Integrating “Back to Sleep” Recommendations Into Neonatal ICU Practice

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**ABSTRACT**

**BACKGROUND AND OBJECTIVES:** The American Academy of Pediatrics stresses that NICUs should endorse and model the sudden infant deaths syndrome risk-reduction recommendations significantly before anticipated discharge of the infant. Medical personnel are critical role models for parents, and the way they position infants in the hospital strongly influences parental practices at home. The aims of this project were to increase the percentage of infants following safe sleep practices in the NICU before discharge and to determine if improving compliance with these practices would influence parent behavior at home.

**METHODS:** An algorithm detailing when to start safe sleep practices, a “Back to Sleep” crib card, educational programs for nurses and parents, a crib audit tool, and postdischarge telephone reminders were developed as quality improvement intervention strategies.

**RESULTS:** NICU compliance with supine positioning increased from 39% to 83% (P < .001), provision of a firm sleeping surface increased from 5% to 96% (P < .001), and the removal of soft objects from the bed improved from 45% to 75% (P = .001). Through the use of a post-discharge telephone survey, parental compliance with safe sleep practices was noted to improve from 23% to 82% (P < .001).

**CONCLUSIONS:** Multifactorial interventions improved compliance with safe sleep practices in the NICU and at home. Pediatrics 2013;131:e1–e7
Sudden infant death syndrome (SIDS) remains the third leading cause of infant mortality in the United States.\textsuperscript{1,2} Epidemiologic studies have demonstrated a strong association between infant sleep position, sleeping environment, and SIDS. The most recent American Academy of Pediatrics (AAP) guidelines stress the following preventive safe sleep practices (SSPs): supine-only position for sleep, a firm sleep surface, no soft objects in the crib, no loose bedding in the crib, no bed sharing, avoidance of overheating the infant, and elimination of infant exposure to smoking.\textsuperscript{3} Sleeping position and environment are emphasized as crucial modifiable risk factors for SIDS. Despite the aggressive, nationwide “Back to Sleep” campaign, SIDS continues to be one of the leading causes of postneonatal infant deaths, and the majority of these deaths still occur when the above SSPs are not followed.\textsuperscript{4–6}

Premature and low-birth-weight infants have a higher risk of SIDS than term infants,\textsuperscript{7,8} and very low-birth-weight infants are more likely to sleep in the nonsupine position after discharge than larger low-birth-weight infants.\textsuperscript{9} This numbers are particularly concerning because the rate of prematurity in the United States remains high (12% of all births).\textsuperscript{10} Parental knowledge and acceptance of SSPs are key to decreasing the risk of unexpected deaths. Studies have indicated that nurses and other medical personnel play critical roles in parental education: the way infants are positioned in the hospital strongly influences parental practices at home.\textsuperscript{9,11,12}

Full implementation of the AAP guidelines on SSPs is challenging in the NICU environment. Prone sleeping positions are encouraged early in the hospital course to optimize respiratory mechanics.\textsuperscript{13} Because non–oxygen-dependent healthy preterm infants nearing discharge have similar breathing patterns and work of breathing in the prone versus supine position,\textsuperscript{14} there should be no impediment to transitioning these infants to the supine sleeping position at some point before discharge. When caring for preterm infants, nurses often use special aids or blanket rolls to position infants and may apply extra blankets to improve thermoregulation when weaning infants from incubators to open cribs. Nonetheless, in its updated recommendations from 2011, the AAP stressed that NICUs should endorse and model the SIDS risk-reduction recommendations significantly before the infant’s anticipated discharge.\textsuperscript{5}

SSPs and SIDS reduction strategies are typically introduced to parents by bedside nurses before discharge. However, there is a significant knowledge gap in SIDS prevention measures and implementation among NICU nurses who discharge infants. In a survey of 430 nurses, just 42% to 64% of NICU nurses (depending on the component of SSPs) identified themselves as always following safe sleep recommendations when preparing infants for discharge.\textsuperscript{15} Another survey showed that only half of NICU nurses advised parents to place their infant exclusively supine after discharge.\textsuperscript{16}

The aims of this project were to develop a safe sleep educational and modeling program for the NICU, to develop a process to identify which infants are ready to begin SSPs in the NICU, to increase the percentage of eligible infants following SSPs before discharge, and to determine if improving compliance in the unit influences parental choices at home.

**METHODS**

The project was reviewed and approved by the Children’s Memorial Hermann Hospital (CMHH) Quality Council. The project activities were part of the regular hospital education and quality improvement activities; identifiable information about patients, parents, and nurses was not collected. The project was carried out over a 7-month period from May to November 2010.

