

Nurses' Perspective about Developmentally Supportive Care for Preterm Neonates

Awatif Aly Hassan Elsharkawy, Lecturer

Pediatric Nursing, Faculty of Nursing, Alexandria University

Abstract

Background: Despite the fact of evidences are suggesting the training of neonatal intensive care nurses in developmentally supportive care (DSC) to improve the outcomes of preterm neonates, no previous researches explored the nurses perspective to improve the development of preterm during hospitalization. **Objective:** The study aims to identify nurses' perspective about developmentally supportive care for premature neonates. **Subjects:** All available nurses (45 nurses) who are responsible for caring of preterm neonates were involved in the study. **Tools:** Developmental supportive care interview structured schedule was used to collect data. **Results:** Unfortunately, most of NICU nurses (73.3%) did not receive or attend any educational courses or workshops about the developmentally supportive care for preterm neonates. It was found that the majority of nurses (91.7%) who received training mentioned most of developmental supportive care for preterm neonates such as the application of nesting, avoidance of unnecessary activities and handling of preterm neonates, control of infection and promotion of breastfeeding. In addition, involvement of mother in baby care will promote the preterm development. In contrast, the largest percent of untrained nurses (42.4%) suggested only breastfeeding and involvement of mother in neonatal care. **Recommendations:** Establishment of Newborn Individualized Developmental Care and Assessment Program (NIDCAP) for the team in NICU are essential. Such program has to work in collaboration with other health professionals who are responsible to care for preterm neonates on day to day basis.

Introduction

The striking difference between the intrauterine environment and the Neonatal Intensive Care Unit (NICU) is obvious. The sensory impact of the NICU has been assumed to adversely influence the

developmental outcome of preterm neonates. A negative impact of the NICU environment can be manifested in a number of ways by the preterm neonates. Typical markers of stress are physiological parameters such as increased

heart rate and decreased oxygen saturation. The adverse effects of the environment might also extend the infant's recovery from typical preterm illnesses. The preterm neonates' rapidly developing brain is particularly vulnerable to a stressful environment. Moreover, the detrimental effects of this stress could have short and long term implications for compromised neuron-behavioral development^(1,2).

The World Health Organization reported that each year 15 million babies are born preterm and their survival chances vary dramatically around the world. Increasing complexity of Neonatal Intensive Care in the last quarter of the 20th century has changed the chances of survival at lower gestational ages⁽³⁾. Furthermore, in Egypt, newborn birth rate was estimated 7.3% of life births neonates in 2010⁽⁴⁾.

Developmental supportive care is introduced in the mid 1980's. It is defined as a broad category of interventions designed to minimize the stress placed on the newborn and the family by the NICU environment. It is based on the principle of understanding each neonatal neuron-regulatory capacities to guide interventions that are developmentally supportive, family-centered, evidence-based, and collaborative. The focus of developmental care is to promote infant organization as indicated by homeostasis between the physiologic and behavioral systems⁽⁵⁾.

There are multiple evidence based strategies that are included under the umbrella of developmental care such as control of external stimuli (vestibular, auditory, visual, and tactile), clustering of nursery care activities, positioning, swaddling, nesting of the preterm neonate as well as kangaroo mother care (warm hug). This is in addition to noise and light reduction, minimal handling and the provision of longer rest periods for preterm. One or more of these elements may be included in developmental care interventions^(1,6,7). The Newborn Individualized Developmental Care and Assessment Program (NIDCAP) utilize a combination of these strategies depending upon the needs of each infant. Developmental care interventions that are individualized to the needs of the newborn include a pre-assessment using an instrument designed for this purpose. Behavioral observations are conducted on each preterm including respiratory status, color, visceral responses (e.g. gagging, hiccoughing), motor state (e.g. tone, posture), facial expressions (e.g. grimace, smile), and attention. This individualized assessment is used as a measure of the preterm's tolerance to the environment and care giving activities. The findings then become the basis for the developmental interventions used to decrease the postulated detrimental effects of the neonatal intensive care environment^(8,9).

