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RESEARCH

Effect of Timing of the First Bath on a Healthy Newborn's Temperature

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ABSTRACT

Objective: To determine if a healthy newborn's age in hours (3, 6, or 9 hours after birth) affects thermoregulatory status after the first bath as indicated by axillary (core) and skin temperatures.

Design: Quasi-experimental, mixed-model (between subjects and within subjects) design with hours of age as the nonrepeated variable and prebath and postbath temperatures as the repeated variables.

Setting: Family-centered care unit at an urban hospital in the southwestern United States.

Participants: Healthy newborns ($N = 75$) 37 weeks or more completed gestation.

Methods: Mothers chose time of first bath based on available time slots ($n = 25$ newborns in each age group). Research nurses sponge bathed the newborns in the mothers' rooms. Axillary temperature, an index of core temperature, was measured with a digital thermometer, and skin temperature, an index of body surface temperature, was measured with a thermography camera. Temperatures were taken before the bath; immediately after the bath; and 5, 30, 60, and 120 minutes after the bath. Immediately after the bath, newborns were placed in skin-to-skin care (SSC) for 60 or more minutes.

Results: We found a difference ($p = .0372$) in axillary temperatures between the 3- and 9-hour age groups, although this difference was not clinically significant (0.18 °F [0.10 °C]). We found no statistically significant differences in skin temperatures among the three age groups. Regardless of age group, axillary and skin temperatures initially decreased and then recovered after the bath.

Conclusion: For up to 2 hours postbath, axillary and skin temperatures were not different between healthy newborns bathed at 3, 6, or 9 hours of age. Thermography holds promise for learning about thermoregulation, bathing, and SSC.

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The timing for a newborn's first bath is of interest for parents and maternity care providers (Kuller, 2014; Lund, 2016). Bathing times often are scheduled around the activities of the mother and newborn, including visits from family members. While taking into consideration parents' requests, nurses also consider newborn acuity and thermal status, time-sensitive orders, and the availability of primary care nurses to bathe the newborn and teach the parents. Timing of the first bath may also be dictated by cultural beliefs (Adejuyigbe et al., 2015; Wilson, 2012) and exposure of care providers to blood-borne pathogens such as HIV or hepatitis B (Association of Women's Health, Obstetric and Neonatal Nurses [AWHONN], 2013; Behring, Vezeau, & Fink, 2003; Bergström, Byaruhanga, & Okong, 2005). In addressing many competing scheduling priorities, including newborn and mother discharges at or before 24 hours, nurses may ask if the timing of a healthy newborn's first bath matters.

Background

The goal for a newborn's first bath is "to remove unwanted soil such as blood and meconium and to leave residual vernix intact" (Kuller, 2014, p. 167). The vernix has a protective and adaptive function with moisturizing, antimicrobial, anti-inflammatory, and immune-enhancing properties (Visscher & Narendran, 2014). The occasion of the first bath is an opportunity to teach parents about newborn characteristics and care. A wide range of recommendations exist with regard to when to perform a newborn's first bath. The World Health Organization (WHO, 2017) and the Joanna Briggs Institute (Mittinty, 2017) recommended

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that the first bath be delayed for 24 hours or for at least 6 hours if cultural beliefs preclude a longer delay. In 2017, the American Academy of Pediatrics (AAP) and the American College of Obstetricians and Gynecologists (ACOG) recommended that newborns remain with their mothers 24 hours a day and that bathing should be delayed until after the first breastfeeding. The first bath should be deferred until the newborn is thermally stable because bathing is linked to a significant loss of heat. The AAP and ACOG (2017) encouraged hospitals to develop guidelines for the timing of the first bath and other bathing practices. For healthy newborns, AWHONN (2013) suggested that the first bath be delayed at least 2 hours whenever possible and that the bath should occur only after a newborn has shown thermal and cardiorespiratory stability.

The recently updated AWHONN skin care guidelines (2018) include a recommendation for the first bath to occur between 6 and 24 hours of age. Research studies on the timing of the first bath are generally more than 5 years old and were not conducted at hospitals where skin-to-skin care (SSC), rooming-in, and breastfeeding were promoted. In these studies, during or after the routine newborn bath, researchers used procedures and equipment that are not commonly used in present-day clinical care, such as rectal or aural thermometers and radiant warmers (Behring et al., 2003; Medves & O'Brien, 2004; Nako et al., 2000; Penny-MacGillivray, 1996; Varda & Behnke, 2000).

Thermoregulation and Hypothermia

Newborn thermoregulation is a primary consideration for the timing of the first bath (AAP & ACOG, 2017; AWHONN, 2013; George et al., 2015; So et al., 2014). Newborns are especially sensitive to changes in environmental temperature because of their small body masses and relatively large body surface areas. Newborns have three times the surface area–to-weight ratio as adults and lose heat at a rate four times faster than adults (George et al., 2015). With fewer physiological reserves, such as insulating body fat and hair, newborns are more prone to heat loss (So et al., 2014).

Transition, the complex adaptation process that occurs when a newborn makes the change from intrauterine to extrauterine life, includes thermoregulatory processes to balance heat production and heat loss (Aylott, 2006; Graves & Haley, 2013). According to Cheffer and Rannalli (2016), a healthy newborn should establish independent thermoregulation during transition with temperature stabilization between 36.4 °C and 37 °C (97.5 °F and 98.6 °F). The transition period was described as the first minutes after birth and continuing up to 24 to 48 hours (AAP, 2017; AAP & American Heart Association, 2016), with major transitions occurring within the first 6 to 8 hours (Alden, 2018). For more than 20 Q1 years, normothermia, evidence of temperature stabilization, has been defined as a core temperature of at least 36.5 °C (97.7 °F; WHO, 1997). Temperature instability (hypothermia) was Q2 defined as *mild*, core temperature of 36.0 °C to 36.5 °C (96.8–97.7 °F); *moderate*, core temperature of 32.0 °C to 35.9 °C (89.6–96.6 °F); and *severe*, core temperature lower than 32.0 °C (< 89.6 °F). Identification and treatment of moderate to severe hypothermia are critical because hypothermia is associated with increased morbidity and mortality and a greater chance for hemorrhage, respiratory disease, hypoglycemia, and sepsis (Trevisanuto, Testoni, & de Almeida, 2018). Physiological effects of untreated hypothermia include respiratory distress, bradycardia, hypotension, and hypoglycemia (Karlsen, 2013).

Bathing can disrupt the transition process unless care is taken to minimize heat loss (AWHONN, 2013). Results of two studies (Bergström, Byaruhanga, & Okong, 2005; Takayama, Teng, Uyemoto, Newman, & Pantell, 2000) indicated that bathing in the first hour after birth can lead to hypothermia in healthy newborns of average gestational age (38.2–38.4 weeks). However, Penny-McGillvray (1996) and Varda and Behnke (2000) found that healthy full-term newborns could be bathed at 1 hour of age provided that appropriate care, including radiant warmers, was provided for thermal stability.

Thermoregulation and SSC

SSC aids in thermoregulation during a newborn's transition from intrauterine to extrauterine life (Cleveland et al., 2017; Fransson, Karlsson, & Nilsson, 2005; Graves & Haley, 2013). During SSC, a mother holds her unclothed newborn prone on her bare chest covered with a blanket (Moore, Anderson, Berman, & Medley, 2016), and her breasts increase heat transfer to a cool