

(Effectiveness of an Educational Program upon nurses' knowledge toward The Continuous Positive Airway Pressure (CPAP) Machine in Neonatal Intensive Care Unit at Al-Diwanyia City Hospitals)

فاعلية برنامج تعليمي لمعلمي التمريض في استخدام جهاز ضغط المجرى الهوائي الايجابي المستمر في وحدة العناية المركزية لحديثي الولادة في مستشفى مدينة الديوانية

*Dr. Afifa Radha Aziz, ** Murtadha Abbas Abdul-Hamza

* Assist Prof, Pediatric Nursing Department, College of Nursing/ University of Baghdad, E: mail afifa Redha
** MSc Student, Pediatric Nursing, Ministry of health, Al-Diwanyia Health Directorate/AL-Hamza General Hospital.

Abstract- Objectives: To assess nurses' knowledge toward The Continuous Positive Airway Pressure (CPAP) Machine in Neonatal Intensive Care Unit at Al-Diwanyia City Hospitals and to find out the relationships between the nurses' knowledge concerning The Continuous Positive Airway Pressure (CPAP) Machine in Neonatal Intensive Care Unit and socio-demographic information.

METHODOLOGY: a descriptive study was carried out at Neonatal Intensive Care Unit at Al-Diwanyia City Hospitals During the period from December 26th -2016 to the 15th of May -2017. A non-probability (purposive) sample of (24) nurses, who worked at Neonatal Intensive Care Unit at Al-Diwanyia City Hospitals. The tool of the study included a questionnaire, which has five main parts. The Reliability of questionnaire was determined through internal consistency and through a pilot study, and the content validity of the questionnaire was determined through an expert panel. The data were analyzed through the application of descriptive frequencies, percentages, mean of score and the inferential statistical analysis: F-test, T-test and ANOVA.

RESULTS: The study revealed that there is statistical significant association between nurses' level of education and nurses' years of services in NICU and their knowledge toward The Continuous Positive Airway Pressure (CPAP) Machine at (post-2) of educational program follow up (p value > 0.05). There is no statistical significant association between nurses' age, nurses' gender, years of service in nursing field, nurses' training course and their knowledge toward The Continuous Positive Airway Pressure (CPAP) Machine at (pretest, post-1 and post-2). The present study concluded that high percentage of staff nurses were graduate junior high nursing and most of them had been participated in training courses about CPAP.

CONCLUSIONS:(1) Most study sample was females. (2) Mostly the ages of study sample were (25-29) Year. (3) A High percentage of the sample had been participated in training courses about CPAP. (4) Highly significant differences between the two periods (pre and post-1 tests) of study sample in all domains of (toward The Continuous Positive Airway Pressure (CPAP) Machine in Neonatal Intensive Care Unit).

RECOMMENDATION: (1) The study recommended the necessity to develop the nurses' skills. (2) Policy should be initiated to providing a special educational course about Neonates with Continuous Positive Airway Pressure (CPAP) Machine.

I. INTRODUCTION

The Continuous Positive Airway Pressure is a technique of airway management in which Positive intrapulmonary pressure is applied artificially to the airways, whereby distending pressure is created in the alveoli in a spontaneously breathing baby throughout the respiratory cycle. Continuous Positive Airway Pressure (CPAP) is a noninvasive method for applying a constant distending pressure level (above atmospheric) during inhalation and exhalation to support spontaneously breathing newborn infants with lung disease. CPAP is an "open-lung approach" used to manage newborn infants predisposed to developing airway instability, edema, and atelectasis⁽¹⁾. It is applied when the infant is breathing spontaneously. It can be applied by nasal prongs or nasopharyngeal prongs. Nasal prongs constitute a simple system for application of CPAP. Mouth leak provides pressure pop off but introduces variation in level of CPAP. This system requires high flow of oxygen. Nasopharyngeal prongs are as endotracheal tube inserted through nose to hypopharynx. The length and diameter of any long prong in CPAP system increases resistance and work of breathing. It is very useful in postoperative high-risk infant with severe nonhypercapnic oxygenation failure and avoids reintubation⁽²⁾. The use of early NCPAP, showing that CPAP initiated in the delivery room decreases the need for intubation and lowers the risk of other comorbidities of prematurity such as IVH, NEC, or prolonged oxygen delivery. This applies to all but the smallest premature infants (less than 25 wG) and thus should be considered as respiratory support prior to intubation for all patients with suspected RDS. Other studies have supported extubation and NCPAP immediately after surfactant delivery, showing that it prevents later need for MV the use of NCPAP can use it to help decrease the need for prolonged ventilatory support for patients with RDS and potentially decrease the incidence of

