Poster Number 1096

Effect of a Maternal Simulated intervention on Physiologic and Developmental Behaviors of 24-38 Week Gestation Infants in a Level III Neonatal Intensive Care Unit

Give Them A Hand To Develop Their Brain

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THE PROBLEM

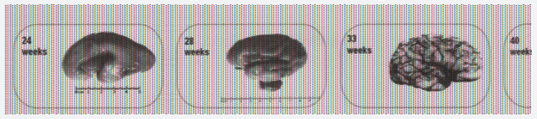
Premature birth (babies born before 37 weeks of gestation) accounts for one in eight births (over 500,000 annually) in the United States and can lead to long-term health problems and lifelong disabilities.[1] The estimated societal economic impact for the country is at least $26.2 billion annually.[2]

Complications of preterm delivery are associated with numerous developmental abnormalities that may impact the overall quality of life of the infant.

There is concern that an unfavorable environment in the Neonatal Intensive Care Unit (NICU) can negativity affect the infant's growth, with the brain being particularly vulnerable.

Although survival among premature infants has improved over the past two decades,[3] the long term morbidity of survivors remains of serious concern. Follow up studies of preterm survivors into the school years consistently find reduced cognitive performance and increased behavioral problems in these children.

Developing Brain by Gestational Age



DEVELOPMENTAL CARE MAKES THE DIFFERENCE

Early experience can modify the anatomy of the rapidly developing brain, which implies that early intervention may alter developmental paths and improve health, educational and social outcomes. 6,7 Individualized developmental care is a framework for providing care that enhances the neurodevelopment of the infant through interventions that supports both the infant and family unit.

Research has shown that developmental care enhances the outcomes of high-risk infants who require neonatal intensive care. Additionally, many interventions are still not well tested by research and require cautious implementation.

The process of providing nursing care should be adjusted in response to communication from the infant, or behavioral cues. The aim is to decrease associated stress and increase the potential of the available skills possessed by the infant to regulate and organize his/her responses. Evidence-based developmental care with the incorporation of the family unit is pivotal for the best long-term outcomes in this fragile population.

THE PURPOSE OF THIS STUDY

The literature supports the use of many developmental interventions for premature infants convalescing in the NICU. Interventions have been shown to be beneficial to premature infants by helping to increase weight gain, shortened hospital stay, and improve bonding (Dodd, 2005).

A number of devices that support developmental positioning of premature infants are currently in use in many Neonatal Intensive Care Units, however, few of these support devices have been explored to determine the benefits for the infant.

The purpose of this study was to explore the impact of simulating maternal intervention in the development of those infants that are born prematurely and are hospitalized.

OBJECTIVE

- To assess the effectiveness of a nurse-driven maternal simulated intervention in providing developmental care to infants 24-38 weeks gestation by assessing:
  1. self regulatory versus stress behaviors.
  2. physiologic data.
- To evaluate implications for nursing practice.

METHOD / DESIGN

- In a Single Blind Randomized Trial, a sample of 45 infants was randomized into four groups to explore differences over time when different developmental interventions were applied.
- Differences in pain scores, episodes of apnea of prematurity/bradycardia, vital signs, and occurrences of self-regulatory and stress behaviors were observed.
- Participants were Infants admitted to the Level III Neonatal Intensive Care Unit (NICU) between 24-38 weeks gestation.
- IRB approval and informed consent from the parents was obtained.
- Exclusion criterion included surgical infants, infants in

DATA COLLECTION

- Randomly assigned infants to one of four treatment groups.
- Recorded physiologic data every 2 hours (temperature, heart rate, respiratory rate, FiO2 and PIPP pain score).
- Recorded infant behaviors on 7 indicators and categorized them (Self Regulatory versus Stress Behaviors) based on infant assessment.
- Recorded number of Episodes of Apnea of Prematurity and Bradycardia.

STATISTICAL ANALYSIS

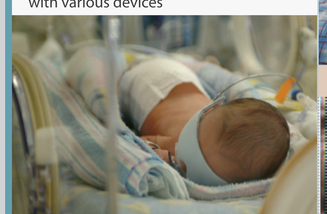
Descriptives, Repeated Measures – ANOVA, and Poisson Regression.

THE DESIGN

GROUP A
Standard Nursing Care

Standard Nursing Care Includes:

- Quiet environment with minimal stimulation
- Uninterrupted periods of sleep
- Individual infant beds shielded from light
- Dimming and cycling of overhead lighting
- Positioning, containment, and boundaries with various devices



GROUP B
The Zakys® / Unscented

The Zaky® is a device readily available in the market, ergonomically designed to keep the scent of the parent and to simulate the shape, touch, weight and warmth of the parents' hands and forearms. Each weighs 500 grams

The Zakys® in use

GROUP C
The Zakys® / Maternally Scented

Mother scents The Zaky® for one hour with her skin

GROUP D
Snugglie Insert/ Maternally Scented

Snugglie is a fleece bedding that wraps around the infant to provide containment.
The maternally scented insert was placed

Snugglie Insert Maternally Scented in use

THE RESULTS

DESCRIPTIVES

Results suggest there are no biases due to those descriptive factors.

