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Nurse's Skills Regarding Care of Preterm Infants in Neonatal Intensive Care Unit Selected in Jazan, KSA

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Abstract

Preterm is defined as babies born alive before 37 weeks of pregnancy are completed. Premature infants can develop a range of problems because their organs are not mature enough. The proper nursing care of premature baby should be established by good nursing performances. Our aim of this descriptive cross-sectional study was to assess the skills of nurses regarding premature infants care in incubator admitted in neonatal intensive care unit (NICU) at king Fahd Hospital and prince bin Nasser Hospital, Jazan city. The study was conducted in the period from December 2018 to March 2019. Total convenience sample of 50 nurses were enrolled in the study. The study focused mainly on frequent and routine nursing process. Data was collected by questionnaire and observational check list. The study showed that most of nurses had adequate practice regarding care of premature in incubator except wiping the inside and changing humidified water. The study recommended that nurses need continuous education program for staff development and maintaining their practice on good levels.

Keywords: Preterm neonate; Nursing care of preterm neonate; Neonatal intensive care unit

Introduction

Most women receive the news of their pregnancy with great excitement, awaiting the required weeks to give birth and receive a healthy, full-term baby. Sometimes, due to certain circumstances, birth takes place before the necessary weeks have elapsed and the baby is born prematurely and presenting certain complications. Although there are organizations around the world dedicated to protecting mothers in their prenatal stage as well as their babies, and even with the great efforts taken and developments to avoid premature births, the rate of premature newborns is still high all around the world [1].

Preterm infants are at risk because their organ systems are immature and they lack of adequate physiologic reserves to function in an extra uterine environment. The range of birth weight and physiologic problems varies widely among preterm infants as a result of increase survivability among those who weigh less than 1000 gm. However, the lower weight and gestational age produce lower chances of survival among those infants. Preterm birth is responsible for almost two thirds of infants' deaths [2].

All premature newborns should be cared for in the Neonatal Intensive Care Unit (NICU) by specialized personnel. Advances in research and science have provided new, high-tech equipment for use in NICUs [3].

Justification

The premature babies exist universally in all populations. According to the WHO, more than 15 million premature babies are born each year, of them a million die within a year due to health complications. [1]

Preterm and low birth weight with high mortality and morbidity continues to be a major public health problem in the world this is a serious and big problem which leads to increase in mortality and morbidity rate among this group of newborns.

Assessment of nurse's practice regarding care of premature babies hence improving them reduces this mortality rate and improves their outcome.

Objectives

General objective

To assess the skills of nurses regarding care of preterm infants in neonatal intensive care units.

Specific objectives

- To assess nurses skills regarding incubator care.
- To determine the effect of years' of experience in NICU on nurses practice regarding premature infants care
- To evaluate nurses support and education for the mothers about the care of preterm infants.

Literature Review

Definition of premature baby

Preterm births are babies born before 37 weeks of gestational period or 259 days from the first day of the last menstrual cycle as per the World Health Organization.

Preterm births are most commonly classified as:

- Late term-premature: Babies that are born between 34 to 36 weeks of gestation.
- Moderately premature: Babies that are born between 32 to 36 weeks of gestation.

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- Very premature: Babies that are born before 32 weeks of gestation. [4] Premature baby is the birth of a baby before the developing organs are mature enough [5].

Risk factors

Premature birth has been associated with several factors, such as history of preterm birth [6-9], anemia [10,11], high catecholamine levels in the maternal urine [12], tobacco consumption [13,14], premature rupture of membranes (PROM) [7-15], high blood pressure (HBP) [16], vaginal bleeding [7], urinary tract infection (UTI) [7-17], lack of prenatal care [15], inadequate prenatal care [15], maternal age less than 20 years [14], maternal age over 35 years [17], oligohydramnios [8], preeclampsia, twin pregnancy [8-15], although there are several risk factors associated with premature birth, its etiology has not been fully determined [11-17].