chronic lung disease (CLD) ⁽³⁾. Among more than 130 million births per year globally, approximately ten percent of newborns require some form of intervention immediately at birth. It is estimated that 25% of approximately 4 million neonatal deaths worldwide are secondary to birth asphyxia ⁽⁴⁾. Nasal continuous positive airway pressure (CPAP) is the most widely used non-invasive continuous distending airway pressure modality and a cornerstone of modern neonatal care. Whereas there has been emphasis on understanding which devices and pressure sources best implement CPAP, the optimal duration of this therapy is less well studied. At birth, premature infants have life-threatening anatomic and physiologic immaturities of the respiratory system. CPAP attenuates this pathophysiology until sufficient stability develops and continuous distending pressure is no longer needed ⁽⁵⁾. Non-invasive respiratory support in the neonatal intensive care unit (NICU) has been used for nearly 40 years as a means to reduce complications of invasive mechanical ventilation. Specific types of non-invasive support have been implicated in preventing respiratory failure in spontaneously breathing infants, especially those with Respiratory Distress Syndrome (RDS). Technological progress, along with a better understanding of the applications of equipment, advances in the care of the neonate, and documented favorable patient outcomes have translated into trends that continue to promote non-invasive respiratory support for care of the neonate ⁽⁶⁾.

Objectives of the study

To find out demographic characteristics of nurses like age, gender, level of education ...etc.

To assess nurses' knowledge toward children with continuous positive airway pressure machine.

To assess the effectiveness of an educational program on nurses' knowledge toward The Continuous Positive Airway Pressure machine on study group (pre – posttest).

Finding out the relationship between effectiveness of an educational health program and nurses' general information characteristics such as (age, gender, nurses' educational level, years of experience in hospitals and years of experience at respiratory care unit).

II. METHODOLOGY

Administrative Arrangement:-After getting the approval of the council of Nursing College for the study, the researcher submitted a detailed description including the objectives and methodology of the study to the Ministry of Planning (Central Statistical Organization and to the Al-Diwanyia Health

Directorate (Training and Development department) in order to obtain an official permission.

SETTING OF THE STUDY: To obtain a comprehensive data, the study was conducted in selected hospitals in Al-Diwanyia City, where Neonatal Intensive Care Units are available at the following Pediatric Teaching Hospitals: AL-Hussein Pediatric Hospital and The Pediatric and Maternity Teaching Hospital in Al-Diwanyia city, Iraq. The study was carried out during the period from (26December 2016 to 15 May 2017).

DESIGN OF THE STUDY: A (quasi experimental) study was carried out to assess the Effectiveness of an Educational Program on nurses' knowledge toward The Continuous Positive Airway Pressure (CPAP) Machine in Neonatal Intensive Care Unit.

THE SAMPLE OF THE STUDY: A non-probability (purposive) sample of (24) nurses was chosen. All of them working in Neonatal Intensive Care Units (NICU) at Pediatric Teaching Hospitals.

THE STUDY INSTRUMENTS: For the purpose of the present study, a questionnaire was conducted by the researcher, The questionnaire was used before and after conducting a special program designed to increase the knowledge of the sample, Scale of the questionnaire is (Yes or No)(36 questions) the correct answer code was (2) and the wrong answer code was (1) . The study instrument consisted of (5) parts. Part I: Socio-demographic information of the nurses. Part II: General information about Continuous Positive Airway Pressure (CPAP) Machine: It consists of (7) items. Part III: Nurses' knowledge about the Uses of (CPAP) Machine for premature babies and newborns. It included (10) items. Part IV: Nurses' knowledge about the Contraindications for using of the (CPAP) Machine for newborn and premature infants. It included (11) items. V: Nurses' knowledge about the Fundamentals for using CPAP Machine and The sign for (CPAP) failure in the treatment of respiratory distress syndrome. It included (8) items.