**Setting**

The CMHH NICU is a large tertiary care unit in Houston, Texas, with an average census of 100 infants. There are 900 to 1000 admissions to the NICU per year; approximately one-third are born outside CMHH. During random crib audits in May and June 2010 performed in the level II nursery at CMHH, only 39% of infants were sleeping in the supine position, 5% had a firm sleeping surface, and 45% had no soft objects in bed. Although these hospitalized infants were not at risk because they were being continuously monitored, pre-discharge sleep practices that conflict with the AAP recommendations for SIDS prevention are likely to be continued after discharge when the infants are no longer being monitored. Furthermore, a postdischarge telephone survey of parents, done at the same time along with crib audits, showed that only 23% of parents reported full compliance with SSPs at home.

**Overall Framework**

A quality improvement model was developed to translate the AAP guidelines on SSPs into nursing practice in our NICU. The project team worked closely with all key stakeholders, including representatives from administration, nursing, physical and occupational therapy, and physicians. Team members met regularly once or twice a month for the duration of the project. They were responsible for developing a unit guideline on SSPs, educational materials for nurses and parents, visual cues for staff, a tool for auditing cribs, and conducting a parental survey. Team members performed literature searches and group interviews with...
physicians, nurses, and parents to identify facilitators and barriers for developing and implementing safe sleep policies in premature infants. The project was divided into before-intervention (May–June), intervention (July–September), and after-intervention (October–November) phases. The before-intervention phase was defined as the time before any interventions or staff interviews were started. The intervention phase included the development of nursing guidelines and education of staff nurses on SSPs. The after-intervention phase was measured after the nursing guidelines and nursing education campaign on SSPs were completed.

**Intervention and Implementation**

All nurses in the NICU were required to complete the continuing education program on SIDS risk reduction developed by the National Institute of Child Health and Human Development. They were also tested on safe sleep role modeling during their annual skills evaluation. The National Institute of Child Health and Human Development computer module took about 1 hour to complete and provided 1 hour of continuing education credit for the nurses. The module covered theories of SIDS etiology, outlined modifiable and nonmodifiable risk factors, and provided strategies on risk reduction. Numerous question and answer sessions with the nursing staff were conducted to educate them on issues regarding specific implementation strategies for our NICU. The project was also discussed with the physicians in a division meeting to elicit their acceptance and incorporate their suggestions.

On the basis of the literature review, expert opinions, and numerous unit discussions, an algorithm was developed to determine when an infant was ready to start SSPs in our NICU (Fig 1).

NICU therapeutic positioning was defined as positions (prone, side-lying, elevated head of bed, etc.) and positioning tools (positioning aids, blanket rolls) used in the NICU for medical reasons but not appropriate for the routine home environment. SSP included the following components: sleeping on the back on a firm, flat mattress covered by a fitted sheet; blanket positioned in such a manner that it stays below the shoulders, preventing possible airway obstruction; a crib free of loose material including pillow-like stuffed toys and bumper pads; and room temperature that is comfortable for a lightly clothed adult (21.13–23.35°C).

A laminated “Back to Sleep” crib card based on the AAP’s recommendations was developed (Fig 2). The clinical staff was responsible for putting the card on all open cribs. The crib card was used to remind medical providers and parents that the infant had started SSPs. This form of implementation would also cue nurses to provide discharge teaching to the parents. The crib card had 2 sides: one with an explanation of SSPs and the other with NICU therapeutic positioning for infants who were not ready to start SSP; it was secured to the crib with the appropriate side up. At discharge, parents received a different Back to Sleep card with the SSP recommendations on one side and cardiopulmonary resuscitation tips on the other side for use on the baby’s crib at home.

SIDS education was offered to all parents. Parents were encouraged to watch the DVD on safe sleep education from the First Candle Foundation (www.firstcandle.org); the DVD explained how to implement SSPs in the home setting. The DVD method was used to provide consistent and accurate information. A written parent discharge instruction sheet containing language-appropriate information on SSPs was given to every family; neonatal nurses reviewed the instructions with parents before discharge. SSP strategies were also included in the agenda of the discharge educational class for parents.

**Methods of Evaluation**

A crib audit tool was developed to monitor in-hospital compliance with SSPs and limit the variability among observers. A single-page form was created to collect information on the sleep position of the infant (back, prone, side), presence of firm sleep surface, and absence of extra soft objects in the bed. Only cribs of the SSP-eligible infants were selected for auditing (Fig 1, Initiating SSP Algorithm). Multiple audits were conducted by different quality improvement team members in each phase of the project. There were 2 or 3 days on which audits were conducted in each phase. They were taken during weekdays on day shifts without previous warning to the staff nurses.

