

**Establishing Basic Standards of Nursing care protocol at Neonatal Intensive care unit.**Sabah Mohamed El sayed<sup>1</sup>, Yomn Y. Sabry<sup>2</sup>, Hamed M. sharkawy<sup>3</sup>, Ebtisam M. elsayed<sup>1</sup> and Thanaa Ali<sup>1</sup>Faculty of Nursing,<sup>1</sup> Tanta and<sup>2</sup> Alexandria University,<sup>3</sup>Faculty of Medicine, Tanta University

**Abstract:** The advancements in intensive care in recent decades have enabled better survival of full spectrum of newborns. The management of neonates at NICU is based on various modalities of support and application of fundamental principles of neonatal care. **The aim** of this study was to establish basic standards of care for nurses working at Neonatal Intensive Care Unit. **The subjects** of the present study consisted of 70 nurses working in Neonatal Intensive Care Unit and responsible for providing direct care for newborn. Two tools were used to collect data: **Knowledge assessment sheet and observation checklist** to assess nurses' knowledge and actual performance of nurses providing direct care for neonates in Neonatal Intensive Care Unit before, immediately, and after three months from the standard application. **The results** showed that, before the standard application the total scores of knowledge for nurses were good (30 %) and poor with percentages of 63%. It was improved immediately, and after three months later of the standard application. There was significant difference in nurses' performance before, immediate, and after three months of the standard application. **Conclusion:** it can be concluded that all the nursing activities presented in the initial standard as basic nursing responsibilities was enhanced. **Recommendations:** The developed standards should be translated into Arabic and disseminated to the managers of health organizations. [Sabah Mohamed El sayed, Yomn Y. Sabry, Hamed M. sharkawy, Ebtisam M. elsayed and Thanaa Ali.

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**1. Introduction**

The neonatal period is defined as the first four weeks subsequent to birth<sup>(1)</sup>. Some newborns require observation and care that is beyond the scope of a normal newborn nursery, these are called high risk neonates<sup>(2)</sup>. High risk neonate can be defined as a newborn, regardless of gestational age or birth weight, which has a greater-than-average chance of morbidity or mortality, requiring early intervention that should be delivered at neonatal intensive care unit<sup>(3)</sup>. It provides care to full spectrum of newborns ranging from extremely premature infants, to high-risk and critically ill babies, to less critically ill babies who are recovering and maturing with increased emphasis is being placed on the need for standards of care, as well as mechanisms which address the barriers to provision and use of quality care<sup>(4)</sup>. The first step in improving quality of nursing care is an articulation of standards of care that provide a mean for determining quality of care as well as accountability of the nurses<sup>(5)</sup>. A standard is defined as a professionally agreed level of performance, it provides the required knowledge and skills that can be used to orient new staff and to guide nurses in clinical practice<sup>(6)</sup>. Nurses are the key elements in critical care. They are required to keep pace with the rapid changes in health care, and provide quality of patient's care in a cost-effective manner<sup>(7)</sup>.

**Aim of the study:** was to assess actual performance of nurses working in Neonatal Intensive Care Unit at Tanta University Hospital.1

**2.Subjects and Method:-****Research design: -**

A quasi-experimental research design was used to accomplish this study.

**Setting:**

This study was carried out at the Neonatal Intensive Care Unit of Tanta University Hospital.

**Sample:**

Consisted of all bedside nurses working in NICU responsible for providing direct care for neonates with any health problems in the previously mentioned setting. Their number was 70.

**Tools:-**

1-A Structured questionnaire sheet for Neonatal Nursing management competences: This tool was developed to assess nurses' knowledge and skills related to the basic competences needed for neonatal care.

2- Nurses practice observational checklist to assess their actual performance in providing direct care for those neonates.