DATA COLLECTION: The data were collected after conducting a pretest questionnaire, applying the program then the posttest by the personal direct intervention of the researcher. The data collection process was performed for the period from the 8th January until the 2nd of March 2016.

STATISTICAL ANALYSIS: The following statistical data were obtained by using the analysis approach (SPSS) to analyze and assess the data of the study Descriptive Data Analysis and Inferential statistical analysis that include F test, T test and ANOVA.

III. RESULTS

Table(1): Distribution of the Study Sample According to their Sociodemographic Characteristic.

Variables	No.	%	
Ages (years)	20-24 years	6	25
	25-29 years	12	50
	30-34 years	4	16.7
	35-39 years	1	4.2
	40 years and more	1	4.2

	Total	24	100
Gender	Male	11	45.8
	Female	13	54.2
	Total	24	100
Level of education	graduate nursing Course	-	-
	Graduate Nursing school	2	8.3
	graduate Junior high nursing	10	41.7
	Graduate Institute of Nursing	8	33.3
	Graduate of the College of Nursing and over	4	16.7
	Total	24	100
Years of service	1-5 years	16	66.7
	6-10 years	5	20.8
	11-15 years	2	8.3
	16-20 years	1	4.2
	21 years and more	-	-
	Total	24	100
Years of experience in neonatal intensive care unit	1-5 years	18	75
	6-10 Years	6	25
	11-15 Years	-	-
	16 years and more	-	-
	Total	24	100
Training course about CPAP	Yes	15	62.5
	No	9	37.5
	Total	24	100
No. of training course	1-2	10	66.7
	3-4	5	33.3
	5-6	-	-
	7 and more	-	-
	Total	15	100

No. = number, %= percentage

This table (1) shows that 50% of the study sample was between (25-29) years of age, females were 54.2%, 41.7% had graduate Junior high nursing, 66.7% had (1-5) years of services, 75% of them had (1-5) years of experience in neonatal intensive care unit, 62.5% of them participated in intensive care courses for newborn, from the 15 nurses who participated in intensive care courses for newborn 66.7% of them had (1-2) courses.

Table (2): Distribution the Levels of Assessment through the "Mean of Score" Among the Three Period (Pre, Post-1 and Post-2) for Nurses' Knowledge of the Study Sample

Period	Level of Assessment	Frequency	Percent
Pre-test	(1.00 - 1.33) Low	24	100
	(1.34 – 1.67)Moderate	-	-
	(1.68 – 2.00) High	-	-
	Total	24	100
	$\bar{x} \pm S. D$	1.16±0.014	
Post 1-test	(1.00 - 1.33) Low	-	-
	(1.34 – 1.67)Moderate	-	-
	(1.68 – 2.00) High	24	100
	Total	24	100

	$\bar{x} \pm S. D$	1.84±0.024	
Post 2-test	(1.00 - 1.33) Low		
	(1.34 – 1.67)Moderate		
	(1.68 – 2.00) High	24	100
	Total	24	100
	$\bar{x} \pm S. D$	1.9158±0.008	

$\bar{x} \pm S. D.$ =Arithmetic Mean (\bar{x}) and Std. Dev. (S.D.)

This table shows low level of assessment to the mean of score 24 (100%) of suggested group of assessment (1.00-1.33) for pre-test of study sample with mean score and standard division (1.16±0.014). This table Also, shows high level of assessment to the mean of score 24 (100%) of suggested group of assessment for the high level (1.68-2.00) for post-1 test of study sample, with mean score and standard division (1.84±0.024) and 24 (100%) of suggested group of assessment for the high level (1.68–2.00) for post-2 test of study sample, with mean score and standard division (1.9158±0.008).

