

# Effectiveness of an Interventional Program on Nurses' Knowledge and Practice about Oxygen Therapy in Teaching Hospitals in Al- Nasiriya City

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## Abstract

**Methodology:** A quasi-experimental study was applied with the use of a pre-posttest approach for two groups of samples (study and control) during the period from (14 November 2020 to 20 April 2021), on a non-probability (purposive) sample. The size of the sample was (60) nurses divided into two groups each one contained (30) nurses as the control group and the study group

**Results:** Through data analysis of nurses' knowledge and practice about oxygen therapy to assess the effectiveness of an educational program on nurses. The study shows that nurses who participated in the educational program demonstrated a highly significant increase in their knowledge ( $p = 0.000$ ) when compared to the study group and control group. And shows that nurses who participated in the educational program demonstrated a highly significant increase in their practice ( $p = 0.000$ ) when compared the tests that the study and control group at ( $P \leq 0.001$ ) when analyzed with t-test.

**Conclusions:** The current study's findings revealed that nurses working in critical care units, emergency units and oncology units who were exposed to an interventional program on oxygen therapy had higher knowledge and practice after the evaluation (posttest) as compared to before (pretest).

**Recommendations:** Conduct periodic training courses to improve nurses' knowledge and practices on the administration of oxygen in all hospitals in the city of AL-Nasiriya. Continuously monitor the performance of nurses to ensure that they practice oxygen therapy procedures correctly.

**Keywords:** Effectiveness, an Interventional Program, Knowledge, Practice, Oxygen Therapy.

## Introduction

Oxygen therapy is an important part of resuscitation, acute medical treatment, critical life support, anesthesia, and postoperative care. Any oxygen therapy errors can worsen the condition of a patient and can even be life-threatening. The advantages and possible dangers of oxygen therapy are well understood; however, members of the health team often practice oxygen therapy without special care and appropriate consideration [1,2]. At the end of the 18th century, oxygen therapy started to be used for the treatment of various illnesses. Nowadays, oxygen is commonly used for medical treatments. Hypoxia, hypoxemia, cardiac and respiratory arrest, hypertension, decreased cardiac output, metabolic acidosis, and respiratory distress are all indications for oxygen treatment [3,4].

Individuals' health status, activity level, and hydration are factors influenced by how much human being requires for oxygen. Without enough oxygen, medical problems are certainly occurring. Oxygen deficiency in the human body doesn't occur instantly, it might take a long time to occur, possibly months or years. There are various causes of oxygen deprivation, which may occur from the health factors or environmental factors of the person. Oxygen deficiency may have significant health effects; it is also linked to the growth of tumors [5].

Long-term oxygen therapy (OT) is the supply of oxygen therapy for at least 15 hours per day, including overnight. The advantage of long-term OT in the field of chronic obstructive pulmonary disease has been contentious and contested [6,7].

Oxygen therapy is classified as a key item in the World Health Organization (WHO) model of essential medicines, which is a list of the most common and safe medications used in the healthcare field [8].

It is also believed to be an important therapy for a wide variety of hospitalized patients in the developing world, as it plays a crucial role in increasing saturation and decreasing breathing effort. OT plays a pivotal role in saving the lives of many patients with heart and lung disorders when used in a timely and effective manner by the newly revised guidelines [6,8].

## Methodology

A quasi-experimental study was applied with the use of a pre-posttest approach for two groups of samples (study and control) during the period from (14 November 2020 to 20 April 2021). A non-probability (purposive) sample was selected from nurses who are working in (critical care units), (emergency units), (oncology units) at Al- Haboby Teaching Hospital and Al-Hussein Teaching Hospital

in Al- Nasiriya City. The size of the sample was (60) nurses divided into two groups each one contained (30) nurses as the control group and the study group. The study group was exposed to an interventional program while the control group was not exposed to the interventional program. The researcher constructed the interventional program and instruments through the review of available related literature, and studies about oxygen therapy to reach the aims of the present study. The program deals with 3 main sessions related to oxygen therapy and the questionnaires to measure the effectiveness of the education program. It is consisting of three parts;

**The first part** is concerned with the demographic data for nurses includes (12) items; which as (age, gender, Area of work (unit), the category of profession, number of years of active service in nursing, number of years of active service in (units), participate in an oxygen therapy training course, the number of Sessions, course duration, course place, updating information on the topic of oxygen therapy, and sources of information).