A questionnaire was developed to monitor parental compliance with SSPs at home after discharge (Table 1). This questionnaire was added to the routine postdischarge telephone courtesy calls. Parents of all discharged patients were routinely contacted by phone within several days of discharge. A maximum of 2 attempts was made to reach a parent. Parents were asked about SSPs and provided with counseling if incorrect practices were identified. A pilot survey was conducted to assess understanding of the questions. The surveys were provided before, during, and after the implementation of the changes. A parent was counted as fully compliant only if all requirements of SSPs were always in place (eg, if parent answered “sometimes” when the correct response was “always,” the
compliance was counted as not fully compliant). The results of the crib audits and parental surveys were displayed in the nursing lounges for review and feedback to reinforce the educational measures.

**Analysis**

Comparisons between the before- and after-implementation phases were made by using Fisher’s exact test (Stata 11.0; StataCorp, College Station, TX). The nurses’ participation with education was monitored by the NICU’s clinical nurse educators by collecting copies of continuing education certificates.

**RESULTS**

**Consensus Building**

Despite reaching the consensus that the AAP guidelines should be implemented, multiple group interviews of the nurses, physicians, and auxiliary staff revealed persistent attitudinal barriers to the program. Many nurses were aware of the AAP recommendations but still continued to believe that other positions, mainly side positions, were safer for infants, especially after their feedings. Education, along with a recommended hospital policy, helped modify nurses’ beliefs and behaviors toward putting infants to sleep on their backs. Our NICU staff is composed of 236 nurses; 189 nurses (around 80%) completed Back to Sleep training. Maintenance of education was accomplished by including questions on SSPs and Back to Sleep in the annual nursing competency assessment and in the online program for all new employees.

At the beginning of the project, numerous staff members were also concerned with the implementation of the Back to Sleep recommendations in fragile premature infants who spend a majority of their time in their beds; concerns focused on the possibility that putting those infants exclusively to bed in the supine position could be detrimental to their respiratory and cardiac health.
NICU Therapeutic Positioning

Examples of when NICU Therapeutic Positioning is appropriate:
- Respiratory symptoms such as tachypnea, retractions, grunting and oxygen dependency.
- Nasal CPAP
- Nasal Cannula requirements other than home oxygen requirements.
- Phototherapy
- Scalp IV or central lines
- Neonatal Abstinence Syndrome
- Lack of handling due to social reasons (please address with primary team)
- Any medical condition that requires prone or side lying positioning.
- If tummy time cannot be implemented due to inability to be positioned prone (such as ostomy/surgical site).

Continue to evaluate infant for readiness to start Back to Sleep positioning.

Ready for Back to Sleep
- Back to Sleep is recommended by the AAP and should be implemented prior to discharge.
- Arms in or arms out are both acceptable ways to swaddle an infant based on its needs.
- Cold infants are not happy infants. Dress infants appropriately and use extra blankets if necessary.
- Keep unnecessary blankets, toys, and soft objects out of the infant’s bed space.
- Tummy time should be encouraged when alert and should be supervised by a parent or caregiver.
- Opportunities for tummy time are during an assessment or when a nurse is warming a feed.
- Swaddling is safe. Keep the blankets from going above the infant’s shoulder line.
- Look through the guideline located on SharePurc for more detailed information on Back to Sleep.
- Educate parents on a safe sleep environment and practice with the parent crib card, DVD, and discussion.
- Encourage the use of a pacifier.
- Prevent plagiocephaly by encouraging tummy time when the infant is awake.

FIGURE 2
Each infant’s crib had a crib card that would either recommend therapeutic positioning or Back to Sleep practices depending on the readiness to begin SSPs.

TABLE 1
Postdischarge Survey Included as Part of the Routine Follow-up Telephone Courtesy Call Made Within Days After Discharge

| 1. Do you put your baby on his back to sleep? | Never | Sometimes | Almost | Always |
| 2. Does your baby sleep in his own crib/bassinette? | | | |
| 3. Is your baby exposed to cigarette smoke? | | | |
| 4. Do you dress you baby in as much or as little as you would wear? | | | |
| 5. Does your baby sleep on a firm mattress? | | | |
| 6. Do you keep toys or extra blankets in your baby’s crib? | | | |

If incorrect practices were identified, further counseling provided advice on how to pursue SSPs based on the AAP recommendations.

supine might negatively affect their respiratory function and predispose them to a higher risk of plagiocephaly.

Through numerous discussions, we eventually reached consensus about the patients who qualified to start the SSPs (Fig 1). During this process, it became clear that finding the optimal time to transition our infants to SSPs was a fundamental key to increasing the nurses’ acceptance and compliance.

