 4.

Table 5, shows the distribution of nurses according to the knowledge about oxygen concentration delivered by nasal cannula. 12/50(24%) of the nurses had knowledge from 22-24%, 18/50(36%) from 36-40%, and 20/50(40%) from 40-44%. In regard to the knowledge about nursing care for patient who receiving oxygen by nasal cannula, 78% of nurses had knowledge about keep nosepieces clean and 22% evaluate for presser sore over ears.

Table 5. Distribution of nurses according to the knowledge about oxygen concentration delivered by nasal cannula.

Oxygen concentration deliver by nasal cannula	Frequency	Percent
22-24%	12	24%
36-40%	18	36%
40-44%	20	40%
Total	50	100%

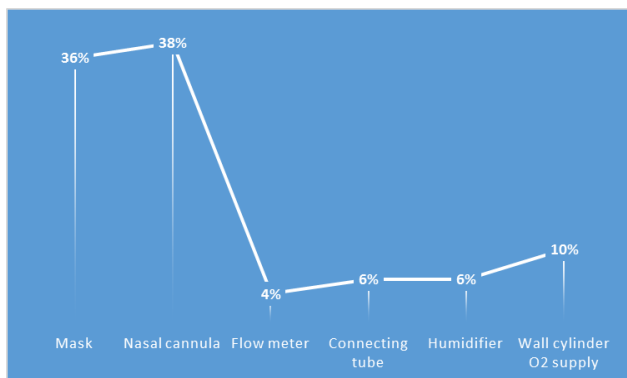


Figure 4. Description of the nurses by knowledge oxygen equipment.

The distribution of the nurses according to the knowledge about problem associated with face mask was summarized in Table 6. About 66% of nurses had knowledge about mask need to be removed, 18% tight seal can cause facial irritation and 16% can feel hot. In regard to the knowledge of nurses about general consideration in oxygen therapy, 30% of nurses had knowledge about alcohol ether and other Inflammatory, 50% smoking and 20% keep secure position.

Table 6. Distribution of the nurses according to the knowledge about problem associated with face mask.

Problem association with face mask	Frequency	Percent
Mask need to be removed	33	66%
Tight seal can cause facial irritation	9	18%
Can feel hot	8	16%
Total	50	100%

Table 8. Showing the relation between the nurses' level of education and knowledge about assessment the patient response

Level of education	Assess the patient response					Total
	oxygen saturation	quality and rate of respiration	vital sing	comfort level	oxygen saturation	
Diploma	4	0	0	0	4	4
Bachelor	14	2	22	3	41	14
Master	0	0	0	5	5	0
Total	18	2	22	8	50	18

In regard to the knowledge of nurses about assessment of patient response, 36% of nurses had knowledge about oxygen saturation, 18% quality and rate of respiration, 44% vital sing and 16% comfort level, as shown in Table 7, Fig 5.

Table 7. Distribution of the nurses according to the knowledge about assessment of patient response.

Nurses assess the patient response	Frequency	Percent
Oxygen saturation	18	36%
Quality and rate of respiration	2	4%
Vital sing	22	44%
Comfort level	8	16%
Total	50	100%

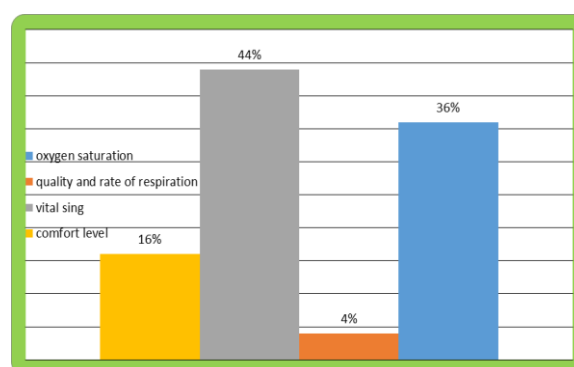


Figure 5: the distribution of nurses according to the knowledge to assess the patient response.

The relation between the nurses' level of education and knowledge about assessment the patient response was summarized in Table 8. Moreover, the relation between the nurses' experience level and their Knowledge about know cautions in oxygen therapy was indicated in Table 9. Furthermore, the relation between the indication of oxygen and oxygen concentration delivered by nasal cannula was distributed in Table 10.

