Practising developmentally supportive care during infant bathing: reducing stress through swaddle bathing

Although bathing is widely accepted within society to be stressful for the healthy newborn, there is minimal research into the physiological and behavioural impact it has on vulnerable preterm infants. Developmental care strategies encourage nursing staff to adapt the extra-uterine environment to reduce infant stress and promote overall stability. This article highlights the benefits of swaddle bathing in reducing stress and encourages considerations towards it becoming common practice for improving patient care.

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Key points

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1. Tub bathing is a stressful experience for healthy newborn babies and is even more stressful for vulnerable preterm infants with fragile physiological stability.
2. Sponge bathing premature infants poses significant risks due to heat loss.
3. The containment offered during swaddle bathing mimics the compact environment of the womb.
4. Swaddle bathing has been shown to reduce behavioural stress cues which normally occur during tub bathing, such as crying, back arching and extended limbs with splayed fingers.

During intra-uterine life the infant's vital stages of growth and development are conducted in an ideal environment, offering protection and security. However, when an infant is born prematurely this becomes far from the reality as continuing care is provided on the neonatal intensive care. This environment in comparison to the womb is full of noise, harsh lighting, touch as well as painful and stressful procedures, all of which have been found to cause distress in preterm infants, disrupting their normal growth and development[1-3].

It is with this understanding that thought was given regarding the traditional routine care of tub bathing. Developmental care has taught nursing staff to become more in-tune with infant behavioural cues in order to recognise and react to distress signs. Such distress signs are accepted as normal during bathing of healthy infants, generally with crying throughout the procedure[4]. However as neonatal nurses we have a duty of care to recognise that this has potential dangers for the preterm infants in our care and act in an appropriate manner.

The resolution to this problem was introduced to the author's unit through the practice of swaddle bathing. The concept was brought to light when liasing with developmental care medical representatives regarding a Tiny Tub bathing system (Children's Medical Ventures). It seemed from observation and the decrease in noise from the infant that swaddle wrapping of babies during bathing reduced stress. With a lead role in developmental care the author was keen to implement the method of bathing onto the unit. Initially there was staff resistance to the new concept and with no evidence-based research to support the procedure, a research proposal was generated to provide the required information to take it forward. Background knowledge was collected and training of staff was carried out to record the comparisons between traditional tub bathing and swaddle bathing, while awaiting ethical approval to conduct the study. During this time staff began to recognise the benefits to both the baby and the parents and were consequently reluctant to revert back to traditional baths, feeling it was morally and ethically wrong. The research project was therefore unable to be taken forward as this would have meant infants were knowingly allocated to an inferior procedure, which poses ethical dilemmas in conducting research[5]. Swaddle bathing became common practice on the author's unit for preterm babies, as well as any term baby the staff felt would benefit.

History of bathing infants

Traditionally, sponge baths were carried out on newborns until the umbilical cord fell off, then tub baths where introduced[6]. However, infants born prematurely continued to have sponge baths as part of their routine care (biweekly/daily) during their prolonged hospitalisation on the

NICU[3]. It was believed that this practice reduced the risk of infection and bacterial colonisation, which can be life threatening for all preterm infants[7]. However, in later research conducted comparing sponge bathing to tub bathing it was found there was no significant difference in infection rates[3,8,9]. In actual fact, the research concluded that a sponge bath posed more of a risk due to significant heat loss, physiological alterations, including changes in heart rate, oxygen requirements and saturation levels, and detrimental behavioural cues, including crying, wimpering and thrashing[3,10-12]. In addition, the procedure of sponge bathing was not supportive of family-centred care as neonatal nurses were reported to be carrying out the procedure in the middle of the night when they had more time available, meaning the family were never involved[3].

Bathing procedures therefore moved away from sponge bathing as routine care to the practices currently used today. Critically ill infants are no longer bathed as it is recognised to be detrimental to their well being, minimal handling is now encouraged to reduce stress on suboptimal physiological ranges[11]. However through the recognition that newborns appeared to be comforted when immersed in warm water[4,6,13], several studies have recommended that once an infant is stable consideration should be given to introducing tub bathing, with the involvement of the family. It is believed that the tub simulates the uterine environment, with the submersion of water being a familiar feeling to the infant[14].

