

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

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ABSTRACT

Background: One of the most unpleasant and painful NCPAP related complication is the risk of nasal skin breakdown. It commonly occurs on areas under high pressure of nasal interface, mostly on the nasal bridge but can take place at any area under pressure of mask or prong which are used to connect the ventilation system to the patient's nose.

Objective: Evaluation of nurses' knowledge 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 27(81.82%) items, while leftover items were a assigned moderate evaluation 5(15.15%), and low evaluation 1(3.03%).

Conclusion: In concerning nursing management about neonatal continuous positive airway pressure (CPAP) nasal injuries at neonatal intensive care unit are assigned at the established level in which that achieving goal of this study.

Recommendations: Training courses to increase nurses' knowledge and practices about working on the continuous positive air pressure device.

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

INTRODUCTION

The danger of nasal skin disintegration is one of the complications that are associated with NCPAP that is both uncomfortable and painful. It typically takes place on locations that are subjected to high pressure at the nasal interface, most frequently on the nasal bridge; however, it can take place on any area that is subjected to pressure from the mask or prong that is used to link the ventilation system to the patient's nose³.

Injuries to the nose can be excruciatingly painful, may need a switch in the method or kind of breathing assistance, and in the most severe instances may involve surgical intervention to address nasal abnormalities. There is a wide range of likelihood of nasal damage associated with the use of CPAP in preterm newborns, ranging from 20% to 100%. Hyperemia, nasal snubbing and flaring (upturned nose and swollen nares), scab development, and regions of necrosis are some of the ailments that might occur¹.

Nasal trauma as a result of the use of nasal continuous positive airway pressure (NCPAP) is a regularly documented problem in newborns weighing less than 1500 g at birth and having 32 weeks of gestation. According to Guimares et al² research, preventative interventions should be addressed now that non-invasive respiratory assistance, known as NCPAP, has become the gold standard.

The prevalence rates of nasal injuries across the world range between 20 and 42.5 percent, with those rates ranging between 85 and 100 percent in Brazil. It is projected that 88.4 percent of the newborn services in the Northeastern region of Brazil employ the non-invasive breathing approach, and that the nasal prong is the most common equipment used⁴.

The prevalence of nasal injuries reported to be related with the use of nasal continuous positive airway pressure (NCPAP) ranges from 20 percent to 60 percent. These injuries can be as little as blanching of the nasal tip or as severe as nasal septal necrosis and septal drop. Important risk factors for nasal damage include a younger gestational age, a lower birth weight, and a longer period of nasal continuous positive airway pressure (NCPAP). In addition to the established risk factors, the kind of nasal interface may also be a significant factor in determining whether or not a person sustains a nose injury⁵.

However, continuous positive airway pressure (CPAP) can keep the airways open. Because of this, it is essential that all infants diagnosed with RDS get exceptional supportive care, which consists of the following: gentle handling, maintenance of body temperature, and careful management of fluids. The nurses have a significant part to play in the care of high-risk and preterm newborns; nevertheless, nurses working in the NICU need to be competent and trained through an ongoing education program in order to do their jobs effectively. As a result, it is essential to test the nurses' knowledge regarding the RDS of newborns in order to help them become more knowledgeable and so reduce the risk of RDS-related issues among neonates⁶.

METHODOLOGY

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 OF THE STUDY

Knowledge 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 knowledge of nursing staff, where the knowledge domain consist 33 items, with setting binary nominal dichotomous scales (Yes, and No) with integer numbers (1, 0) in that order, as well as

items of numbers (3, 7, 10, 11, 16, 23) has a reversed scored due to setting score, since the success answered are symbolized with no scale response.

Table (1) shows descriptive statistics, 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 27(81.82%) items, while leftover items were a assigned moderate evaluation 5(15.15%), and low evaluation 1(3.03%).

For summarizing preceding results, it could be concluded that knowledge part, in concerning nursing management about neonatal continuous positive airway pressure (CPAP) nasal injuries at neonatal intensive care unit are assigned at the established level in which that achieving goal of this study.

Table 1: Descriptive Statistics of the studied group according to Knowledge items with comparisons significant

