Competency of Nursing Care Activities at Neonatal Intensive Care Units: An Assessment Study

Monera Sayed Mohamed Farag, Wafaa El-Sayed Ouda, Eman Amin Mohammed
Pediatric Nursing Department – Faculty of Nursing, Ain Shams University

Abstract

Competency of nursing care activities of nurses working at neonatal intensive care units together with advancement in medical science and technology increased the survival rate of newborns that need specialized care. To ensure the quality of care and provide the safety of patients, assessing the competency of nursing care activities of nurses working at NICU seems necessary. **This study aimed to** assess competency of nursing care activities at the neonatal care units. **Design:** A descriptive design was used. **Setting:** The study was carried out at the neonatal intensive care units affiliated to Ain Shams University Hospital. **Subjects:** A purposive sample of 70 nurses working at the previously mentioned setting, regardless their characteristics. **Tools of data** collection involved an interviewing questionnaire (that was constructed by the researcher after reviewing related literatures to gather data in relation to characteristics of nurses such as age, qualification, years of experience……etc) and observation checklist (to assess competency of nursing care activities at neonatal intensive units). **Results:** The study findings revealed that nursing care activities at NICU were incompetent by nearly two thirds (64.3%) of them. There was a statistically significant difference between the total mean scores of nursing care activities competencies skills at NICU and their age, qualifications, years of experience and social status. **Conclusion:** The study concluded that more than half of studied nurses were having incompetent nursing care activities at NICU. **Recommendations:** The study recommends continuous assessment and upgrading of competency of nursing care activities at NICU.

Key words: competency, nursing care activities, intensive care unit, neonates.

Introduction

An increased rates of premature and low birth weight newborns as well as associated factors with high risk pregnancies, the number of infants who require admission to neonatal intensive care units (NICU) is growing ***(Malusky and Donze, 2011).*** Along with the increasing complexity of technology and the development of the NICU, the survival of these newborns has improved. A major share of the responsibility for such care practices is related to the nurses working in the NICUs ***(Phibbs et al., 2007).***

Neonatal nurses are in a unique and powerful position to influence the lives of neonates and can work in practice settings with various care levels, from well baby term nurseries to high units play an integral role to provide optimal nursing care to improve the quality of neonatal care ***(Lawhon, 2002).*** Therefore, the nurse is an important member of the neonatal health team and her role is considered the key element in the neonatal care units ***(Fortney and Steward, 2014).***

Nursing care for neonates in the neonatal units has become more detailed and complicated and considered a critical element in the neonate's chance for survival, so highly skilled nurse should have a power of observation and the ability to take accurate decision, rapid management and to evaluate any complications to help for efficient, excellent neonatal outcomes ***(Spence, 2011).***

Significance of the Study

It is important to carry out this study to shed light on the competency of nursing care activities at Neonatal Intensive Care Units that can help in reducing the morbidity and mortality rates among the neonates in the neonatal intensive care units ***(Evans, 2008).***

Competency was defined by Benner (1982) as 'the ability to perform a task to obtain an optimum and favorable results in changing conditions in the real world', neonatal nurse use an activation directory professional competency in general nursing activities which include a set of knowledge, abilities and skills to perform all related care needed to neonates effectively in a professional manner ***(Kamel et al, 2011).***

Aim of the study

Assess competency of nursing care activities at the Neonatal Intensive Care Unit.

Research questions

- What is the level of nurses' competencies at the neonatal intensive care unit?
- Is there a relationship between nurses' characteristics and their competency level in activities at neonatal intensive care unit?

Subjects and Methods

A descriptive design was utilized in carrying out this study to assess competency of nursing care activities at the Neonatal Intensive Care Units.

The subjects and methods for this study are categorized under four main designs as the following:

I. Technical design.
II. Operational design.
III. Administrative design.
IV. Statistical design.

I-Technical design:

1- Research design:

A descriptive research design was utilized in the Current study.

2- Research setting:

The study was conducted at the neonatal intensive Care Units affiliated to Ain Shams University Hospitals.

3- Research subjects:

A purposive sample was composed of 70 of Neonatal nurses working at the previously mentioned Setting, regardless their characteristics.

Tools of data collection

Data were collected through the use of the following tools:

1. **A pre- designed questionnaire (Appendix, II):**It was designed in simple Arabic language by the researcher after reviewing relevant literature and it was revised by a jury of experts in critical care nursing to test its validity. It was used together data concerned with characteristics of the studied nurses namely age, gender, qualification, years of experience and work place.