**Method:**

- All nurses were observed during different nursing procedure at different shifts (morning, afternoon and night shifts).
- The questionnaire was answered on an individual basis in the presence of the researcher. The time needed to answer the questionnaire ranged from thirty minutes to one hour. Data collection of this tool lasted approximately ten months.
- Preparation of suitable media for teaching the nurses including; lectures, data show, poster, video, doll for redemonstration, and book notes.
- Determining the framework of the standards; The Donnabedian model<sup>(8)</sup> (structure, process and outcome) was used.

Implementation of the standard care strategies.

- Nurses were divided into ten groups, seven nurses in each group.
- The standard of care was discussed for all nurses included in the study; it includes 13 sessions; daily care , high risk, infection control, CPR, suction, ventilator, phototherapy, kangaroo care, relactation, tactile stimulation , palliative care , communication and discharge plan.)

Evaluation was done immediately and three months later.

**Part (A):-Knowledge of the nurses regarding care of neonates at NICU was evaluated and classified as:**

Every item was evaluated as follow:

- Correct and complete answer was scored (2)
- Correct and incomplete answer had been scored (1)
- incorrect and incomplete answer had been scored (0)

Total score of knowledge items was calculated in percentage and a score of 70% or more is considered good, 60-69% fair & less than 60% was considered poor.

**Part (B):-Practice of the nurses regarding care of neonates at NICU was evaluated and classified as:**

Every item evaluated as follow:

- Competent (Correct and complete done) had been scored (2)
- incompetent (Correct and incomplete done) had been scored (0)
- incorrect or not done had been scored (0)

The scoring system of the practice including zero point for either incorrectly or not done, because this result will affect the survival of the neonates.

The total score of every item had been calculated in percentage and classified as follow:

- 85 and more had been considered good
- 70-84 % had been considered fair.
- Less than 70% had been considered poor.

**3.Results:**

Table (1) illustrates the general characteristics of nurses included in the study. It was observed that, nearly two third (60%) of the nurses were 30 to less than 40 years old, with mean age were  $31 \pm 6$ . Regarding their education, 67.1% of nurses are secondary nursing school graduates while 24.3 % of them have completed their university nursing education and only 8.6 % of them have a technical nursing institute certification.

Unfortunately, the same table indicates that only 12.9 % of nurses have attended specific course/ training in neonatology, and the majority of them (87.1%) did not attain any course or training. It was observed that most of them (85.7) were married and 14.3% were single. In relation to their years of experience in NICU, the result reveals that the mean years of experience in NICU were  $11.6 \pm 5.8$  years.

**Table (1): Distribution of the Nurses According to Their General Characteristics.**

Characteristics	No.	%
	70	
<b>Age in years</b>		
20 –	24	34.3
30 –	42	60
40 –50	4	5.7
<b>Total</b>	<b>70</b>	<b>100</b>
<b>X ±SD</b>	31±6	
<b>Education</b>		
•Baccalaureate degree	17	24.3
• Technical nursing institute	6	8.6
• Secondary nursing school.	47	67.1
<b>Total</b>	<b>70</b>	<b>100</b>
<b>Attending special courses/training in neonatology.</b>		
• Yes	9	12.9
• No	61	87.1
<b>Total</b>	<b>70</b>	<b>100</b>
<b>Marital status:-</b>		
•Married.	60	85.7
•Single.	10	14.3
<b>Total</b>	<b>70</b>	<b>100</b>
<b>Years of experience: 1 -</b>		
5 –	18	25.7
10 –	10	14.3
15 –	12	17.1
20 –25	26	37.2
	4	5.7
<b>Total</b>	<b>70</b>	<b>100</b>
<b>X ±SD</b>	<b>11.6±5.8</b>	

Table (2): shows the correlation between nurses' knowledge before and immediately after application of the standard, and between before and three months after application of the standards of care. It was observed that, the nurses' levels of knowledge

regarding high risk neonates, infection control, oxygen therapy, control of body temperature, kangaroo care, nutrition, re-lactation, tactile stimulation, and support of parents (19%, 13%, 34%, 46%, 100%, 37%, 100%100%, and 99%.) respectively were incompetent before application of the standard, while after application of the standards either immediately or three months later , the nurses ' knowledge regarding the previously mentioned items completely improved, With statistical significant differences  $p<0.001$ .

