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RESEARCH ARTICLE

Evaluation of Nurses' Practice about Neonatal Continuous Positive Airway Pressure (CPAP) Nasal Injuries at Neonatal Intensive Care Unit

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ABSTRACT

Background: *Preterm birth (PTB) is a worldwide health problem and remains the leading cause of prenatal morbidity and mortality. In industrialized countries, preterm delivery is responsible for 70% of mortality and 75% of morbidity cases during the neonatal period, contributing to significant long-term neurodevelopment problems, pulmonary dysfunction, and visual impairment.*

Objective: *Evaluation of nurses' practice about Neonatal Continuous Positive Airway Pressure (CPAP) Nasal Injuries at Neonatal Intensive Care Unit.*

Methodology: *A Descriptive cross-sectional study, quantitative research has been carried throughout the present study to evaluate their management about nasal injury related to CPAP at neonates' intensive care units in hospitals of Medical City director in Baghdad and it examined the type of relationship between variables. During the period from 3rd October 2021 to 15th May 2022.*

Results of the study: *Results that observed responses of high evaluated generally assigned, and they are accounted 9(45.0%) items, while leftover items were assigned moderate evaluation 7(35.0%), and low evaluation 4(20.0%).*

Conclusion: *Practices in concerning nursing management about neonatal continuous positive airway pressure (CPAP) nasal injuries at neonatal intensive care unit does not came at the level in which that achieving goal of this study.*

Recommendations: *Continuous follow-up of nurses' practices on caring for a newborn with continuous positive air pressure.*

Keywords: *Nurses' Practice, Neonatal Continuous Positive Airway Pressure (CPAP), Nasal Injuries, Neonatal Intensive Care Unit.*

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INTRODUCTION

Continuous Positive Airway Pressure (CPAP) is a noninvasive approach for supporting spontaneously breathing newborn infants with lung illness by delivering a continuous distending pressure level (above atmospheric) throughout intake and expiration. CPAP is a "open-lung technique" used to treat newborn infants at risk for airway instability, edema, and atelectasis. CPAP is used to treat hypoxemia in newborns with acute respiratory failure. It allows for a larger inspired oxygen content than conventional oxygen supplementation techniques, raises mean airway pressure, and improves ventilation to collapsed lung regions. The recruitment of under ventilated lung is comparable to the use of positive end expiratory pressure (PEEP) in mechanically ventilated patients who are intubated (Aziz & Abdul-Hamza, 2017).

Neonates are newborn infants aged 0 to 28 days. The infant mortality rate is 19 per 1,000 births. Respiratory diseases are one of the common causes of newborn mortality. To lower the risk of death in neonates with respiratory distress, CPAP treatment should be made simpler and less expensive. The use of CPAP decreased the rate of mechanical ventilation from 12.3 per 1000 births to 11.8 per 1000 births and decreased the duration of newborn care in the neonatal intensive care unit (NICU) room. NICU is an intensive care unit for babies at high risk who require particular care or action, including the use of mechanical breathing devices, the administration of certain medications under constant medical monitoring, and the support of high-tech equipment (Irtanti & Utami, 2019).

Preterm birth (PTB) is the major cause of prenatal morbidity and death on a global scale. In developed nations, preterm birth accounts for 70 percent of newborn mortality and 75 percent of neonatal morbidity, contributing to major neurodevelopmental issues, pulmonary dysfunction, and visual impairment. Prematurity is a significant public health issue and a primary cause of newborn death. Premature birth is a global occurrence. Approximately 24 million low birth weight newborns are born each year, according to estimates (Mohammed & Alsawaf, 2016).

Premature newborns are at risk for respiratory disfortune syndrome (RDS), a complex lung condition. Aborted fetuses can be able to breathe or have a bad gas career for a few hours after the commencement of treatment unless high-quality care is provided. Due to RDS's lack of pulmonary surfactant, a lipoprotein combination is needed to reduce air-liquid surface tension and prevent broad atelectasis in the alveolar ducts and alveoli, which is the primary cause of the disease (Abdul Alridh et al., 2019).

One of the causes of birth asphyxia is preterm lungs that lack sufficient surfactant to function properly. Triggers in the mother, the placenta, or the fetus might all play a role (Yousef & Hasan, 2020). RDS is now being administered by one or a combination of the following: Non-invasive respiratory support methods include nasal CPAP (continuous positive airway pressure) and noninvasive intermittent positive airway pressure (NIPPV) (Saad, 2019).

RDS is a leading cause of infant death and morbidity in 44% of infants weighing 500-1500g and 50% of those delivered before the 30th week of pregnancy. Treatment for RDS in preterm newborns involves replacing the surfactant and addressing the underlying causes of hypoxia, hypercapnia, and metabolic acidosis. Even at 70 percent oxygen concentration, there is an indication of (CPAP) in RDS therapy if the partial oxygen pressure is less than 50 mmHg. NCPAP therapy has reduced the need for intubation and invasive ventilation in RDS patients (Gökdoan & leri, 2018) because of its widespread early usage.