Variable	Group A mean (sd) n=11	Group B mean (sd) n=11	Group C mean (sd) n=11	Group D mean (sd) n=12
Age (weeks)	**30.5** (4.6)	**30.1** (3.7)	**31.0** (3.9)	**28.1** (4.0)
Apgar1	**5.5** (2.7)	**5.9** (2.4)	**5.7** (1.9)	**4.8** (2.4)
Apgar5	**7.2** (2.3)	**7.3** (2.0)	**7.3** (1.6)	**7.5** (1.3)
DOL	**18.9** (23.9)	**15.1** (19.7)	**6.7** (6.4)	**17.3** (19.1)

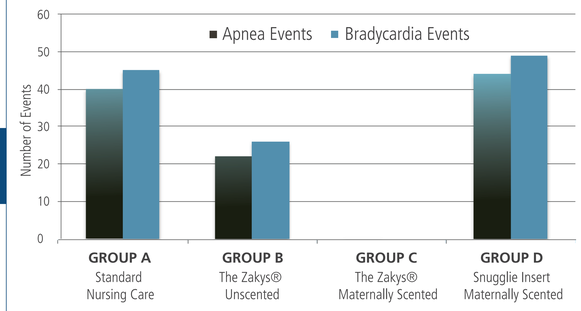
SELF REGULATORY (SR) VERSUS STRESS BEHAVIORS

There is evidence to suggest the unscented and scented Zakys® are beneficial based on the results below for SR1, SR2, SR4, SR5, SR6, and SR7, with the Maternally Scented Zakys® demonstrating a better response for all of the self regulatory items. The Maternally Scented Snugglie Insert demonstrates modest benefit.

Variable	Odds Ratio groups B versus A (95% C.I.)	Odds Ratio groups C versus A (95% C.I.)	Odds Ratio groups D versus A (95% C.I.)
SR1 Cardio-respiratory	**0.095** (0.027, 0.337)	**0.031** (0.004, 0.236)	**0.482** (0.222, 1.293)
SR2 Color	**0.803** (0.380, 1.701)	**0.295** (0.120, 0.728)	**0.662** (0.312,1.404)
SR3*** Feeding	**Cannot calculate**	**Cannot calculate**	**2.026** (0.558, 7.362)
SR4 Body Movements	**0.099** (0.044, 0.222)	**0.060** (0.025, 0.141)	**0.219** (0.102, 0.470)
SR5 Sleep/Wake	**0.096** (0.042, 0.221)	**0.110** (0.048, 0.252)	**0.449** (0.197, 1.025)
SR6 Self Quieting	**0.651** (0.327, 1.297)	**0.301** (0.143, 0.632)	**1.177** (0.602, 2.301)
SR7 Attentive Behaviors	**0.565** (0.280, 1.142)	**0.155** (0.072, 0.334)	**0.474** (0.238, 0.947)

EPISODES OF APNEA OF PREMATURITY AND BRADYCARDIA

Poisson regression results indicate the chances of seeing either apnea or a bradycardia event is about twice for standard nursing as opposed to The Zakys® Unscented. As there were no events for The Zakys® Maternally Scented, no estimate can be made. However, no events indicate a considerable benefit and the table below says it all.



SUMMARY

The maternal simulated intervention used had positive effects on infants in the NICU:

- Infants that used the Zakys® (maternal simulated intervention) experienced fewer episodes of apnea and bradycardia ($p<0.05$), especially those Maternally Scented.
- The odds of observing stress behaviors over time were higher for the infants receiving standard nursing care than for the odds for the infants receiving the simulated interventions (OR=10.5, $p<0.05$).

CONCLUSIONS

The Zaky®, the maternal simulated intervention used in this study, suggests an efficacious method to reduce adverse physiologic and developmental behaviors of 24-38 week gestation infants in a Level III Neonatal Intensive Care Unit.

Further research is required to determine the efficacy of this intervention as it has the potential to provide tremendous public health benefit such as:

- Significantly reduce life threatening apnea of prematurity (pause in the regular breathing of a baby lasting longer than 15-20 seconds) and bradycardia (heart rate too slow) which are potentially detrimental to the developing brain. Current knowledge suggests immaturity of the cardiovascular, respiratory, and nervous systems of the premature baby as causes of apnea/bradycardia.
- Improvement in the quality and standard of care while reducing cost related to treatment.
- Improved neurological development thus quality of life of the baby, the

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