

PHYSIOLOGICAL EFFECTS OF THERMOREGULATION IN TRANSITIONAL ELBW INFANTS

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Problem: Extremely-low-birth-weight (ELBW) infants (infants less than 1000 grams) are vulnerable to cold stress during the first 12 hours of life (transitional period) due to stabilization in the delivery room and NICU. Maintaining ELBW infants' body temperatures in an optimal range protects them from cold stress and organ system insult. Little research has examined thermoregulation in the ELBW infant or the body temperature range that would lead to optimal oxygenation, acid-base balance, stable blood glucose, stable heart rate and minimize peripheral vasoconstriction.

Purpose: The purpose of this study is to explore the physiological aspects of thermoregulation as a first step toward determining the optimal body temperature for ELBW infants during transition. The study will use a multiple case design to explore the relationships between body temperature and oxygenation, acid-base balance, peripheral vasoconstriction, blood glucose, and heart rate in ten ELBW infants over their first 12 hours in the NICU.

Methodology: The study population includes ten ELBW infants born prematurely at Pitt County Memorial Hospital, Greenville, NC and intubated at birth. Infants will be continuously monitored from admission to the NICU for 12 hours. Thirteen variables will be collected using a Spacelabs Cardiopulmonary Monitor, TrendCare Neotrend Monitor, Mini-Logger Temperature Monitor, Nelcor Pulse Oximetry, observation and chart review. Data will be collected continuously and outputted in 1-minute intervals into a bedside laptop computer in real time. Time series analysis within subjects will be conducted on physiologic data to define relationships between temperature and these variables and to look for similarities over infants. Logistic regression will be used within subject data to help define the temperature range predicting normal values of oxygenation, acid-base balance, blood glucose, and heart rate while minimizing peripheral vasoconstriction for ELBW infants.

Relevance to Nursing: Analysis of these variables should provide information as a first step towards determining the optimal body temperature range for ELBW infants. These results will add to the data to guide nurses in setting control points for body temperature, inform nurses when it is necessary to augment the warmer or incubator heat with additional heat sources, and help nurses guard against cold stress during stabilization procedures.