

PHYSIOLOGICAL AND BEHAVIORAL RESPONSES OF PRETERM NEWBORNS TO VARIOUS TYPES OF PROCEDURAL TOUCH

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Problem: Exposure to excessive handling in neonatal ICUs may have an adverse impact on neurodevelopment in medically compromised newborns. While some types of touch are needed and/or may be beneficial to the infant, most handling is considered stressful. Routine procedures are generally considered to be straightforward and innocuous. However, more recent evidence suggests that such procedures may be extremely complex and can cause significant physiological instability. Other research suggests that excessive handling may exacerbate subsequent acute pain responses. While a few studies reporting frequency of touch exist, the touch pattern as a function of the type of micro-environment is still to be determined. Micro-environments include radiant warmers, incubators, or open cribs.

Purpose: To evaluate patterns of touch as a function of type of micro-environment.

Sample: A convenience sample of eighty infants was included in this study. Subjects ranged from 535 to 3320 grams and 23 to 38 weeks postconceptual age at the time of birth. They had a variety of medical complications that included conditions such as extreme prematurity, hydrops fetalis, sepsis, and persistent pulmonary hypertension of the newborn. Acuity of illness was measured using the Scoring for Neonatal Acute Physiology (SNAP). All infants were receiving supplemental oxygen and/or mechanical ventilation during the period of data collection and all required care in either a radiant warmer (Ohmeda Medical IWS 4400), an incubator (Ohmeda Medical Care Plus 4000), or a newly-developed combination type micro-environment capable of converting from radiant warmer to incubator and back (Ohmeda Medical Giraffe OmniBed).

Design/Analysis: Using a prospective, quasi-experimental design, all physical encroachments by a caregiver into the infant's micro-environment were recorded. Frequency, duration, and reason for such breach were recorded if the breach resulted in infant contact. Infant responses to touch patterns were continuously recorded and comparisons were made among physiological components (heart rate, respiratory rate, blood pressure, and oxygen saturation). Sampling occurred every 60 seconds for the first 72 hours of life. Relevant maternal and neonatal data were also gathered. Descriptive analyses were used to detail demographic characteristics. ANCOVA (4 x 4) was used to determine if a main effect for type of micro-environment (traditional radiant warmer, traditional incubator, Giraffe OmniBed radiant warmer mode, or Giraffe OmniBed incubator mode) or for gestational age group existed in either frequency or duration of touches. Touch differences due to differences in illness acuity was handled through statistical control using the SNAP index as the covariate. ANCOVA (4 x 4) was also used to determine if a main effect for type of micro-environment (traditional radiant warmer, traditional incubator, Giraffe OmniBed radiant warmer mode, or Giraffe OmniBed incubator mode) or for gestational age group existed among the physiological variables.

Results: Findings suggest that frequency and duration of caregiver disruptions were significantly different depending upon the type of micro-environment. Even when acuity of illness is statistically controlled, data analysis showed infants were handled an average of 6.9 times per hour in a traditional radiant warmer compared to 4.4 times per hour in a traditional incubator. In the Giraffe OmniBed

radiant warmer mode, touches decreased to 3.1 times per hour. When the Giraffe OmniBed was converted to incubator mode (again statistically controlling for acuity of illness), the number of touches was further reduced to 1.9 times per hour. Differences in touch as a function of type of micro-environment were statistically significant ($p=0.005$). No differences in duration of caregiver disruptions were noted.

Conclusion: It is not surprising that the number of touches differ between a radiant warmer and an incubator micro-environment. The presence of the plexiglas wall probably acts as a physical barrier to subconsciously unnecessary touches. Researchers had expected to find that the number of touches in a Giraffe OmniBed would be similar to the number of touches in a traditional bed when the Giraffe OmniBed was in the same bed state. Specifically, that the number of touches in a traditional radiant warmer would be the same as the Giraffe OmniBed in a radiant warmer mode. Similarly, that the number of touches in a traditional incubator would be the same as the Giraffe OmniBed in an incubator mode. Qualitative interviews with staff nurses who had cared for the infants in the study suggested that a significant number of unnecessary touches come during repositioning a baby during procedures such as IV insertion, as well as ET intubation and suctioning. A rotating mattress seems to decrease a portion of these touches.

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