Table (3): shows the correlation between nurses' performance before, immediately after application of the standards, and between before and three months later from application of the standards. It was reveals that, the percentage of nurses' performance regarding control of infection were 96% incompetent before standard compared to 61% and 69% immediately and after application of the standard respectively. The percentage of others items also was decreased after application of the standard as: (daily care, measurements, suction, resucetation,ventilation and communication) . statistical significant difference was detected ( $p<0.001$ ).

Table (4) and figs. (1, 2): represents the total score for the nurses' knowledge and practice

according to their level of performance. It was observed that 63% of the nurses' knowledge was incompetent before standard application, compared to 8% and10% immediately and three months later respectively. As regards nurses' practices the total scores were 80% incompetent before standard and decreased to 30% and 36% respectively immediately and three months later from application of the standards. There were statistically significant differences ( $p<0.001$ ).

Table (5) and Figs (3, 4): Illustrated the total score of nurses' performance according to their competences. It was observed that, the total scores of nurses' knowledge were poor with percentage 63%, whereas, immediately and after three months of the standard application, the total score of knowledge improved as the majority of them (89%) and (81%) obtained good scores respectively. As regards the total score of practice, 80% of nurses' performances were poor before the standard, while after application of the standard either immediately or after three months, the nurses' performance improved and 45%,43%obtained good scores respectively with statistical significant difference . ( $p<0.001$ ).

**Table (2):** The correlation between nurses' knowledge before and immediately after application of the standard, and between before and three months after application of the standard

	Before		Immediate		After		P1	P2
	In Competent		In Competent		In Competent			
	No.	%	No.	%	No.	%		
1- High risk neonates	13	19	0	0	0	0	<0.001	<0.001
2- Infection control	9	13	0	0	0	0	<0.001	<0.001
Oxygen therapy-3	24	34	0	0	0	0	<0.001	<0.001
4- Suction	41	59	0	0	10	14	<0.001	<0.001
5- Ventilator	35	50	14	20	16	23	<0.001	<0.001
6-Control body temperature	32	46	0	0	0	0	<0.001	<0.001
7- Kangaroo care	70	100	0	0	0	0	<0.001	<0.001
8- Nutrition	26	37	0	0	0	0	<0.001	<0.001
9- Relactation	70	100	0	0	0	0	<0.001	<0.001
10- Tactile stimulation	70	100	0	0	0	0	<0.001	<0.001
11- Support parents	69	99	0	0	0	0	<0.001	<0.001
12- Palliative care	70	100	50	71	55	79	<0.001	<0.001
Total	44	63	5	8	7	10		

P1: Comparing between before and immediate.

P2: Comparing between before and after three months.

**Table (3):** Correlation between nurses' performance before and immediately after, and between before and three months after application of the standards of care.

Items	Before		Immediate		After		P1	P2
	In Competent		In Competent		In Competent			
	No.	%	No.	%	No.	%		
1- Infection control	67	96	43	61	48	69	<0.001	<0.001
2- Daily care.	45	57	4	5.5	16	23	<0.001	<0.001
3- Measurement.	70	100	55	78.5	55	78.5	<0.001	<0.001
4- Phototherapy	51	73	25	35	27	38	<0.001	<0.001
5- Intravenous therapy	53	76	44	63	44	63	<0.001	<0.001
6- Gavage feeding.	67	96	15	21	20	29	<0.001	<0.001
7- Oxygen therapy.	16	23	5	7	8	11	<0.001	<0.001
8- Pulse oximetry	58	83	10	14	10	14	<0.001	<0.001

