Neonate Apnea Nursing Care in Neonatal Intensive Care Unit

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Abstract

Apnea is a common occurrence in sick neonates, characterized as a cessation of breathing those results in pathological changes in heart rate and oxygen saturation. In the neonatal age, apnea is the most common form of breathing disorder. A neonate with apnea must be admitted to a special ward known as a neonatal intensive care unit (NICU) (1)

The study aims to study nurse's knowledge regarding nursing management of apnea in neonate and to detect association between nurse's knowledge of apnea in neonate and nurses demographic data.

A descriptive hospital based is carried out at neonatal intensive care unit at Bint Al-Huda teaching hospital and Al-Musawi pediatric hospital, the study period from 3 January 2021 and 15 Abril 2021. Total coverage (50) nurses were participated in the study to achieve the objective of the study the researcher has established the constructed questionnaire which consists of two parts (1) sociodemographic data for nurses 4 items, (2) knowledge of nurses about apnea in neonate that consist of 17- items. Data were coded & analyzed by electronic was sent to the nurses participants in the study through social media after taking the approval of Dhi Qar health directorate to research in hospitals covered by the study and statistical tables and pie charts were construct from the data using a statistical package for social sciences (SPSS) program version 20 and excel.

Results: The finding of the present study suggested that assessment of nurses' Knowledge about nursing management for apnea in neonate. The level of knowledge (16% good, (48 %)fair,(36%) poor knowledge, because their relative sufficiency (76%) were under cutoff point(4), there is a significant association between nurses' knowledge about nursing management and demographic data such (age –level of education and level of experience) in neonatal intensive care unit by P value < 0.05. The study indicated to provide Nursing management of apnea in neonates' educational program for nurses, including updating booklets, pamphlets, and boosters to help nurses improve their awareness of apnea in neonates.

Key Words: *Neonate, Apnea Nursing care, Neonate Intensive Care Unit*

Background

Apnea is a very common problem in preterm babies. It is a symptom of serious concern as timely intervention is must to prevent serious hypoxia/death and morbidities. Hypoglycemia, hypothermia, infection, or patent ductus arteriosus may all be caused by apnea.

Neonate with apnea need to stay in the placed in special unit called a neonatal intensive care unit (NICU) .or special care baby unit. The neonate need proper observation &care from competence nurses, careful assessment, and other therapeutic interventions as need. Therefore, Researcher would like to assess nurse's knowledge about apnea in neonate to reduce mortality rate and improve outcome of neonates' apnea.

The absence of respiratory airflow is referred to as apnea. Over the last few decades, the length of time required to be classified as a true apneic event has changed dramatically: 2 minutes in2006, (2) 1 minute

in2009,(3) 30 seconds in2010,(4) and 20 seconds or less if associated with bradycardia or cyanosis in 2018. (5)

The reduction in the duration of apnea's definition reflects doctors' desire to intervene early enough to avoid systemic consequences. In the neonatal age, apnea is the most common form of breathing disorder (3). Artificial surfactants, new technologies, and advances in neonatal care have allowed for a significant increase in the survival of neonates weighing less than 1.500g and, as a result, in the population at risk for apnea in recent years. (5)

Most of the time, apnea is a one-time occurrence, but it can put a neonate's life in jeopardy if not diagnosed and treated promptly. Sever apnea rarely affects term is neonates, but it common in neonates weighing less than 2.500 grams. A 12% point prevalence of apnea was found in a descriptive study of babies who had exchange transfusions for hyperactive bilirubinemia (6).

Furthermore, in some low-resource parts of the developing world, where resuscitative measures are inadequate, it is a leading cause of perinatal and neonatal mortality. Indeed, in India, apnea has been shown to predict mortality in neonates with very low birth weight by a factor of three (9).

Butcher-Puech and colleagues discovered that infants with obstructive apnea lasting longer than 20 seconds had a higher risk of intraventricular hemorrhage, hydrocephalus, prolonged mechanical ventilation, and abnormal neurologic development after one year of life (10). According to international data, 91 % of premature neonates had apnea lasting more than 12 seconds at the time of hospital discharge. Because of the severity of their apnea and bradycardia, 31% of these babies also had bradycardia, and 6.5 % needed prolonged hospitalization (11).

Premature neonates suffer from apnea, which is the most common concern. During their hospital stay, approximately 70% of babies born before 34 weeks of pregnancy have clinically severe apnea, bradycardia, or o2 desaturation. The greater the infant's immaturity, the greater the risk of prematurity apnea. Apnea can occur in 25% of neonates weighing less than 2500 g at birth and 84 % of neonates weighing less than 1000 g at birth during the postnatal period. Approximately half of all living infants weighing less than 1500 g at birth have apnea episodes (10).

