Published in final edited form as:

Newborn Infant Nurs Rev. 2012 September 1; 12(3): 171–178. doi:10.1053/j.nainr.2012.06.001.

Sleeping Arrangements in Families with Twins

Elizabeth G. Damato, PhD, RN, CPNP [Associate Professor],

Frances Payne Bolton School of Nursing, Case Western Reserve University, 10900 Euclid Avenue, Cleveland, OH 44106-4904, 216-368-2597

Jennifer A. Brubaker, PhD, RN, FNP-BC [Nurse Practitioner], and

Center for Pediatric and Congenital Heart Disease, Children's Hospital Cleveland Clinic, Cleveland, OH

Christopher Burant, PhD [Assistant Professor]

Frances Payne Bolton School of Nursing, Case Western Reserve University, Cleveland, OH

Elizabeth G. Damato: egd@case.edu

Abstract

This paper describes home sleeping arrangements used by parents of twins and investigates whether room sharing (twins in the same room as parents) or codbbedding (crib-sharing between twins) influences parental night time sleep duration or sleep quality. A secondary analysis of data obtained from a longitudinal study of sleep in 104 families with twins was undertaken. Over 65% of twins were codbbedded at 4 weeks; this decreased to approximately 42% by 13 weeks of age. Approximately 64% of families practiced room sharing at 4 weeks, this decreased to approximately 40% by 13 weeks of age. Mothers and fathers who both room shared and codbbedded their twins at 9 weeks of age were most likely to experience restricted sleep duration when compared to other sleeping arrangements. Results suggest that parents of twins may not be following the most recent AAP recommendations regarding safe infant sleep for multiple birth infants.

Keywords

Infant Room Sleeping; Cosleeping; Codbbedding; Safe Infant Sleep; Twin Sleeping

Little is known regarding home sleeping arrangements in families of twins. With a few notable exceptions (1–3) investigations of sleeping arrangements for twins have largely been restricted to the practice of codbbedding of hospitalized multiples (i.e. crib-sharing between multiple birth infants). Such studies have examined short-term outcomes related to safety and benefits of codbbedded hospitalized twins compared to twins who are cared for in separate cribs. Reported benefits have not been well substantiated. Available evidence is generally limited by small sample sizes and lack of scientifically rigorous study designs, resulting in an inability to strongly endorse or reject the practice of codbbedding for multiple birth infants (4,5).

© 2012 Elsevier Inc. All rights reserved.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Despite a lack of compelling evidence for benefits, cobedding of multiple birth infants has been touted as a developmentally supportive strategy and has been widely adopted in hospitals over the past two decades. This is important because care practices related to infant sleep and the sleep environment modeled in hospitals are often continued by parents in the home (1,6,7). Additionally, lay publications targeted at postpartum mothers of twins promote cobedding as a natural extension of the previously shared intrauterine environment, and claim that sleep duration is lengthened for cobedded twins, that waking and feeding periods become synchronized, that tight finances can be stretched by having twins share a crib for the first several months, and that all of this translates into easier care of the twins (8–10). Furthermore, families believe their twins prefer to be cobedded, that it continues the bond that began between the twins in utero, and view it as a strategy for parents themselves to obtain more sleep (1–3,11).

Perhaps the most compelling reason that sleeping arrangements in families of twins should be of concern to nurses and other health care providers is the link between the sleep practices and sleep environment of infants and Sudden Infant Death Syndrome (SIDS). SIDS remains the third leading cause of death in infancy and is the leading cause of death in infants beyond the neonatal period (12). A preliminary analysis of 2009 mortality data shows that SIDS accounted for 2168 deaths in the United States (US) for a rate of 52.5 per 100,000 live births (13). Evidence to date does not support multiple birth as an independent risk factor for SIDS after controlling for low birth weight and preterm birth (3,5). Yet, because the majority of twins are both low birth weight and born preterm, twin infants are at high risk for SIDS (14). In 2009, more than 56% of twins were low birth weight and over 58% were born preterm (15).