Knowledge Items	Resp.	No.	%	MS	SD	RS%	Ev.
1. Nasal Injury is defined as an injury to the nose or the surrounding areas and is either internal or external	No	1	1.7	0.98	0.13	98	H
	Yes	59	98.3				
2. Nasal Injury divided into three stages: 1- Redness 2- Erosion of the surface of the nose 3- Necrosis of a thick layer of the skin of the nose	No	2	3.3	0.97	0.18	97	H
	Yes	58	96.7				
3. CPAP tubes (circuits) should not be humidified	No	27	45.0	0.55	0.50	55	M
	Yes	33	55.0				
4. Ensure that the humidifier is on and warmed prior to connecting to the infant.	No	1	1.7	0.98	0.13	98	H
	Yes	59	98.3				
5. Sterile water for irrigation is used to fill the chamber	No	3	5.0	0.95	0.22	95	H
	Yes	57	95.0				
6. Don't over-fill the chambers or let them dry out	No	13	21.7	0.78	0.42	78	H
	Yes	47	78.3				
7. Humidification is delivered to the infant at 28°C.	No	30	50.0	0.50	0.50	50	M
	Yes	30	50.0				
8. We use a tape measure to measure the correct hat size for the child	No	2	3.3	0.97	0.18	97	H
	Yes	58	96.7				
9. The measurement of the hat is taken from the base of the neck to the middle of the forehead and back to the base of the neck again	No	21	35.0	0.65	0.48	65	M
	Yes	39	65.0				
10. The hat tape is measured at the circumference of the newborn's head	No	40	66.7	0.33	0.48	33	H
	Yes	20	33.3				
11. Putting the hat on the infant's head after connecting it to the air generator	No	36	60.0	0.40	0.49	40	M
	Yes	24	40.0				
12. Monitor the hat size regularly and change it when there is a loss of elasticity or dirt	No	0	0.0	1.00	0.00	100	H
	Yes	60	100				
13. Use the sizing guide provided by the manufacturer to correctly gauge the size of the prongs/mask needed.	No	1	1.7	0.98	0.13	98	H
	Yes	59	98.3				
14. Attach the prongs/mask to the generator prior to attaching to the infant.	No	7	11.7	0.88	0.32	88	H
	Yes	53	88.3				
15. Putting the nose piece (prongs) positioned correctly so that they are square onto the nose and not tipped at an angle	No	4	6.7	0.93	0.25	93	H
	Yes	56	93.3				
16. We must press the nose piece (prongs) hard against the nasal septum	No	18	30.0	0.70	0.46	70	L
	Yes	42	70.0				
17. Pressing too hard may damage to the lateral walls of the nostrils and the nasal septum	No	4	6.7	0.93	0.25	93	H
	Yes	56	93.3				
18. The masks are placed evenly on the nose to create a seal and minimize gas leak especially to the eyes	No	5	8.3	0.92	0.28	92	H
	Yes	55	91.7				
19. The infant's eyes are clearly visible without any of the mask or hat touching them	No	6	10.0	0.90	0.30	90	H
	Yes	54	90.0				
20. Prongs/mask kept clean, patent and free from obstruction	No	1	1.7	0.98	0.13	98	H
	Yes	59	98.3				
21. Alternate between prong and mask when the infant tolerates this	No	8	13.3	0.87	0.34	87	H
	Yes	52	86.7				

Continue ...

Knowledge Items	Resp.	No.	%	MS	SD	RS%	Ev.
22. The prongs/mask are secured using the straps from the generator horizontally across the infant's cheeks	No	4	6.7	0.93	0.25	93	H
	Yes	56	93.3				
23. Tie the straps from the air generator over tighten across the infant's cheeks	No	21	35.0	0.65	0.48	65	M
	Yes	39	65.0				
24. Securing the tubes coming from the air generator using Velcro strip on the hat	No	7	11.7	0.88	0.32	88	H
	Yes	53	88.3				
25. Putting an orogastric tube and leaving it open to reduce gas and help prevent abdominal distention	No	2	3.3	0.97	0.18	97	H
	Yes	58	96.7				
26. Removing a piece (prongs/mask) and relieving pressure from the nose and face	No	8	13.3	0.87	0.34	87	H
	Yes	52	86.7				

every 2-4 hours with a massage	Yes	52	86.7				
27. Cleaning the nose from the inside (Nasal wash) every 4 hours	No	1	1.7	0.98	0.13	98	H
	Yes	59	98.3				
28. Moisten the nasal prongs thoroughly with lubricant, and then place them curved side down into the infant's nose	No	13	21.7	0.78	0.42	78	H
	Yes	47	78.3				
29. Keep a small space between the tip of the septum and the bridge between the prongs (around 0.2-0.3 cm)	No	7	11.7	0.88	0.32	88	H
	Yes	53	88.3				
30. Elevate the head of the bed about 30 degrees and put roll under the neck to maintain the comfort and correct position of the infant's	No	3	5.0	0.95	0.22	95	H
	Yes	57	95.0				
31. Placing small bandage pieces attached to adhesive tapes (Duo Derm) A thin piece is placed on the upper lip and two wide pieces on each cheek, then two thin strips are placed on both ends of the nose piece (Hudson prongs) to prevent friction and exposure to	No	2	3.3	0.97	0.18	97	H
	Yes	58	96.7				
32. We use tetracycline ointment after a nasal injury to treat dermatitis	No	20	33.3	0.67	0.48	67	H
	Yes	40	66.7				
33. Monitoring should be careful and immediate response to any indications of nasal injury by healthcare providers	No	0	0.0	1.00	0.00	100	H
	Yes	60	100				

Ev: Evaluation (0.00 – 33.33) Low (L); (33.34 – 66.66) Moderate (M) ; (66.67– 100) High (H). Red Color: Belong to items of having a reversed scores.

