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IMMEDIATE EFFECT OF DIAPER CHANGE ACTIVITY WITH INDIVIDUALIZED DEVELOPMENTAL CARE ON PRETERM NEONATES NEUROBEHAVIOR.

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ABSTRACT **BACKGROUND-** Preterm born infants experience a range of adverse physical and neurobehavioral problems. NICU's and their various stimuli such as exposure to light, loud noise and stressful interventions may interfere with cognitive and behavioral development of preterm newborns. Diaper change are routine procedures in NICU but can be stressful for preterm neonates so attention needs to be given to the Individualized Neuro behavior of the neonates during activities like Diaper change.

OBJECTIVE- To observe Neurobehavior and Physiological parameters of the neonates during diaper change activity & to see the immediate effect with Individualized care on Neurobehavior.

Study Design- Experimental and single system type of study.

METHODS- Written consent was taken from mothers of Preterm infants. SPO2, Heart Rate, Stress and Self-Regulatory signs were noted on NIDCAP sheet before, during and after diaper change activity and all the parameters were analyzed.

RESULT- There was Significant improvement in Heart Rate and in APIB Scores in infants (State Attention and Interaction/ Autonomic and Visceral) before and after training during diaper change activity.

CONCLUSION- Neuroprotective strategies like correct handling, positioning and appropriate method of diaper change activity reduced the distress level of infants in NICU.

KEYWORDS : NICU,NIDCAP, Individualized Developmental Support Care, APIB.

INTRODUCTION:

The Neonatal Intensive Care Unit (NICU) is a complex and highly specialized hospital unit designed to care for infants who are born prematurely or are critically ill. The NICU populations include infants who are acutely ill or premature and who are often unstable, fragile and easily compromised by environmental conditions. NICU's and their various stimuli such as exposure to light, loud noise and stressful interventions may interfere with cognitive and behavioral development of preterm newborns. Diaper Change is a regular and frequent activity in NICU. Aspects of diaper change activity include handling and positioning of the infant. For a preterm baby, if the handling is not proper and careful it can result into stress on nervous system which can result into increased Intracranial pressure, distress and pain.

Individualized Developmental Support Care in Neonatal Intensive Care Unit is becoming a world-wide standard. This involves a Comprehensive approach in which caregiving is based on the individual behavior of the infant and refers to the impact of Neonatal Intensive Care Unit(NICU) on the infant's environment. This supportive care is provided by Occupational therapists in NICU who are specialized in training infants and provides comprehensive services including focused neonatal evaluation, educating parents, supporting the family, decision making, treatment and discharge planning.

NEED OF THE STUDY:

Continuous noxious or inappropriate experiences in the NICU due to routine caregiving activities have the potential to change the development of the neurologic system in ways that may not be malleable to future change. If the Neuroprotective practices are adapted in NICU, it will continue to provide protection of the infant's Nervous system. This will bring about cumulative effect in long run and therefore the effect of individualized care with emphasis on various strategies for neuro protection needs to be studied.

AIM:

To assess the immediate effect of Individualized Neonatal Care subsequent to Naturalistic Observation during diaper change activity on Physiological and Neurobehavioral parameters.

OBJECTIVES:

- To observe Neurobehavior and Physiological parameters of the neonates during diaper change activity by caretaker.
- To provide Individualized Care Intervention to the neonates.
- To see the immediate effect with Individualized care on Neurobehavior and physiological parameters of neonates.

METHODOLOGY:

Principal Investigator and the Co-Investigator presented the entire protocol to the neonatologists and explained the need for the study before recruiting the participants in the study. Power-point presentations, flashcards and charts were used for the educational purpose. Informed Consent from infant's mother was taken and purpose of the study was explained.

Investigator observed the Infants according to the Newborn Individualized Developmental Care Assessment Program (NIDCAP) Observation Sheet and Physiological parameters of Heart Rate, SPO2 was noted during diaper change activity. The protocol for the observation was before, during and after diaper change activity. Total time for observation was around 20-30 minutes.

All the parameters were clearly reflected on the NIDCAP sheet before, during and after diaper change activity for 5 consecutive days. Based on analysis of neonatal Neurobehavior and Physiological parameters, caregivers were educated regarding correct ways of changing diaper in the next diaper change activity. For training, videos, pictures in addition to demonstration on the neonates were used.

During the period of diaper change, the baby was positioned in a slightly flexed posture, preferably in a side-lying position with the limbs directed to the midline and set in a nest, in order to provide support all around the baby's body, back, limbs and feet.

In the further session, caregivers were asked to change diapers in front of the co-investigator and were given feedback accordingly. Caregivers practiced adapted method of diaper change activity for 5 days continuously. After the intervention period, Physiological and Neurobehavioral parameters of the neonates were again noted down on the NIDCAP sheet. Based on the Neurobehavioral analysis on the NIDCAP sheet, the observations were converted and scored on Assessment of Preterm Infant Behavior-Autonomic/Visceral scale and Assessment of Preterm Infant Behavior- State Attention and Interaction scale.