2. **Nursing Care Activities competencies skills at NICU (Appendix, III): was assessed by a**

Dryfus Rating Scale, 1980. This scale "Dryfus modle of skill acquisition" was adopted by the researcher used to assess the competency of nursing care activities in the NICU. The scale contained of 19 nursing skills procedures which focused on all neonatal nursing care activities. Provided for the neonates in the NICU. Each nurse was asked by the researcher to put (✓) in the space that reflect his or her degree of performance either full met (2), partially met (1) Not met (0) and Not applicable.

- **Scoring system**

According to nurses' practice, the score of 80% and more was considered competent of nurses' competencies skills, while less than 80% was considered as incompetent of nurses' competencies skills.

II. Operational design:

Pilot study

The pilot study was conducted to evaluate the efficiency and validity of the tools of data collection; the necessary modifications were done as revealed from the pilot study.

Field of work

The study was carried out 3 days per week for 3 months from the 1st of January 2017 to the end of March 2017 using the previously mentioned study tools. Each nurse was individually interviewed by the researcher for 30 minutes. According to their physical and mental readiness in addition to the mitigating circumstances of work environment.

Administrative design

An official permission was taken from the hospital administration to conduct this study in the light of clear explanation about nature of the study, its importance and expected outcomes.

Ethical consideration

The study proposal was approved by the Scientific Research Ethics Committee of the faculty of nursing Ain Shams University. Also an official permission to conduct the study was secured from pertinent authorities. All participants gave their oral consent to participate in the study. They were secured that the study is harmless. They were informed about the study purpose and about their rights to refuse or withdraw at any time without giving reasons.

Statistical analysis

Data are statistically designed and analyzed using appropriate statistical tests (No and %, ±SD using X^2 and t-test) The study results presented in tables and figures with appropriate comment to explain its contents.

Results

Table (1): Distribution of neonatal nurses' according to their demographic characteristics (n=70).

Personal characteristics	No.	%
Age (years)		
< 20 years	3	4.3
20 : < 30	48	**68.6**
30 : < 40	4	5.7
≤ 40	15	21.
Mean ± SD (29.51 ± 5.02)		
Sex		
Female	61	**87.1**
Male	9	12.9
Social status		
Single	43	**61.4**
Married	26	37.1
Divorced	1	1.4
Level of qualification		
Technical Nursing Diploma	36	**51.4**
Nursing Institute Diploma + Specialty	24	34.3
Bachelor of Nursing	10	14.3
Years of experience		
1: < 5	43	**61.4**
5: < 10	11	15.7
10 ≤ 15	16	22.9
Mean ± SD (7.69 ± 3.61)		
Residence		
Urban	50	**71.4**
Rural	20	28.6
Attending training courses		
Yes	39	**55.7**
No	31	44.3

Table (1): showed the distribution of the demographic characteristics in the study sample. Regarding the age of the studied nurses, it was found that 68.6% of them were 20 : < 30 years old, 87.1% were females and 61.4% were single. Moreover, this table shows that 51.4% had technical nursing diplomas. Regarding the years of experiences, 61.4% had less than 5 years of experiences, 71.4% were from urban areas, and 55.7% of the studied nurses attended training courses.

Part 2: Distribution of the neonatal nurses according to growth and development skills competences assessment.

Table (2): Distribution of the neonatal nurses' according to Growth and development skill competences assessment.

Growth and development skill competences assessment.	Competent		Incompetent		Mean	±SD	t-test	p-value
	No.	%	No.	%				
Apgar scoring	13	18.6	57	**81.4**	6.74	1.98	28.55	<0.001
Neonatal weight	35	50.0	35	**50.0**	6.91	1.87	30.92	<0.001
Neonatal height	27	38.6	43	**61.4**	6.44	2.81	19.18	<0.001
Head circumference	25	35.7	45	**64.3**	5.94	1.19	41.77	<0.001
Gestational age assessment	57	81.4	13	**18.6**	4.67	0.76	51.69	<0.001

As regards to the nursing competences in growth and development assessment of the neonatal nurses, it was found that 81.4% , 50.0% , 61.4% , 64.3% and 18.6% of them were incompetent in assessment of Apgar scoring, neonatal weight, neonatal height, head circumference and gestational age assessment respectively at p-value **<0.001**

Table (3): Distribution of the neonatal nurses according to administration skill competences assessment.