The NICU is a unique environment that functions as an independent community with its own medical culture, personnel, equipment, terminology, and policies. Developmental team

members must collaborate closely with other members of the NICU team. The developmental team consists of professionals who are involved in newborn care through a referral. The role of these professionals is to support nurses, medical staff, and family members in providing care that is developmentally appropriate within the context of the NICU environment. The role is shared and many times overlapped due to collaboration, consultation, and shared responsibility that is best achieved through cohesive teamwork^(5,10).

The nurse as a member of health team plays an important role in promoting preterms development. Applying developmental supportive care can contribute to better development therefore; this study is carried out to determine the NICU nurses perspective about different strategies that used to promote the development of preterm neonates.

Aim of the Study

The aim was to identify nurses' perspective about developmentally supportive care for premature neonates.

Research Question:

What is the nurses' perspective about developmentally supportive care for premature neonates?

Materials and Method

Materials

Design: A descriptive research design was implemented.

Setting: This study was conducted at Neonatal Intensive Care Unit of Alexandria University Children's Hospital at El-Shatby (AUCH).

Subjects: All available nurses (45nurse) who are responsible for caring of preterm neonates were involved in the study.

Tools:

Tool I: Developmental Supportive Care Interview Structured Schedule

This tool was developed by the researcher after thorough review of literature to identify the NICU nurses' perspective about developmental supportive care to promote development of preterm neonates during hospitalization.

It included the following parts:

Part I: Nurse's Characteristics:

It is composed of nurse's age, sex, level of education, years of experience in NICU and history of receiving training on developmental supportive care for preterm neonates.

Part II: Developmental supportive care such as:

- Control of external stimuli (vestibular, auditory, visual, tactile),
- Clustering of nursery care activities,
- Positioning , swaddling or nesting of the preterm neonate,

- Noise, and light reduction,
- Minimal handling of preterm neonates,
- Provision of longer rest periods,
- Promotion of breastfeeding,
- Family centered care such as the family has 24-hour unrestricted access to their infant and is provided the opportunity to parent's participation in preterm care.
- Kangaroo mother care (warm hug),
- Protected sleep,
- Pain and stress assessment and management,
- Developmental activities of daily living,
- The healing environment such as quiet and dimly lit environment that promotes safety and sleep.

Method

1. Permission to conduct the study was obtained from the director of the NICU of Alexandria University Children's Hospital at El-Shatby (AUCH).
2. The tool of the study was developed after thorough review of the related and recent literature about developmental supportive care for preterm neonates.
3. The developed tool was validated by 5 experts in pediatric nursing field.

4. The reliability of the tool was ascertained using test–retest technique.
5. A pilot study was carried out on 5 pediatric nurses to test clarity as well as the feasibility of the tool. Necessary modification was carried out. They are excluded from the actual sample size of the study.
6. Data collection covered a period of 3 months, starting from July 2013 till the end of September 2013.

Ethical Considerations:

- Written informed consent for participation was obtained from nurses after explaining the aim of the study.
- Every nurse was interviewed individually to obtain the necessary data.
- Confidentiality of the data, anonymity and right to withdraw at any time were guaranteed.

Statistical Analysis

The raw data is coded and transformed into coding sheets. The results were checked .Then; the data was entered into SPSS system files (SPSS package version 18). Output drafts were checked against the revised coded data for typing and spelling mistakes. Finally, analysis and interpretation of data were conducted.

The following statistical tests were used:

A: Descriptive statistics:

It includes frequency, distribution, minimum, maximum, mean and standard

deviation were used to describe different characteristics.

B: Analysis of categorical data:

Pearson's chi square test: It is non parametric statistic that is used to test for the association between the categories of two independent variables to reflect a real association between these two variables.

