

Factors Contribute to Non Applicability of the Developmental Supportive Care by Neonatal Nurses at Intensive Care Unit

Amany Ahmed Mohamed⁽¹⁾, Iman Ibrahim Abd Al-Moniem⁽²⁾, Madiha Amin MorsyAbou Khalaa⁽³⁾, Eman Abdel Fattah ALI⁽⁴⁾

B.Sc. Nursing (2012)⁽¹⁾, Professor of Pediatric Nursing⁽²⁾, Assistant Professor of Pediatric Nursing⁽³⁾, Assistant Professor of Pediatric Nursing⁽⁴⁾
Faculty of Nursing -Ain Shams University.

Abstract

Background: Developmental care was introduced as a method to protect the neonates' neurological system; it consists of a large range of medical and nursing interventions that help to reduce the stress of neonates in neonatal units. **Aim of the study:** To assess factors affecting non-applicability of developmental supportive care by neonatal nurses at neonatal intensive care unit. **Research design** A descriptive research design was utilized. **Setting:** The study was conducted at the neonatal intensive care unit (NICU) at Tanta Educational Hospital at Gharbia Governorate. **Subject:** A purposive sample of sixty nurses who were providing direct care to neonates in the previously mentioned setting.. **Tools for data collection:** Two tools were used questionnaire sheet and observational checklists to identify the factors contribute to non-applicability of the developmental supportive care. **Results:** It was found that more than half of the studied nurses had poor knowledge and had incompetent level of practices as well as the lack of neonatal physical set up facilities, which all considered as factors lead to non-applicability of developmental supportive care. **Conclusion:** the deficit of knowledge, lack of neonatal physical set up facilities lead to non-compliance of nurses' practice, which considered factors contribute to non-applicability of developmental supportive care. **Recommendation:** Enhancing neonatal nurse's knowledge, practice and standardize the neonatal physical set up for application developmental supportive care.

Keywords: Non -Applicability, Development Supportive Care , Neonatal Intensive Care Unit and Neonatal Nurses.

Introduction:

The neonatal period is the first 4 weeks of a neonate life. It is a time when changes are very rapid. Many critical events can occur in this period since neonates brain go through a critical period of development and maturation between 24 and 40 weeks of gestation occurring mainly during their hospitalization in the neonatal intensive care unit (NICU) (Rozance et al., 2021).

Neonates in the Neonatal Intensive Care Unit (NICU) are extremely vulnerable and dependent, requiring care tailored to meet specific needs and unique concerns. The extra uterine environment does not support normal growth and development of neonates (Raghu and Vatsa, 2021).

Neonatal units are stressful, busy environments where newborns are cared for. Stressors such as bright lights, intense noise, painful procedures frequent physical handling, and sleep disturbance might affect the structural and functional development of the neonates brain, causing neuro-developmental disabilities in preterm neonates, which may lead to poor developmental outcomes, physical, motor, and cognitive impairments (Weber and Harrison, 2020).

Developmental supportive care refers to a range of strategies designed to modify the neonatal unit environment and modes of care to reduce the stressors on the developing brain. It commonly implemented by neonatal nurses to support the neonates' physiological stability and

optimize their neurodevelopment this involves. Positioning, skin to skin contact (touch, Kangaroo care), minimizing stress (noise, excessive lights) and pain to support each neonate to be as stable (*Griffiths et al., 2019 & Ding et al., 2019*).

The aim of developmental supportive care is to support each neonate and family to maintain neonate stability by responding to the neonates' cues, handling them carefully, positioning them with support and involving family in their care from day one (*Royal Women's Hospital, 2018*).

The neonatal nurses are the backbone of the neonatal intensive care units (NICU). Nurses working in NICU are uniquely positioned to facilitate safer and less stressful environment while they provide care to the preterm neonates. They also play a vital role in leading the successful implementation of developmental supportive care (*Zhang et al., 2016*).

There are several barriers affecting effective implementation of developmental supportive care in neonatal intensive care units (NICU) such as, nurses' lack of knowledge or training about developmental supportive care, staff resistance, lack of time, lack of administrative support, lack of equipment and supplies, inadequate number of staff, NICU environment, and frequent staff rotation (*Austin et al., 2019*).

