

QUALITY IMPROVEMENT



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Decreasing Sudden Unexpected Infant Death

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ABSTRACT

Background: Sleep-related sudden unexpected infant death (SUID) is an alarming, potentially preventable event with over 3,500 annual occurrences in the United States (US). In response to sleep-related SUIDs, the American Academy of Pediatrics and National Institutes of Health advocate for safe sleep practices to promote establishment of safe sleep environments for infants through the *Safe to Sleep* initiative. However, research evidence shows that lack of knowledge in hospital staff and community members (parents/caregivers) and cultural barriers/biases are factors associated with the inability or resistance to adopting safe sleep practices for infants.

Methods: In 2017, internal evidence within a local South Florida hospital emergency department (ED) revealed eight sleep-related SUID cases. A Sleep Safe Task Force was initiated followed by implementation of a quality improvement project using the Plan-Do-Check-Act model. The purpose of the project was to improve knowledge through education on safe sleep practices among hospital staff and parents/caregivers of infants within the community to decrease the number of infant sleep-related deaths presenting to the ED. The implementation plan included education for hospital staff, community members, and local pediatric/obstetric office staff, coupled with distribution of sleep sacks to parents/caregivers.

Results: Post-implementation of education sessions, SUID cases presenting to the ED decreased by 50% ($n = 4$) in 2018, with zero cases in 2019 and 2020, one case in 2021, and zero in 2022.

Conclusions: The results of the project suggested that providing education and safe sleep resources helped reduce the rate of SUID cases. Further studies are needed to evaluate efficacy of the education in community members by examining adoption of safe sleep practices for infants.

Keywords: SIDS, SUIDS, safe sleep, Safe Sleep Task Force, crib death, newborn safe sleep, sleep sacks

INTRODUCTION

Sleep-related sudden unexpected infant death (SUID) is an alarming, potentially preventable event with over 3,500 annual occurrences in the United States (US) (Moon et al., 2022; Vladescu et al., 2020). In efforts to increase community and healthcare provider awareness of interventions that prevent SUID, the American Academy of Pediatrics (AAP) provided recommendations to reduce the risk of sleep-related infant deaths and the National Institutes of Health (NIH) led the *Back to Sleep* initiative (now called *Safe to Sleep*), in 1992 and 1994 respectively. Subse-

quently, the rate of infant sleep-related deaths decreased from 154.6 per 100,000 live births in 1990 to 93.9 per 100,000 live births in 1999, an approximate 50% decrease (NIH, n.d.). However, despite the success of the 1990's recommendations and initiative, the SUID rate in 2017 was approximately 1,400 deaths, with 1,300 deaths due to unknown causes and almost 900 deaths due to accidental sleep-related suffocation and strangulation (Centers for Disease Control and Prevention, 2022). Recent evidence shows that implementation of safe sleeping recommendations by infant caregivers is suboptimal (Bombard et al., 2018). Furthermore, internal evidence with-

in the emergency department (ED) of a South Florida acute care hospital revealed eight cases of sleep-related infant deaths in 2017.

