Use of Safe Cribs and Bedroom Size Among African American Infants With a High Rate of Bed Sharing

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Background: Impoverishment and crowding are associated with an increased risk of sudden unexpected death among infants. Bed sharing likely increases this risk, particularly among African American infants.

Objectives: To compare the sleep environment of African American infants who bed share with that of infants who do not share sleep surfaces and to compare access to a safe crib, and the space available for it, in the sleeping rooms of both groups of infants.

Methods: Home visits were made at approximately age 2 weeks to the homes of serially enrolled African American infants born between July 15, 2001, and November 1, 2001. Questionnaires were used to survey sleep practices, especially sleep surface used. The area of the floor space of rooms used for sleeping was calculated. A portable crib was provided for infants lacking access to safe sleep surfaces.

Results: Of these infants, 42 (41%) usually bed shared and 60 (59%) slept alone. The areas of the floor spaces were similar (mean±SD, 13.8±3.3 m² for bed sharers vs 12.7±3.7 m² for those who slept alone; 95% CI for difference, −0.34 to 2.51 m²). Infants sleeping alone were much more likely to have access to a safe crib (51 of 60 vs 13 of 42; PH11021.001), and 53 cribs were provided. Follow-up telephone calls made at approximately age 7 months to 43.4% of recipients suggested that the cribs were used on most nights, were durable, and were enthusiastically received.

Conclusions: Crowding is not a strong explanation for bed sharing among impoverished African American infants in St Louis, Mo, who often bed share because there is not a safe crib available. Providing safe cribs may reduce the prevalence of bed sharing.

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Bed sharing by infants is consistently associated with an increased risk of sudden unexpected death, particularly among infants from minority backgrounds. Confounding factors such as maternal cigarette smoking affect analyses of bed-sharing deaths in some countries. However, among African American infants who die of sudden infant death syndrome and related diagnoses such as accidental suffocation and overlying, 58% to 67% were bed sharing at the time of death. The prevalence of maternal smoking appears to be low (14%) and not to significantly affect bed-sharing risk. Furthermore, the overall risk of sudden death while bed sharing may be underestimated. In recent studies of sudden infant death syndrome in which the analysis of risk of sudden death while bed sharing was complicated by who the bedmate was, deaths due to overlying, which can occur only while bed sharing, were excluded from the analysis. In earlier studies of sleep practices involving 218 African American infants, bed sharing was not usually a traditional practice passed from grandmother to mother to infant. There were several statistically significant reasons for bed sharing, but the most significant reason was the mothers’ observations that they could not afford a crib (an average price of $160 for a basic, standard-size crib and mattress). This suggests that in addition to teaching mothers about sleep position and avoiding soft bedding, providing a safe sleep surface for very poor infants may lessen the putative effect of bed sharing.

It has been suggested that even if cribs are provided gratis, mothers might not want to or have the space to use them. We address 3 questions pertinent to whether providing safe cribs to impoverished African American mothers will lead to use by their infants during the first 6 months of life: Is the floor space available for infant sleep surfaces smaller in the homes of bed-sharing infants? Are bed-sharing in-
fants less likely to have access to safe cribs than infants who sleep alone? Will a solid, no-frills portable crib be used by new mothers and their infants?

METHODS

SUBJECTS AND HOME VISITS

Our goal was to perform home visits for 100 consecutively enrolled African American infants. The rationale for this sample size is discussed later in the article, and we estimated that we might need to enroll up to 150 mother-infant pairs to assure that 100 home visits could be accomplished.14

All healthy, term African American infants to be discharged on a weekday from Tenet–Forest Park Hospital (St Louis, Mo) were enrolled from July 2001 through November 2001. Tenet–Forest Park Hospital is a general hospital that serves as a teaching facility for St Louis University. More than 90% of all infants born at this hospital receive Medicaid. Exclusion criteria included birth before 37 weeks' gestation and congenital anomalies or neonatal conditions significantly affecting respiration, renal function, cardiovascular function, nutrition, or neural development.

Mothers were first approached to participate by nurses on the postpartum floor. Informed consent was obtained before leaving the hospital. It was our intent to make the visit soon after the infant was brought home (at approximately age 14 days).

During the home visit, the mother or caregiver was asked to show us “the usual place for nighttime sleep.” “Usual” was defined as more than half the nights since coming home or more than 7 of the previous 14 nights. We also noted whether the infant was reported to usually sleep alone on a sleep surface or with others, where he or she had slept the night before, and with whom. The area of the room in which the infant typically slept was then calculated from its length and width, which were measured using a handheld sonar device (SONIN Multi-Measure 45; SONIN Inc, Brewster, NY). The coefficients of variation of area calculations using this device were 0.2% or lower. In calculating the area of 5 offices, the sonar device consistently yielded a larger estimate compared with a metal tape measure, but only by 0.25 m² or less.13 If the infant also slept in other rooms, these areas were calculated as well.