Significance of the Study:

Neonates have an increased risk of neuro-developmental disorders including motor, cognitive, and behavioral impairment also neonates are exposed to a variety of sensory stimuli so, non- applicability of developmental supportive care can lead to brain injury, neurosensory impairment, and respiratory disease (*HeeChung et al., 2020*).

Developmental supportive care practices have shown positive outcomes for neonates, including enhanced weight gain, shorter hospitalization duration, decreased cost of

hospital stay, promotion of normal growth and development, enhanced family emotional and social wellbeing, decreased incidence of moderate/severe chronic lung disease and effective pain control (*Park and Kim, 2019*).

Aim of the study:

This study aimed to assess factors affecting non-applicability of developmental supportive care in neonatal intensive care unit.

Research questions:

- What are the factors contribute to non-applicability of the developmental supportive care?
- 1-Are the nurses' knowledge deficit about the developmental supportive care factors lead to non-applicability?
- 2 Does the neonatal intensive care unit physical set up facilities contribute to application of the developmental supportive care?
- 3-Do nurses' practices policy contribute to non-applicability of the developmental supportive care?

Subjects and Methods

Subjects and methods for this study were portrayed under the four main designs as the following:

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

I- Technical Design

The technical design of this study includes four main categories: research design, setting, subject and tools of data collection.

Research Design:

A descriptive research design was utilized in this study.

Research Setting:

The study was conducted at the selected Neonatal Intensive Care Unit (NICU) at Tanta Educational Hospital at Gharbia Governorate which considered the biggest hospital in

Gharbia Governorate providing care to neonates.

Research Subjects:

Purposive sample of nurses who providing direct care to neonates in the previously mentioned setting, The total number of nurses were (sixty nurses) regardless their age, educational level, years of experiences and attending of previous courses.

Tools of data collection: Two tools of data collection was used a questionnaire sheet and an observation checklist.

1- Questionnaire sheet:

It was designed by the researcher based on scientific updated literature review after reviewing the related national and international related studies. It was written in simple Arabic language to suite the understanding level of the study subject, it was consist of three parts as the following:

- **Part I: Concerning characteristics of nurses** include (age, educational level, years of experience, previous attending of training courses).
- **Part II: Concerning nurse's Knowledge regarding developmental supportive care:** It consisted of (34) questions.
- **Part III: Concerning** an assessment of the environment of the neonatal intensive care unit **which could lead to non –applicability of developmental supportive care:** It consisted of (11) questions.

❖ Scoring System:

The scoring system for the studied nurse's knowledge was designed as follows: A score was assigned for each question concerning specific items. According to the nurse's responses each complete correct answer was given (2) mark, incomplete correct answer was given (1) mark and incorrect answer was given (0) mark, these scores were summed-up and converted into a percent score., The total

score was (90) marks, 100% and accordingly three score level as following:

- Score more than 90% was considered good knowledge.
- Score from 80% <90% was considered average level of knowledge.
- Score less than <80% was considered poor knowledge

2-An observational checklist:

It was adopted from (*Betts et al., 2015 & Bowden and Greenberg, 2016*). Used by the researcher to assess nurses' applicability of developmental supportive care it included the following items:

- 1-Postures support/positioning:-supported side lying (5 items), supported supine (4 items) & supported prone (3 items).
- 2-Reducing noise (6 items).
- 3-Reducing light (4 items).
- 4-Containment (2 items).
- 5-Kangaroo care (7 items).
- 6-Non-nutritive sucking (4 items).

❖ Scoring System:

The scoring system for the practice of the studied nurses regarding application of developmental supportive care was designed as follows 6 procedure each procedure consisted of number of steps, each step scored (1) if competently done and (0) if not done. The total score level was (35), according to the nurse actual practice it was classified into competent level of performance more than (99%) and incompetent level less than (99%) practices.

These scores was summed up and converted into percent score. According to the actual practice for each study subject. It was be categorized into:

- Incompetent less than 99%.
- Competent 99% or more.

II-Operational design:

The operational design for this study consisted of three phases, namely; preparatory phase, pilot study and field work.

Preparatory phase:

It included review of the past, current, local and international related literature on

various aspects of the study using. Books, articles, internet, periodicals, magazines in order to develop and modify the data collection tools.