**The second part** is concerned with the assessment of the nurses' knowledge about oxygen therapy. The questionnaire was conducted by the researcher depending on an extensive review of available related literature, and studies about oxygen therapy. The questionnaire which adopted from scale (Desalu et al., 2019) [9]. It is composed of (21) questions consists of 5 domains, which include: general knowledge of oxygen therapy, recognizing hypoxemia & tissue hypoxia, indications for oxygen therapy, oxygen prescription, and oxygen delivery practices.

**The third part** is to evaluate the nurse's practices during oxygen administration, the researcher observes and checks for correct or incorrect performance, by using an assessment tool (observational checklist), which adopted from (Browne, 2012) [10]. It contains (26) items as follows; 8 items should be done before administration of oxygen therapy, 13 items should be done during the administration of oxygen therapy, and 5 items should be done after administration of oxygen therapy, the items were rated and score with (3) for correct done, (2) for incorrect done and (1) for not done. The validity of the program and the study instruments (questionnaire, practice checklist) are determined by a panel of (14) experts, who have more than five years' experience in their fields of work. The reliability of the instruments was determined through the use of the test-retest approach for the knowledge test and intra observation for nurses' practice.

### **Ethical Considerations**

permission was sent to Al- Haboby Teaching Hospital and Al-Hussein Teaching Hospital in order to ensure the agreement and cooperation.

The researcher obtained written informed approval from each nurse.

### **Results and discussion**

#### **A Discussion of the Demographic Characteristics of Nurses in (critical care units, emergency units and oncology unit), as shown in Table (1).**

Females in both groups (study and control) (66.7% and 80.0%) respectively, within the age group (20-29) years. The high percentage were females because the colleges and institutes of nursing has recently incorporated male students into their education and with limited percentage. More than half of nurses in the profession category were secondary nursing school and institute of nursing, while less than one-third were a college of nursing (bachelor degree). More than two-thirds of the study and the control group working in the critical care units (63.4% and 74.6%) respectively. More than three quarters (76.7%) of the study group and (73.3%) of the control group have (3-6) years of active service in nursing experience.

These findings agreed with the study of (ELgneid et al., 2020) conducted the effect of implementing oxygen administration guidelines on Nurses' performance caring for patients with chest disorders at Mansoura University, Egypt, the data analysis revealed that the most (90%) of studied sample was females and more than two-thirds of studied nurses (71.4%) aged 20- 30 years. Only one-third were highly educated (Bachelor's Degree), and half of them were graduates from the Technical Institute of Nursing. The mean and stander deviation of years of experience were ( $5.7 \pm 4.6$  years), and more than one-half (52.9%) with less than five years of experience [11]. Also, in the same line with the study findings, a study (Uwineza Didi, 2017) assessed the knowledge, attitudes, and practice among nurses toward oxygen administration to the critically ill patients at University Teaching Hospital of Kigali (UTHK), said that more than half (56.9%) of the respondents are females and a small number of them (29.2%) are Bachelor degree holder in Nursing [12].

Regarding the participate in an oxygen therapy training course, it was found that, the majority (86.7%) of the study group and (73.3%) of the control group had not attended any previous training. The reason for this may be that the hospitals do not have oxygen therapy development programs represented by training courses. These findings are agreed with the study of (Uwineza Didi, 2017) mention the attendance of training courses, around 69.2% of the respondents have never attended any short or long-course training about oxygen administration [12].

### Discussion of Comparison of pre-test and post-test between the study and control groups for Nurses' Knowledge of Oxygen Therapy as shown in Table (2).

In the present study, data analysis shows the effectiveness of an interventional program on all five knowledge domains (general knowledge of oxygen therapy, recognizing hypoxemia, indications for acute oxygen therapy, oxygen prescription, and oxygen delivery practices). There are no statistically significant differences between the study group and control group results for pre-test ( $P > 0.05$ ). While there are highly significant relationships between study group and control group results for post-test at ( $P \leq 0.001$ ).

