

Swaddle Bathing: Implementing a Quality Improvement Project

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Abstract

Although the first bath is essential to prevent cross contamination of body fluids between the newborn and the health care provider, it can be a significant factor influencing successful extrauterine transition and parental bonding during the early neonatal period. Bathing the infant is essential following birth; however, a bath can precipitate thermal instability and stress. The purpose of the proposed quality improvement project is to increase the rate of swaddle bathing among newborn infants admitted to the newborn nursery of a Level II and Level III maternity center and to evaluate infant outcomes regarding thermoregulation, parental involvement, and parental satisfaction with a swaddle bath. A total of 55 infants in the newborn nursery and his/her parents were evaluated for each infant's axillary temperatures prior to the initial bath, immediately following, when a heat source was removed, and two hours following the initial bath and parental involvement and satisfaction with the infant bath. Participants included any infant admitted to the newborn nursery with a gestational 36 0/7 weeks and greater and his/her parents. 42 infants/parents were evaluated using the newborn nursery's current infant bathing practice. A second group of 13 infants/parents were evaluated after healthcare providers were educated on the technique of swaddle bathing. Infants who were sponged bathed had an average temperature loss of 1.6 degrees Fahrenheit from immediately before to immediately following the bath, where as the swaddle bath group experienced an average temperature loss of 0.35 degrees Fahrenheit. Parental involvement and satisfaction with the infant swaddle bath improved following staff education. Providing an infant swaddle bath improves thermostability as an infant transition to extrauterine life while engaging parental involvement in newborn cares.

Swaddle Bathing: Implementing a Quality Improvement Project

Bathing the newborn infant is a standard of care in nearly all newborn nursery facilities. The initial bath is provided early in the neonatal period to decrease the transmission of communicable diseases via blood and body fluid contact (Sarkar, Basu, Agrawal, & Gupta, 2010). Although the first bath is essential to prevent cross contamination of body fluids between the newborn and the health care provider, it can be a significant factor influencing successful extrauterine transition and parental bonding during the early neonatal period. Many studies have shown standard newborn baths to increase infant and parental stress, decrease thermoregulation and impair self-regulation of the newborn (Burke, 1987; Liaw, Yang, Chou, Yang, & Chai, 2010; Loring et al., 2012). However, by providing supportive care to reduce infant thermal and developmental stress during the initial bath, the infant is guided to a successful transition to extrauterine life while increasing parental bonding and education.

Problem

After being in a moderately stable thermal neutral environment within the uterus during pregnancy, the newborn infant is exposed to a much different environment with colder temperatures in the delivery room and use of cold equipment by caregivers. This change in environment places a newborn at risk for significant heat loss and hypothermia in the first hours of life. The World Health Organization (1997) defines normal body temperature as 36.5-37.5°C (97.7-99.5°F) axillary; hypothermia is a temperature less than 36.5°C (97.7°F) axillary. Hypothermia is divided into three categories: mild hypothermia 36-36.5°C (96.8-97.7°F) axillary, cold stress 32-36°C (89.6-96.8°F) axillary, and severe hypothermia less than 32°C (89.6°F) axillary. Nayeri and Nili (2005) identify hypothermia as a worldwide issue that is associated with an increased risk of morbidity and mortality in infants of all gestational ages.

Bathing the infant is essential following birth; however, a bath can precipitate thermal instability and stress. Newborn infants are at greater risk for developing hypothermia due to their large surface area, decreased thermal insulation of brown adipose tissue, greater body water content, and immature metabolic mechanisms for responding to thermal stress (Darcy, 2009). The late preterm infant (34^{0/7} – 36^{6/7} weeks gestation) is at greater risk for thermal instability due to decreased amounts of brown adipose tissue compared to a term newborn, but they are cared for similar to term infants when they are admitted to the newborn nursery. In 2009, the late preterm infant birth rate comprised of 8.7% of all live births, up nearly 5% from 1999 (March of Dimes, 2012). With the growing trend of late preterm infants, it is important for health care providers to recognize their challenges and support a successful transition to extrauterine life as they are cared for in the newborn nursery.