Characteristics of premature infant

Premature infant may have very little body fat, this can make the infant appear very thin. The baby will not weigh nearly the amount of a full-term baby. Premature babies who born between 30 and 32 weeks are likely to have thin skin as a result of the limited body fat, the ribs may be easy to see under the skin, the tissue may appear red. The skin is often wrinkly, extremely, premature infants who are delivered anytime between the 24th and 27th weeks; have yet to develop the exterior layer of skin, which begins solidifying in the 26th week, points out that the skin may appear smooth and shiny. Premature babies have no hair at all; they lack the lanugo, or fine fuzz that covers an infant's body beginning around week 24 or shortly after. Premature baby who arrives closer to term may have fuzz all over the body, even the head. A premature will not move, the movements of a baby born between 29 and 32 weeks may appear jerky instead of smooth. Babies born before these weeks may not move much at all. The arms and legs may remain in an outstretched position from the lack of muscle tone. Around the 35th week, a premature has enough muscle tone to get into the fetal position, like a full-term newborn. Sucking may be difficult due to an infant's poor muscle tone, they have soft flat ears with little cartilage, and small scrotum with few folds; testes may be undescended in very premature newborns, girls labia majora not yet covering labia minora. [18].

Equipment used to evaluate and treat the newborn

Incubator: An incubator (or isolate [19]) is an apparatus used to maintain environmental conditions suitable for a neonate (newborn baby). It is used in preterm births or for some ill full-term babies.

There is additional equipment used to evaluate and treat sick neonates. These include:

Blood pressure monitor: The blood pressure monitor is a machine that's connected to a small cuff which wrapped around the arm or leg of the patient. This cuff automatically takes the blood pressure and displays the data for review by providers.

Oxygen hood: This is a clear box that fits over the baby's head and supplies oxygen. This is used for babies who can still breathe but need some respiratory support.

Ventilator: This is a breathing machine that delivers air to the lungs. Babies who are severely ill will receive this intervention. Typically, the ventilator takes the role of the lungs while treatment is administered to improve lung and circulatory function.

Incubator care

The incubators provide special environment for high risk babies till they adapt themselves to standard nursery or home conditions. Incubators allow optimal heat balance and provide isolation from air-borne infections. Incubators are mainly used for low-birth weight or premature babies, infants recovering from stress of birth and sick babies requiring special observation or ambient oxygen.

Possible functions of a neonatal incubator are

Oxygenation, through oxygen supplementation by head hood or nasal cannula, or even continuous positive airway pressure (CPAP) or mechanical ventilation. Infant respiratory distress syndrome is the leading cause of death in preterm infants, [20] and the main treatments are CPAP, in addition to administering surfactant and stabilizing the blood sugar, blood salts, and blood pressure observation: Modern neonatal intensive care involves sophisticated measurement of temperature, respiration, cardiac function, oxygenation, and brain activity.

Protection from cold temperature, infection, noise, drafts and excess handling: [21]. Incubators may be described as bassinets enclosed in plastic, with climate control equipment designed to keep them warm and limit their exposure to germs.

Provision of nutrition, through intravenous catheter or NG tube.

Administration of medications. Maintaining fluid balance by providing fluid and keeping a high air humidity to prevent too great a loss from skin and respiratory evaporation [22]. A transport incubator is an incubator in a transportable form, and is used when a sick or premature baby is moved, e.g., from one hospital to another, as from a community hospital to a larger medical facility with a proper neonatal intensive-care unit. It usually has a miniature ventilator, cardio-respiratory monitor, IV pump, pulse oximeter, and oxygen supply built into its frame [21].

Premature infants care

In developed countries premature infants are usually cared for in an NICU. The physicians who specialize in the care of very sick or premature babies are known as neonatologists. In the NICU, premature babies are kept under radiant warmers or in incubators, which are bassinets enclosed in plastic with climate control equipment designed to keep them warm and limit their exposure to germs. Modern neonatal intensive care involves sophisticated measurement of temperature, respiration, cardiac function, oxygenation, and brain activity. Treatments may include fluids and nutrition through intravenous catheters, oxygen supplementation, mechanical ventilation support [23], and medications. In developing countries where advanced equipment and even electricity may not be available or reliable, simple measures such as kangaroo care (skin to skin warming), encouraging breastfeeding, and basic infection control measures can significantly reduce preterm morbidity and mortality. Bili lights may also be used to treat newborn jaundice (hyperbilirubinemia).