Even though tub bathing was felt to be a more pleasurable experience for both infant and the family, it is still widely accepted within society that bathing continues to be a stressful experience for healthy newborns, resulting in most babies crying throughout the procedure[4]. When considering research on preterm infants, Liaw et al acknowledged that papers on bathing in the literature have predominantly focused on traditional sponge bathing techniques[12]. Regarding tub bathing techniques, this highlighted that bathing routines in most NICUs are not currently based on evidence and that preterm infants tub-bathed continued to display alterations to heart rates and oxygen saturation levels, with frequent behavioural distress cues. This, therefore, raised further the question of the benefit of tub bathing vulnerable preterm infants.

Benefits of swaddling

With concerns still highlighted within the literature surrounding the current method of bathing preterm infants[12], alternative approaches to the procedure need to be considered. It is with this in mind that the author decided to address tub bathing using swaddling techniques during the bath. This concept is promoted by Children's Medical Ventures[15] with the introduction of the developmental bathing system the Tiny Tub. However there is minimal recognition of this technique within the literature[16-18] and no research conducted to date into the benefits of swaddle bathing versus traditional unswaddled tub bathing of preterm infants.

With reference to swaddling preterm infants, historically research has indicated that swaddled infants have improved sleep patterns[19,20]. However, this does raise the controversial issue of the possible associated risk of sudden infant death syndrome during swaddling of infants[21]. However, mainly through research into infant pain[22-24], swaddling is recognised as improving the stability of physiological parameters and reducing behavioural stress signs, including crying and fussing, which continue to be of concern with infant tub baths.

An article by Neu and Brown compared swaddled versus unswaddled preterm infants during weighing procedures[25]. The potential hazards to preterm infants during weighing were recognised and the data obtained indicated beneficial effects for swaddled infants. These infants exhibited less physiological distress, including paleness, duskiness, and reduced visceral activity, such as hiccupping. Improved motor organisation with reduced arousal from conscious level was observed with less motor activity in general, and any movement that occurred was smoother, resulting in reduced general energy expenditure. Placing infants on the scales unswaddled resulted in the babies displaying either poor muscle tone, resulting in a flaccid uncontrolled posture, or rigid hyperextension tone. Also, self-regulatory infant behaviour was observed during the swaddled procedure, whereas unswaddled infants could not, or made no attempt to, self regulate.

Many of the difficulties preterm infants face during tub bathing mirror what was concluded in the research article by Neu and Brown when observing infants during weighing[25]. Fern et al[18] discuss how a father recognised the distress his child displayed during a bath and how containment relieved many of these stress cues. As neonatal nurses we recognise such cues including back arching, hyperextension, trusting, extended limbs with splayed fingers, fussing, often crying and expending large amounts of energy. The bath therefore becomes rushed and unpleasurable for both the infant and the bather, with the baby subsequently reluctant to feed and needing rest and recovery time. Also, more importantly, all of such behaviours are recognised to be behavioural stress cues, which can impact on other subsystems, most importantly the autonomic system[12].

The womb is a compact environment with clear boundaries offering security, which can be mimicked through the containment offered during swaddling. Immersion into warm water also simulates the uterine environment[14]. Combining immersion into water and containment may therefore offer a familiar feeling and promote a calm and stress-free bathing experience.

Swaddle bathing technique

All bathing should be carried out alongside or by the parent, to promote family-centred care, with explanation and education surrounding the bathing technique. As hunger increases an infant's behavioural stress cues and alters performance, baths should be carried out while the baby is settled and before a feed is due, with positive calming communication promoted throughout the bath.

The developmental bathing system Tiny Tub offers a back support, temperature guide and a triangular soft fabric with a deep pocket for safe swaddling (**FIGURE 1**). The water should reach the top of the tub so that the infant's shoulders are submerged, to assist with temperature stability, and the infant's feet positioned at the bottom corner for foot bracing. An additional bowl of warm water is required to bath the eyes, using cotton wool balls.