Infants who are unable to maintain adequate thermoregulation and become hypothermic can be admitted to the Neonatal Intensive Care Unit (NICU) for further evaluation. In the NICU, these infants are exposed to multiple blood tests, antibiotics; prolonged hospital stays, and interrupted parental bonding. The average first year medical cost of a preterm infant (less than 37^{0/7} weeks gestation) in 2005 was \$32,325, compared to the first year cost of a term infant at \$3,325 (March of Dimes, 2012). Initiating nursing interventions to support the infant's thermoregulation during routine care can impact the health of the infant, prevent additional stress of subsequent testing, improve parental bonding, and minimize healthcare cost.

Adequate thermoregulation is achieved when an infant reaches a neutral thermal environment in which the infant's basal metabolic rate is at a minimum, oxygen consumption is minimal, and the infant is thriving. Although there is a better understanding of the importance of neonatal thermoregulation, there is a need for improved practice to prevent hypothermia among

newborn infants. Providing a swaddle bath to infants in the newborn nursery can prevent heat loss during a routine newborn bath and promote a successful transition to extrauterine life.

Purpose

The purpose of the quality improvement project was to increase the rate of swaddle bathing among newborn infants admitted to the newborn nursery of a Level II and Level III maternity center and to evaluate infant outcomes regarding thermoregulation, parental involvement, and parental satisfaction with a swaddle bath. Evidence-based bathing is important to provide optimal care to support the infant during this time. Liaw, Yang, Chou, Yang, and Chao (2010) found preterm infants had an improved self-regulation while receiving a bath when caregivers used containment and positional support. The Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) (2007) recommends the use of immersion tub bathing to achieve infant hygiene. Swaddle bathing an infant utilizes evidence supporting containment and positional support and combines it with evidence supporting immersion tub bathing to provide the highest evidence-based bathing practice for newborn infants. Swaddle bathing consists of bathing an infant while swaddled in a flexed, midline position. The swaddled infant is immersed into a tub of water to the level of the infant's shoulders. Each limb is separately unwrapped, gently washed, rinsed, and reswaddled keeping the infant in a contained position throughout the bath (Quraishy, Bowles, & Moore, 2013).

Theoretical Framework

Levine's Conservation Model attempts to explain promotion of the physical and emotional well-being of a patient through the concepts of conservation, adaptation, and wholeness. The model guides the nurse to focus on the influences and responses at the organismic level (Current Nursing, 2012). The concept of wholeness in Levine's Conservation

Model is described as a continuous, open interaction between the internal and external environment resulting in a holistic thought of viewing the individual as a whole and is the primary focus of this project (Current Nursing, 2012). The wholeness of an infant needs to be considered when providing basic infant care. By caring for the wholeness of the infant, swaddle bathing promoted neurobehavioral development, supported developmental comfort, decreased infant and parental stress, and supported thermoregulation.

Review of the Literature

The aim of this review was to examine the literature on newborn bathing in late preterm (34^{0/7} – 36^{6/7} weeks gestation) and term infants (37^{0/7} – 42^{0/7} weeks gestation) and identify outcomes associated with different newborn bathing techniques. The intention was to gather the evidence to date and help clinicians achieve a better understanding of the topic, and subsequently, encourage an improved bathing technique of late preterm and term infants being cared for in the newborn nursery. A review of literature published from 2007-2013 was conducted to reflect the most current research. Multiple articles published prior to 2007 were used due to lack of available research of that subject. Articles were searched with electronic databases (CINAHL and PubMed), using search terms “swaddle bathing”, “infant bathing”, “newborn tub bathing”, “infant swaddle” and “interactive newborn bath”. Articles were limited to neonates and to English language papers.