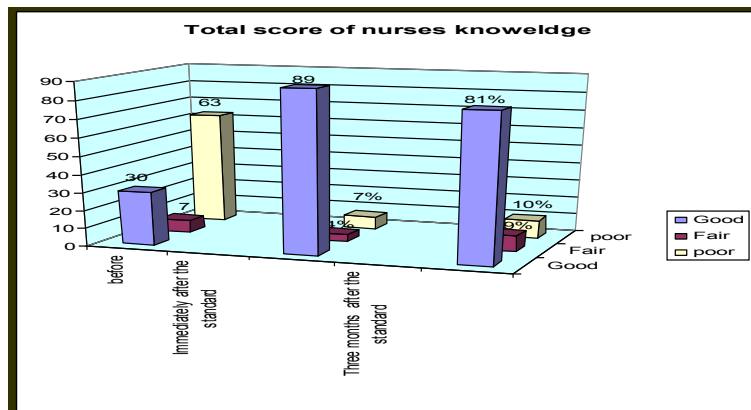
9- Suction	70	100	0	0	0	0	<0.001	<0.001
10- Resuscitation	70	100	10	14	20	29	<0.001	<0.001
11-Ventilator	70	100	22	31	30	43	<0.001	<0.001
12-Communication	43	61	19	28	21	30	<0.001	<0.001
Total	56	80	21	30	25	36	<0.001	<0.001

**P1:** Comparison between before and immediate after application of the standard

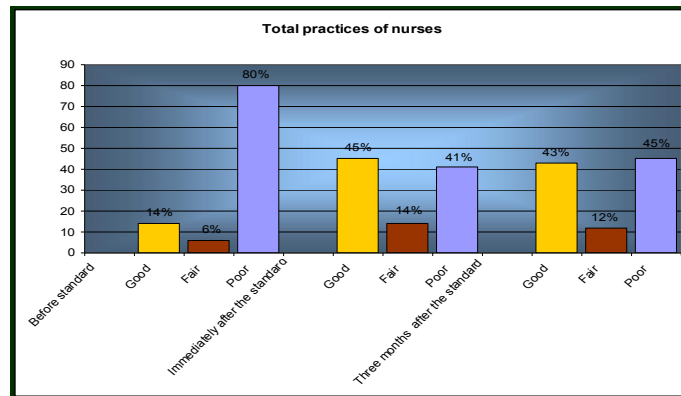
**P2:** Comparison between before and after three months application of the standard

**Table (4):** The Total Score of Nurses' Knowledge and Practice according to Their Level of performance.

	Before				Immediately				Three months later				P value
	Comp.		In comp.		Comp.		In comp.		Comp.		In comp.		
	No	%	No	%	No	%	No	%	No	%	No	%	
Knowledge	26	37	44	63	65	92	5	8	63	90	7	10	<0.001
practice	14	20	56	80	49	70	21	30	45	64	25	36	<0.001



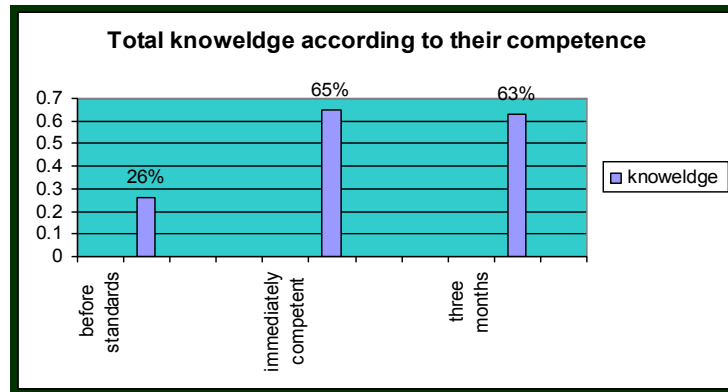
**Figs. 1:** Total Score for the Nurses' Knowledge according their level of performance.