Table 9. Showing the relation between the nurses' experience level and their Knowledge about know cautions in oxygen therapy.

Experience level	Cautions in oxygen therapy				Total
	carefully assesses its effect on each patient	oxygen is medication	prescribed by physician	the nurse assesses the patient frequently	
Less than one years	7	0	0	0	7
1-2 years	8	10	1	0	19
3-5 years	0	0	15	0	15
more than 5 years	0	0	3	6	9
Total	15	10	19	6	50

Table 10. Showing the relation between the indication of oxygen and oxygen concentration delivered by nasal cannula

The indication of oxygen	Oxygen concentration deliver by nasal cannula			Total
	22-24%	36-40%	40-44%	
Hypoxemia	12	13	0	25
increased work of breathing	0	5	1	6
increased myocardial work	0	0	12	12
pulmonary hyperventilation	0	0	7	7
Total	12	18	20	50

In regard to the nursing practices during administration of oxygen by face mask and nasal cannula, proper performance of Mask face and Nasal cannula were indicated by 41/50(82%) and 44/50(88%), respectively.

Improper performance of Mask face and Nasal cannula were indicated by 9/50(18%) and 6/50(12%), respectively, as shown in Table 11.

Table 11. Showing nursing practices during administration of oxygen by face mask and nasal cannula.

Method	Performance					
	Proper		Improper		Not don	
	%	No	%	No	%	%
Face mask	41	82%	9	18%	0	0%
Nasal cannula	44	88%	6	12%	0	0%

DISCUSSION

It is essential to provide optimal oxygen therapy to the acutely breathless patient, and for most patients the major risk is giving too little oxygen.^[8] Insufficient oxygen therapy can lead to cardiac arrhythmias, tissue damage, renal damage and ultimately cerebral damage. However, the present study revealed that most of the nurses where varied in their educational level (82%) had bachelor degree (8%) had diploma degree and (10%) had master degree. The results showed only half (50%) of nurse know hypoxemia as indication of oxygen therapy, this might due to poor knowledge about other indication of oxygen therapy. In addition that the study showed that all of the nursing staff (100%) had not training course, this might due to hospital not have staff development program.

Better understanding of patients' and nurses' experiences of oxygen therapy could inform clinical decisions about oxygen administration using low-flow devices. Variances between the patients' and nurses' perspective of oxygen therapy illustrate the variety of factors that impact on effective oxygen administration. Further research should seek to provide a further in-depth

understanding of the current oxygen administration practices of nurses and the patient factors that enhance or hinder effectiveness of oxygen therapy.^[9]

The result showed (58%) based on doctor order selection of appropriate oxygen delivery device (20%) of nurses know based on pao₂, 10% based on guideline , and 12% patient condition this might due to hospital polices. More one that the study found about nurses opinions for general consideration in oxygen therapy (50%), said keeping oxygen away from smoking, (30%) for said keeping oxygen away from alcohol and other inflammatory, (20%) keep oxygen cylinder in secure position.

More one the study showed that there was insignificant relation P value (0.70), between nurses knowledge about the indication at oxygen and oxygen concentration deliver by nasal cannula this might due to hospital polices not have staff development program. the study showed that most of nurses staff (78%) had keep nosepieces clean in nursing care. in addition that the study showed that most of the nurses (66%) said mask need to be removed, these might be due to nurses had

good knowledge about nursing care about oxygen therapy.

However, airway management, an essential component of care for patients receiving mechanical ventilation, is multifaceted and includes oral hygiene and suctioning, endotracheal suctioning, and care of endotracheal tubes. Registered nurses and respiratory care personnel often share responsibilities for airway management. Knowledge of current practices can help facilitate evidence-based practices to optimize care of patients receiving mechanical ventilation.^[10]

Majority of the nurses which represents (88%) had proper performances regarding administrating oxygen by nasal cannula, and (82%) had Proper performances regarding administrating oxygen by face mask these might be due to nurses had good practise about oxygen therapy.

In conclusion: Half of nurses (50%) knows hypoxemia as indication of oxygen therapy, this might due to poor knowledge about other indication of oxygen therapy. Majority of the nurses which represents 88% had Proper performances regarding administrating oxygen by nasal cannula. Most of the nurses 82% had Proper performances regarding administrating oxygen by face mask. Establishment of training courses and workshops, continues educational programs are important to ensure standard quality of nursing care.

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