A total of nineteen articles were reviewed, which ranged from expert opinion, literature reviews, case studies, and formal research studies. A selection of eleven articles were identified as relevant to the clinical question of improving infant bathing techniques in late preterm and term infants cared for in the newborn nursery. Due to the lack of research on the identified topic of swaddle bathing, a wider range of literature was needed. The literature reviewed includes six

randomized control studies, two crossover experimental studies, one case study, and ten cohort studies. There is minimal research on the idea of swaddle bathing infants; however, there is substantial evidence supporting the practice of infant swaddling and immersion tub bathing.

Swaddle

Infant baths can be a very stressful event and impact an infant's behavior and developmental growth. Huang, Tung, Kuo, Ying-Ju (2004) found premature infants (<37 weeks' gestational age or <2500 g body weight) who were swaddled following a painful event returned to their baseline heart rate and oxygen saturation in a shorter time period compared to infants who were contained with blanket rolls. One study found swaddling to have a positive effect on neuromuscular development in very low birth weight infants through improved Morgan Neonatal Neurobehavioral Exam (MNNE) scores (Short et al., 1996). Neu and Browne (1997) compared swaddled versus unswaddled preterm infants during weighing procedures. Many difficulties exhibited by preterm infants while unswaddled during a weighing procedure can be seen in infants during a tub bath. Infants swaddled during the weighing procedure exhibited less physiological distress, improved motor organization, and improved self-regulation. Swaddling an infant was found to be superior and more effective in crying infants compared to infant massage. Infants in the swaddle group were found to have improved behavior regulation, improved ability to cope with stress, and improved neurobehavioral organization (Ohgi, Akiyama, Arisawa, & Shigemori, 2004). Another study found infants less than eight weeks of age demonstrated a decrease in crying times when swaddled (van Sleuwen et al., 2006).

Immersion Tub Bathing

Bryanton, Walsh, Barrett, and Gaudet (2003) studied the effects of tub bathing versus traditional sponge bathing in healthy term newborns. The researchers found the tub-bathed

infants had significantly less temperature loss during the bath when compared to sponge-bathed infants. The tub-bathed infants had a 0.2° C less temperature loss during the bath and 0.2°C higher temperature following the bath. The same study found no significant differences between the two groups regarding cord healing and cord infections. Tub-bathed infants also resulted in a higher maternal pleasure with the infant bath. Loring et al. (2012) found infants who were tub bathed had less variability in body temperature and were warmer at ten and thirty minutes following the bath compared to infants who were sponge bathed.

Swaddle Bathing

Liaw, Yang, Chou, Yang, and Chao (2010) found preterm infants had a positive response and improved self-regulation while receiving a bath when caregivers used containment and positional support. Fern, Graves, and L' Huillier (2002) observed the following benefits among infants receiving a swaddle bath: decreased physiological and motor stress; conserved energy as evidenced by reduced flailing and startling; decreased crying and agitation; facilitated social interaction by keeping the baby in a calm, quiet alert state; increased self-regulation, and enhanced ability to participate in feeding immediately after the bath. Swaddle baths engage parental involvement and family centered care.

Parental Involvement

An interactive bath helps parents better understand their infant and supports parent-infant attachment (Karl, 1999). Fern, Graves, and L'Huilier (2002) also identified an increased parental comfort level in handling the infant during the swaddle bath, increased confidence in parenting skills, facilitated parent attachment, enhanced interaction with the baby, and decreased parental stress. Medves and O'Brien (2004) compared thermoregulation between infants bathed by a parent and infants bathed by a nurse. The authors found newborn heat loss during a bath is

not associated with who performs the bath and encourages parents to be actively involved in bathing their newborn.

Methods

Design

The quality improvement project involved implementing the practice change of swaddle bathing after birth in a mother-baby unit and evaluating the rate of swaddle baths performed following implementation; including the outcomes related to infant thermoregulation and parental involvement and satisfaction with the bath. The evaluation of the project includes descriptive and quantitative information.