In agreement with this results Al-Wily and Aziz (2020) who evaluate the effectiveness of instructional program for nurses' knowledge regarding oxygen administration methods at Pediatric Teaching Hospitals in Mosul City. Their result showed that the statistical differences between the study and control groups for the constructional program (pre-test, post-test) for pediatric oxygen administration methods. While, there is no significant association between the study group and control group results in pre-test. However, there are strong significant association between the study group and control group results in post-test at ( $P \leq 0.001$ ) [13].

Also, this finding is supported by Jang et al., (2020) identify the effects of a simulation-based high flow nasal cannula oxygen therapy training program on the knowledge, clinical performance and educational satisfaction of clinical nurses in Yeungnam University Hospital. The results show that after the application of the educational program, the experimental group had more expertise, knowledge, and satisfaction than the control group. ( $t = -14.09, p < .001$ ), ( $t = -12.99, p < .001$ ) [14].

### Discussion of Comparison of pre-test and post-test between the study and control groups for Nurse's Practice toward Oxygen Therapy as shown in Table (3).

The improvement of the study group was demonstrated by nurse-related practices (before, during, and after administration oxygen therapy) in comparison with the control group. The post-observation checklist of the study and the control group showed a highly statistically significant difference in all three domains of practice ( $P \leq 0.001$ ). While there are no statistically significant differences between the study group and the control group ( $P > 0.05$ ) in the pre-education of the three domains of practice (before, during, and after administration of oxygen therapy).

Our finding is in agreement with Jang et al., (2020) who clarified that, nurses' clinical performance for both use of Opti flow and Airvo2 was higher in the experimental group than in the control group ( $t = -11.39, p < .001$ ), ( $t = -11.38, p < .001$ ) [14].

These results are similar to those of Kord et al., (2015) evaluating adherence to oxygen therapy by nurses in Neonatal Intensive Care Units (NICU), the results reveal that, the observance of the standards before oxygen therapy in (90%) of cases was poor. In addition, (84%) of them had moderate performance during  $O_2$  therapy and (99.2%) had poor performance after oxygen therapy [15].

### Conclusions

The current study's findings revealed that nurses working in critical care units, emergency units and oncology units who were exposed to an interventional program on oxygen therapy had higher knowledge and practice after the evaluation (posttest) as compared to before (pretest).

### Recommendations

Conduct periodic training courses to improve nurses' knowledge and practices on the administration of oxygen in all hospitals in the city of AL-Nasiriya. Nurses should regularly update their knowledge and follow scientific developments by reading nursing and medical books, new journals, and international protocols. And attend oxygen workshops, conferences, and lectures at the hospital's continuing education units. Continuously monitor the performance of nurses to ensure that they practice oxygen therapy procedures correctly.

**Table (1) Distribution of The Critical Care Units, Oncology and Emergency Nurses by Demographic Characteristics of the Study and the Control Groups (N= 60 Nurses).**

Demographic Characteristics	Variables	Study Group (n=30)		Control Group (n=30)	
		F	%	F	%
Age group (Years)	20 – 29 years	24	80.0	22	73.3
	30 – 39 years	4	13.3	5	16.7
	40 – 49 years	2	6.7	3	10.0
Gender	Male	10	33.3	6	20.0
	Female	20	66.7	24	80.0
Area of work (unit)	ICU	11	36.7	13	43.3