Administration skill competences assessment	Competent		Incompetent		Mean	±SD	t-test	p-value
	No.	%	No.	%				
Neonatal admission	24	34.3	46	**65.7**	13.56	4.88	23.23	<0.001
Neonatal transfer	9	12.9	61	**87.1**	8.84	2.71	27.34	<0.001
Neonatal discharge	25	35.7	45	**64.3**	6.11	2.13	24.02	<0.001
Family education regarding Neonatal discharge	10	14.3	60	**85.7**	5.77	2.82	10.01	<0.001

As regards to the nursing competences in administration assessment of the neonatal nurses, it was found that 65.7% , 87.1% , 64.3% , and 85.7% of them were incompetent in assessment of neonatal admission ,transfer ,discharge and family education regarding neonatal discharge, neonatal respectively at p-value **<0.001**

Table (4): Distribution of the neonatal nurses according to measuring vital signs skills competences assessment.

Measure vital signs skills.	Competent		Incompetent		Mean	±SD	t-test	p-value
	No.	%	No.	%				
Auxiliary temperature	25	35.7	45	**64.3**	11.54	3.24	29.79	<0.001
Rectal temperature	65	**92.9**	5	7.1	28.56	1.87	127.77	<0.001
Apical pulse	25	35.7	45	**64.3**	10.79	4.98	18.11	<0.001
Radial pulse	11	15.7	59	**84.3**	11.13	3.86	24.10	<0.001
Measuring respiratory rate	25	35.7	45	**64.3**	8.46	3.87	18.27	<0.001
Measuring blood pressure	25	35.7	45	**64.3**	30.59	10.16	25.19	<0.001

As regards to the nursing competences in measuring vital signs assessment of the neonatal nurses, it was found that more than half 64.3%, 64.3%, 84.3%, 64.3% and 64.3% of them were incompetent in measuring Auxillary temperature, apical pulse, radial pulse, measuring respiratory rate and measuring blood pressure respectively while 92.9% of them were competent regarding measuring rectal temperature at p-value<0.001.

Table (5): Distribution of the neonatal nurses according to safety, security, asepsis and infection control skills competences assessment.

	Competent		Incompetent		Mean	±SD	t-test	p-value
	No.	%	No.	%				
Safety, security								
Applying restraint	9	12.9	61	**87.1**	11.17	3.14	29.77	<0.001
Asepsis and infection control								
Hand washing	23	32.9	47	**67.1**	12.60	4.39	24.02	<0.001
Perform sterilization for incubator	25	35.7	45	**64.3**	4.07	2.31	14.78	<0.001
Perform aseptic technique principles	26	**37.1**	44	62.9	7.79	4.32	15.08	<0.001

As regards to the nursing competences in safety and security, asepsis and infection control assessment of the neonatal nurses, it was found that more than half 87.1%, 67.1% and 64.3% of them were incompetent in applying restraints ,hand washing ,perform sterilization for incubator respectively while 37.1 %of them were competent regarding perform aseptic technique at p-value<0.001.

Table (6): Distribution of the neonatal nurses according to their medication administration skills competences assessment.

Medication administration skills.	Competent		Incompetent		Mean	±SD	t-test	p-value
	No.	%	No.	%				
Oral medication	23	32.9	47	**67.1**	6.31	1.90	27.81	<0.001
Topical medication	25	35.7	45	**64.3**	14.49	4.92	24.65	<0.001
Intramuscular injection	22	31.4	48	**68.6**	12.29	3.88	26.47	<0.001
Intradermal injection	20	28.6	50	**71.4**	12.70	4.70	22.60	<0.001
Subcutaneous injection	25	35.7	45	**64.3**	11.30	3.55	26.61	<0.001
Intravenous therapy	27	38.6	43	**61.4**	13.23	4.48	24.71	<0.001
Blood transfusion	9	12.9	61	**87.1**	14.39	3.45	34.90	<0.001

As regards to the nursing competences in medication administration assessment of the neonatal nurses, it was found that 67.1% , 64.3% , 68.6% ,71.4% ,64.3% ,61.4% and 87.1% of them were incompetent in assessment of neonatal oral ,topical, medication administration, intramuscular, intradermal subcutaneous injection , intravenous therapy and blood transfusion respectively at p-value **<0.001**

Part 3: Number and percentage distribution of neonatal nurses according to their total competent and incompetent skills competences and activities.

Table (7): Distribution of the neonatal nurses according to their total competent and incompetent neonatal care and activities skill competencies.

Total Competent and Incompetent of Neonatal Nursing care activities	No.	%
Competent	25	35.7
Incompetent	45	64.3
Total	70	100.0

Table(7): This table showed that the competent core are implemented for neonates estimated at around (35.7%) while incompetent (64.3%) of the studied nursing were from total competent of neonatal nurses 'competency procedures (checklists).