Crib Audits
In our NICU, about 20% to 30% of the patients are in open cribs and otherwise eligible for SSPs. A total of 227 cribs were audited during the project period, there was a significant increase in the rate of supine positioning from 39% during the baseline period to 83% after a 3-month implementation period (P < .001; Fig 3). Provision of a firm sleeping surface increased from 5% to 96% (P < .001), and the removal of soft objects in the bed improved from 45% to 75% (P < .001).

Surveying Parental Compliance After Discharge
Of the total of 338 parents that were called after discharge, 259 parents replied with an overall response rate of 77%. Among responders were 66 parents in the pre-intervention phase (65% response rate) and 98 parents in the post-intervention phase (80% response rate). There was a significant increase in the percent of parents fully compliant with SSPs in the after-implementation phase (65% response rate) and 98 parents in the post-intervention phase (80% response rate). There was a significant increase in the percent of parents fully compliant with SSPs in the after-implementation phase (65% response rate). Among the SSP components, we observed the largest improvements in putting infants to sleep on the back (93% vs 73%), dressing infants appropriately (93% vs 66%), and removing extra soft blankets from the crib (97% vs 61%). The other components had relatively high compliance in the pre- and postintervention phases: sleeping in own bed (96% vs 94%); no smoking exposure (98% vs 99%); and sleeping on a firm mattress (94% vs 99%). During the postdischarge telephone survey, a number of parents spontaneously positively commented on the use of crib cards as visual reminders.

DISCUSSION
What parents observe in the hospital regarding SSPs has a significant effect on what they do at home after discharge. To encourage safe practices at home, it is essential to initiate them during the hospital stay as the
beginning of a consistent safe sleep routine.

Although the AAP recommends positioning premature babies on their backs for sleep well before discharge, it is unclear when preterm infants should transition to supine sleeping. One survey showed that the majority of units in the United Kingdom began supine sleeping at least 1 to 2 weeks before discharge or when monitoring for apnea was no longer used and the infant could be nursed in a crib rather than an incubator.\(^{18}\)

The use of positioning devices along with soft bedding material has been advocated for the developmental support of preterm infants in the NICU, even though the benefits are unproven. There is evidence for respiratory advantages of prone positioning in premature infants with respiratory symptoms,\(^ {13,19}\) but these advantages were not found in preterm infants off oxygen and nearing discharge.\(^ {14}\) Soon after discharge, SIDS becomes the leading cause of death, and the physiologic benefits of prone positioning for oxygen-dependent infants must be weighed against the increased risk of dying suddenly and unexpectedly in the prone position.\(^ {14}\)

It seems reasonable to transition the infant to a supine sleeping position as soon as physiologically stable. A simple operational definition of “physiologically stable” is needed for implementation of SSPs in the NICU.

This project offers one institution’s approach to the implementation of the AAP recommendations for infants’ sleep positioning, a guideline primarily directed toward healthy term infants, in the NICU. Our primary implementation strategy was education for nurses and parents and development of unit guidelines based on existing evidence and our own medical staff input. Multiple presentations, question and answer sessions, and consensus discussions helped to identify barriers and possible solutions. We were able to address potential attitudinal barriers such as fear of aspiration and claims that the program compromised developmental care principles through an educational campaign. We believe that an important key to our success was early involvement of key stakeholders including administration, nurses, nurse educators, occupational/physical therapists, and physicians. We empowered our nursing and medical staff with knowledge and included their input into the new unit policy. The results of this project confirmed that the incorporation of SIDS risk-reduction strategies into the hospital nursing routine can positively affect parental postdischarge practices.

This project has several limitations. Demographic data on the survey responders were not obtained; therefore, it is not known if the groups compared were similar in their educational level, age, and racial distribution. The absence of demographic data may present the possibility for selection bias. We did not collect detailed information regarding the consistency with which intervention components were implemented or what the nurses included in the discharge teaching. Because we implemented a multifaceted program at one time, we do not know the intensity of the use of each intervention and therefore could not determine which intervention components had the greatest effect.

Currently, ongoing efforts by the nursing administration and nursing educators are directed at maintaining or improving our postintervention results. If the results of this project are to be reproduced in other units, we recommend local adaptation to incorporate these practices into the routine workflow. In our case, SSPs were most conveniently triggered at transition from incubator to open crib. Success with these practices requires commitment from both nursing administration and medical staff to prioritize SSPs into routine care practices and discussions with families.

**ACKNOWLEDGMENTS**

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**Integrating "Back to Sleep" Recommendations Into Neonatal ICU Practice**

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