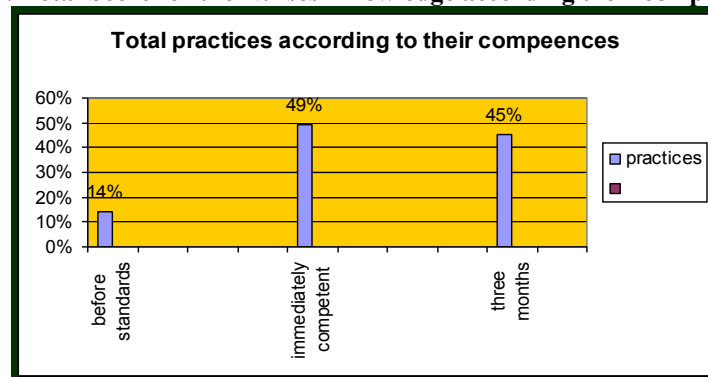
**Figs 2:** Total Score for the Nurses' Practice according their level of performance

**Table (5):** The Total Score for the Nurses' Knowledge and Practice according to their competence

	Before standard		Immediately after the standard		Three months after the standard		Fisher exact test P value	
	no	%	No	%	No	%		
<b>knowledge</b>							<i>p</i> < 0.001	
Good	21	30	62	89	57	81		
Fair	5	7	3	4	6	9		
Poor	44	63	8	7	7	10		
Total	70	100	70	100	70	100		
	<b>Practice</b>							<i>p</i> < 0.001
Good	10	14	32	45	30	43		
Fair	4	6	9	14	8	12		
Poor	56	80	29	41	32	45		
Total	70	100	70	100	70	100		



**Figs 3: Total Score for the Nurses' knowledge according their competences.**



**Figs 4: Total Score for the Nurses' Practice according their competences**

#### 4. Discussion:

Maintaining and improving neonatal care requires active involvement of everyone in health care system, in order to meet the needs for evaluating health care in its totality as well as to identify whether effective and appropriate care has been provided. Education and training are potential means for implementing effective nursing care at Neonatal Intensive Care Unit (NICU), as they alter perception, increase knowledge, and in turn change work practice. (9) "The current study is figuring out that, most of nurses didn't attend any previous in-service training program related to neonatal care at NICU. This finding may be owing to the shortage of nurses' number, absence of continuing education department in the hospital and lack of motivation for training, as well as increased workload in Neonatal Intensive Care Unit. The findings of the current study are in line with ". The British Association of Perinatal medicine (BAPM) (10) which stated that "a lack of trained staff may lead to care that is unsafe." and Jeffery *et al.* (11), Vidal *et al.* (12), stated that the implementation of effective training programs for health care providers in hospital settings followed by moderate improvement in Essential Newborn Care (ENC) is a must. While the finding was incongruent with another study (13), who revealed that the nurses' factors

related to in-service training had no effect on both nurses' knowledge and performance.

The current study revealed that about two third of nurses' knowledge was incompetent about neonates in intensive care unit before standards application, while immediately and after three months application of the standards, nurses' knowledge highly improved. On the other hand, it was found that, most of them demonstrated incompetent level of performance before standards, which improved also immediately and three months later. This moderate level of competencies could be related to the improper working environment and unclear cut-responsibilities among nurses, as well as the in-adequate attendance of continuous pre-service and in-service training programs. This finding is supported by Salem (14) who showed that, half of the studied nurses gave correct responses when assessing their level of knowledge, while none of them attained the competent level in their performance. Another study carried out by El-Sayed (15) who reported that, a score of more than half of studied nurses was unsatisfactory regarding care provided for neonates. Fair performance was observed among more than half of nurses as mentioned by El-Mommani (16).

In addition WHO (2006), (17), which stated that, there was inadequate nurses' knowledge and performance and attributed this deficiency to one or

more of the following reasons as mentioned; lack of orientation program prior to work as well lack of nursing care conference during work, invariability of procedure, and books especially in the studied area, lack of supervision, and nurses' evaluation against identified standards of patient care. On the contrary, this finding disagreed with Al-Sharkawy (18). Who reported that, almost three-quarters of nurses had good scores of performance.