Results

The results of the study were presented in three parts as follow:

Part (1): Characteristics of NICU nurses.

Part (2): NICU nurses' perspective about developmental supportive nursing care for preterm neonates.

Part (3): Relationship between nurses' perspective about developmental supportive care for preterm and nurses' characteristics.

Part (1): Socio-demographic characteristics of NICU nurses:

Table (1) illustrates the characteristics of NICU nurses. Regarding their age, it was found that 40% of NICU nurses aged 40 – 50 years, while, the lowest percent of them (13.3%) aged more than 50 years. The minimum age was 25 years and the maximum one was 59 years with a mean and standard deviation of 40.3778 ± 8.90171 years.

Concerning the nurses' years of experience, it was found that more than half of NICU (55.6%) have more than 15 years. But the lowest percent of them (6.7%) worked in NICU for less than 5 years.

Unfortunately, the results revealed that most of NICU (73.3%) did not receive any educational courses or workshops about the developmentally supportive care for preterm neonates.

Table (2) represents the NICU nurses' Perspective about developmental supportive care of preterm neonates. It was clear that nearly one third of nurses (31.1%) mentioned that breastfeeding and involvement of mother in neonatal care are the most beneficial intervention. Other developmental appropriate nursing interventions necessary for promoting preterm development involved infection control measures (17.8%), Promotion of neonatal warmth and reduction of night light (15.6%), as well as nesting and avoidance of unnecessary activities and excess handling of preterm (11.1%). Approximately one quarter of nurses (24.4%) mentioned all of the above nursing measures.

Table (3) portrays the relationship between NICU nurses' perspective about developmental supportive care and their educational training perceived. It was found that the majority of nurses (91.7%) who received training courses mentioned most of the developmental supportive care for preterm neonates such as the application of nesting, avoidance of unnecessary activities and handling of preterm neonates, control of infection and promotion of breastfeeding in addition to involvement of mother in baby care will promote the preterm development. In contrast, the largest percent of untrained nurses

(42.4%) suggested only breastfeeding and involvement of mother in neonatal care. There was a statistical significant difference between nurses' knowledge and their training experience about developmental supportive care for preterm neonates, where $P = .000$.

Table (4) demonstrates the relationship between NICU nurses perspective and their years of experience. The results revealed that nearly two third of nurses (66.7%) who have less than 5 years experience in NICU mentioned that promotion of warmth and reduction of light at night are helpful for promoting preterm development, whereas, the largest percent of nurses who have 5 -< 10 years and from 10-<15 years of experience considered breastfeeding and involvement of mother in preterm care are beneficial for their development (45.5, and 33.3 respectively). Besides, 40 % of those who have more than 15 years experience added application of nesting, and avoidance of unnecessary activities and handling of preterm, implementation of infection control measures as well as promotion of warmth and decrease light at night are helpful for development of preterm neonate. There was no statistical significant difference between years of NICU nurses experience and their knowledge about developmental care for preterm neonates.

Discussion

Certainly, an unfavorable NICU environment can negatively affect the preterm neonatal growth and development because their brains are particularly vulnerable. Therefore, the application of developmental care in NICU is crucial to promote their development during hospitalization. Developmental care refers to a range of strategies designed to reduce stresses of the NICU. Consequently, The short- and long-term developmental outcome of preterm neonates remains central to the endeavors of neonatal intensive care practice^(11,12).

To establish a developmental care environment which is conducive for preterm infants, there are multiple modalities which can be implemented⁽⁷⁾.

and involvement of mother in preterm care, promotion of preterm warmth and decrease light as well as following infection control measures (Table 3).