Discussion

The results of the current study revealed that more than two thirds of the studied nurses had technical nursing diplomas, also more than two thirds of the neonatal nurses attended training courses which involved quality and infection control as in-hospital training. These results were in contradiction with the study of ***Rogowski et al. (2015),*** entitled "Nursing Staffing in Neonatal Intensive Care Units in United States", which showed that most NICU nurses had a bachelor degree in nursing, and all of the registered nurses in the NICU had varying levels of training courses (specialty certification or advanced training and experience in the nursing management of high risk neonates and their families) and experience that may complement infants with more and less complex status.

The current study showed that the nearly more than one third of the studied nurses were competent, more than three fifths were incompetent. This result was in accordance with ***Mirlashari et al. (2016),***

who mentioned in the study entitled "Clinical competence and its related factors of nurses in neonatal intensive care units" that more than two thirds of the total neonatal nurses were competent regarding their nursing activities, and the remaining nurses needed more training to improve their performance.

Weighing neonates became a mean of determining a good health condition, and through the association between nutrition and health, the current study revealed that one half of the neonatal nursing staff in the NICU were competent regarding measuring neonatal weight. This could have been related to nurses caring for a lot of neonates, which made them more experienced in this field. These results were contradicted with the study of ***Weaver et al. (2010),*** entitled "In the balance: Weighing neonates and the Birth of the neonate Welfare Clinic" that all included nurses were able to perform the weighing of neonates perfectly on a standard basis.

The current study revealed that more than one third of the NICU nurses were competent regarding care of neonates upon discharge from the NICU, and less than one fifth provided family education regarding baby discharge, this could have been related to the nurses' workload with neonates and nursing staff shortages. These results were in contradiction with those of ***Rochefort et al. (2016),*** in the study entitled "Rationing of nursing care interventions and its association with nurse-reported outcomes in the neonatal intensive care unit: a cross – sectional survey", where from a total of 285 NICU RNs, more than one third reported rationing discharge preparation for the neonates from the NICU competently, also they were able to provide infant comfort care in addition to being competent regarding providing the infant's relatives with the essential information for the care and follow up of their neonate after discharge.

The current study revealed that most of nurses had competent skills as regards competency in measuring rectal temperature competency compared to apical pulse represented among more than one third of nurses had competent skills (table 4). This result is contradiction with ***Hasegawa et al (2014),*** who mentioned in the study entitled "Extending role by Japanese neonatal nurses after training for performing vital signs monitoring" that all neonatal nurses had competent skills as regards to rectal temperature measuring, more than one third of them had opportunity to perform apical pulse.

The current study also showed that more than one third of the studied nurses performed aseptic techniques, this could have been because the nurses were exposed to infection control training and seminars and on job training that caused them to be more efficient in applying aseptic techniques when caring for neonates. This was in accordance with ***Rogowski et al. (2013),*** who mentioned in the study entitled "Nurse Staffing and NICU Infection Rates" that hospital understaffed more than one third of their NICU infants and more than two fifths of high – acuity infants in relation to guidelines. To meet minimum staffing guidelines on average would require an additional 0.11 of a nurse per high-acuity infant. Very low-birth-weight infant infection rates were less than one fifth.

Regarding medication administration, the current study showed that more than one third of the nurses had competent skills regarding estimating intravenous therapy, compared to less than one fifth regarding blood transfusion skill competency, also application of topical medications was represented competently among more than one third of the studied nurses. This could have been due to absence of nursing supervision and penalties incurred against nurses who weren't competent in drug administration and blood transfusion. Also, no medication administration checklists

were available to be followed by neonatal nurses. These results were in contradiction with those of ***Shahrokhi et al. (2013),*** who mentioned in the study entitled "Factors effective medication errors: A neonatal nursing view" that most of the NICU nurses were competent regarding IV therapy administration as well as blood and blood products' administration for neonates. In the current research, the top contributing among nurse-related factors was the careless performance of the neonatal nurse which was mentioned as one of the most effective factor by other researchers too.

The current study showed that the competent core are implemented for neonates estimated at around more than one third while incompetent more than two third of the studied nursing were from total competent of neonatal nurses 'competency procedures, part 3, (table 14). This result is in accordance with ***Mirlashari et al. (2016),*** who mentioned in the study entitled "Clinical competence and its Related Factors of Nurses in Neonatal Intensive Care Units "that more than two thirds from the total neonatal nurses are competent regarding their nursing activities and the remaining nurses needs more training to improve their performance. The study concluded that more than half of studied nurses were having incompetent nursing care activities at NICU.

In the light of the study findings, the following recommendations were suggested:

- Nurses' competencies in NICU should be regularly assessed and updated.
- Continuous education and training of nurses at NICU should be carried out periodically to provide quality of care for neonates.

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