PROVISION AND USE OF SAFE CRIBS

We used several criteria to evaluate the safety of the sleep surfaces we observed.14,15 (www.cpsc.gov/cpscpub/pubs/5020html). Criteria for safe cribs include intact side slats that are at least 6 cm apart, parts that are securely fastened in place, and a mattress that fits snugly in its frame so that there is no room for entrapment.

If the infant was sleeping in or sharing an adult bed or using an unsafe crib or sleep surface, we asked the mother if there were plans for buying a safe crib. If there were no plans, as soon as a safe crib became available through our supplier (Port-A-Crib, model 10-T62 WHO; Cosco, Beijing, China), usually within 48 hours, we delivered a crib to participants lacking one. Crib, model 10-T62 WHO; Cosco, Beijing, China), usually

STATISTICAL ANALYSES AND SAMPLE SIZES

All descriptive statistics are given as mean±SD, and 95% confidence intervals for mean differences were computed using the standard deviation × 1.96. Earlier studies suggested that from 40% to 60% of these infants would bed share.15 It was hypothesized that a sample size including 50 infants who were sleeping alone and 50 who were bed sharing, assuming a 20% coefficient of variation among the areas of sleep rooms in each group, would yield 93% confidence intervals for mean areas that would be narrow enough to allow reasonable predictions and estimates for the sleep space available for infants sleeping alone and those bed sharing. For example, if the mean bedroom size was 4.2 m × 4.8 m (14 ft × 16 ft), the mean±SD area would be 20.8±3.7 m². If the sample size was 30, the 95% confidence interval for the mean bedroom area would be 19.5 m² to 22.1 m².

Assuming an SD of 1.9 m² for the mean room area for both groups, it was predicted that a sample size of 50 infants in each group would have 80% power to detect a mean difference in area of 0.9 m². Other continuous variables were compared using the t test. Categorical variables were compared using χ² analysis.

RESULTS

MOTHERS AND INFANTS

On the day of discharge, 160 African American mothers were asked by the postpartum nurses if they were interested in being in a research project about infant sleep; 26 declined. Seven more decided against participating when we (C.V. and K.G.) explained the research in more detail. A total of 127 mothers consented to enrollment and signed the informed consent document. Visits were made to 102 homes, all of which were within 24 km of Tenet–Forest Park Hospital. Sixteen mothers could not be reached by telephone and were not at the address recorded at discharge from the hospital. Nine mothers said they had changed their minds about participating when called just before the home visit.

No detailed data could be collected for mothers who declined to participate, either initially or after giving consent. Similarly, because no demographic information was collected until the time of the home visit, such data are lacking for mothers who could not be reached at home.

SOLITARY SLEEP, BED SHARING, AND ROOM AREAS

Forty-two infants (41%) shared an adult bed on most nights after leaving the hospital. Sixty (59%) slept alone. On the night before the visit, 46% shared a sleep surface and 54% were solitary sleepers.

Twenty-nine of 42 bed-sharing infants slept with their mother alone; 13 slept with their mother plus 1 or more family members. The mean±SD number of bed-
mates was 1.40±0.73 (range, 1-4), including the mother. All infants sharing a sleep surface were in adult beds; none had slept all night on sofas or chairs.

There were no differences in the areas of the sleeping room used the previous night between bed-sharing infants and those sleeping alone (mean±SD, 13.8±3.3 m² vs 12.7±3.7 m²; P=.13; 95% confidence interval for difference, −0.34 to 2.51 m²). The rooms used by bed-sharing infants did not appear more crowded with furniture than those used by infants sleeping alone. To make floor space available for a safe crib (101.6 cm × 76.2 cm; 0.75 m²), it would have been necessary to move furniture in the rooms of 5 bed-sharing infants and 4 solitary-sleeping infants. The latter were in unsafe cribs or make-shift beds often lined with soft blankets, including a drawer, laundry basket, and woven bamboo basket. In all other circumstances (93 [91%] of 102 infants), unoccupied floor space was available for the crib provided.

The areas of additional rooms that might be used for sleeping were also calculated and added to those of the rooms used the night before. The total areas of all potential sleeping rooms were similar in the homes of bed-sharing infants and those who slept alone (mean±SD, 17.6±7.8 m² vs 18.0±7.7 m²; P=.79; 95% confidence interval for difference, −3.52 to 2.68 m²).