Sleep is important to the neurodevelopment and growth of the preterm neonate, and disruption of normal sleep cycles may be detrimental⁽¹³⁾. The finding of the current study revealed that NICU nurses recognize the importance of avoidance unnecessary activities and handling of preterm as well as reduction of light for promotion of preterm development (Table 2). This finding is supported by Smith KM (2007) who develops practices that preserve and promote preterm's sleep within the NICU such as individualized care, and increased awareness of preterm sleep states may increase total sleep time thus optimizing the

environment to support sleep⁽¹⁴⁾. Likewise, Brummelte S et al (2012) and Liu WF et al (2007) determine the environmental factors including noise, bright lights, painful procedures, and physical separation from mother which can have stress inducing effects on premature neonates and this can seriously affect his brain development by causing changes to the brain architecture^(15,16).

Containment is often used in the NICU to help preterm neonate establish a good position to optimize development and support. There are specially made preterm support items or many soft ones can be used as a good substitute such as soft rolls of flannelette baby sheets, small foam shapes, and small pillows. The supports can be placed at all or any of the following places: hips, back, shoulders, knees, or neck. Nesting is also common practice in the NICU. Staff may “nest” a preterm neonate by tucking a roll of material all the way around the body. This creates a support position with which to optimize good posture and muscle development, as well as creating a comfortable and secure feeling for your baby⁽¹⁷⁾. It was obvious in the current study that NICU nurses mentioned nesting of the preterm has a beneficial impact on his development (table 3). This result was consistent with the finding of Coughlin M, Gibbins S, Hoath S (2009) who suggested that supportive bedding which nestles a baby in a comfortable

position with blankets or other soft materials to support the shoulders, legs, trunk, and head should be standard in all NICUs in order to prevent deformities caused by lying on the back for extended periods^(10,18).

Kangaroo mother care (warm hug) also should be encouraged in NICU to enhance mother-neonate bonding, stabilize body temperature, assure weight gain, and improve cognitive functions among premature and LBW neonate^(19,20). Unfortunately, none of nurses in the present study know the Kangaroo mother care or warm hug approach and its benefits. This result can be attributed to the fact that most of NICU nurses attended only breastfeeding workshops.

Available evidence suggests family centered care in NICU that the best environment for the stable preterm is his or her parents' faces, voices, and bodies⁽²¹⁾. The result of the current study show that more than half of NICU nurses appreciate the mothers' involvement in preterm care and encouragement of breastfeeding for preterm neonates (Table 2). The finding of the study is congruent with Browne J., Talmi (2005) who suggest that improving early relationship makes a positive contribution to the enhancement of future infant-parent relationships⁽²²⁾.

Regarding anxiety, the present study indicated that, approximately one quarter of the study subjects had severe anxiety while 31.7% had mild-moderate anxiety and 42.9% had normal anxiety.

Nurses are the key members of health team in NICU. Today along with the improvement of other sciences, nursing discipline is moving towards development and also evolution. The present study revealed that there was no statistically significant correlation between nurse' years of experience and their knowledge about developmental interventions for preterm neonate. It could be due to lack of continuous training workshops held in NICU regarding the developmental support care for preterm neonates or lack of motivation to improve their knowledge. Besides, some nurses in NICU worked in adult areas many years and recently, they are hired in NICU due to shortage of the nursing staff. This finding was in harmony with Mohammadi GH, Ebrahimian AA, Mahmoudi H (2009) who found that no statistical significant difference was discovered between work experiences in NICU and nurses' knowledge level about cares for critically ill patients⁽²³⁾.

Conclusion

Based on the findings of the current study, it can be concluded that NICU nurses perspective involve most of developmental

interventions such as enhancement of nutrition (especially breastfeeding), reduction of noise and light, organize nursing activities to avoid unnecessary activities which interrupt sleep period of preterm neonate in addition to implementation of nesting to limit the preterm movement and save his energy.

Recommendations

The following recommendations can be suggested in light of the present study results:

1. The NICU nurses should implement developmental care interventions and establish an environment which is conducive for preterm. These interventions are clearly supported by evidence, and based on the neonatal responses.
2. Establishment of Newborn Individualized Developmental Care and Assessment Program (NIDCAP) team in NICU to provide care for preterm neonates on day to day basis.
3. NIDCAP team provides education and specific training for health care professionals about developmental observation and assessment of preterm neonatal response and behavior.