The limbs are cleaned using parental touch or cotton wool, only exposing one extremity at a time. If the baby demonstrates any behavioural signs of stress during this stage, pausing the procedure and offering time out with containment holding, should resolve any distress. If the baby remains unsettled a

Submerge infant to shoulder depth in swaddling cloth, ensuring infant's feet are touching the bottom corner of the tub for foot bracing.

Wipe eyes with fresh water, from the inner corner to the outer corner. Clean face with additional clean water.

Supporting infant's head, slowly unswaddle one arm at a time to wash, using hand or a wash cloth.

Slowly expose one leg at a time to wash and clean genital area. If the infant demonstrates any signs of stress allow time for recovery.

Rock the infant forward supporting under the neck. Wash the back through the wash cloth, so as not to disorganise the infant.

Top up with warm water if necessary. Wash the infant's head.

Gently unswaddle the infant, remove from the tub leaving the cloth in the bath, maintaining a contained, flexed position for security.

Quickly draw the infant to caregiver's chest and wrap in the fetal position in a towel, ensuring that the head is covered.

After bathing the infant should be alert and eager to feed orally.

FIGURE 1 Procedure for a swaddle bath.

non-nutritive sucking tool (dummy) should be offered. The infant's back should be washed through the cloth, as unswaddling would disorganise the infant, and lastly the hair washed prior to finishing the bath, to reduce cold stress. To complete the bath, the cloth is removed and the baby is quickly lifted onto the bather's chest, where a towel is ready. After the infant has been re-swaddled the priority is to dry the head, as this is where infants lose most of their heat, through the large surface area[26]. The bath should take 7-10 minutes, with additional warm water supplemented if required.

Infants should not cry during the procedure – this helps the parents to feel comfortable in bathing their infant and encourages a more pleasurable family event (**FIGURE 2**). Fern et al[18] found parents involved in swaddle bathing their infants had increased confidence in their parenting skills, which helped with their attachment and interaction with their baby and overall

Baby 1: born at 25 weeks' gestation – bathed from 33 weeks

My baby had a swaddle bath, I expected him to cry while having a bath but due to the benefits of swaddle bathing he was relaxed, calm and I definitely think that swaddle bathing is very beneficial.

Baby 2: born at 26 weeks – bathed from 32 weeks

We were introduced to swaddle bathing by the NICU's developmental care nurse. As he was lowered into the water he didn't open his eyes and stayed asleep throughout! He was so calm afterwards and went straight on the breast and had a full breastfeed without tiring as I had expected he would.

FIGURE 2 Parental feedback regarding swaddle bathing.

improved their understanding of their baby's needs. According to Children's Medical Ventures[15], infants exhibit positive feeding after bathing, as less energy has been expended. Reviewing the independent literature surrounding research into tub bathing and generalised swaddling of infants, this theory appears plausible.

Changing practice

Nursing in today's climate relies heavily on evidence-based practice and with such new concepts implementing change in practice is by no means easy[27]. Although, the initial aim of the author was to begin the collection of data to support this theory, whilst submitting a research design to the ethical committee and organising staff training, the overall consensus regarding swaddle bathing changed.

Staff and parents expressed positive feedback related to swaddle bathing and consequently felt it would be morally and ethically wrong to carry out a study, in accordance with the NMC code of conduct[28], knowingly exposing preterm infants to potential harm. Benefits of swaddle bathing observed have included

- a reduction in temperature variation
- infants either remain in light sleep/semi dozing or are awake, maintaining a quiet alert state
- infants dislay reduced behavioural stress, ie absence of extended limbs, back arching, splayed fingers saluting across the face, hiccupping, fussing and crying
- after bathing the babies remain alert and eager to feed orally.

Swaddle bathing therefore has become common practice on the author's unit and is a method which the author believes all nurses caring for vulnerable infants should consider using as an alternative to the traditional bathing method commonly used.

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