The present study showed that few of nurses have competent level of performance about infection control, before standards, which increased immediately and after three months application of the standards. This low level of performance may be due to shortage of staff, absence of continuous observation from health professionals and lack of work motivation either verbal or financial. This result is congruent with Abd-alla (19). who found inadequate nurses knowledge and practice related to nosocomial infection, principle of disinfectant, sterilization, and standard infection control precautions and he interpreted that by the lack of nurses' awareness with importance of infection control and safe health practice. Attia (20) and El-Shenawy (21) revealed that control of infection in ICU was considered a total responsibility of the nurse as stated by the entire expert group included in their studies.

A large number of premature infants require prolonged ventilatory support. In order to provide this support an artificial airway must be inserted. This airway can be established in one of two ways, either with an end tracheal tube or by the means of a tracheotomy tube. Regardless of which method is used, the neonate's upper airway is by passed, thus reducing the neonate's ability to clear secretions spontaneously. Additionally, the presence of the tube may lead to an increase in sputum production. For these reasons neonates with an artificial airway in place will require airway suctioning (22). Endotracheal intubation may be necessary for the ventilation process. The nurse must constantly ensure tube placement, stability and patency. End tracheal intubation and subsequent oxygen therapy decrease ciliary activity and accelerate mucus production. Appropriate suctioning of the end tracheal tube is required to aid in the outflow of pulmonary secretions and assure patent airway. (23, 24-5)

The present study revealed that half of nurses were competent in performing suctioning before standard application and it increased to include all of them immediately and after three months application of standards. . Increased awareness that suctioning is one of nurses' own responsibilities could be the reason behind this competent level of performance, in addition to the understanding of the danger of accumulation of these secretions in the neonates'

airway. The Finding of the present study was in accordance with El-Mommani (16) who reported that ,more than half of nurses demonstrated poor level of performance in suction procedure, and another(13) who reported that ,suction was satisfactory in only few numbers of nurses. The result of the current study is in the line with Salman (7) who revealed that, three quarter of nurses gave competent answers about assisting pediatricians during end tracheal tube insertion. Moreover, most of nurses scored competent in performing suctioning.

Anthropometric measurements help in assessing neonates' growth and development. When combined with other measurements, they are used to form an index that becomes useful (WHO 2009) (26). Anthropometric indices such as height for age, weight for age and weight for height can be compared to recognized standards of growth to decide if the individual or populations under investigation are within the normal for size, proportion or composition. (27) As regards this aspect, the present study revealed that, the majority of the studied nurses demonstrated incompetent level of performance in taking the neonates' general measurements. This could be attributed to the fact that pediatricians usually do the measurements on admission as a part of their physical examination. Weight is an important measurement which should be performed by the nurses and couldn't be measured, in spite of the fact that weighing the neonate is considered as a part of their routine nursing care which should be performed every night shift, this could be attributed to unawareness of the nurses that weighing should be done regularly to protect rapid decrease in body weight which may result from dehydration or insufficient caloric intake.

The findings of the current study are in harmony with a study carried out by El-Sayed (15) who reported that none of the studied nurses had taken the general measurements for the neonates. Furthermore, El-Mommani (16) stated that the lowest scores were assigned to taking general measurements, and Mahmoud (28) reported that approximately two-thirds of nurses were unsatisfactory in this aspect. In addition Al-Sharkawy (18) found that only few numbers of the studied nurses were good in taking general measurements for neonates. Mohamed (13) found that the majority of nurses did not take the length, the head and chest circumferences, while weighing the neonates was done by more than one-quarter of nurses.

#### **Conclusion: Recommendations:-**

Conclusion: it can be concluded that there was an enhancement in nurses' knowledge and moderate improvement in performance after application of the standard. Recommendations: The developed

standards should be translated into Arabic and disseminated to the managers of health organizations.

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