Ethical Consideration:

Approval to conduct the study was obtained from the ethical committee in the faculty of nursing, Ain Shams University before starting the study. The researcher explained and clarified the study aim and conducting way to the participants before taking the consent of participation. The researcher assured maintaining anonymity and confidentiality of data of subjects included in the study. The participants were informed about their right to withdraw from the study at any time without giving any reason.

Pilot study:

Pilot study was carried out on 10% (6 nurses) of the studied nurses at the previously mentioned setting in order to test the applicability of the constructed tools and its clarity and validity. The pilot has also served to estimate the time needed for each subject to fill in the questions, the subjects who were included in the pilot study were included in the study sample because no modification was done after conducting the pilot study.

Validity and Reliability:

It was ascertained by three experts from Pediatric Nursing department, faculty of nursing, Ain Shams University. Their opinions were elicited regarding comprehensiveness, accuracy, clarity, relevance and appropriateness of the study tools.

Testing reliability of the proposed tools was done statistically by Cronbach's alpha test. The coefficient alpha for nurses' knowledge sheet=0.81, Observational Checklist=0.80 and total factors related to neonatal physical set up =0.87.

Field work

This study was conducted in a period of 6 months started at August (2021) month and ended at January (2022) for data collection, the

researcher was available in the study setting during morning and afternoon shifts 2 days per week (Saturday, and Monday) at the previously mentioned setting where 2-3 nurses/day were met.. Questionnaire was distributed to be filled by nurses in (30-40minute). The researcher observed each nurse in each shift for each procedure in different shift twice. Then the researcher filled checklists during nurses' practices (25-30 minutes).

III- Administrative design:

An official letter including the title and purpose of the study to carry out the study was submitted from the dean of faculty of nursing, Ain Shams University to the administrators of neonatal intensive care unit at Tanta Educational Hospital. To collect the necessary data for the current study.

IV- Statistical analysis

Data collected from the studied sample was revised, coded, tabulated and entered using computerized data entry and statistical analysis were fulfilled using the statistical package for social sciences (SPSS) version 20. Data were presented using descriptive statistics in the form of frequencies, percentages. Chi-square test(x) was used for determine whether there was a significant statistically difference or not and correlation coefficient (spearman's rank test) was used to test correlation between knowledge and performance.

Significance of results:

- At $p < 0.05$ there was a statistically significant difference.
- At $p > 0.05$ there wasn't a statistically significant difference.

Results:

Table (1): shows that, the mean age of the studied nurses were 28.56 ± 4.22 years. Regarding educational level it was found that 66.7% of them had nursing bachelor degree. Regarding to years of experience were 6.49 ± 3.7 as 51.6% had from 5 years to less than 10 years, And all of nurses did not receive developmental supportive care courses.

Table (2): illustrates that 61.7% of the studied nurses had poor total knowledge regarding developmental supportive care, light, noise, positioning, kangaroo care, non-nutritive sucking and family-centered care.

Figure (1): clarifies that 61.7% of the studied nurses had poor level of knowledge, 25% of them had good level of knowledge and the minority 13.3% of studied nurses had average level of knowledge regarding developmental supportive care.

Figure (2): clarifies that 95% of the studied nurses reported that physical set up facilities of neonatal intensive care unit was a factor contribute to non-applicability of

developmental supportive care, while 5% of them reported that neonatal physical set up was not affecting application of developmental supportive care.

Figure (3): clarifies that 63.3% of the studied nurses had incompetent level of practices regarding developmental supportive care, while 36.7% of them had competent level of practices.

Table (3): shows that there was a statistically significant positive correlation between the studied nurses' total knowledge and their total practices regarding to factors affecting non applicability of developmental supportive care at neonatal unit.

Table (1): Distribution of the Studied nurses regarding to their Characteristics (n=60).

Characteristics of Nurses	N	%
Nurses' age (years)		
20- <25	15	25.0
25- <30	24	40.0
30 or more	21	35.0
Mean±SD	28.56±4.22	
Level of education		
Technical nursing institute	17	28.3
Nursing bachelor degree	40	66.7
Master of nursing	3	5.0
Years of experience at neonatal intensive care unite		
< 2	7	11.7
2< 5	16	26.7
5< 10	31	51.6
≥10	6	10.0
Mean±SD	6.49±3.7	
Previous Training Courses related Developmental Supportive care courses?		
Yes	0	0.0
No	60	100

Table (2): Distribution of the studied nurses' total knowledge regarding developmental supportive care (n=60).