DISCUSSION

As regard to nurses knowledge about nasal injury related CPAP in table (1), the findings revealed that majority of nurses have high knowledge about the items of definition of nasal injury and stage of nasal injury, the humidifier is on and warmed prior to connecting to the infant, sterile water for irrigation is used to fill the chamber, don't over-fill the chambers or let them dry out, uses a tape measure to measure the correct hat size for the child, the hat tape is measured at the circumference of the newborn's head, high level for monitor the hat size regularly and change it when there is a loss of elasticity or dirt, use the sizing guide provided by the manufacturer to correctly gauge the size of the prongs/mask needed, attach the prongs/mask to the generator prior to attaching to the infant, putting the nose piece (prongs) positioned correctly so that they are square onto the nose and not tipped at an angle, pressing too hard may damage to the lateral walls of the nostrils and the nasal septum, the masks are placed evenly on the nose to create a seal and minimize gas leak especially to the eyes, the infant's eyes are clearly visible without any of the mask or hat touching them, prongs/mask kept clean, patent and free from obstruction, alternate between prong and mask when the infant tolerates this, the prongs/mask are secured using the straps from the generator horizontally across the infant's cheeks, securing the tubes coming from the air generator using velcro strip on the hat, putting an orogastric tube and leaving it open to reduce gas and help prevent abdominal distention, removing a piece (prongs/mask) and relieving pressure from the nose and face every 2-4 hours with a massage, cleaning the nose from the inside (nasal wash) every 4 hours, moisten the nasal prongs thoroughly with lubricant, and then place them curved side down into the infant's nose, keep a small space between the tip of the septum and the bridge between the prongs (around 0.2-0.3 cm), elevate the head of the bed about 30 degrees and put roll under the neck to maintain the comfort and correct position of the infant's, placing small bandage pieces attached to adhesive tapes (duo derm) a thin piece is placed on the upper lip and two wide pieces on each cheek, then two thin strips are placed on both ends of the nose piece (hudson prongs) to prevent friction and exposure to, we use tetracycline ointment after a nasal injury to treat dermatitis, monitoring should be careful and immediate response to any indications of nasal injury by healthcare providers.

Irtanti and Utami⁷ discovered that nurses had a decent degree of understanding regarding the use of CPAP in the majority of cases (70 percent). According to the findings of Lomnyack et al.⁸, the majority of nurses possessed a decent level of knowledge regarding CPAP general information, uses of the CPAP device, and contraindications of the usage of the CPAP device. This discovery is consistent with our previous findings.

When putting the hat on the infant's head after connecting it to the air generator, tie the straps from the air generator over tighten across the infant's cheeks. The nurses have a moderate level of knowledge about the items, the CPAP tube is humidified, and humidification is delivered to the infant at 28 degrees Celsius.

The measurement of the hat is taken from the base of the neck to the middle of the forehead and back to the base of the neck again.

Due to our lack of familiarity with the product, we are required to press the nose piece (the prongs) firmly on the nasal septum.

Aziz and Abdul-Hamza⁹ discovered that nurses working in NICUs had a low level of knowledge regarding the following topics: general information about the CPAP device; uses of the CPAP device for premature babies and newborns; contraindications to use the CPAP device for newborns and premature babies; and fundamentals in the use of the CPAP device. Elsobkey and Amer¹⁰ observed that nurses had a low level of understanding on the fundamentals, aim, uses, contraindications, and complications of continuous positive airway pressure (CPAP).

Ahmed¹¹ discovered that out of a total of 120 nurse participants, 72 (60 percent) had inadequate knowledge regarding CPAP therapy. In addition, 48 (40 percent) of the nurses score less than 70 percent by answering incorrectly the knowledge item questions in the NICU at the selected public hospitals in Addis Ababa. This finding was inconsistent with the findings of the current study.

From the perspective of the researcher, the nurses have a high degree of expertise as a result of the fact that they have dealt with a big number of instances of babies that suffer from respiratory distress syndrome. This results in a buildup of knowledge on the CPAP equipment, in addition to the issues that are caused by this technology.

CONCLUSION

Knowledge part, in concerning nursing management about neonatal continuous positive airway pressure (CPAP) nasal injuries at neonatal intensive care unit are assigned at the established level in which that achieving goal of this study.

Recommendations: Training courses to increase nurses' knowledge and practices about working on the continuous positive air pressure device. A similar study for the same subject of among a large sample from different regions of Iraq. A study to evaluate nurses' knowledge and practices about the complications of continuous positive air pressure on an ongoing basis.

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