	CCU	5	16.7	7	23.3
	RCU	3	10.0	3	10.0
	Emergency	5	16.7	3	10.0
	Oncology	6	20.0	4	13.3
Your category of profession	Secondary Nursing School	11	36.7	13	43.3
	Nursing institute	11	36.7	10	33.3
	Nursing College	8	26.7	7	23.3
Number of years of active service in nursing	1 – 3 years	8	26.7	10	33.3
	3 – 6 years	15	50.0	12	40.0
	6 – 9 years	1	3.3	4	13.3
	>= 10 years	6	20.0	4	13.3
Number of years of active service in (units)	1 – 3 years	18	60.0	19	63.3
	3 – 6 years	7	23.3	7	23.3
	6 – 9 years	1	3.3	2	6.7
	>= 10 years	4	13.3	2	6.7
participate in an oxygen therapy training course?	Yes	4	13.3	8	26.7
	No	26	86.7	22	73.3
Select the number of Sessions	One	3	10.0	5	16.7
	two or more	1	3.3	3	10.0
	Never	26	86.7	22	73.3
Study Course duration	2 weeks	2	6.7	2	6.7
	1 month	1	3.3	3	10.0
	2 months or more	1	3.3	3	10.0
	not participate	26	86.7	22	73.3
Course place	inside Iraq	4	13.3	8	26.7
	not participate	26	86.7	22	73.3
Do you take the task of updating your information on the topic of oxygen therapy?	Yes	8	26.7	5	16.7
	No	22	73.3	25	83.3
select sources of information	Online (social networking sites)	3	10.0	2	6.7
	Colleagues	3	10.0	2	6.7
	Nursing and medical books	2	6.7	1	3.3
	No	22	73.3	25	83.3

n=number of samples, F=frequency, %= percentages

Table (2) Comparison of pre-test and post-test between the study and control groups for nurse`s Knowledge toward Oxygen Therapy.

Domains of nurse`s Knowledge toward Oxygen Therapy	Test period	Study Group (N=30)		Control Group (N=30)		Independent t-test statistics		
		M.S	SD	M.S	SD	t test value	df	P Value& Sig
1. General knowledge of oxygen therapy	Pre	1.10	0.923	1.20	0.925	-0.419	58	0.677 (NS)
	Post	2.57	1.073	1.33	0.922	4.775	58	0.000 (HS)
2. Recognizing hypoxemia	Pre	2.03	1.474	2.03	1.474	0.000	58	1.000 (NS)
	Post	4.03	0.850	2.07	1.230	7.204	58	0.000 (HS)
Indications for Acute O2 Therapy	Pre	2.00	1.203	1.53	1.196	1.507	58	0.137 (NS)
	Post	2.87	0.860	1.57	1.194	4.837	58	0.000 (HS)
Oxygen prescription	pre	1.43	1.006	1.50	0.900	-0.270	58	0.788 (NS)
	post	3.10	0.803	1.47	1.042	6.802	58	0.000 (HS)
Oxygen delivery practices	pre	1.37	1.033	1.37	1.129	0.000	58	1.000 (NS)
	post	3.17	0.834	1.50	1.196	6.260	58	0.000 (HS)

M.S=mean of score, SD=standard deviation, df=degree of freedom, NS= Non-significant at (P ≥ 0.05), HS= highly significant at (P ≤ 0.001).