In 1992, the American Academy of Pediatrics (AAP) issued its first recommendation aimed at reducing the risk of SIDS, advising that healthy term infants not be placed in the prone position for sleep (16). The “Back to Sleep” campaign began in 1994, resulting in more than a 40% reduction in infant deaths attributed to SIDS in less than 10 years (17). Three subsequent policy statements were issued by the AAP in 2000, in 2005, and most recently in late 2011. These statements expanded SIDS risk-reduction strategies beyond use of the supine position to include changes in infant care, sleep practices, and the infant’s environment. The major recommendations include exclusive use of the supine position for sleep; encouragement of room sharing with a parent; pacifier use at the initiation of bedtime; avoidance of exposure to tobacco pre- and post-birth; use of a crib that conforms to current safety standards; avoidance of soft sleeping surfaces and loose bedding or objects in the infant’s bed; avoidance of excessive layers of clothing or blankets that could result in infant overheating; avoidance of co-sleeping (i.e. having the infant sleep on the same surface with another person) particularly in cases where the infants is sharing a bed with adults other than the parent or with siblings/other children; and a suggestion to use an appropriately sized infant sleep sack that prevents the infant’s face from being covered by blankets (12,17,18). The most recent AAP statement additionally placed emphasis on the protective role of human breast milk feedings and up-to-date AAP/CDC immunizations. Of particular note, for the first time the AAP report specifically addressed sleeping arrangements for twins and higher-order multiples. Acknowledging that many of the known risk factors for SIDS apply to multiple birth infants, the AAP recommends that separate sleep areas be provided for multiple birth infants and that cobedding should be avoided both in the hospital and at home (12).

SIDS risk reduction recommendations that encourage room sharing with a parent and discourage a shared sleep surface with another child may present particular challenges in the case of twins. Two studies (1,2) conducted in the United Kingdom (UK) and one study (3) from New Zealand documented that between 45–77% of twins shared a room with the

parents in the first 4 to 6 weeks at home; this decreased to 34–68% who room shared at 3 to 4 months of age. This compares to a study of US mothers where 85% of singleton infants slept in the same room as their mother during the first 3 months (19). Mothers of twins in the UK cited space constraints as the reason that twins no longer room shared with the parents—parental bedrooms did not accommodate the space required by two infant cribs once the babies outgrew their bassinets (1).

Ball's study of 60 British families reported that 61% cobedded their twins at one month with 40% cobedding at 3 months (1). The mailed survey of 109 mothers of twins in New Zealand documented that 54% of twins shared a crib at 6 weeks of age; this decreased to 31% by 4 months and 10% at 8 months (3). In the UK study, 65% of twins who room shared with the parents also cobedded at one month; this decreased to 47% who cobedded in the parent's room at three months (1). In the New Zealand study, 28% of twins were cobedding and room sharing in their parent's room at 6 weeks of age (3). Both studies noted a tendency for cobedded twins to be more likely to room share with the parents, but over time increased infant size prompted a transition from cobedding to separate cribs and household space limitations prompted a discontinuation of room sharing with the parent.

The number of twins born in the US annually has risen dramatically since 1980. In 2009, the twin birth rate was 33.2 per 1000 live births, the highest ever recorded (15), yet no published studies of sleeping arrangements in US families with twins were located. This paper reports the results of a secondary analysis of sleeping arrangements in US families of twins recruited from a medium-sized Midwestern metropolitan area. Because room sharing of parents and twins and cobedding of twins was felt to influence parental sleep, these data were collected as part of a larger study of sleep patterns in parents of twins. The influence of sleeping arrangements on sleep duration and sleep quality of mothers and fathers is also reported here. Findings of this study are applicable to recent recommendations from the AAP for safe sleep of twins and higher-order multiples.

Methods

Design

This secondary analysis was derived from a descriptive, correlational study examining sleep patterns in parents of twins during the first three months after hospital discharge. Barnard's Child Health Assessment Interaction Model guided the main study. In Barnard's model, the function and development of the family unit is affected by interactions between the infant, the parents, and the environment (20). For families with twins, the sleep environment of mothers, fathers, and infants could be influenced by whether or not the twins are cobedding with each other, whether one or both twins co-sleep with the parents, or whether one or both twins share the same room as the parents. Data regarding sleeping arrangements were collected at three time points. Data collection first occurred when the twins reached 40 weeks corrected gestational age; this allowed a baseline assessment of parent sleep during the early transition to home. The second and third time points occurred approximately 8 and 12 weeks after the twins' hospital discharge. The 8 and 12 week data collections were chosen because they allowed for documentation of the evolution of parent's sleep patterns over time as infants begin to establish a more regular sleep-wake pattern after 2 to 3 months of age (21). To avoid measuring atypical sleep patterns, data collections were scheduled to avoid the weekends of major holidays and biannual time changes for daylight saving time.