Water can be carefully provided to prevent dehydration but no so much to increase risks of side effects [24].

In a 2012 policy statement, the American Academy of Pediatrics recommended feeding preterm infants human milk, finding "significant short- and long-term beneficial effects," including lower rates of necrotizing enter colitis (NEC) [25]. It is unclear if fortification of breast milk improves outcomes in preterm babies, though it may

speed growth [26]. There is limited evidence to support prescribing a preterm formula for the preterm babies after hospital discharge [27].

Material and Methods

Study design

Descriptive cross-sectional hospital based study

Study duration

The study was conducted from December 2018 to March 2019

Study area

The study was carried out in King Fahd Hospital and prince bin Nasser Hospital. King Fahd Hospital is located in Abu Arish state. The hospital contains one neonatal intensive care unit (NICU) which consists of 6 rooms. The total number of nurses working in NICU was 40 nurses working in the morning shift and afternoon night shift. Prince bin Nasser Hospital is located in Jazan state, the total number of nurses working in NICU was 30 nurses also working in the morning and afternoon-night shift.

Study population

Qualified nurses who were working in neonatal intensive care unit (NICU) in the two hospitals.

Sample size and selection

The sample included 50 NICU staff nurses selected on the basis of inclusion and exclusion criteria. Non-probability convenience sampling technique was used for selection.

Inclusion criteria

Qualified nurses

Nurses working in King Fahd Hospital and prince bin Nasser Hospital NICUs at the time of data collection.

Exclusion criteria

Nurses working in other departments in the hospital

Refusal of nurses to participate

Ethical consideration

Official letter from Deanship of Scientific Research at Jazan University to the manager of King Fahd Hospital and Prince bin Nasser Hospital. Then they have referred us to Jazan Health Research Ethics Committee (REC), for permission to carry out this research in their hospitals. The goal of research was explained to the responders and they were informed about the rights and confidentiality.

Data collection tools

The tools used for the study were questionnaire and check list.

1. Structured questionnaire consisting Socio- demographic variables such as age, gender, professional qualification, experience in NICU (years).

2. Checklist: Created for assessing nurse's skills regarding preterm infant nursing care in incubator. The skills evaluated during observation. The nurse practice was evaluated by either "Applied completely and correctly", applied partially or did not apply format.

Data collection technique

The questionnaire was filled by the nurses. The skills included in the check list were evaluated by observation during nurse's work.

Data entry and statistical analysis: The data was analyzed by using (statistical package for social science) SPSS program. Chi- square test (X^2) was used for statistical significance (95% confidence level)

Assumption

This study will improve the skill of the nurses about premature infant's care providing incubator care to the neonates. Enhance the skill of the nurses in the clinical practice related to incubator for neonates.

Results

Table 1 showed that all nurses were females (100%), 80% of nurses had bachelor degree, and 6% of our sample were post graduate level and 14% were diploma level, most of the of nurses (88%) had 1-5 years of experience followed by 6% of experience for 6-10 years and less than 1 year.

Table 2 showed that (78%) of nurses applied hand washing completely and correctly and 11 nurses (22%) applied it incompletely. All nurses kept baby in incubator by diaper only and checked vital signs frequently. Only 30.0% of nurses changed humidifier water daily and almost 90% monitored O_2 flow rate and concentration as prescribed, all nurses checked vital signs frequently.

Table 3 demonstrated that 60% of nurses checked temperature of milk and half of them bured the preterm infant during and after feeding. All nurses clamped the tube well and observed the patient carefully. Almost 94% of them placed the infant on right side after feeding to prevent regurgitation and aspiration.

Table 4 showed that most nurses (80%) checked the lights of phototherapy unit before use and placed it in proper place, all nurses (100%) covered eyes and genitalia while the preterm is under phototherapy and also all of them monitored infant temperature frequently. Also 74% of nurses removed the eye patch every 4 hours.