Table (3): Comparison Significant Among the Three Period (Pre, Post-1 and Post-2) for Nurses’ Knowledge toward the Continuous Positive Airway Pressure (CPAP) Machine in the Neonatal Intensive Care Unit of the Study Sample

Over all items	Periods		Matched Paired t-test	Sig. P- value	C.S.
Over all responding	Pre test	Post-1	-1.2	0.000	HS
		Post-2	-2.414	0.000	HS
	Post-1	Post-2	-12.037	0.000	HS

C.S.: Comparison Significant, NS: Non Significant at $P \geq 0.05$, S: Significant at $P < 0.05$, HS: Highly Significant at $P < 0.01$

This table shows that there is a highly significant different at $P < 0.01$ between the initial period of pre time and post-1, then followed with a highly significant different at $P < 0.01$ between the initial period of pre time and post-2, and finally a highly significant different at $P < 0.01$ between the initial period of post-1 and post-2.

Table (4): Distribution and Association of Nurses' Knowledge with Their Age.

Variables	Nurses' Knowledge			
	No.	Pre-test Mean ± S.D.	Post 1 Mean ± S.D.	Post 2 Mean ± S.D.
20-24	6	1.16±0.015	1.83±0	1.92±0.00
25-29	12	1.16±0.014	1.84±0.029	1.91±0.009
30-34	4	1.15±0.017	1.87±0.015	1.91±0.01
35-39	1	1.17±0	1.83±0	1.92±0.00
40 and more	1	1.17±0	1.86±0	1.9±0.00
Total	24	1.16±0.014	1.84±0.024	1.9158±0.008
		F =0.389 d.f.= 4 P = 0.814	F =1.853 d.f.= 4 P =0.16	F =1.517 d.f.= 4 P = 0.237

$\bar{x} \pm S. D.$ =Arithmetic Mean (\bar{x}) and Std. Dev. (S.D.), No. = Number of frequencies, F = Fisher test, d.f. = degree of freedom, P = probability value.

This table shows that there is no statistical significant association between nurses' age and their knowledge concerning CPAP machine at (pretest, post-1 and post-2) of educational program follow up(p value > 0.05),there are no differences between age groups and mean of knowledge when analyzed ANOVA .

Table (5): Distribution and Association of Nurses' Knowledge with Their Gender.

Variables	Nurses' Knowledge			
Gender	No.	Pre-test Mean ± S.D.	Post 1 Mean ± S.D.	Post 2 Mean ± S.D.
Male	11	1.16±0.014	1.85±0.025	1.9145±0.009
Female	13	1.16±0.014	1.84±0.022	1.9169±0.007
Total	24	1.16±0.014	1.84±0.024	1.9158±0.008
		F =0.032 d.f.= 1 P = 0.859	F = 2.969 d.f.=1 P = 0.099	F =0.478 d.f.= 1 P = 0.496

$\bar{x} \pm S.D.$ = Arithmetic Mean (\bar{x}) and Std. Dev. (S.D.), No. = Number of frequencies, F = Fisher test, d.f. = degree of freedom, P = probability value.

This table shows that there is no statistical significant association between nurses' gender and their knowledge concerning CPAP machine at (pretest, post-1 and post-2) of educational program follow up(p value > 0.05), there are no differences between gender and mean of knowledge when analyzed ANOVA

Table (6): Distribution and Association of Nurses' Knowledge with Their Level of Education.

Variables	Nurses' Knowledge			
Level of Education	No.	Pre-test Mean ± S.D.	Post 1 Mean ± S.D.	Post 2 Mean ± S.D.
graduate of the School of Nursing	2	1.15±0.021	1.84±0.035	1.91±0.014
graduate Junior high nursing	10	1.16±0.015	1.84±0.028	1.92±0.00
Graduate Institute of Nursing	8	1.17±0	1.84±0.017	1.91±0.01
Graduate of the College of Nursing and over	4	1.15±0.17	1.87±0.015	1.92±0.00
Total	24	1.16±0.014	1.84±0.024	1.9158±0.008
		F =1.809 d.f. = 3 P =0.178	F = 1.88 d.f.= 3 P = 0.165	F = 3.889 d.f.=3 P =0.024

$\bar{x} \pm S.D.$ = Arithmetic Mean (\bar{x}) and Std. Dev. (S.D.), No. = Number of frequencies, F = Fisher test, d.f. = degree of freedom, P = probability value.