The most common admission to (NICU) is due to respiratory problems. The causes of respiratory distress are (RDS), transient tachypnea of the newborn (TTN), meconium aspiration syndrome (MAS) and pulmonary infection. The most commonly used treatment for supporting the respiration of a newborn and the first-preferred treatment option at the third level NICU is (CPAP) administration (Abou-Faddan & Abdelaziz, 2018).

METHOD

Design

A Descriptive cross-sectional study, quantitative research has been carried throughout the present study to evaluate their management about nasal injury related to CPAP at neonates' intensive care units in hospitals of Medical City director in Baghdad and it examined the type of relationship between variables. During the period from 3rd October 2021 to 15th May 2022

Ethical Approvals

The researcher first presented the research proposal to the Department of pediatric Health Nursing committee in the College of Nursing – The University of Bagdad to review and approve it. Subsequently, the researcher attained the approval of the Ministry of Planning and

Development/ The Central Organization of Statistics for the acceptance of the questionnaire draft.

Population and Sample

The research sample includes (60) nurses working at neonates' intensive care units. They are selected by using non-probability sampling (purposive sample). 60 nurses from different educational level and occupation from hospitals of medical city who had met the specific inclusion criteria are invited to participate in the study. Permission to administer the survey was obtained. Participation in the survey is voluntary. All responses are anonymous and not linked to any identifiable data. The participants had to select affirmatively to continue to participate in the survey.

Data Collection

A self-reported questionnaire is used in the study to collect the nurses knowledge & observation method used to collect the data related nurses practices. Observation methods done by observe each participant in three different times. The data is collected through the utilization of the developed questionnaire (Arabic version). The process of gathering information was conducted from 20th January 2022 to 10th April 2022.

Statistical Analysis

The following statistical data analysis approaches were used in order to analyze and assess the results of the study under application of the statistical package (SPSS) ver. (22.0).

RESULTS

Practices part, in concerning nursing management about neonatal continuous positive airway pressure (CPAP) nasal injuries at neonatal intensive care unit relied entirely on the guidance of a prepared questionnaire in order to evaluation of the level of practices of nursing staff, where the practices domain consist 20 items, of setting remote frequency view scale as presented at the beginning of the presentation to display the results of the essential components.

Table (4-2-2) shows descriptive statistics of practices main domain's items, such as, frequencies and percentages, mean of score, standard deviation, relative sufficiency, as well as evaluation for the observed responding through using preceding intervals. Results that observed responses of high evaluated generally assigned, and they are accounted 9(45.0%) items, while leftover items were a assigned moderate evaluation 7(35.0%), and low evaluation 4(20.0%).

Table 1

Descriptive Statistics of the studied group according to Practices items with comparisons significant

Practices items	Resp.	No.	%	MS	SD	RS%	Ev.
1. The nurse washes hands before starting work	No	10	16.7	1.57	1.00	52.33	M
	One trial	18	30				
	Two trials	20	33.3				
	Three trials	12	20				
2. The nurse sanitizes hands before providing nursing care	No	2	3.3	2.37	0.80	79.00	H
	One trial	6	10				
	Two trials	20	33.3				
	Three trials	32	53.3				
3. The nurse wears medical gloves	No	10	16.7	1.80	1.05	60.00	M
	One trial	10	16.7				
	Two trials	22	36.7				
	Three trials	18	30				

4. The nurse prepares the CPAP device, connects it to oxygen and medical air and connects it to electricity	No	0	0	2.75	0.44	91.67	H
	One trial	0	0				
	Two trials	15	25				
	Three trials	45	75				
5. The nurse prepares the humidifier and observes the level of sterile water within the required limits and the temperature of the humidifier is 37 ° C	No	2	3.3	1.70	0.70	56.67	M
	One trial	20	33.3				
	Two trials	32	53.3				
	Three trials	6	10				
6. The nurse chooses the correct hat size	No	0	0	2.17	0.76	72.33	H
	One trial	13	21.7				
	Two trials	24	40				
	Three trials	23	38.3				
7. The nurse chooses the correct (prongs/mask) size	No	0	0	1.98	0.65	66.00	M
	One trial	13	21.7				
	Two trials	35	58.3				
	Three trials	12	20				
8. The nurse puts on the hat prior to connecting the infant's to the air generator	No	0	0	2.68	0.50	89.33	H
	One trial	1	1.7				
	Two trials	17	28.3				
	Three trials	42	70				
9. The nurse attaches (prongs/mask) to the air generator before connecting it to the infant's	No	0	0	2.37	0.52	79.00	H
	One trial	1	1.7				
	Two trials	36	60				
	Three trials	23	38.3				
10. The nurse moistens the nasal prongs with lubricant before placing it on the infant's nose	No	42	70	0.37	0.61	12.33	L
	One trial	14	23.3				
	Two trials	4	6.7				
	Three trials	0	0				
11. The nurse keep a small space between the tip of the septum and the bridge between the prongs	No	17	28.3	0.92	0.72	30.67	L
	One trial	32	53.3				
	Two trials	10	16.7				
	Three trials	1	1.7				
12. The nurse securing the prongs/mask using the straps from the generator horizontally	No	0	0	2.70	0.46	90.00	H
	One trial	0	0				
	Two trials	18	30				
	Three	42	70				