Sample

A convenience sample of 90 mother/father pairs plus 14 unpartnered mothers (104 families with twins) was recruited from four postpartum units in the Midwest over a 2 year period.

Families discharged with newly delivered healthy twins of at least 33 weeks gestational age at birth were eligible to participate. Twins requiring home apnea monitoring were excluded. Parents were eligible to participate provided no more than 2 other children lived in the home and neither parent had a current diagnosed condition that affected sleep such as depression or sleep disorder (e.g. insomnia or sleep disordered breathing). Families also were excluded from study participation if either parent worked night shift or admitted to a history of illicit drug use or alcohol abuse in the previous year. Sixty-two percent of eligible subjects approached agreed to participate.

Measures and Procedure

An investigator-developed form was used during home interviews to collect demographic data as well as data regarding night time sleeping arrangements at each time point. Parents were asked whether the twins slept in the same room as the parents, and whether the twins slept in the same crib. Families were not asked if either or both twins shared the parents' bed.

Night time sleep duration of the parents was objectively measured in minutes with the Octagonal Basic Motionlogger wrist actigraph (Ambulatory Monitoring Inc., Ardsley, NY) worn over a 3-day period from Saturday night at 9:00 pm until Tuesday night at 9:00 pm. Actigraphs are a valid and reliable method for detecting sleep in normal healthy adults (22). An investigator-developed sleep diary completed by parents over the 3-day period was used to edit and interpret the actigraphy recordings. Actigraphy data were analyzed using Action W © manufacturer-compatible software.

Parents subjectively rated their previous night's quality of sleep over the 3-day period by completing the Sleep Effectiveness Sleep Scale, an independent subscale of the larger Verran and Snyder-Halpern (VSH) visual analog sleep scale (23). Each day's sleep quality score was derived from vertical marks made by parents on each of five 100 mm anchored horizontal lines. Examples of line anchors were: "Awoke exhausted / Awoke refreshed" and "Had enough sleep / Did not have enough sleep." Following reverse scoring of two items, values from all items were averaged to obtain a total daily score. Possible score range is 0–100 with higher scores indicating higher quality of sleep. In this study, quality of sleep at each data point was defined as the average of 3 days of daily numerical scores. Convergent construct validity has been established and acceptable internal consistency reliability for the instrument has been documented in adults of both genders as well as in postpartum women (23–26). Cronbach's alpha reliability for the Sleep Effectiveness Sleep Scale ranged 0.83 to 0.93 over the course of the study both for mothers and for fathers in this sample.

Following institutional review board approval from the four recruitment institutions, eligible and interested couples were approached in the hospital postpartum units and consented into the study. Sleeping arrangements were assessed at each scheduled data collection when wrist actigraphs were delivered to subject's homes. Each family received a department store gift card as a token of appreciation when study materials were retrieved by research staff after each 3-day sleep assessment.

Data Analysis

Descriptive analyses were performed on demographic characteristics of mothers, fathers, and infants. The frequency of cobedding and various room sharing arrangements practiced by families of twins was examined at each time point. Multiple sleeping arrangement combinations were reported, including mothers and fathers sleeping in separate rooms with one or both infants. Because a majority of families reported that both parents slept in the same bedroom with or without the twins, these two conditions along with cobedding were

examined for their effect on parental sleep. At each time point, mothers and fathers were separately categorized by their infant's sleeping arrangements. Sleep duration and sleep quality were examined in both mothers and fathers of twins by sleeping arrangement category. Because sleeping arrangements varied over time, data were analyzed separately at each time point using one way ANOVAs. Bonferroni post hoc tests were performed to determine differences among groups when ANOVAs were significant. Subjects without valid actigraphy data at a specific time point were eliminated from the analysis for that time point.

Results

Sample Description

The majority of parents were white, non-Hispanic, college educated, and with middle to high family incomes. Twins in this study were 36.5 weeks mean gestational age at the time of delivery, with mean birth weights ranging from 2545 to 2609 grams. Time 1 data were obtained from approximately 85% of study families between 15–48 days after the twins' hospital discharge; one family was assessed on the 6th day at home and 3 families were assessed on the 7th day at home. Mean chronologic age for the twins was approximately 1, 2, and 3 months of age at Time 1, Time 2, and Time 3 respectively. Of the 194 parents included in this analysis, 18.6% (n=36) did not have complete actigraphy at all 3 time points. Significant differences were noted between those who had complete actigraphy data and those who did not have complete data with respect to age and income. Parents with complete actigraphy data were older (M=32.1 years, SD=5.5) compared to those with incomplete actigraphy data (M=28.6 years, SD=6.0), [$t(102) = -2.27, p=.03$]. A significant difference in family income was also noted with more families (30.8%) with incomplete actigraphy data reporting an annual income < \$60,000 compared to families with incomplete actigraphy data (12.8%) who reported incomes > \$60,000 [$\chi^2 (1, 190) = 7.86, p = .005$]. Parents with complete actigraphy data and those with incomplete actigraphy data did not differ by race, ethnicity, or gender. Sample demographics for parents and for infants are reported in Table 1 and Table 2 respectively.