Apnea is a common cause of neonatal morbidity, with estimates of it affecting 10% of hospitalized babies in a Chinese province (3) and 25% of babies in Mexico City (5).

The prevalence of apnea in the cohort of Nigerian babies examined was19.4 %, which corresponds to one out of every five hospitalized babies having apnea. Unfortunately, there is a severe lack of local data on apnea prevalence in the West African subregion with which to compare the current findings 2008). In certain low-resource areas of the developing world, where resuscitative measures are inadequate, apnea is the leading cause of perinatal and neonatal mortality. (7) Indeed, in India, apnea has been shown to predict mortality in neonates with very low birth weight by a factor of three (9). (7, 8) Indeed, in India, apnea has been shown to predict mortality in neonates with very low birth weight by a factor of three (9).

Methodology

Design of the Study:

A cross sectional descriptive study of **(50)** nurses in this group was performed in separate units of the Bint Al-Huda and Al-Musawi hospitals between 3 January and 15 Abril 2021.

Settings of the Study:

The current study will be conduct in the governorate of Thi-Qar, at the Bint Al-Huda Teaching hospital and Al-Musawi Hospitals, in neonatal intensive care units, morning, evening, and night shifts.

Study population:

Both trained pediatric nurses working in the neonatal intensive care unit (NICU) in Bint Al-Huda and Al-Musawi hospitals were chosen to conduct the study to evaluate their knowledge of apnea in neonates.

Ethical consideration:

The Faculty of Nursing at Thi-Qar University provided ethical clearance, which facilitated the writing of an official letter to the selected hospitals to obtain their permission and cooperation for the research. Every participant gave verbal consent; the researchers respected the participants' rights and treated the data with confidentiality. The participants had the choice to not participate in the study or to withdraw at any time.

Data collection Tools:

- Official letters were written to the headmaster of administration, requesting permission to do this job.
- The data was collected using the direct interview method.
- The nurses on the unit were given details about the report.

Results

Table (1): Demographic characteristics of nurses at Neonate Intensive Care Unite

Demographics			Frequency	Percentage
1	Age by years	< 30Y	32	64%
		31 – 35Y	8	16%
		36 -40Y	4	8%
		<40 Y	6	12%
2	Gender	Female	39	78%
		Male	11	22%
3	Educational level	Master degree and above	5	10%
		Bachelor degree	16	32%
		Diploma degree	29	58%
4	Years of experience	< 10 Y.	15	30%
		6 -10Y.	9	18%
		1 – 5Y.	24	48%
		1>Y.	2	4%

Table (2) Distribution of Nurses Knowledge Domain

No.	Variables		Frequency	Percentage
1	Taught about apnea	Yes	37	74%
		No	13	26 %
2	Training course	Yes	15	30%
		No	35	70%
3	Definition of Apnea	Irregular breathing	10	20 %
		Cessation of respiratory movement (15-20 seconds)	34	68%
		Cessation of heart Rate (15-20 seconds)	6	12%
4	Associations with apnea	Bradycardia	20	40%
		Cyanosis	6	12%
		A & B	24	48%
5	Types of apnea	Central and obstructive apnea	6	12%
		Central and persistent apnea	31	62%
		Central and mixed apnea.	9	18%
		A & C	4	8%
6	Causes of apnea	Prematurity	33	66 %
		Necrotizing Enterocolitis	12	24 %
		Sepsis	5	10 %
7.	High risk of apnea	Patent ductus arteriosus	6	12%
		Birth weight less than 2500 grams	20	40%
		Gestation less than 34 weeks	24	48%
8	Evaluate apnea for newborn	Clinical Examination	30	60%
		Emergency Treatment	3	6%
		A&B	17	34%
9	Important blood chemistries for apneic newborn	Glucose	19	38%
		Calcium – electrolyte	6	12%
		Urea –Creatinine	3	6%
		A &B	22	44%
10	Pharmacologic therapy for apnea	Atropine	8	16%
		Aminophylline	12	24%
		Epinephrine	30	60%
11	Non-pharmacologic therapy for apnea	Maintain air way breathing and circulation	38	76 %
		Identify under lying causes	4	8 %
		Transfuse packed cells	8	16 %
12	Prevention of bradycardia and cyanosis	Tactile stimulation	20	40%
		Prophylactic antibiotic	6	12 %
		Clear air way(frequent suction) and correct position	24	48 %
13	Equipment's beside apneic neonate	Bag and mask set ups	4	8%
		Oxygen.	4	8%
		Equipment's of CPAP or ventilation	18	36%
		a and b	24	48%
14	nurse can do If neonate develop apnea	Tactile stimulation and bag mask ventilation(BMV)	19	38 %
		prepare equipment of CPAP or ventilation	14	28 %
		Taking vital sign	17	34 %