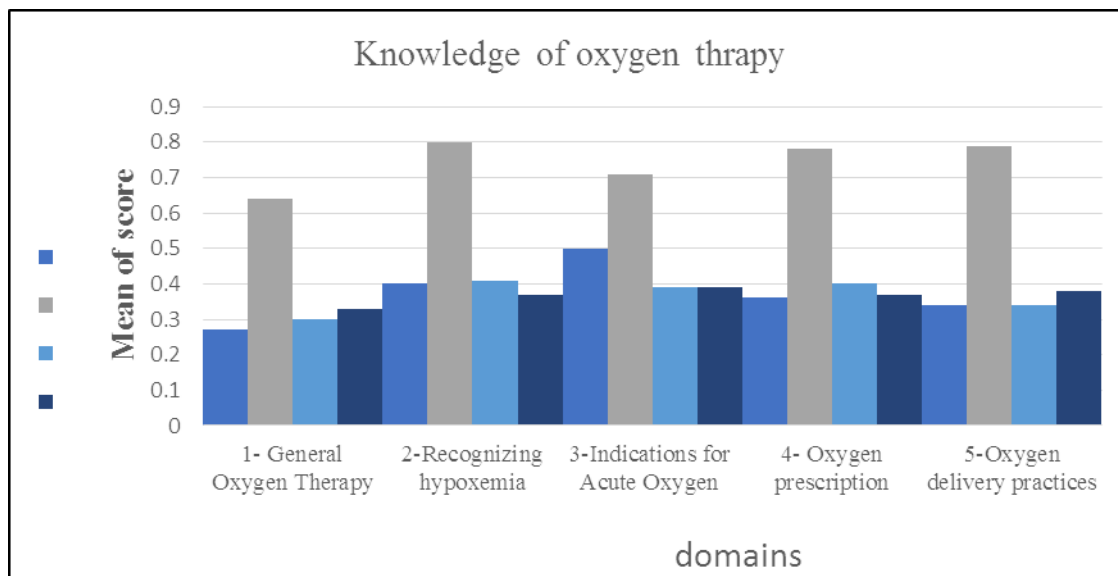
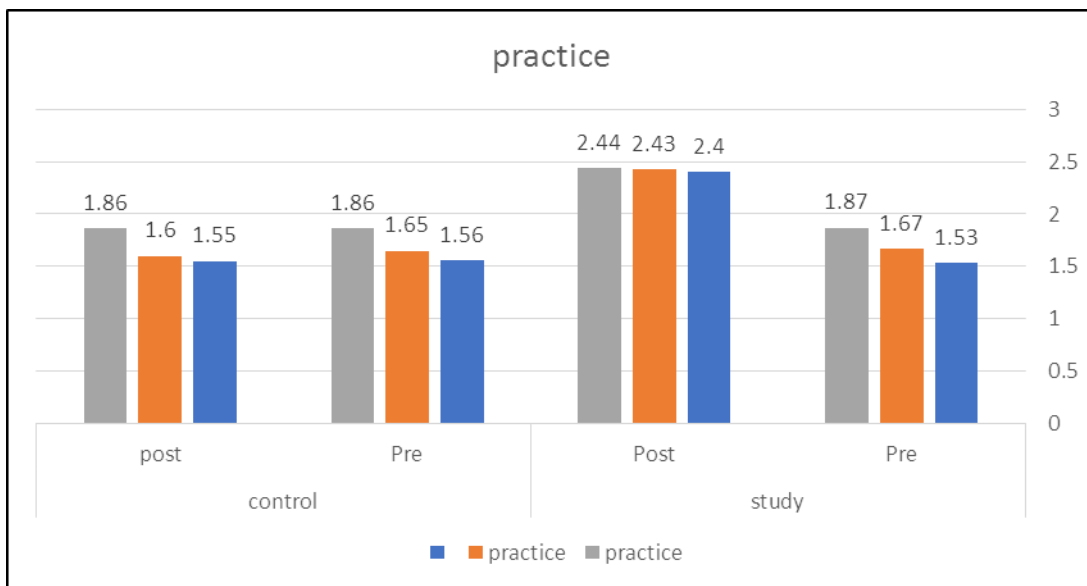


Figure (1) Level of nurse`s Knowledge domains toward Oxygen Therapy\* level of assessment: (Less than 0.50) = Low level, (0.51-0.75) = Moderate Level, (0.76and more) = High Level.

Table (3) Comparison of pre-test and post-test between the study and control groups for nurse`s Practice toward Oxygen Therapy.

Domains of Practice	est period	Study Group (N=30)		Control Group (N=30)		Independent t-test statistics		
		M.S	SD	M.S	SD	t-test value	df	P Value& Sig
1. Before administering oxygen therapy	pre	12.30	.803	12.5	1.717	0.51	58	0.610 (NS)
	post	19.20	.188	12.4	1.832	10.07	58	0.000 (HS)
2. During administering oxygen therapy	pre	21.83	.743	21.5	2.487	0.39	58	0.695 (NS)
	post	31.63	.445	20.9	2.482	11.54	58	0.000 (HS)
3. After administering oxygen therapy	pre	9.37	.159	9.3	1.149	0.22	58	0.824 (NS)
	post	12.23	.832	9.3	1.149	7.42	58	0.000 (HS)

M.S= mean of score, SD=standard deviation, df=degree of freedom, NS= Non-significant at (P ≥ 0.05), HS= highly significant at (P ≤ 0.001).



**Figure (2) Level of nurse`s Practice domains toward Oxygen Therapy \*Level of assessment:(1-1.66) = Low ;(1.67-2.33) = Moderate; (2.34-3.00) = High.**

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