This table shows that there is statistical significant association between nurses' level of education and their knowledge concerning CPAP device at post-2 of educational program (p value < 0.05). There is no statistical significant association between nurses' level of education and their knowledge concerning CPAP device at (pretest and post-1) of educational program (p value > 0.05).

Table (7): Distribution and Association of Nurses' Knowledge with Their years of service.

Variables	Nurses' Knowledge			
years of service	No.	Pre-test Mean ± S.D.	Post 1 Mean ± S.D.	Post 2 Mean ± S.D.

1-5 years	16	1.16 ±0.13	1.84±0.025	1.917±0.006
6-10 years	5	1.16 ±0.16	1.85±0.025	1.912±0.01
11-15 years	2	1.15±0.021	1.85±0.021	1.92±0.00
16-20 years	1	1.17±0.0	1.86±0	1.9±0.00
Total	24	1.16±0.014	1.84±0.024	1.9158±0.008
		F = 0.366 d.f. = 3 P = 0.778	F = 0.578 d.f. = 3 P = 0.636	F = 2.279 d.f. = 3 P = 0.111

$\bar{x} \pm S.D.$ = Arithmetic Mean (\bar{x}) and Std. Dev. (S.D.), No. = Number of frequencies, F = Fisher test, d.f. = degree of freedom, P = probability value, < = Less than, ≥ = equal and more.

This table shows that there is no statistical significant association between nurses' years of services and their knowledge concerning CPAP device at (pretest, post-1 and post-2) for educational program follow up (p value > 0.05), there are no differences between years of service in nursing field and mean of knowledge when analyzed by ANOVA.

Table (8): Distribution and Association of Nurses' Knowledge with Their years of service in NICU.

Variables	Nurses' Knowledge			
	No.	Pre-test Mean ± S.D.	Post 1 Mean ± S.D.	Post 2 Mean ± S.D.
years of service in NICU				
1-5 years	18	1.16 ±0.14	1.84±0.024	1.917±0.006
6-10 years	6	1.16 ±0.15	1.85±0.023	1.91±0.01
Total	24	1.16±0.014	1.84±0.24	1.9158±0.008
		F = 0.062 d.f. = 1 P = 0.806	F = 1.747 d.f. = 1 P = 0.2	F = 4.568 d.f. = 1 P = 0.044

$\bar{x} \pm S.D.$ = Arithmetic Mean (\bar{x}) and Std. Dev. (S.D.), No. = Number of frequencies, F = Fisher test, d.f. = degree of freedom, P = probability value, < = Less than, ≥ = equal and more.

This table shows that there is statistical significant association between nurses' years of services in NICU and their knowledge concerning CPAP device at post-2 of educational program (p value < 0.05). There is no statistical significant association between nurses' years of services in NICU and their knowledge concerning CPAP device at (pretest and post-1) of educational program (p value > 0.05).

Table (9): Distribution and Association of Nurses' Knowledge with Their Training course about CPAP.

Variables	Nurses' Knowledge			
	No.	Pre-test Mean ± S.D.	Post 1 Mean ± S.D.	Post 2 Mean ± S.D.
Training course about CPAP				
Yes	15	1.16±0.015	1.85±0.024	1.917±0.007
No	9	1.17±0.01	1.84±0.025	1.91±0.01
Total	24	1.16±0.014	1.84±0.024	1.9158±0.008

		F = 2.301 d.f.= 1 P = 0.144	F = 1.663 d.f. = 1 P = 0.211	F = 1.326 d.f. = 1 P = 0.262
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$\bar{x} \pm S. D.$ = Arithmetic Mean (\bar{x}) and Std. Dev. (S.D.), No. = Number of frequencies, F = Fisher test, d.f. = degree of freedom, P = probability value, \geq = equal and more.