across the infant's cheeks	trials						
13. The nurse secures the tubes coming from the air generator using Velcro strip on the hat	No	0	0	2.48	0.54	82.67	H
	One trial	1	1.7				
	Two trials	29	48.3				
	Three trials	30	50				
14. The infant's eyes are clearly visible without any of the mask or hat touching them	No	0	0	2.53	0.54	84.33	H
	One trial	1	1.7				
	Two trials	26	43.3				
	Three trials	33	55				
15. The nurse alternate between prong and mask and relieving pressure from the nose and face every 2-4 hours with a massage	No	21	35	0.78	0.67	26.00	L
	One trial	31	51.7				
	Two trials	8	13.3				
	Two trials	0	0				
16. The nurse puts the orogastric tube for the infant's and leaves it open	No	0	0	1.90	0.73	63.33	M
	One trial	19	31.7				
	Two trials	28	46.7				
	Three trials	13	21.7				
17. The nurse elevate the head of the bed about 30 degrees and puts a roll under the neck to maintain the comfort and correct position of the infant's	No	8	13.3	1.20	0.68	40.00	M
	One trial	33	55				
	Two trials	18	30				
	Three trials	1	1.7				
18. The nurse cleans the infant's nose from the inside (Nasal wash)	No	13	21.7	1.10	0.75	36.67	M
	One trial	29	48.3				
	Two trials	17	28.3				
	Three trials	1	1.7				
19. The nurse using tetracycline ointment after a nasal injury to treat dermatitis	No	16	26.7	0.95	0.70	31.67	L
	One trial	31	51.7				
	Two trials	13	21.7				
	Three trials	0	0				
20. The nurse frequently monitors the infant's and observes the correct attachment of the CPAP device to prevent nasal injury	No	0	0	2.07	0.61	69.00	H
	One trial	9	15				
	Two trials	38	63.3				
	Three trials	13	21.7				

Ev. : Evaluation: (0.00 – 33.33) Low; (33.34 – 66.66) Moderate ; (66.67– 100) High.

DISCUSSION

According to nurses' CPAP-related nasal injury practices in table 1, the results indicate that nurses have a moderate level of practice related hand washing before working and wearing gloves; the nurse prepares the humidifier and observes the level of sterile water within the required limits and the temperature of the humidifier is 37 ° C; the nurse selects the correct (prongs/mask) size; the nurse places the orogastric tube for the infant and leaves it open; and the nurse elevates thoracic positioning (nasal wash).

High level of practice regarding the items for the nurse sanitizes hands prior to providing nursing care, the nurse prepares the CPAP device, connects it to oxygen and medical air, and connects it to electricity, the nurse can choose the appropriate hat size, the nurse puts on the hat prior to trying to connect the infant's to the air generator, the nurse attaches (prongs/mask) to the air generator prior to connecting it to the infant, and the nurse secures the prongs/

Low level of practice regarding the following: the nurse moistens the nasal prongs with lubricant prior to actually placing it on the infant's nose, the nurse leaves a small space between the tip of the septum and the bridge between the prongs, the nurse alternates between prong and mask and relieves pressure from the nose and face every 2-4 hours with a massage, and the nurse uses tetracycline ointment to treat dermatitis after a nasal injury.

In table 1, the results revealed that nurses have strong knowledge and moderate practices, and by the percentile global mean of score, the results are considered as a high border to a moderate level for a mixed evaluation.

Tiryaki and Cinar (2016) found in their research (Management of Continuous Positive Airway Pressure in the Newborn: Impact of Lecture-based Interactive Workshops on Training for Neonatal Intensive Care Nurses). They discovered that nurses were inadequately managing Continuous Positive Airway Pressure in the Newborn. Our finding was contradicted by this finding.

In descriptive study (Assessment Nursing Care in Neonatal Respiratory Distress Syndrome for Nurses at Intensive Care Unit in AL- Nasiriyah City Hospitals). The findings revealed that nurses' practices regarding observation and monitoring of child care, as well as child management and nursing care, were inadequate, resulting in inadequate nursing care for newborn respiratory distress syndrome (Mansi, & Aziz, 2017).

CONCLUSIONS

Practices in concerning nursing management about neonatal continuous positive airway pressure (CPAP) nasal injuries at neonatal intensive care unit does not came at the level in which that achieving goal of this study. While, concerning nursing management about neonatal continuous positive airway pressure (CPAP) nasal injuries at neonatal intensive care unit does not came at the level in which that achieving goal of this study compared to the results of the evaluation process that came from the knowledge part.

RECOMMENDATIONS

Continuous follow-up of nurses' practices on caring for a newborn with continuous positive air pressure. Continuous follow-up of nurses' practices on caring for a child with persistent positive airway pressure complications.

ETHICAL CONSIDERATIONS COMPLIANCE WITH ETHICAL GUIDELINES

This study was completed following obtaining consent from the University of Baghdad.

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AUTHOR'S CONTRIBUTIONS

Study concept, Writing, Reviewing the final edition by all authors.

DISCLOSURE STATEMENT:

The authors report no conflict of interest.

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