Interventions to Improve Infant Safe Sleep Practices

Carrie K. Shapiro-Mendoza, PhD, MPH

Division of Reproductive Health, US Centers for Disease Control and Prevention, Atlanta, Georgia

In 2013, there were nearly 3500 deaths among infants from sudden infant death syndrome (SIDS) and other sleep-related events (egg, accidental suffocation) in the United States.[1] Although the cause of SIDS is unknown, several modifiable risk factors have been identified, including prone and side sleep position, bed sharing, and use of potentially hazardous soft bedding in the sleep environment. SIDS rates declined by more than 50% following the Back to sleep campaign in the 1990s,[2] but since then, rates of sudden unexpected infant deaths have declined less rapidly[1, 3] and SIDS remains the leading cause of post-neonatal mortality in the United States.[1]

To improve infant care practices and ultimately reduce SIDS and other sleep-related infant deaths, innovative strategies that educate caregivers about safe sleep and encourage them to adopt recommended infant safe sleep practices need to be developed[3] and their effectiveness evaluated. Effective interventions could be scaled upto reach populations at highest risk and ultimately reduce infant mortality.

A key component to developing effective evidence-based strategies to promote safe sleep is understanding caregivers' barriers to adopting recommendations. Examples of barriers are caregiver concerns about choking risk if an infant is placed supine for sleep[4] or perceived discomfort if the infant is not placed in a warm and soft environment with blankets and pillows.[5] With an understanding of the barriers, interventions can be developed to counteract them.

In this issue of *JAMA*, the Social Media and Risk-Reduction Training (SMART) randomized clinical trial evaluated 2 such strategies: a nursing quality improvement (NQI) intervention provided postpartum teaching and modeling to mothers during the postpartum hospital stay, and a mobile health(health) intervention delivered tailored email or text messages and videos to mothers up to 60 days after giving birth.[6] The safe sleep interventions encouraged supine sleep position, room sharing without bed sharing, not using soft bedding in the sleep environment, and pacifier use when placing the infant to sleep for naps and at bedtime. In addition, the safe sleepm Health messaging aimed to counteract

Corresponding Author: Carrie K. Shapiro-Mendoza, PhD, MPH, US Centers for Disease Control and Prevention, MS F74, 4770 Buford Hwy NE, Atlanta, GA 30341 (ayn9@cdc.gov).

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barriers that can limit use of safe sleep practices. Control interventions substituted breastfeeding for safe sleep practices.

Sixteen US hospitals were selected from a nationally representative sample of 32 hospitals with more than 100 deliveries annually, based on their history of successful recruitment for the Study of Attitudes and Factors Effecting Infant Care Practices (SAFE) study.[7] Hospitals were randomly assigned to 1 of 4 intervention combinations: breastfeeding NQI and breastfeeding mHealth; safe sleep NQI and breastfeeding mHealth; breastfeeding NQI and safe sleep mHealth; or safe sleep NQI and safe sleep mHealth. The main objective was to evaluate the effectiveness of the safe sleep interventions compared with the breastfeeding control interventions.

Of 1600 mothers of healthy term infants recruited, 1263 completed a follow-up questionnaire when their infant was 2 to 8 months old. Mothers who received both the NQI and the mHealth interventions for safe sleep reported the highest percentages of adherence to safe sleep practices and mothers who received the safe sleep mHealth intervention alone had the second highest percentages.

The safe sleep mHealth intervention alone compared with the control mHealth intervention increased adherence to the 4 recommended safe sleep practices (supine sleep position, 89.1% vs 80.2%, respectively; adjusted risk difference, 8.9% [95% CI, 5.3%–11.7%]; room sharing without bed sharing, 82.8% vs 70.4%; adjusted risk difference, 12.4% [95% CI, 9.3%–15.1%]; no soft bedding use, 79.4% vs 67.6%, adjusted risk difference, 11.8% [95% CI, 8.1%–15.2%]; any pacifier use, 68.5% vs 59.8%; adjusted risk difference, 8.7% [95% CI, 3.9%–13.1%]). Significant differences were not found for the safe sleep NQI intervention alone, but additional analysis suggested that mothers receiving both the NQI and mHealth interventions had better adherence to supine sleep recommendations than mothers receiving mHealth alone.

The prevalence of adherence to these recommended safe sleep practices is not known at a national level for 2015 and 2016. However, in 2007–2010, the National Infant Sleep Position study found 73% of infants were reported as being usually placed to sleep supine and 54% reported soft bedding use.[8] A 2011–2014 national survey found that 66% of mothers reported usual room sharing without bed sharing.[7] In addition, the percentages from the SMART randomized clinical trial were higher than the baseline rates from the SAFE study.

Safe sleep interventions have rarely been tested with a randomized clinical trial. Notwithstanding the rigorous and innovative methods, the study does have some limitations. First, generalization of study findings may be challenging. Hospitals were selected to participate in the study based on a history of successful recruitment to an earlier study. Second, compared with enrolled mothers who responded at follow-up, nonrespondents were more likely to be younger, black, single, and less educated, which are all risk factors for SIDS and are associated with higher rates of nonadherence with safe sleep recommendations. Third, because the study was restricted to healthy term infants, it is unknown if the intervention would be effective for mothers with infants born preterm,[9] which is another high-risk SIDS group. Fourth, study outcomes relied on self-report, which

may be subject to social desirability bias. For example, mothers may under-report practices that would be perceived as unfavorable responses because they would contradict the messages about a safe sleep environment provided in the interventions. Unannounced direct observations of infant care practices at a family's home would be the preferred approach but would be challenging to accomplish.[10]

The feasibility of scaling up them Health safe sleep intervention remains to be determined, although the mHealth intervention likely requires fewer resources and less effort to scale up than follow-up home visits or telephone coaching from health care professionals because it relies on delivering emails and text messages. In addition, whether the intervention will result in reduction in SIDS rates is unknown because the study was underpowered and too short-term to evaluate long-term outcomes at a population level. However, conducting such a study might not be possible because SIDS is a rare event.

The multifaceted approaches used in the SMART study are promising. This study combined health messaging, education of health care professionals, and interventions aimed at reducing barriers to safe sleep practices for infant caregivers.[4] However, the NQI safe sleep intervention, which taught mothers about safe sleep practices and modeled these practices, did not improve maternal practices independently. Other studies have shown improvements to safe sleep practices following postpartum nursing education and modeling.[10,11] It could be that the selected hospitals provided safe sleep education that was as effective as the NQI safe sleep intervention. It is also possible that mothers receiving the intervention in the hospital may not have retained the information after they went home.

For the greatest effect on reducing infant mortality, interventions need to be adapted for implementation among the highest risk groups such as non-Hispanic black, American Indian, and Alaskan Native mothers and families because these are the populations with the highest rates of SIDS and sleep-related infant death.[12] At the same time, interventions tailored to individual caregivers[13] and to the cultural beliefs of a particular demographic or racial/ethnic group should be investigated. Studying whether providing safe sleep interventions to all caregivers, not just mothers, and their support systems would lead to benefit also is important.

Whether widespread implementation of an mHealth safe sleep intervention is feasible or will reduce rates of SIDS and other sleep-related mortality remains unknown. SIDS is a devastating event and progress in further reducing the incidence of SIDS and other sleep-related events has stalled.[3,12] Scaling up interventions that improve safe sleep practices, especially among those at highest risk, would be an important step forward.

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