This table shows that there is no statistical significant association between nurses' training course and their knowledge concerning CPAP device at (pretest, post-1 and post-2) for educational program follow up (p value > 0.05), there are no differences between years of service in nursing field and mean of knowledge when analyzed by ANOVA.

IV. DISCUSSION

The data analysis of the present study as shown in Table (1) of the sociodemographic variables reveal that the majority of the participants age that 12 (50%) in the study sample were within (25-29) years, this results supported by Otheeb, (2016) study (Assessment of Nurses' Knowledge and Practices toward Isolation Techniques among Children with Hepatitis at Pediatric Teaching Hospitals in Baghdad City). who mentioned that most of his study sample were within (20-29) years⁽⁷⁾. Concerning to the nurses' gender, most of nurses in the study sample were female 13 (54.2 %) these results supported by Obaid et al., (2016) study (Nurses' Knowledge Concerning Neonatal Sepsis In Neonatal Intensive Care Units At Pediatric Teaching Hospitals In Baghdad City), who mentioned that the most of his study sample was female 40 (70%)⁽⁸⁾. In regard to the level of education, most of nurses 10 (41%) in the study sample were graduate Junior high nursing working in the Neonatal Intensive Care Unit, these results agree with Al-Jubouri, (2014) study (Assessment of Nurse's Knowledge about Nosocomial Infection at Hospitals in Baghdad City)⁽⁹⁾. In relation to the number of years of experiences in nursing field 16 (66%) of nurses in the study sample had services of (1-5) years in the employment, As for years of experience in Neonatal Intensive Care Unit 18 (75%) of nurses had expert ≥ 1 years of provide in care for children, these results agree with Hammod, (2016) in her study (Effectiveness of an Educational Program on Nurses Knowledge Concerning Complications Prevention of Mechanical Ventilation at Intensive Care Unit in Al- Hussein Teaching Hospital at Nasiriya City). who mentioned that most of her study sample had experience 1-4 years were 17 (68.0%)⁽¹⁰⁾. The results of the study also reveals that nurses participants in session of Continuous Positive Airway Pressure (CPAP) machine training (37%) who did not having training sessions This results supported by Al- Ftawy, (2011) in his study (Determination of Nurses' knowledge Toward Care Provided to Patients with Acute Myocardial Infarction in Al-Najaf City). Who mentioned that 18 (47.4%) who did not have training sessions⁽¹¹⁾. The findings of the study sample showed that there is statistical significant association between nurses' level of education and nurses' years of services in NICU and their knowledge toward The Continuous Positive Airway Pressure (CPAP) Machine at (post-2) of educational program follow up (p value > 0.05). There is no statistical significant association between nurses' age, nurses' gender, years of service in nursing

field, nurses' training course and their knowledge toward The Continuous Positive Airway Pressure (CPAP) Machine at (pretest, post-1 and post-2).

V. CONCLUSIONS

Most study sample were females, Mostly the ages of study sample were (25-29) Years, a High percentage of the sample had been participate in training courses about CPAP Machine. Highly significant differences between the two periods (pre and post-1 tests) of study sample in all domains of (nurses' information toward The Continuous Positive Airway Pressure Machine in the Neonatal Intensive Care Unit).

VI. RECOMMENDATIONS

Nurses must participate in training course about CPAP inside or outside Iraq. The study recommended the necessity to develop the nurses' skills. In addition, Policy should be initiated to providing a special educational course about Neonates with Continuous Positive Airway Pressure (CPAP) Machine.

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AUTHORS

First Author – Dr. Afifa Radha Aziz, Assist Prof, Pediatric Nursing Department, College of Nursing/ University of Baghdad, E: mail afifa Redha afifa50@yahoo.com

Second Author – Murtadha Abbas Abdul-Hamza, MSc Student, Pediatric Nursing, Ministry of health, Al-Diwanyia Health Directorate/AL-Hamza General Hospital.