Table 5 showed that 92% of nurses washed hands before and after holding the baby, 74.0% of nurses did all standard precautions and half of them wiped down the inside daily and outside of incubator every 8 hours with disinfectant. All nurses used spatial equipment for each baby, almost 84% of them wore clothing that has been provided and 70% cleaned baby's skin and the umbilical cord.

Table 6 Shows that all of nurses 100% explained baby condition to the parents to reduce their anxiety, 78% of nurses teaching mother's about breast feeding, 80% teaching mother's about any problem may be occur after discharge and few of nurses 10% teaching and help mother's about kangaroo care.

Demographic data		Frequency	Percent
Gender	Male	0	0.00%
	Female	50	100.00%
	Diploma	7	14%
Educational level	Bachelor degree	40	80%
	Master degree	3	6%
	<1 year	3	6.00%
Years of experience in NICU	1-5 years	44	88.00%
	6-10 years	3	6.00%
	Total	50	100.00%

Table 1: Distribution of nurses according to their demographic data.

Incubator care practice	Applied completely and correctly		Applied partially		Did not apply		Total
	No	%	No	%	No	%	
Hand washing	39	78%	11	22%	0	0.00%	50 (100%)
keeping baby in incubator by diaper only	50	100.00%	0	0.00%	0	0.00%	50 (100%)
Changing humidifier water daily	15	30.00%	0	0.00%	35	70.00%	50 (100%)
Monitoring O_2 flow rate and concentration as prescribed	45	90%	5	10%	0	0.00%	50 (100%)
Checking vital signs frequently	50	100%	0	0.00%	0	0.00%	50 (100%)

Table 2: Distribution of nurses according to their practice regarding premature care in incubator.

Steps of feeding	Applied completely and correctly		Applied partially		Did not apply		Total
	No	%	No	%	No	%	
Checking temperature of milk	30	60%	20	40%	0	0.00%	50 (100%)
Burping the preterm infant during and after feeding	25	50.00%	15	30.00%	10	20.00%	50 (100%)
Changing humidifier water daily	50	100.00%	0	0.00%	0	0.00%	50 (100%)
Placing on right side after feeding to prevent regurgitation and aspiration.	47	94%	3	6%	0	0.00%	50 (100%)

Table 3: Nurses practice regarding neonatal feeding by nasogastric tube.

Steps of care under phototherapy	Applied completely and correctly		Applied partially		Did not apply		Total
	No	%	No	%	No	%	
The lights of phototherapy unit checked before use and placed in proper place	40	80%	0	0%	10	20.00%	50 (100%)
The eyes and genitalia covered during phototherapy	50	100.00%	0	0.00%	0	0.00%	50 (100%)
Eye patch removed every 4 hours.	37	74.00%	9	18.00%	4	8.00%	50 (100%)
Infant temperature monitored frequently	50	100%	0	0%	0	0.00%	50 (100%)

Table 4: Nurse practice regarding care of premature infant under photo therapy.

Prevention of infection	Applied completely and correctly		Applied partially		Did not apply		Total
	No	%	No	%	No	%	
Washed hands before and after holding the baby	46	92%	0	0.0%	4	8.00%	50 (100%)
Did all standard precautions (gown, mask, gloves)	37	74%	1	2.0%	12	24.00%	50 (100%)
Wiped down the inside daily and outside of incubator every 8 hours with disinfectant	25	50%	25	50.0%	0	0.00%	50 (100%)
Baby's skin and the umbilical cord cleaned as possible	35	70%	15	30.0%	0	0.00%	50 (100%)
Each baby had his own equipment	50	100%	0	0.0%	0	0.00%	50 (100%)

Table 5: Nurse practice regarding care of premature infant to prevent infection.

Teaching and support of parents	Applied completely and correctly		Did not apply		Total
	No	%	No	%	
Condition explained to the parents to reduce their anxiety	50	100%	0	0.00%	50 (100%)
Teaching mother's about breastfeeding	39	78.00%	11	22.00%	50 (100%)
Teaching and help mother's about kangaroo care	5	10.00%	45	90.00%	50 (100%)
Teaching mother's about any problem may occur after discharge	40	80%	10	20.00%	50 (100%)
Explain environmental hygiene, follow-up plan and immunization	30	60.00%	20	40.00%	50 (100%)

Table 6: Teaching and support of parents.

