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Factors Associated With Infant Bed-Sharing

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Abstract

Objective: Bed-sharing is associated with sudden infant death syndrome and accidental suffocation and strangulation in bed. The purpose of this study was to identify risk factors for newborn bed-sharing. **Methods:** Postpartum mothers from a university maternity service were contacted by phone to complete a survey. Demographic and environmental data were collected; newborn bed-sharing and sleep environment were self-reported. **Results:** A total of 1261 mothers completed surveys; bed-sharing was reported by 79 mothers (6.3%). Multivariate logistic regression identified referral to a nurse (odds ratio [OR] = 10; 95% confidence interval [CI] = 4.5-30) and sleep location "other" than a crib, bassinet, or Pack and Play (OR = 7.1; 95% CI = 1.9-25.9) as factors associated with an increased risk of bed-sharing; formula feeding (OR = 0.4; 95% CI = 0.20-0.77) and crib sleeping (OR = 0.49; 95% CI = 0.26-0.86) reduced this risk. **Conclusion:** Infants with no identifiable places to sleep, significant health issues, and who are breastfed are more likely to bed-share. Interventional studies should be directed at these factors.

Keywords

sudden infant death syndrome, SIDS, bed-sharing, sudden unexpected infant death, accidental suffocation

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Introduction

In 1992, the American Academy of Pediatrics (AAP) recommended back sleeping for infants as a measure to reduce the incidence of sudden infant death syndrome (SIDS) in the United States.[1] In 2003, the Chicago Infant Mortality Study reported that a prone sleeping position, a soft sleeping surface, and shared bed sleeping were major risk factors associated with SIDS,[2] and in 2011, the AAP expanded its position to include recommendations for a safe, infant sleeping environment.[3] Following an initial decline in SIDS deaths after the release of the original AAP recommendations, the incidence of SIDS has plateaued in the United States; of concern, an increase in other causes of sleep-related deaths, including asphyxia and suffocation, has occurred.[4]

Bed-sharing (when the infant sleeps on the same surface as an adult) is both a risk factor for SIDS and a major barrier to safe sleep. A recent meta-analysis confirmed that bed-sharing was a significant risk factor for SIDS (odds ratio [OR] = 2.88; 95% confidence interval [CI] = 1.99-4.18). Moreover, bed-sharing may predispose to other SIDS risk factors, including overheating, rebreathing, airway obstruction, head covering, and exposure to tobacco smoke.[5] In spite of the evidence incriminating the role of bed-sharing in SIDS, little is known about the social and environmental factors that are associated with bed-sharing. This study was undertaken to determine how sleeping environment, in addition to other social and environmental factors, affect bed-sharing in the immediate newborn period.

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Methods

Patients and Data Collection

Women who delivered at Temple University Hospital between January 1 and October 31, 2015, who were discharged from the hospital with their child, and had a phone number listed in the medical record were eligible for study. Attempts were made to contact each subject within 72 hours of discharge. For those subjects successfully contacted by phone, general questions regarding the hospital stay as well as need for follow-up appointments and other health issues were asked. In some instances, the maternal responses to questions resulted in a referral to a nurse. Maternal age; parity; educational level; smoking status; method of infant feeding; enrollment in the state women, infants, and children supplemental nutritional program; and whether a referral to a nurse was made were recorded. To determine infant and parental sleep behaviors, the following questions were also included:

1. "Are you having any trouble feeding your baby?" Yes or no.
2. "Where does your baby sleep: crib, bassinet, Pack and Play or other?"
3. "Does your baby sleep on his/her back, side, belly, or all of these?"
4. "Do you ever fall asleep with your baby in the same bed, couch, or chair?" Yes or no.
5. "Has a doctor ever talked to you about sleeping with your baby?" Yes or no.

Statistical Analysis

Chi-square analysis was used to compare responses to dichotomous and multiclass questions using co-sleeping as the response variable, while *t* test of estimated means was used for continuous variables. A logistic linear classifier without regularization was used to develop a probit model for co-sleeping. Differences in co-sleeping rates for each feature of the model were determined by analysis of variance and expressed as an odds ratio. Features with *P* values less than .05 and with 95% confidence intervals not including 1 were considered to be statistically significant and independent predictors of co-sleeping. All calculations were performed using the basic package in R (version 3.1.0).

Results

This study was reviewed by the institutional review board of Temple University.