On the day of the visit, the ages of the bed-sharing infants (n=42) and their mothers did not differ from those of solitary-sleeping infants (n=60) or their mothers (mean±SD age of infants, 12.3±6.7 days for bed sharers vs 13.7±6.9 days for solitary sleepers; P=.31; mean±SD age of mothers, 21.9±4.4 years vs 21.5±4.9 years; P=.64.) Mothers who did not have access to safe cribs were not younger than those who did (mean±SD, 22.2±4.3 years vs 21.4±4.8 years; P=.44).

AVAILABILITY OF SAFE CRIBS

Only 13 (31%) of 42 infants who bed shared had access to a safe crib in their home. Although advice was often given to remove soft blankets from the sleep surfaces, most solitary sleepers (51 [85%] of 60) were sleeping in otherwise safe cribs or bassinets (χ² = 30.9; P<.001).

REPORTED USE OF CRIB PROVIDED

We (K.G., C.V., and J.S.K.) delivered and assembled 53 Cosco Port-A-Cribs (model 10-T62 WHO) and demonstrated their use. Recipients included infants without apparent access to a safe crib as well as those who would soon “graduate” from safe bassinets without a larger crib available.

We were able to contact and interview by telephone 23 (43%) of 53 mothers who had received the crib. The mean±SD age of infants was 7.5±0.9 months. Only 1 mother reported never using the crib because her infant “would only sleep in my bed.” Twenty of 22 infants used it regularly beyond age 6 months, and 18 of 22 were using it. The 22 infants who had used or were using the crib, 11 reportedly used it every night, 7 most nights, 2 half of the time, and 2 once in a while. When not using the cribs, the infants usually slept with the mother in her bed.

All 23 mothers would recommend that other mothers use the crib, including the 1 mother who never used it. None reported breakage even when specifically asked. The features of the crib most frequently cited as positive were its small size (0.75 m²), that it folded easily, and its portability. Seven of 23 mothers liked that the wheels allowed the crib to be moved from room to room so that the infant could be near the mother while she worked. Although most mothers reported that it was difficult to find something that they would change about the crib, the most common change desirable would be a color other than white.

Our results in earlier studies suggested that lack of access to safe cribs, rather than a cultural preference, was the primary reason for bed sharing among a group of young African American mothers. This information is important because in St Louis, the population-attributable risk for sudden unexpected death among African American infants who bed share may be as high as 50%. Concerns about using and sharing adult beds have arisen from studies that included scene investigations of where infants died suddenly and unexpectedly during sleep. Visits to describe the sleep environments of living infants have also proved useful in earlier studies in St Louis. This study addressed specific issues concerning crowding and the acceptability of a crib and involved visits to the sleeping environments of 102 infants. Our findings in this and earlier studies are based on direct observation and firsthand knowledge of where high-risk infants sleep as well as where they die during sleep. It is essential that on-site studies of sleep environment be done in other cities in the United States and abroad to test the generalizability of our findings.

In addition to the Back to Sleep Campaign, the American Academy of Pediatrics, National Institute of Child Health and Human Development, and Consumer Product Safety Commission have cautioned that infants should not be near pillows, comforters, or other soft bedding that might cover their head or face. In our study, all bed-sharing infants were in adult beds. None of these beds met the criteria believed necessary to reduce exposure to soft bedding or the likelihood of entrapment within the bed or by a bedmate.

The Cosco crib we delivered is simple but attractive. It is easy to assemble, wheel from room to room, and fold for transport to another home. The bulk price for the bed frame and platform, mattress, and fitted sheet was $65, and it met all standards for safety (www.cpsc.gov/cpscpub/pubs/5020.html). We learned of this crib from nurses providing services to former patients in the neonatal intensive care unit. They were already providing the Cosco cribs to infants whose sleep environment seemed unsafe during home visits. Their channels for obtaining these cribs at a bulk rate proved economical.

We followed the nurses’ example in assembling the cribs in the infants’ homes. This was also required by the 2 institutional review boards. Although the Cosco cribs can be fully assembled in 4 or 5 steps, improper assembly leading to an unsafe crib would remain a problem if it o
CONCLUSIONS

African American infants who bed share have as much bedroom floor space in their homes as those who sleep alone. However, African American infants who sleep alone are significantly more likely to have access to a safe sleep surface than infants who bed share. When their infants were aged 7 months, in a subset of mothers given free cribs, these cribs were enthusiastically evaluated and used on all or most nights by 78% of infants.

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