Years of nursing experience in NICU	Practice regarding changing humidifier water daily						Total
	Applied (completely and correctly)		Applied partially (incompletely or incorrectly)		Did not apply		
	No	%	No	%	No	%	
<1 year	3	6.00%	0	0.00%	0	0.00%	3 (6%)
1-5 years	12	24.00%	0	0.00%	32	64.00%	44 (88%)
6-10 years	0	0.00%	0	0.00%	3	6.00%	3 (6%)
Total	15	30.00%	0	0.00%	35	70.00%	50 (100%)

Table 7: Relation between duration of nurse's experience in NICU and practice regarding change of humidifier water daily.

Years of nursing experience in NICU	Practice regarding monitoring O_2 flow rate and concentration as prescribed						Total
	Applied (completely and correctly)		Applied partially (incompletely or incorrectly)		Did not apply		
	No	%	No	%	No	%	
<1 year	3	6.00%	0	0.00%	0	0.00%	3 (6%)
1-5 years	42	84.00%	2	4.00%	0	0.00%	44 (88%)
6-10 years	0	0.00%	3	6.00%	0	0.00%	3 (6%)
Total	45	90.00%	5	10.00%	0	0.00%	50 (100%)

Table 8: Relation between years of nursing experience in NICU and practice regarding monitoring O_2 flow rate and concentration as prescribed.

Years of nursing experience in NICU	Practice regarding monitoring O_2 flow rate and concentration as prescribed						Total
	Applied (completely and correctly)		Applied partially (incompletely or incorrectly)		Did not apply		
	No	%	No	%	No	%	
<1 year	3	6.00%	0	0.00%	0	0.00%	3 (6%)
1-5 years	27	54.00%	17	34.00%	0	0.00%	44 (88%)
6-10 years	0	0.00%	3	6.00%	0	0.00%	3 (6%)
Total	30	60.00%	20	40.00%	0	0.00%	50 (100%)

Table 9: Relation between duration of nurse's experience in NICU and practice regarding checking temperature of the milk.

Years of nursing experience in NICU	Practice regarding monitoring O_2 flow rate and concentration as prescribed						Total
	Applied (completely and correctly)		Applied partially (incompletely or incorrectly)		Did not apply		
	No	%	No	%	No	%	
<1 year	3	6.00%	0	0.00%	0	0.00%	3 (6%)
1-5 years	37	74.00%	0	0.00%	7	14.00%	44 (88%)
6-10 years	0	0.00%	0	0.00%	3	6.00%	3 (6%)
Total	40	80.00%	0	0.00%	10	20.00%	50 (100%)

Table 10: Relation between years of nursing experience in NICU and practice regarding care of premature baby under photo therapy (Check the lights of phototherapy unit before use and place it in proper place.

Years of nursing experience in NICU	Practice regarding monitoring O_2 flow rate and concentration as prescribed						Total
	Applied (completely and correctly)		Applied partially (incompletely or incorrectly)		Did not apply		
	No	%	No	%	No	%	
>1 year	3	6.00%	0	0.00%	0	0.00%	3 (6%)
1-5 years	34	68.00%	4	8.00%	6	12.00%	44 (88%)
6-10 years	0	0.00%	0	0.00%	3	6.00%	3 (6%)
Total	37	74.00%	4	8.00%	9	18.00%	50 (100%)

Table 11: Relation between years of nursing experience in NICU and practice regarding monitoring infant temperature frequently.

There was significant association between years of nursing experience in NICU and Practice regarding change of humidifier water daily. (P. value=0.015) (Table 7).

There was significant association between years of nursing experience in NICU and practice regarding monitoring O_2 flow rate and concentration as prescribed. (P. value=0.000) (Table 8).

There was significant association between years of nursing experience in NICU and Practice regarding checking temperature of the food; it should be in room temperature. (P. value=0.038) (Table 9).

There was significant association between years of nursing experience in NICU and practice regarding care of premature baby under photo therapy (Check the lights of phototherapy unit before use and place it in proper place. (P. value=0.001) (Table 10).