Table 1. Summary of Subjects.

Factor	n (N= 1261)	%
Feeding method		
Breast	299	24%
Formula	472	37%
Formula and breast milk	490	39%
Feeding problem		
No	1171	93%
Yes	90	7%
Phone call referred to a nurse		
No	507	40%
Yes	754	60%
Maternal smoking		
No	1146	91%
Sometimes	17	1%
Yes	98	8%
Sleep location		
Bassinet	573	45%
Crib	452	36%
Pack and Play	221	18%
Other	15	1%
Sleep position		
Back	1206	95%
Side	51	4%
Belly	1	<1%
All of the above	3	<1%
Receipt of adequate sleep education from a doctor		
No	34	2.7%
Yes	1227	97.3%
Highest level of maternal education		
College graduate	101	8%
Some college	186	15%
High school graduate	479	38%
GED	37	3%
Some high school	458	36%
Reported sleeping with baby		
No	1182	93.7%
Yes	79	6.3%

Demographics

A total of 2421 mothers were called between January 1, 2015, and October 31, 2015; 1506 respondents answered the call, and 1261 respondents completed the questionnaire. The demographics and responses of the study subjects are shown in Table 1. The median maternal age was 25.06 years, and the mean age was 26.00 years (interquartile range = 21.24-29.85 years). Thirty-eight percent (479/1261) of the subjects graduated high school, and 9% (115/1261) smoked tobacco. Twenty-four percent of the infants (754/1261) were exclusively breastfed during the first week of life, while 39% (490/1261) were breastfed and supplemented with

Table 2. Univariate Comparison of Mothers Who Bed-Share With Infants and Those Who Do Not.

Factor	OR	95% CI	*P*
Maternal age	0.99	0.95-1.0	NS
Feeding problem	3.5	1.8-6.2	<.0001
Feeding method			
Formula	0.28	0.15-0.52	<.0001
Formula and breast milk	0.53	0.31-0.88	.01
Phone call referral to nurse	10.9	4.8-31.3	<.0001
Maternal smoking			
Yes	0.61	0.18-1.5	NS
Sleep location			
Crib	0.50	0.28-0.86	.02
Pack and Play	0.63	0.30-1.2	NS
Other	8.0	2.6-23.3	.0002
Adequate education from a doctor	0.24	0.11-0.62	.001
Highest level of maternal education			
GED	0.51	0.09-2.4	NS
High school graduate	0.16	0.26-1.3	NS
Some college	0.95	0.45-2.5	NS
Some high school	0.22	0.29-1.4	NS

Abbreviations: OR, odds ratio; CI, confidence interval; NS, not significant.

Table 3. Logistic Regression Analysis of Risk Factors for Bed-Sharing.

Factor	OR	95% CI	*P*
Maternal age	0.99	0.95-1.0	NS
Feeding problem			
Yes	1.6	0.80-3.1	NS
Feeding method			
Formula	0.40	0.20-0.77	.007
Formula and breast milk	0.58	0.33-1.0	NS
Call referred to nurse	10	4.5-30	<.0001
Maternal smoking			
Yes	0.56	0.16-1.5	NS
Sleep location			
Crib	0.49	0.26-0.86	.016
Pack and Play	0.68	0.32-1.3	NS
Other	7.1	1.9-2.6	.003
Education from a doctor	0.37	0.15-1.0	.04
Highest level of maternal education			
GED	0.59	0.08-2.7	NS
High school graduate	0.60	0.25-1.6	NS
Some college	1	0.40-2.7	NS
Some high school	0.73	0.29-2.0	NS

Abbreviations: OR, odds ratio; CI, confidence interval; NS, not significant.

formula; 7% of mothers (90/1261) reported a feeding problem. Clinical issues requiring input from nursing occurred in 60% (754/1261) of the calls. Bed-sharing was reported by 6.3% (79/1261) of the subjects, and 15 subjects (1%) reported an infant sleep location other than a bassinet, crib, or Pack and Play.