Items of total knowledge	Good		Average		Poor	
	N	%	N	%	N	%
Developmental supportive care	6	10.0	3	5.0	51	85.0
Light and noise in neonatal intensive care unit	20	33.3	6	10.0	34	56.7
Developmental supportive positioning	17	28.3	4	6.7	39	65.0
Kangaroo care	26	43.3	6	10.0	28	46.7
Non-nutritive sucking	11	18.3	11	18.3	38	63.3
Family-centered care	27	45.0	14	23.3	19	31.7
Total knowledge	15	25.0	8	13.3	37	61.7

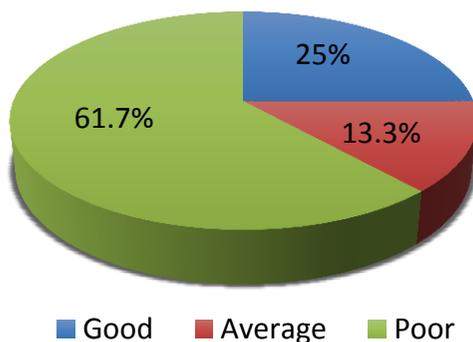


Figure (1): Percentage distribution of the studied nurses' total knowledge regarding developmental supportive care (n=60).

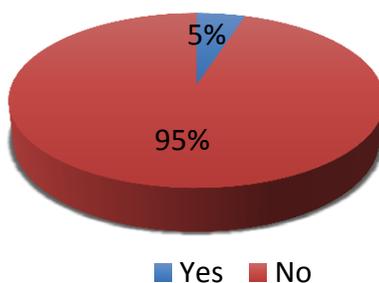


Figure (2): Percentage distribution of the studied nurses knowledge regarding physical set up facilities of neonatal intensive care unit as a factor affecting non-applicability of developmental supportive care (n=60).

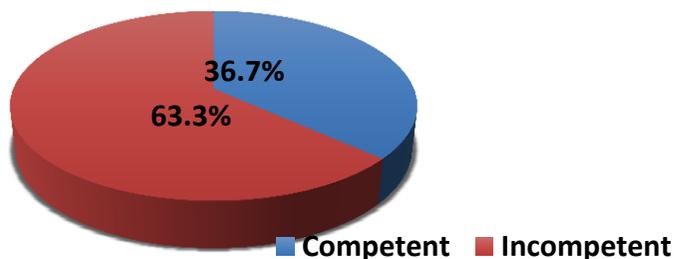


Figure (3): Percentage distribution of the studied nurses' total practices regarding developmental supportive care (n=60).

Table (3): Correlation between nurses total knowledge, total practices and neonatal physical Factors affecting non applicability of developmental supportive care (n=60).

	Total knowledge score		Total practices score	
	r	P-value	r	P-value
Total neonatal Factors related to physical set up facilities score	0.806	<0.001*	0.394	<0.001**

Discussion:

Concerning the characteristics of the studied nurses (**Table 1**), the present study revealed that, less than half of studied nurses were in age group 25-30 with mean age 28.56 ± 4.22 years.

This finding was in agreement with **Ahmed and Mohammed, (2019)**, in a study entitled "Effect of Implementing Learning Package of Nesting and Swaddling for Premature Infants on Nurses' Knowledge and Performance in NICU" who found that less than half of studied nurses were in age group 25-30 with mean age 28.9 ± 3.3 years.

Regarding nurses' level of education (**Table 1**), the current study findings revealed that, two thirds of studied nurses had bachelor of nursing science. This finding was supported with **Fadlalmola and Elhusein, (2020)**, in a study entitled "Nurses' knowledge and practice on the care of preterm infants at Khartoum state hospitals" who found that, most studied nurses had bachelor's degree in nursing sciences.

This finding was similar to **Mehrnoush et al. (2017)**, in a study entitled "Knowledge and Attitude of Personnel, Key Factors in Implementation of Neonatal Pain Management in NICU" who found that, the majority of the participating nurses had a bachelors' degree of nursing.