Factors Contributing to Sleep-Related Infant Deaths

Factors contributing to the continued high number of unexpected infant deaths are multifaceted (Maged & Rizzolo, 2018). Firstly, external evidence suggests that parents do not follow AAP recommendations (Patrick et al., 2021), potentially related to lack of knowledge, preconceived ideas of safe infant sleep (such as sleeping prone), concern for the infant's comfort, and/or fear of aspiration when sleeping supine. Through their qualitative study analysis, Vilvens et al. (2019) identified six major themes contributing to reluctance to adopt safe sleep practices: 1) culture and family tradition, 2) knowledge about safe sleep practices, 3) available resources and how to access them, 4) stressed out parents, 5) lack of support, and 6) fear for safety of the baby. These themes may be inhibiting factors related to adoption of safe sleep practices, potentially contributing to sleep-related infant death. Furthermore, despite the AAP and NIH Safe to Sleep initiative, some parents reported receiving incorrect infant sleep safety information from healthcare professionals or no information at all (Hitchcock & Ruhl, 2019). As such, the AAP recommends healthcare professionals and staff in newborn nurseries, as well as childcare providers, teach and model the sleep-related infant death risk-reduction recommendations (Maged & Rizzolo, 2018). Modeling behaviors throughout the admission prior to discharge may initiate a discussion with parents and possibly influence parents to adopt the safe sleep environment recommendations. However, according to Patrick et al. (2021), some nurses may also be reluctant to follow AAP recommendations for safe sleep environment. Reasons may include lack of confidence in hospital policies or confusion due to numerous updates to the recommendations. Therefore, providing education to parents and healthcare professionals (nurses) is essential to promoting adoption of safe sleep practices for infants. As such, the purpose of this quality improvement (QI) project was to improve knowledge through education on safe sleep practices among hospital staff as well as parents and caregivers of infants within the community to decrease the number of infant sleep-related deaths presenting to the ED.

Cultural Considerations

Rates of sleep-related death, like other causes of infant mortality, are associated with racial and ethnic disparities (Moon et al., 2022). Furthermore, while infant mortality rates have decreased in general, a slower decline in non-Hispanic Black and American Indian/Alaska Native infants has been observed (Moon et al., 2022). Differences in the prevalence of supine positioning and other sleep environment conditions among different racial and ethnic populations may contribute to these disparities (Vilvens et al., 2019). Factors that result in the marginalization of infants and their families, including low socioeconomic status or position, unemployment, housing instability, and domestic violence, are highly correlated with race/ethnicity in the United States (Moon et al., 2022). Therefore, special considerations are needed for these populations.

METHODS

Implementation Plan

The target populations were perinatal services, pediatrics, and ED hospital staff and community members (parents/caregivers) within a 142-bed hospital in Southeast Florida, which is part of a large non-profit healthcare system consisting of 11 hospitals and more than 100 outpatient facilities and physician practices. A Safe Sleep Task Force (SSTF) was formed and met monthly starting in June 2018. The SSTF was comprised of staff from the following departments/units: perinatal services, pediatrics, ED, foundation, and leadership.

Plan-Do-Check-Act

The SSTF used the Plan-Do-Check-Act model to guide planning and implementation of the QI project. The primary objective was to increase awareness of safe sleep practices/environments for infants by providing education regarding the AAP/NIH Safe to Sleep recommendations with the intention of decreasing the number of SUID cases presenting in the hospital's ED. Another objective specific to staff education was inclusion of instruction regarding modeling safe sleep practices/environments throughout the postpartum period/hospital stay. Additionally, local pediatric and obstetrical physicians and office staff were included in the educational sessions. Parent/caregiver education was conducted throughout the hospital during admission, at discharge, and post-

discharge. Hospital staff education was conducted over the course of three months from July 1st, 2018, through October 31st, 2018 utilizing online modules.

PLAN

Education Sessions

The SSTF provided education materials for hospital staff through online modules during this timeframe and during onboarding of new staff. Pediatric/obstetric office physicians and their staff were educated in person using informational booklets that are provider-specific, provided by the NIH. Parents/caregivers were educated in person from time of admission through discharge during the safe time frame. The education sessions were designed to include the Safe to Sleep standards/recommendations. The AAP/NIH recommendations for a safe sleeping environment for infants include two key elements: 1) parent education about safe infant sleep that includes verifying their understanding of safe sleep and 2) modeling safe infant sleep environments by hospital staff (Moon et al., 2022). Therefore, the education plan included information about environmental factors that increase an infant's risk of sudden death, such as prone sleeping, sleeping on soft surfaces, sleeping with blankets, pillows, and/or other soft objects, bed sharing with adults, and hyperthermia. As such, the AAP recommendations for "back to sleep for every sleep" (supine position), use of firm sleep surfaces, breastfeeding, rooming together but on separate surfaces (no bed sharing), and no soft objects or loose bedding in the sleep area were key elements of the education (Moon et al., 2022). All session attendees were provided with the opportunity to ask questions. In person participation in education sessions was voluntary for parents/caregivers and

local office staff and physicians. Participation for hospital staff was mandatory through online modules.