RESULTS AND DATA ANALYSIS:

- Data was analyzed using the SPSS version 20. The level of Significance for outcome measure was calculated using Wilcoxon Signed Ranks tests

TABLE 1 : Comparison of Mean Heart Rate Scores.

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	HR1M - HRT	.53750	-2.51045	.28068	-1.09617	.02117	-1.915	79	.059
Pair 2	HR1M - HR3M	.70000	-2.92263	.32676	-1.35040	-.04960	-2.142	79	.035

HR1M- Heart rate of infants during mother's session before training.
HRT- Heart rate of infants during training.
HR3M- Heart rate of infants during mother's session after training.

Table 1 showed the *P* value<0.05(0.035) in pair 2 so there was statistical significant improvement in the Heart Rate of the infants before and after training by mother.

TABLE 2: Comparison Of Mean SPO2 Scores Before And After Training.

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	SPO2M1 - SPO2T	-.27500	1.54244	.17245	-.61825	.06825	-1.595	79	.115
Pair 2	SPO2M1 - SPO2M3	.01250	1.82454	.20399	-.39353	.41853	.061	79	.951

SPO2M1- SPO2 of infants during mother's session before training.
SPO2T- SPO2 of infants during training.
SPO2M3- SPO2 of infants during mother's session after training.

Since the *P* value>0.05(0.115,0.951) in both the pairs, there was no Statistical significant improvement in the SPO2 of the infants before and after training.

TABLE 3 Depicting '*P*' Value Of APIB: State Attention And Interaction Scale And APIB: Autonomic And Visceral Scale Pre And Post Training.

	SAA4 Cat - SAA1 CAT	SAB4Cat - SAB1 Cat	SAC4 CAT - SAC1CAT	AVA4CAT - AVA1CAT	AVB4 CAT - AVB1 CAT	AVC4 CAT - AVC1 CAT
Z	-2.982[a]	-3.244[a]	-3.569[a]	-1.667[a]	-3.051[a]	-2.673[a]
Asymp. Sig. (2-tailed)	.003	.001	.000	.096	.002	.008

As shown in table no. 3, '*P*' <0.05 in all the columns except comparison of APIB: Autonomic and visceral system before diaper change activity pre and post training. Thus, there is statistical significant improvement in APIB: State Attention and Interaction scale before, during and after diaper change activity pre and post training and there is statistical significant improvement in APIB: Autonomic and visceral scale during and after diaper change activity pre and post training.

DISCUSSION:

The study showed that if caregiver focuses on various stress and self-regulatory signs shown by the infant in the NICU and implement the correct method of handling and positioning of infant during diaper change activity with various Neuro-protective strategies required by the infant, the level of stress experienced by the neonate automatically decreases.

EFFECT ON PHYSIOLOGICAL PARAMETERS:

Proper handling of the infant during diaper change activity provided the infant with more developmentally supportive positions optimising the musculoskeletal development and overall behavioral organisation. These techniques helped to reduce stress of the preterm neonates and increase in the self-regulatory capacity resulting into calming and soothing of infants. Positive handling of the infant during diaper change activity helped the infant to attain physiologic stability. The handling of the caregiver during the activity varied appreciably before and after training. Mothers/caregivers were compliant in identifying behavioral cues and change in Physiological parameters of the infant during the intervention. Hence, there was a positive change in the physiological parameters of the neonates and ***significant change*** in Heart Rate post training

EFFECT ON NEUROBEHAVIORIAL PARAMETERS:

The study trained caregivers to be sensitive to each infant's stress and stability behaviours. These observations helped them to modify the environment and caregiving practices and facilitated infant's Neurobehavioral organization. The infants were able to regulate their capabilities by the amount of support offered by the caregiver or by the environment. The caregivers observed that they were able to communicate better with the infants and level of response improved post training. The study also showed an improvement in the observational skills of the caregiver towards the infant. A family centered approach used in this study helped the caregivers to recognize and respond to the behavioral cues and encouraged them to use appropriate method for changing diapers, giving the feedback regularly about proper positioning and handling and to enhance parental sense of competence.

ADDITIONAL FINDINGS:

Due to hectic schedule of NICU and psychological stress faced by caregivers, they were unable to allot the time required for the activity and were not able to follow the protocol taught by the therapist. The non-compliance of the caregivers was also influenced by the nursing staff.

LIMITATIONS:

Even if there was an attempt to provide training throughout the day during diaper change activity, mother's compliance for the activity was affected due to various factors like environmental disturbances, vital procedures of infant.

For feasibility purpose, we compared only one activity to reduce stress on neonates but this may not be enough as bundled approach with comprehensive teamwork will contribute significantly in improving neurobehavioral status of neonates.

CONCLUSION:

In this study, it was concluded that caregivers education and observation towards Neurobehavioral signs shown by infant can reduce the stress of infants during various routine caregiving activities. By implementing these neuroprotective strategies like correct handling, positioning and appropriate method of diaper change activity ,it helped in decreasing the distress level of infants experiencing in NICU. Education had immediate effect on reducing stress of neonates as observed from physiological parameters which will help in long run.

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