Sleeping Arrangements

Frequency of cobedding and room sharing practiced by families of twins in this sample were noted to both decrease over time. Over 65% of twins were cobedded at Time 1; this decreased by Time 3 to approximately 42%. The frequency of room sharing closely paralleled the frequency of cobedding, with room sharing decreasing over time from approximately 64% at Time 1 to 40% at Time 3. Table 3 displays cobedding and room sharing status of families at each time point.

Parental Sleep Duration and Sleep Quality

Night time sleep duration was examined by sleeping arrangement status separately for mothers and for fathers. The four sleeping arrangement categories included: room sharing and cobedding (twins in one crib in parent's room), room sharing and no cobedding (twins in two cribs in parent's room), cobedding and no room sharing (twins in one crib in a different room), no cobedding and no room sharing (twins in two cribs not in the parent's room).

Mean sleep duration for mothers by sleeping arrangement status at each time point is reported in Table 4. No statistically significant differences in night time sleep duration were found for mothers regardless of cobedding or room sharing status at Time 1 and Time 3. At Time 2, mothers whose twins cobedded and room shared had significantly fewer minutes of sleep (M=330.25, SD=50.92) than mothers whose twins cobedded but did not room share

($M=393.82$, $SD=87.21$), as well as mothers whose twins were not cotedded and did not room share ($M=416.40$, $SD=54.38$) [$F(3, 57) = 5.448$, $p = .002$]. For mothers employing one of the four sleeping arrangements included in this analysis, sleep quality mean scores ranged from 40.93 to 61.88 on a scale of 0 to 100, with higher scores indicating better sleep quality. No statistically significant differences in sleep quality for mothers were found regardless of the twins' cotedding or room sharing status over the course of the study.

Mean sleep duration for fathers by sleeping arrangement status at each time point is reported in Table 6. Fathers whose twins cotedded and room shared at Time 2 also reported significantly fewer minutes of sleep ($M=309.5$, $SD=107.49$) than those fathers whose twins cotedded but did not room share ($M=408.53$, $SD=51.99$) and those whose twins were not cotedded and did not room share ($M=397.15$, $SD=49.7$) (0) [$F_{\text{Welch}}(3, 14.98) = 3.819$, $p = .032$]. Night time sleep duration did not differ significantly for fathers at Time 1 and Time 3 regardless of cotedding or room sharing status. For fathers employing one of the four sleeping arrangements included in this analysis, sleep quality mean scores ranged from 46.29 to 61.27. Sleep quality scores did not differ significantly for fathers across time regardless of the twins' cotedding or room sharing status.

Discussion

Room sharing without co-sleeping (with an adult) may decrease risk of SIDS by as much as 50% (12). The effect of room sharing with the parent without cotedding with a twin sibling on SIDS risk for twin infants is currently unknown. Compliance with the current SIDS risk reduction recommendations of room sharing with no cotedding in this sample occurred in 16.9% of families when the twins were 4 weeks old, 12.9% of families when the twins were 9 weeks old, and 14.3% of families when the twins were 13 weeks old. This finding is similar to the study of New Zealand families, which noted that only 13% of twins room shared with no cotedding at 6 weeks of age (3). Although these data were collected prior to the most recent AAP policy statement that addressed safe sleep for multiple birth infants, a majority of families of twins in this sample reported at least one unsafe sleep practice in the first 3 months at home. These findings are important as SIDS rate peaks between 1 to 4 months of age with nearly 10% of SIDS deaths occurring in the first month of life (12). Further investigation into why parents choose a particular sleeping arrangement may assist in the development of strategies aimed at increasing compliance with safe sleep practices in families with twins.