Cont... **Table (1): Demographic characteristics of nurses at Neonate Intensive Care Unite**

15	Avoid aspiration	Maintain air way clearance	20	40%
		Attention to gastric tube placement during feeding	22	44 %
		Promote inspiration and ventilation	8	16 %
16	Treated of recurrent episodes of apnea	Bag mask ventilation (BMV).	20	40%
		Put on CPAP or mechanical ventilation	18	36%
		Maintain air way breathing and circulation	12	24%
17	Stimulation by conduct tactile	gentle rubbing of soles of feet and chest wall	21	42%
		gentle rubbing of back and chest wall	23	46%
		gentle rubbing of soles of feet and back	6	12 %

Table (3) Overall Knowledge of Participants

Variables		**Frequency**	**Percentage**
Knowledge of Participates	Good	8	16%
	Fair	24	48%
	Poor	18	36%

Table (4) Association between the Knowledge of participates and education level

Knowledge		**Education Level**						**Total**	
		Diploma		**Bachelor**		**Post graduated**			
Type		F.	P.	F.	P.	F.	P.	F.	P.
	good	1	2%	2	4 %	3	6%	6	12%
	fair	17	34%	10	20 %	2	4%	29	58%
	poor	11	22 %	4	8 %	0	0%	15	30%
Total		29	58%	16	32%	5	10%	50	100%

p. value= 0.05 significant

This table show that Positive association between all knowledge about apnea in neonate and education level of nurses participated.

Table 5: Association between knowledge with demographic data of nurses

Variable	Gender	Age	Level of Education	Level of Experience
Knowledge	p. value:= 0.855	p. value: 0.000	p. value: 0.026	p. value: 0.042
P. Value	not significant	Significant	Significant	Significant

This table show that positive association with knowledge and (age, level of education and Level of Experience)

Discussion

Preterm babies sometimes develop apnea. It is a sign of serious concern, as immediate care is needed to avoid serious hypoxia, death, and morbidity.

The aim of this study was to examine nurses' knowledge of nursing management of apnea in neonates in the neonatal intensive care unit (NICU) at Bint Al-Huda teaching hospital and Al-Musawi pediatric hospital, as well as the relationship between nurses' knowledge of apnea in neonates and demographic data such as age, sex, year of experience, and qualification.

In this research, overall coverage was considered (50) nurses. In the present study, the majority of the nurses **32(64%)** in the NICU were under the age of 30, while all of the pediatric nurses **39(78%)** in the unit are female, which may be due to hospital policies that women have a normal sense of motherhood. Most of nurses having diploma degree as educational level **29(58%)** and most of nurses having 1-5 years of experience in this study **24 (48%).**

According to the findings, **37 (74 %)** of nursing students were taught about apnea in neonates as part of their education. Knowledge gaps are often managed and fixed through training courses; nevertheless, **35(70 %)** of nurses did not obtain in-service instruction on these topics, necessitating the implementation of a continuous training curriculum on the management of high-risk neonates in order to upgrade nursing knowledge.

The majority of the study participants 34 (68%) understood that apnea is characterized by the absence of breathing activity for **15-20** seconds. This is similar to a study conducted at Omdurman Maternity Hospital by (Zubeida Abohmieda,2015) of National Ribat University, which found that nurses have strong knowledge. Almost of half the participants were aware that apnea with bradycardia and cyanosis is a real condition associated with apnea. This is a positive finding or experience because they have played a significant role in lowering neonatal mortality rates. For accurate assessing apnea in neonates, **17(34%)** only used clinical assessment and emergency treatment; this is poor awareness, and they need to be aware of the renewal of details. This is different from the study done by (Tinuade A Ogunlesi) [16] in the western Nigeria who stated that nurses had adequate knowledge of evaluation. Unfortunately, the majority of nurses were unaware of the various forms (type) of apnea in neonates. Just know about various forms of apnea, which is inadequate information and requires updating. Prematurity **33(66%)** is the most common cause of apnea in neonates, though necrotizing enterocolitis and sepsis are also causes of apnea but are less common than prematurity. This study is similar to a study done by (Rajith M.L, Punyashree R.) of the Postgraduate Institute of Pediatrics, India, who reported that prematurity is the most common cause of apnea. Half of the participants in the study **(50%)** knew that neonates with a gestation period of less than 34 weeks had the highest risk of apnea. This is a positive outcome, they have good expertise, and they play an important role in orienting pregnant women in the group, which decreases the incidence of prematurity.[14]

They have a good understanding of emergency essential blood chemistries for apneic neonates **22 (44%)** who take both (glucose and calcium –electrolyte) **19(38%)** who only take glucose **6 (12%)** who only take calcium –electrolyte).