Setting

Participants included fifty-five mother- infant pairs admitted to the mother-baby unit. Infants in the mother-baby unit were 36 0/7 weeks or greater gestation at delivery, healthy infants in no apparent distress. Infants were selected based on convenience sampling. The setting included the mother-baby units of a Level 2 (Lakeside Hospital) and Level 3 (Bergan Mercy Medical Center) maternity centers within Alegent Creighton Health located in the Midwest United States. Ethical considerations of the quality improvement project included cultural beliefs of delaying an infant bath and parental involvement in the newborn bath. Infant participation was based on parental verbal consent and patient identification was protected. Approval from the research committee at Alegent Creighton Health was obtained and patient personal identifying information was not used during this quality improvement project.

Instruments/Tools

Data was collected through the use of a survey (see Appendix A) and an assessment form (see Appendix B). The survey was dispersed at the beginning of the data collection period and

the assessment form was dispersed at two different times during the data collection period. The survey provided information regarding the type of bath given by the caregiver the majority of the time. The assessment form assessed the original bathing technique and the swaddle bathing technique. The data collected from the assessment forms includes the infant's gestational age, infant temperature prior to performing the bath and following the bath according to the system policy, bath water temperature, parental involvement and parental satisfaction related to the infant bath.

A standard digital thermometer was used to obtain newborn axillary temperatures and measure the bath water temperature. A Cardinal Health axillary thermometer was used to obtain all temperatures. A satisfaction scale (see Appendix C) was used for parents to identify their satisfaction level with the original bathing technique and again with the swaddle bathing technique.

Data Collection

Data was collected over a three-month period to include a total of fifty-five mother-infant pairs (forty pairs in the pre-education group and fifteen pairs in the post-education group) who were randomly evaluated on the original bathing technique or on the swaddle bathing technique. The survey was distributed among potential health care providers (registered nurse (RN), nurse aide, and obstetric techs) prior to the swaddle bathing technique education to identify the type of bath given by the caregivers the majority of the time. The health care provider responsible for the infant bath filled out the assessment forms. The assessment forms were completed by the health care provider with the original bathing practice and again following the education of the swaddle bathing technique.

Data Analysis

The data collected were evaluated to determine if the rate of performing a swaddle bath among infants in the newborn nursery has increased following staff education of the swaddle bathing technique and to determine if infant swaddle baths improved the infants temperature regulation, parental involvement, and parental satisfaction regarding an infant bath.

Results

Pre-Education Survey

Of the forty-six participants who completed the Pre-Education Survey, 54% identified sponge bathing as their primary bathing technique. Such individuals identified their choice based on unit policy, habit, ease of the bath, participants identified it was quicker to provide a sponge bath, concerns of infection control with multi-use infant tubs, participants identified Newborn Nursery infants as term and healthy and would not benefit from a swaddle bath, and being for comfortable for the provider to perform. The other 46% of participants utilize the swaddle bathing technique and identified this technique as calming for the infant, less crying from the infant, developmentally supportive, infants maintained their temperatures better. Of all the health care providers who completed the survey, 59% stated they have received formal training on the swaddle bathing technique. The majority of the survey participants were identified as baccalaureate-prepared nurses (76%) with the second largest group (13%) comprised of other degrees, which can include certified nurse aides (CNA) or techs.

Temperature Change

The mean temperature loss for swaddle-bathed infants was 0.2°F (SD= 0.2). For the sponge-bathed infants, the mean temperature loss was 2.97°F (SD = 10.5). Further comparison showed swaddle bathing not only had higher temperatures immediately post bath, averaging

2.87°F (SD = 10.5) higher, but also two hours post bath, averaging 0.1°F (SD = 0.1) higher than those infants sponge-bathed (Figure 1). No infants who had a swaddle bath with skin-to-skin contact with a parent after the bath required additional heat support. Nearly thirteen percent of infants who received a sponge bath and were then placed skin-to-skin with a parent required additional heat support, such as a radiant warmer, to achieve adequate body temperature.