Owing to nurse's years of experiences (**Table 1**), the present study revealed that more than half of the studied nurses had from five to less than ten years of experience with mean years of experience was 6.49 ± 3.7

This result was in disagreement with **Adam and Elssayed, (2022)**, in a study entitled "effect of neonatal training programs on NICU nurses' knowledge and practice in the military and police hospitals of khartoum state, Sudan" who found that one third of the studied nurses had about one to five years of experience.

Regarding receiving related developmental supportive care courses, the findings of the present study revealed that, all nurses hadn't received or attend any program or courses regarding developmental supportive care

This finding was similar to **Henawy et al. (2021)**, in a study entitled "Effect of developmental supportive care training program on nurses' practice regarding behavioral response of premature neonates" who found that all nurses hadn't attended the training program about developmental supportive care.

It could be concluded that the poor total nurses' knowledge regarding developmental supportive care as a factor contribute to non-applicability of developmental care (**Table 2**),

These results were supported by results of **Lee et al., (2022)**, who studied "Analysis of research on developmentally supportive care for prematurity in neonatal intensive care unit" and revealed that, the nurses' level of knowledge regarding developmental supportive care was not high as there was no significant difference in the knowledge and perceived competence of skilled nurses compared with novice nurses.

These findings were contradicted with, **Baghlani et al. (2019)**, in a study entitled "Neonatal Intensive Care Unit Nurses' Perceptions and Knowledge of Newborn

Individualized Developmental Care and Assessment Program" who found that most of the nurses had a good and excellent level of knowledge about developmental supportive care.

Regarding to the neonatal intensive care unit physical set up **Figure (2)** the present study revealed that most of studied nurses had reported not availability of resources needed for developmental care and not suitability of the Structure of neonatal unit physical set up. These findings were similar to **Godarzi et al. (2018)**, in a study entitled "Nurses' Opinions on the Barriers to Effective Implementation of Developmental Care in Neonatal Intensive Care Units" and found that. Most nurses emphasized on inappropriate environments in terms of available space and necessary equipment.

As regards nurses' total practices about developmental supportive care **Figure (3)**, the present study showed that the studied nurses had incompetent level regarding application of developmental supportive care. This finding was similar to **Henawy et al. (2021)**, in a study entitled "Effect of developmental supportive care training program on nurses' practice regarding behavioral response of premature neonates" who found that most of nurses had poor and unsatisfactory level of practice regarding developmental care and also poor level of knowledge.

In the same context **Elarousy et al. (2020)** in a study entitled effectiveness of nurses' training program about neuro-protective developmental care for premature neonates on their knowledge and practices in neonatal intensive care unit found that majority of nurses had "unsatisfactory" score in their practices regarding developmental care before training program.

Regarding the correlation between the studied nurses' total knowledge and their total actual practices **Table (3)** the current study revealed that there was statistically significant positive correlation between the studied nurses' total knowledge and their total actual practices

regarding factors affecting non applicability of developmental supportive care at neonatal unit.

These findings were contradicted with **Ahmed et al. (2013)**, who found that there was highlighted a statistical significant difference in the relationship between nurses' practice and their level of knowledge pre and post instructional sessions implementation.

Finally, the current study illustrate that there was highly statistically significant positive correlation between knowledge with practice and total neonatal factors related to physical set up scores when p-value was <0.001 *using spearman's test **Table (21)**.

Conclusion:

Based on the findings of the current study, it was concluded that, the deficit of knowledge, practice and lack of neonatal physical set up facilities lead to non-compliance of nurses' practice which considered factors contribute to non-applicability of developmental supportive care.

Recommendations:

In the light findings of the present study, the following recommendations are suggested:

- 1) Enhancement of neonatal nurse's developmental supportive care through in services –training programs about developmental supportive care.
- 2) Proper pre-service training for newly recruited nurses and in-service training program for nurses about the most recent developmental supportive care interventions for preterm neonates' guidelines are mandatory to update their knowledge and improve their performance about developmental supportive care.
- 3) Future researches must be strategically targeted to provide more concrete information related to developmental supportive care in NICU.

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