When it comes to pharmacologic treatment for apnea in neonates, only **12(24%)** of nurses used aminophylline, considering the fact that it is the better drug for apnea when opposed to epinephrine and atropine **30(60%)** of nurses used epinephrine and **6(12%)** used atropine, which is considered poor awareness. This differs from a research conducted in Iran-Isfahan by (Amir-Mohammad$_{)(13)}$, who found constructive practice and aminophylline to be effective in the treatment of apnea. When asked about non-pharmacologic treatment for apnea in neonates in an emergency, 38(76%) of nurses said that non-pharmacologic therapy should be the first priority. Maintain airway ventilation and circulation to avoid early apnea symptoms and maintain a normal breathing pattern. This is called good knowledge in this situation. This is similar to a study conducted in western Nigeria by (Tinuade A Ogunlesi) $_{(16)}$

Which found that nurses had sufficient information. With regard to preventing bradycardia and cyanosis of apnea in neonates, 24(48%) of the study group prevent by clear airway (frequent suction) and correct location, the nurses are working suction to let airway clearance with some mistakes, did not wear mask, inserting catheter with compliance, knew time between on and off during suction 20(40%) of the study group prevent by tactile stimulation knowledge .This is similar from the study done by(Widad Ietimad I) of Soba University hospital.$_{(17)}$

Since aspiration is one of the most common causes of apnea in neonates, and nurses often make mistakes when inserting nasogastric tubes, **22(44%)** of nurses are paying attention to gastric tube placement during feeding to prevent aspiration (did not measured the length of the tube should be inserted, do enforcement. Just 20(40%) % of them keep their airways clear to stop aspiration, which is considered bad awareness. This is similar to a study conducted at Soba University Hospital by (Widad , Ietimad I). [16]

Half of the nurses prepared equipment for apneic neonates (bag and mask set ups and oxygen) but made mistakes (did not check bag, mask, oxygen source at least daily) and the other half prepared CPAP or ventilation equipment, which is called fair information. If a neonate develops apnea, only 18(36%) nurses perform tactile stimulation and bag mask ventilation (BMV), but only **19(38%)** of nurses can perform true tactile stimulation (gentle rubbing of soles of feet and chest wall), which is considered inadequate information. This differs from a research conducted in western Nigeria by (Tinuade A Ogunlesi) [16].

Regarding the treatment of chronic apnea episodes in neonates **18(36%)** Just a small number of nurses know how to adequately handle patients by putting them on CPAP or mechanical ventilation. This is because the hospital did not have enough CPAP or mechanical ventilation, resulting in **40** deaths. Poor knowledge this research similar to study doing by (Afifa R A, Murtadha AAH) Iraq –Hussein Pediatric Teaching Hospital

The following is the level of knowledge: 8(14%) considers themselves to have good knowledge. Regard fair knowledge is 24(48%), while bad knowledge is regarded by 18(36%) As a result, the majority of nurses have a good understanding of the subject. Revealed a statistically significant positive relationship between awareness and nurses (age, level of education and experience).

Conclusion

· The majority of pediatric nurses had a fair understanding of general information about apnea in neonates, but they lacked clinical skills in neonatal apnea nursing management, especially in tactile stimulation and feeding techniques.

· According to the findings of this study, nurses have varying levels of knowledge about apnea in neonates, which is a concerning sign. As a result, the findings of this study support the concern of insufficient knowledge about apnea in neonates.

· The research also found a connection between experience and the level of qualification and the age of the nurses who participated in the study.

Recommendations:

1) Nursing management of apnea in neonates' educational program for nurses, including updating booklets, pamphlets, and boosters to help nurses improve their awareness of apnea in neonates.

2) Both NICU nurses should have access to apnea in neonate management protocols and written guidance.

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Conflict of Interest: None to declare.

Ethical Clearance: "All experimental protocols were approved under the Pediatrics Nursing Department, College of Nursing, Al-Muthanna University were carried out in accordance with approved guidelines".

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