Parental Satisfaction and Involvement

Parents whose infants were swaddle-bathed or sponge-bathed had an average parental satisfaction rate of 4.9 (SD = 0.3) (Figure 2). Fifty-six percent of parents were actively involved in the initial bath when a swaddle-bath was performed, compared to fifty-four percent of parents involved when a sponge bath was performed (Figure 3).

Rate of Swaddle Bathing

One maternity center withdrew from the quality improvement practice change after the initial data collection. The rate of swaddle bathing before and after staff education on swaddle bathing was therefore only assessed at one maternity center where the data collection occurred. Prior to staff receiving education on the swaddle bathing techniques, sixty-six percent of infants received a swaddle bath as their initial newborn bath. Following staff education regarding the benefits of infant swaddle bathing and providing staff with swaddle bathing demonstrations, ninety-three percent of newborn infants received a swaddle bath as their initial newborn bath (Figure 4).

Discussion

Comparison between the different bathing techniques used in the newborn nursery showed that the swaddle-bathed infants had less temperature loss during the bath than did the sponge-bathed infants. The quality improvement project also found infants who were placed

skin to skin immediately following the bath for an average of forty minutes did not require additional heat support, such as a radiant warmer, to maintain adequate body temperature whereas some of the infants receiving a sponge bath required additional heat support. There was no significant difference found between the two bathing techniques in regards to parental satisfaction and parental involvement with an initial newborn bath.

Conclusion

According to the results of this quality improvement evaluation, swaddle bathing is a safe and rewarding alternative to sponge bathing for healthy infants in the newborn nursery. Swaddle bathing appears to be more effective than sponge bathing in maintaining infant temperature and preventing heat loss in newborn infants, which in turn fosters the process of extrauterine adaptation. The World Health Organization (1997) identifies an adequate body temperature for infants as 97.7-99.5°F; infants who received a swaddle bath and infants who were placed skin-to-skin following the initial bath were able to maintain a body temperature within the recommended range. Although there is limited data on swaddle bathing, these findings support the work of Bryanton et al. (2003), which identifies tub bathing healthy newborn infants supports thermoregulation and improves maternal pleasure with the infant bath. Although parental involvement and satisfaction were not impacted by the bathing technique, swaddle bathing can be performed more easily at the bedside without additional heating equipment allowing parents to observe the initial bath and engage in parental bonding through skin-to-skin care and breastfeeding immediately following the newborn bath.

Limitations

A limitation of this project included many incomplete Bath Assessment Forms completed by the health care provider performing the initial newborn bath. The forms were created to be

simple and easy to complete by the care provider. Although the information collected minimized objectivity, the Bath Assessment Forms were not completed as designed and information was not always completed on the form. One suggestion to reduce incomplete data is the incorporation of a chart review to gather some information and limit the amount of information gathered by the care provider.

Following staff education on the swaddle bathing technique, one maternity center decided to withdraw from the quality improvement project. Staff involved in providing the newborn baths immediately demonstrated resistance to the new bathing technique. Due to financial restraints of the unit and infection control concerns regarding multi-use infant tubs, staff were concerned about adequate supplies not being available to perform the swaddle bath technique. Staff were also concerned the new bathing technique would require more time to perform the newborn bath and staffing needs would not support the practice change. Staff also stated they would not feel comfortable demonstrating and providing education on a swaddle bath. Due to the reluctance of the nursing staff to perform the swaddle bathing, it was determined the unit would withdraw from the project. This decision impacted the quality improvement project by limiting the available data to assess infant thermoregulation related to different bathing practices and limited the project's ability to assess the frequency of swaddle bathing before and after staff education.

Implications to Practice

Results of this quality improvement project have relevance for health care providers caring for infants and his/her family. Although newborn baths are essential to prevent the transmission of communicable diseases through blood and bodily fluid following the delivery of an infant, they can be developmentally appropriate and family centered. The data suggested that

consideration should be given to the benefits of swaddle bathing in relation to thermal stability, parent involvement, and parent satisfaction to enhance transition to extrauterine life and family-centered care. Transitioning to swaddle bathing of the healthy, late, preterm and term infants on the mother-baby units and utilizing skin-to-skin warming on the parent to supplement thermal regulation is a safe practice and supports parental involvement and satisfaction.