There was significant association between years of nursing experience in NICU and practice regarding monitoring infant temperature frequently. (P. value=0.004) (Table 11).

Discussion

Premature babies can develop a range of problems because their organs are not mature enough. Due to some complications associated with prematurity, these infants need be hospitalized in Neonatal Intensive Care Unit (NICU). Preterm birth complications are the leading cause of death among children under 5 years of age, responsible for nearly 1 million deaths. Three-quarters of these deaths could be prevented with current, cost-effective interventions. [28] So proper nursing care of premature baby should be established by good nursing performances.

The results of the current study showed that all nurses were females, may be because nurses might do some jobs of the mothers in such unit where males might have less ability to do such job, while Eissa SS et al. found 90% of nurses were females and of college graduate were only 2.5% of them [29]. The present study results showed that the bachelor degree was the most of studied participants. This result was disagreeing for the results of Ghoddoos et al. [30] who have found that BSN degree was the majority of participants. Regarding the years of experiences almost 88% of nurses have experiences of 1-5 years; this study is similar with Metwaly [31] who found that more than one-third of nurses had 1-4 years' experience.

On the other hand, the study showed that nurses had adequate performance regarding incubator care of premature baby (78%) of nurses applied hand washing completely and correctly, 90% monitored O_2 flow rate and concentration as prescribed, all nurses checked vital signs frequently, completely and correctly. So comparing with the study

done by Badoor which showed that the majority of respondents have nearly the level of performance is weak in all nursing procedures [32], except for changing humidifier water daily all most of nurses did not applied. also our study showed that most of nurses applied completely and correctly regarding neonatal feeding by NGT these results disagree with study established by Adel Mohammed A and Abdel Fattah S A to assess the effect of educational program on nurse's knowledge and practices about nasogastric tube feeding at neonatal intensive care units, they detected that practitioner nurses' level of knowledge and skills were inadequate with some skills [33] .

Our study showed that nurses had adequate practice regarding care of preterm under photo-therapy, most nurses (80%) checked the lights of phototherapy unit before use and placed it in proper place, all nurses (100%) covered eyes and genitalia while the preterm is under phototherapy and also all of them monitored infant temperature frequently, completely and correctly compared to what reported by Neghabadi FP et al. who stated that the findings of his study suggest that phototherapy-related care services are much below the standards. He also found that other neonates who were close to phototherapy units were not protected against light. Nonetheless, study findings showed that in most cases, neonates' body temperature was monitored neither after starting nor after discontinuing phototherapy [34].

Regarding teaching and support of parents Shows that all of nurses explain baby condition to the parents to reduce their anxiety, all most of nurses teaching mother's about breast feeding and any problem may be occur after discharge, the most deficient item was kangaroo care. Kangaroo care (KC), a well-established parent-based intervention in neonatal intensive care units (NICUs), with documented benefits for infants and their parents [35]. In the Kangaroo National Survey of Practice, Knowledge, Barriers and Perception the majority of nurses were knowledgeable about KC's effects on most topics [36].

The study showed that there is statistically highly significant relationship between the years of experiences of nurses and their performance regarding incubator care in most items. More qualified nurses had longer years of experiences. Costa CC et al. observed similar association between nurses' years of experience and their handling of neonatal incubators [34] .

Conclusion

Based on the study results, the study showed that:

Studied nurses had adequate practice regarding care of premature in incubator, except for wiping the inside (50%) and changing humidified water (30%).

The nurses care regarding preterm under phototherapy, nasogastric tube feeding and precaution steps for infection prevention were adequate.

The teaching and support to parents was accepted except for Kangaroo care (10%) of the nurses do it.

So overall the practice of nurses was good regarding care of premature baby.

There was significant correlation between years of nursing experience in NICU and practice regarding care of premature baby.

Recommendation

Based on the study results, the study recommended that:

1. Continuous education program for staff development and maintaining their knowledge and practice on good levels.

2. Recruitment of qualified nurses for working in NICU to improve the outcome.

3. Establishing education program by nurses for all mothers to improve their knowledge and skills in care of premature babies at home especially the benefits and management of kangaroo mother care (KMC).

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