Table (1): Characteristics of NICU nurses.

Nurses' characteristics	NO (n=45)	% (100%)
Age (Years)		
< 30	10	22.2
30-	11	24.5
40-	18	40.0
50 years or more	6	13.3
Minimum	25	
Maximum	59	
Mean± SD	40.3778 ±8.90171	
Years of experience:		
<5 years	3	6.7
5 years -	11	24.4
10 years -	6	13.3
15 years or more	25	55.6
Educational training:		
Yes	12	26.7
No	33	73.3

Table (2): NICU nurses' perspective about developmental supportive nursing care for preterm neonate.

Nurses' perspective	No (n=45)	% (100%)
Nesting and avoid unnecessary activities and handling of preterm	5	11.1
Control of infection	8	17.8
Breastfeeding and involvement of mother in neonatal care.	14	31.1
Promotion of warmth and reduction of light at night	7	15.6
All of the above	11	24.4

Table (3): Relationship between NICU nurses' perspective about developmental supportive care and their educational training perceived.

Nurses' perspective	Educational Training				Total		$X^2 = 40.909$ $P = .000^*$
	yes		no		No	%	
	No	%	No	%			
Nesting and avoid unnecessary activities and handling	1	8.3%	4	12.1%	5	11.1%	
Infection control	0	0	8	24.2%	8	17.8%	
Breast feeding and involvement of mother in baby care.	0	0	14	42.4%	14	31.1%	
Promotion of warmth and decrease light at night.	0	0	7	21.2%	7	15.6%	
All of the above	11	91.7%	0	0	11	24.4%	
Total	12	100%	33	100%	45	100%	

Significant at $P < 0.05$

Table (4): Relationship between NICU nurses perspective and their years of experience.

Nurses' perspective	Years of experience								Total	
	<5 years		5- <10		10-< 15		15 years or more		No	%
	No	%	No	%	No	%	No	%		
Nesting and avoid unnecessary activities and handling	0	0	1	9.1	0	0	4	16.0	5	11.1
Infection control	0	0	3	27.3	2	33.3	3	12.0	8	17.8
Breast feeding and involvement of mother in baby care	1	33.3	5	45.5	2	33.3	6	24.0	14	31.1
Promotion of warmth and decrease light at night	2	66.7	2	18.2	1	16.7	2	8.0	7	15.6
All of the above	0	0	0	0.0	1	16.7	10	40.0	11	24.4
Total	3	100	11	10	6	100	25	100	45	100
$X^2 = 17.158$ $P = 0.144$										