Figure 1

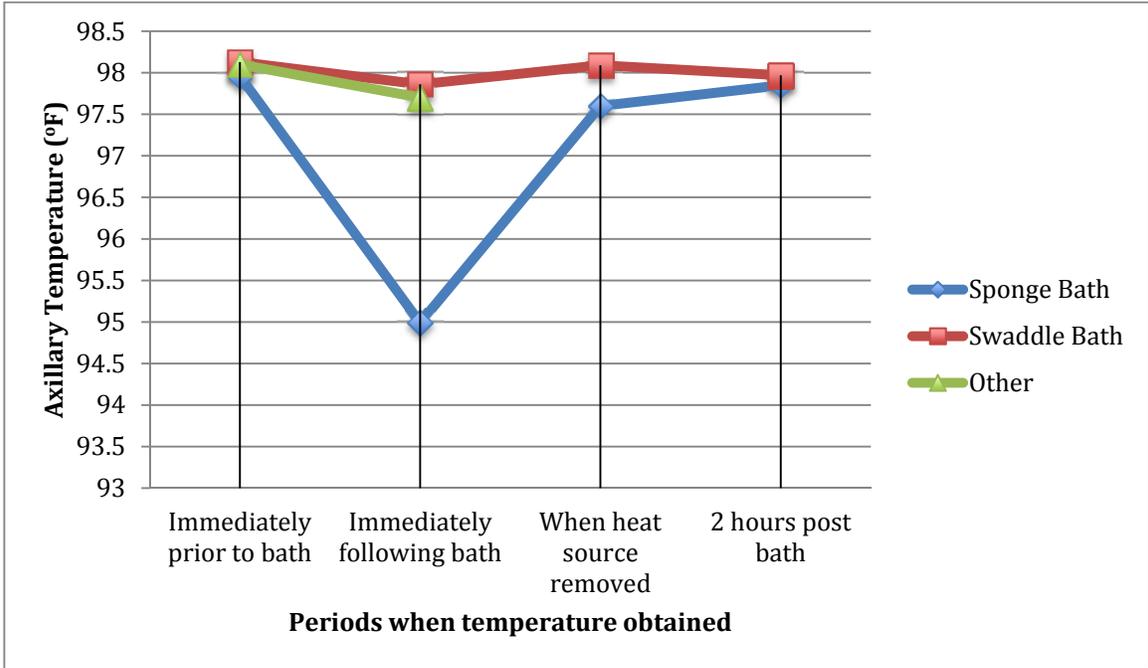


Figure 2

Parental Satisfaction Rating

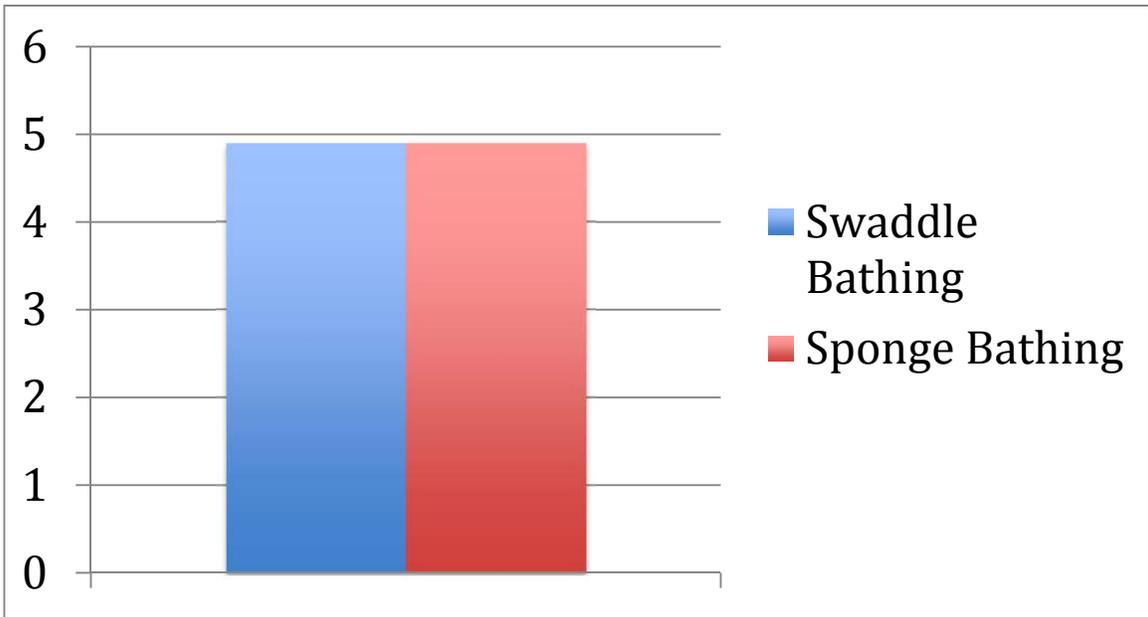