Univariate Analysis

Head-to-head comparisons of the demographic factors and questionnaire responses among those who shared a bed with an infant and those who did not are shown in Table 2. Referral to a nurse (OR = 10.9; 95% CI = 4.8-31.3), presence of a feeding problem (OR = 3.5; 95% CI = 1.8-6.2), and sleep location "other" than a crib, bassinet, or Pack and Play (OR = 8; 95% CI = 2.6-23.3) were associated with an increased risk of bed-sharing. Formula feeding (OR = 0.28; 95% CI = 0.15-0.52), sleeping in a crib (OR = 0.5; 95% CI = 0.28-0.86), and education from a doctor regarding infant sleep (OR = 0.24; 95% CI = 0.11-0.62) were associated with a decreased risk of bed-sharing.

Multivariate Analysis

The results of logistic regression analysis using bed-sharing as the response variable are shown in Table 3. Identification of issues requiring referral to a nurse (OR = 10; 95% CI = 4.5-30) and sleep location "other" than a crib, bassinet, or Pack and Play (OR = 7.1; 95% CI = 1.9-25.9) were associated with an increased risk of bed-sharing. Exclusive formula feeding (OR = 0.4; 95% CI = 0.20-0.77) and sleeping in a crib (OR = 0.49; 95% CI = 0.26-0.86) reduced this risk.

Discussion

Along with sleeping on a soft surface and sleeping in a prone position,[4] bed-sharing is a significant risk factor for SIDS in the United States.[5] The present study suggests that lack of an identified place to sleep, breastfeeding, and health issues requiring a nurse referral are risk factors for bed-sharing.

In 1992, the AAP recommended that infants should sleep in the supine position to reduce the incidence of SIDS.[1] From 1992 to 2001, the SIDS rate decreased 53% (120 deaths per 100 000 live births in 1992 to 56 deaths per 100 000 live births in 2001). From 2001 to 2006, the rate remained constant. From 2006 to 2014, the rate declined to 38.7 deaths per 100 000 live births in 2014.[3]

While the SIDS rate has declined, the rate of deaths attributed to accidental suffocation and strangulation in bed (ASSB) has been increasing. ASSB is the code applied to a death when the terms "asphyxia," "asphyxiated," "asphyxiation," "strangled," "strangulated," "strangulation," "suffocated," or "suffocation" are reported,

along with the terms "bed" or "crib," and also includes deaths while sleeping on chairs and couches.[4] One descriptive study examined the infant mortality data from 1984 through 2004, and analyzed trends in ASSB and other sudden unexpected infant deaths.[6] Infant mortality rates attributable to ASSB quadrupled: from 2.8 deaths (1984) to 12.5 deaths (2004) per 100 000 live births. In 2014, the rate of deaths from ASSB was 21.4 deaths per 100 000 live births.[3]

In 2003, the Chicago Infant Mortality Study reported an increased risk of SIDS associated with bed-sharing with parent(s) alone (OR = 1.9; 95% CI = 1.2-3.1) bed-sharing in other combinations (OR = 5.4; 95% CI = 2.8-10.2), prone sleeping (OR = 2.4; 95% CI = 1.7-3.4), and sleeping on a soft surface (OR = 5.1; 95% CI = 3.1-8.3).[2] The most recent recommendations from the AAP for safe infant sleep include supine positioning, use of a firm sleep surface, breastfeeding, room-sharing without bed-sharing, routine immunization, consideration of a pacifier, and avoidance of soft bedding, overheating, and exposure to tobacco smoke, alcohol, and illicit drugs as measures to decrease the risk of SUID.[7] The data from this study support these recommendations. The greatest risk for bed-sharing in our patient population occurred among those infants with no identifiable place to sleep or with significant health or care issues.

One limitation of this study is the low number of respondents. Of the 2421 mothers called, 1506 (62 %) answered the call, and 1261 (52%) completed the phone survey. Another limitation is the process of a self-reported phone survey, in which the actual behaviors may not be reported.

Conclusion

In summary, the risk of infant bed-sharing is increased among infants with no identifiable place to sleep, who have significant health or care issues, and who are breastfed. Comprehensive educational, postpartum, programs should address the risk factors associated with infant deaths that occur during sleep. This education should include specific support of breastfeeding without bed-sharing as well as the need for identifiable, safe places for the infant to sleep.

Author Contributions

MH: Contributed to conception and design; contributed to acquisition, analysis, and interpretation; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

BM: Contributed to conception and design; contributed to interpretation; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

JA: Contributed to conception and design; contributed to acquisition and analysis; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

JR: Contributed to conception and design; contributed to acquisition; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

SA: Contributed to conception and design; contributed to acquisition, analysis, and interpretation; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

Authors' Note

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Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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