References

1. Hunt K. The NICU: Environmental Effects of the Neonatal Intensive Care Unit on Infants and Caregivers. Published master thesis of science. Southern Illinois University Carbondale May 2011.
2. Symington A, Pinelli J. Developmental Care for Promoting Development and Preventing Morbidity in Preterm Infants. *Cochrane neonatal reviews*. 2003; 4: 1-5.
3. Hannah Blencowe, Simon Cousens, Doris Chou, Mikkel Oestergaard, Lale Say, Ann-Beth Moller, Mary Kinney, and Joy Lawn. Born Too Soon: The global epidemiology of 15 million preterm births. *Reprod Health*. 2013; 10(Suppl 1): S2.
4. Liu L, Johnson H, Cousens S, Perin J, Scott S, Lawn JE, Rudan I, Campbell H, Cibulskis R, Li M, Mathers C, Black RE. Global, regional and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. *The Lancet*. Jun 2012; 379(9832):2151-61.
5. Barbosa VM. Teamwork in the Neonatal Intensive Care Unit Physical & Occupational Therapy in Pediatrics, 2013; 33(1):5-26.
6. Symington AJ, Pinelli J. Developmental care for promoting development and preventing morbidity in preterm infants. *Cochrane Database of Systematic Reviews* 2009; 2. CD001814.
7. National association of neonatal nurse. Appropriate Care of the Premature and Critically Ill Hospitalized Infant Guideline for Practice. 2011. 1-9.
8. Westrup B, Sizun J, Lagercrantz H. Family-centered developmental supportive care: a holistic and humane approach to reduce stress and pain in neonates. *Journal of Perinatology*. 2007; DOI:10.1038/sj.jp.7211724.
9. Hannah LA. Awareness of preterm infants' behavioral cues: a survey of neonatal nurses in three Scottish neonatal units. *Developmental care*. 2010; 6(3):78-82.
10. Hirani S AA. Effects of Early Life Experiences on Brain Development of Premature Babies Admitted in Neonatal Intensive Care Unit. *International Journal of Pediatrics and Child Health*, 2013; 1: 1-3.
11. Daily D. Promoting preterm infant development: NICU toolkit. *Journal of Perinatology*. 2008; 28: 166.
12. Smith GC, Gutovich J, Smyser C, Pineda R, Newnham C, Tjoeng TH, Vavasseur C, Wallendorf M, Neil J, Inder T.. Neonatal Intensive Care unit stress is associated with brain development in preterm infants. *Ann Neurol* 2011; 70(4): 541-9.
13. Jarus T, Bart O, Rabinovich G, Sadeh A, Bloch L, Dolfen T, Litmanovitz I. Effects of prone and supine positions on sleep state

- and stress responses in preterm infants. *Infant Behav Dev.* 2011; 34(2):257-63.
14. Smith KM, Sleep and kangaroo care: clinical practice in the newborn intensive care unit: where the baby sleeps. *J Perinat Neonatal Nurs.* Apr-Jun 2007; 21(2):151-7.
 15. Brummelte S, Grunau RE, Chau V, Poskitt KJ, Brant R, Vinall J, Gover A, Synnes AR, Miller SP. Procedural pain and brain development in premature newborns. *Ann Neurol* 2012; 71(3): 385-96.
 16. Liu WF, Laudert S, Perkins B, MacMillan-York E, Martin S, Graven S. The development of potentially better practices to support the neurodevelopment of infants in the NICU. *Journal of Perinatology* 2007; 27: S48-S74.
 17. Sweeney, J. K., Heriza, C. B., & Blanchard, Y. Neonatal physical therapy. Part I: Clinical competencies and neonatal intensive care unit (NICU). *Pediatric Physical Therapy*, 2009; 21(4): 296–307.
 18. Coughlin M, Gibbins S, Hoath S. Core measures for developmentally supportive care in neonatal intensive care units: theory, precedence and practice. *J Adv Nurs.* Oct 2009; 65(10):2239-48.
 19. Renfrew MJ, Dyson L, McCormick F, Misso K, Stenhouse E, King E, William AF. Breastfeeding promotion for infants in neonatal units: a systematic review. *Child: Care, Health and Development* 2010; 36 (2): 165-78.
 20. Swanson V, Nicol H, McInnes R, Cheyne H, Mactier H, Callander E. Developing maternal self-efficacy for feeding preterm babies in the Neonatal Unit. *Qualitative Health Res* 2012; 22(10): 1369-82.
 21. Browne JV. New perspectives on premature infants and their parents. *Zero to three.* November 2003; 4-12.
 22. Browne JV, Talmi A. Family-based intervention to enhance infant-parent relationships in the neonatal intensive care unit. *J Paediatric Psychology* 2005; 30 (8): 667-77.
 23. Mohammadi Gh, R. Ebrahimian A. A, Mahmoudi H. Evaluating the knowledge of intensive care unit nursing staff. *Iranian Journal of Critical Care Nursing.* Spring 2009; 2(1): 41-6.