Figure 3

Parental Involvement

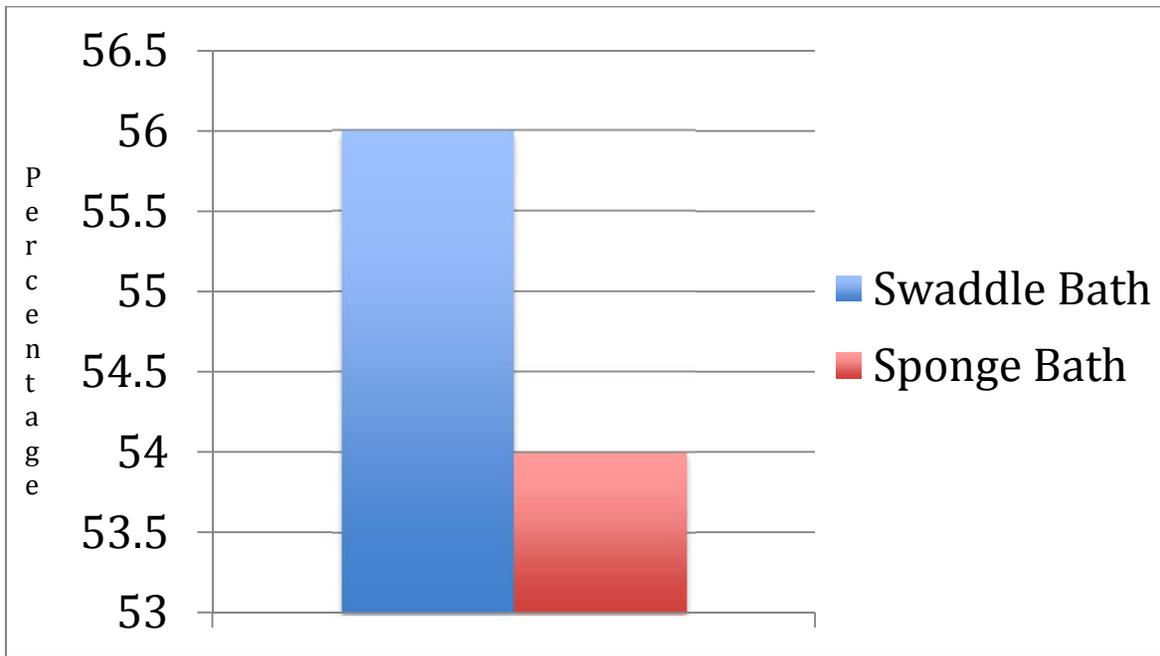
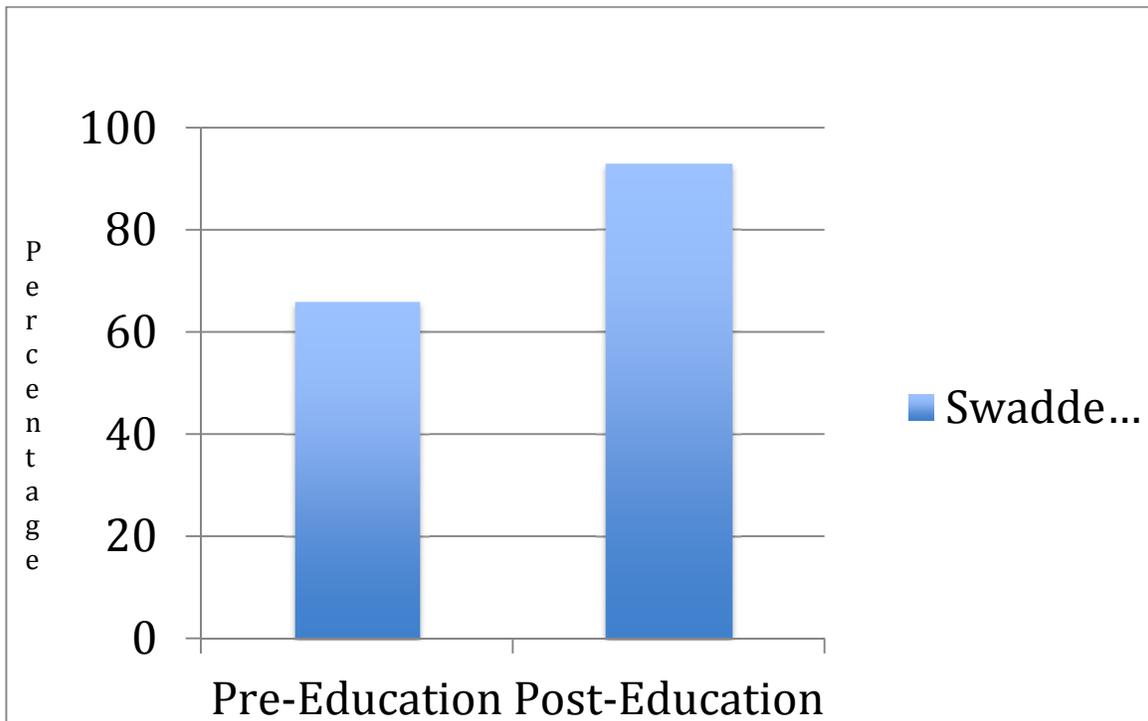