Community Events

Community outreach was an integral component of community education on safe sleep practices for infants. Perinatal services and ED nurses presented information on Safe to Sleep recommendations at the sixth and seventh Annual Holiday Health and Resource Fair sponsored by Florida Department of Health (FDOH) and Women, Infants, and Children (WIC).

Additional Intra-Project Interventions

Post-Discharge Follow-Up

While the initial plan solely included education sessions and parents/caregivers were educated from the time of admission throughout their hospital stay until discharged, the SSTF members noted that parents/caregivers may potentially encounter difficulty with retaining the information presented and modeled. To reinforce the information, post-discharge calls were initiated as an addendum to the education sessions. Following two weeks after discharge, nurses called parents/caregivers using scripted discharge call back questions to guide the follow-up assessment (Figure 1). The parent/caregiver was provided with the opportunity to ask questions regarding the care of the infant; if necessary, the callback nurse reinforced the education.

Sleep Sacks

Serving a culturally diverse population, the SSTF team was aware of cultural practices that potentially included swaddling of newborns with several blankets, as well as bed sharing. During the second task force meeting in July 2018, representatives from administration, patient experi-

Figure 1

Questions for Post-Discharge Follow-Up

Discharge Callback Questions

How is your baby being put to sleep? Back/stomach

Where is the baby sleeping? Crib/bassinet/playpen

He/she using sleep sack given at discharge? Yes/no

Are you using blankets? Yes/no – (if yes WARN of risk of suffocation)

ence, pediatric ED, and pediatrics attended. The team expressed concern regarding the possibility that parents were swaddling their newborns with several blankets at home. Following an online search, the SSTF found a product, sleep sacks or sleep bags (Figure 2), that served as a safe alternative to using multiple blankets; this product is endorsed by the First Candle/SIDS Alliance (First Candle, 2022). The AAP also supports the use of sleep sacks as part of the safe sleep environment. As such, the objective was to include the intervention of sending every couplet (mother and infant) home with a sleep sack to promote neonate comfort and warmth in a safe manner. The retail price of sleep sacks was approximately twenty US dollars, posing a potential cost-prohibitive solution for some community members. The SSTF collaborated with a company that produces sleep sacks and negotiated a significantly reduced price for hospitals interested in purchasing the product with the intent to send it home with each couplet. The purchase included educational materials for distribution to hospital staff and at community events. While purchase of the sleep sacks at a reduced cost was not in the perinatal department's budget, the SSTF contacted the hospital's foundation department for funding assistance; sleep sack funding was secured for five years. The SSTF utilized the sleep sacks as a point of discussion during discharge teaching, as well as during discharge callbacks to parents/caregivers.

Figure 2

Infant Wrapped in a Sleep Sack



Note: Picture used with permission

Outcome Measures

Two measures were selected to assess the success of the project. The first measure of success was attendance of the education sessions. The second measure of success was the number of SUID cases brought to the hospital's ED annually.

DO (INTERVENTION TIMEFRAME)

Education sessions associated with this project were conducted from July 2018 through October 2018 with ongoing hospitalized parent/caregiver education. Sleep sack distribution commenced in March 2019.

CHECK (RESULTS)

One-hundred and eighty of 500 (36%) hospital staff in the ED, perinatal services, and pediatric unit attended the education sessions, and approximately 100 private office staff members were educated. All parents/caregivers were educated throughout their hospital stay, at discharge, and post-discharge. Approximately 2,000 community members attended the FDOH/WIC-sponsored community events with an additional 1,000 receiving education at other SSTF-attended community events. The reported number of SUID cases presenting in the hospital's ED was four in

2018, a 50% decrease from 2017 ($n = 8$), with zero reported cases in 2019 and 2020, one case in 2021, and zero in 2022 (Figure 3).