Figure 4

Rate of Swaddle Bathing



Appendix A

Nurse Survey

1.) What type of bath do you perform on newborn infants the **majority** of the time?

Sponge Bath

Immersion Tub Bath

Swaddle Bath

2.) Reason for your selected method of bathing _____

3.) Have you previously received formal training on swaddle bathing? Yes No

4.) What is your educational background?

Diploma

BSN

MSN

Other _____

Appendix B

Bath Assessment Form

Facility _____

1.) What bathing technique was performed?

Sponge Bath

Immersion Tub Bath

Swaddle Bath

2.) If an immersion or swaddle bath was given, what tub was used?

Basin (pink)

Infant tub

2.) Temperature of bath water _____

3.) What were the following infant temperatures?

Prior to bath _____

Immediately following bath _____

Prior to removing from heat source (radiant warmer/skin to skin) _____

2 hours after bath _____

4.) Was the infant placed skin to skin with parent following bath? Yes or No

If so, for how long? _____minutes

5.) Did the infant require supplemental heat support (radiant warmer) to maintain stable temperature? Yes or No

6.) Where the parents involved in giving the bath? Yes or No

7.) Based on the provide Parental Satisfaction Scale, please have the parents rate their satisfaction regarding the bath given? _____

Appendix C

Parent Satisfaction Scale

Please indicate how satisfied you were with your infants bathing experience.



1



2



3



4



5

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