ACT (DISCUSSION)

The results of this QI project suggest that educating hospital staff and community members on infant safe sleep practices helped reduce the number of SUID cases presenting in the hospital's ED, as evidenced by the 50% decrease in ED SUID cases. The results also suggest that sending parents/caregivers home with a sleep sack may be helpful in reducing SUID rates. The outcomes of this project were in alignment with recommendations from the AAP. The results of this project support education as an effective tool to improve sleep-related infant mortality. However, despite these results, several limitations were identified.

Limitations

While the SUID rate decreased, other factors outside of the education provided by the SSTF may have contributed to the decrease; parents/caregivers of infants with SUID may have presented to the ED of another hospital facility. Additionally, although all couplets were discharged with a sleep sack, it is unknown whether it was utilized beyond the two-week discharge follow-up phone call. Community members'

geographic location was also a limitation. The community involved with the project were in Southeastern Florida and consisted of migrants who had little formal education, therefore posing a potential barrier to learning. Lastly, the data collected was limited to the number of SUID cases presenting to the hospital's ED, therefore limiting the scope of impact on the community at large.

Recommendations/Next Steps

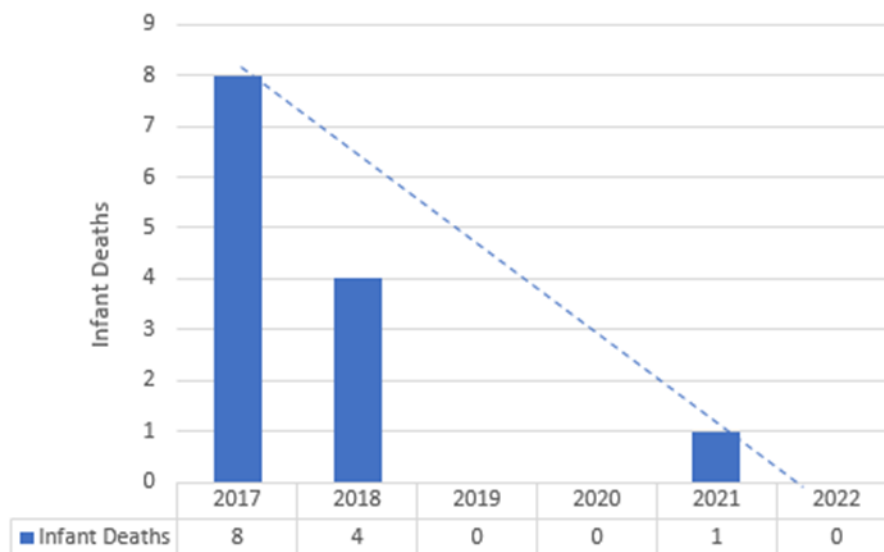
The SSTF will continue to implement the distribution of sleep sacks upon discharge and ensure ongoing hospital staff and community education. However, future research studies examining parents'/caregivers' sleep sack-use frequency and other safe sleep practices for infants are needed. The results of these studies will provide an assessment of parents'/caregivers' understanding of the education and would provide another means of validation related to the education intervention associated with this project.

CONCLUSION

Sleep-related sudden unexpected infant death is a concerning issue in the US. Lack of knowledge and cultural barriers are factors associated with inability or resistance to adopting safe sleep practices for infants. The purpose of this

Figure 3

Sleep-related SUIDs Presenting to the ED



quality improvement project was to increase awareness and knowledge of safe sleep practices in hospital staff and members of the community, as recommended by the AAP and NIH. The SSTF devised and implemented an education plan, with consideration of cultural barriers, to address potential knowledge gaps. Despite its limitations, results suggest the project was a success. However, more studies are needed to assess actual adoption and implementation of safe sleep practices within community members and continue promoting safe sleep practices for infants to prevent sleep-related SUID.

DECLARATION OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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