Regardless of sleeping arrangements, restricted sleep was documented for parents of twins, with night time sleep durations ranging from 5.50 to 6.94 hours for mothers and 5.16 to 6.81 hours for fathers during the first 3 months postpartum. Both mothers and fathers whose twins cotedded and room shared at Time 2 were more likely to report a shorter night time sleep duration compared to those whose twins did not room share but cotedded, and those who did not room share and were not cotedded. At Time 2, a significant difference in night time sleep duration was not found for mothers or for fathers whose twins room shared and slept in separate cribs compared to any other group. Differences may not have been detected because of the small number of families reporting this sleeping arrangement. Space constraints may explain why few families utilized this sleeping arrangement which has been recommended to reduce SIDS risk. The SIDS reduction recommendations that encourage room sharing between infant and parents while discouraging co-sleeping and the recommendation to put twins down for sleep in separate cribs may be mutually exclusive if the sleeping room is limited in size. As such, the duration of time that parents room share with their twins may not be as extended as in the case of singletons due to increased space requirements.

Significant differences in night time sleep duration for mothers and for fathers who were room sharing and cobedding at Time 2 suggest that parents may be most influenced by sleeping arrangements when their twins are 9 weeks old. No significant differences in parental sleep duration were found for either mothers or fathers at 4 or 13 weeks. A potential explanation for the isolated significant findings noted at 9 weeks of age may be that infants develop more regular periods of sleep after 2 months of age (21). Perhaps the establishment of regular sleep is different for twins particularly if they are born preterm. It is possible that the irregular sleeping patterns of infants at 4 weeks of age may overshadow any effect of sleeping arrangements on parental sleep. Alternatively, parents may still be adjusting to caring for their twins and may not sleep well regardless of the room sharing or cobedding status. By Time 3, twins in this sample may have had more regular sleep patterns, thereby reducing the influence of sleeping arrangements on parental sleep and reducing the study's ability to detect a difference in parental sleep duration based on sleeping arrangement status.

Perceived sleep quality scores for mothers and fathers of twins in this sample were lower than previously reported by breastfeeding mothers of singleton infants using the same instrument, suggesting that parents of twins have low perceived sleep quality (26). Sleeping arrangements did not appear to influence parent's perceived sleep quality during the first three months postpartum.

Strengths and Limitations

This study provides beginning empirical evidence of sleeping arrangements practiced by US families of twins, a population which had not previously been studied. A strength of this study was the use of actigraphy to objectively assess the effect of sleeping arrangements on sleep duration in mothers and fathers.

Other sleeping arrangements such as having the parents in one room and the twins in two separate rooms, having the father in one room and the mother in the same room as the twins, and having the mother in one room with one twin while the father is another room with the other twin were reported by parents in this sample. The effect of these variations on parental sleep could not be analyzed as there were a limited number of families in the study who were practicing these alternate sleeping arrangements. Additionally, co-sleeping with parents was not assessed in this study and may have provided valuable information regarding other sleeping practices that increase SIDS risk for twins. Sleeping arrangements may also influence infant sleep however, infant sleep was not measured in this study.

Although parents were screened and excluded from participation for medically diagnosed sleep disorders, it is possible that study participants may have used over-the-counter sleep aids or stimulants for self-diagnosed insomnia or sleepiness that may have confounded the sleep duration and sleep quality results reported here. Another possible confounding factor is the variation in time of when Time 1 data collection occurred. Because we had a few families whose twins were born between 38–40 weeks gestation and also because of difficulties scheduling families at the time the twins reached 40 weeks corrected age, Time 1 data collection took place between 6 and 48 days following the twins' hospital discharge ($M = 23.4$, $SD = 8.9$). It is possible that families who were home with their twins for 6 or 7 days had less opportunity to adjust and settle into a pattern of sleep, however, this applied to only 4 study families. A majority of families had been home with their twins for over 2 weeks before Time 1 data collection.

Clinical Implications

The fact that the least number of parents of twins in this study utilized the safest sleep practices (room sharing without cobedding) supports Ball's conclusion that parents may

choose a particular sleeping arrangement to maximize their coping as they meet the needs of their twins (1). Implementation of SIDS risk reduction strategies must be adapted for families of twins. Sleep restricted parents of twins may be seeking ways to increase their sleep duration, possibly by removing the twins from their room. Therefore, the importance of room sharing with a parent as a strategy for reducing SIDS risk should be emphasized when discussing safe sleep practices with parents of twins. Interventions to optimize safe sleep practices for twins must highlight the dangers of utilizing bedding and other soft materials to create separate sleep environments and focus on the importance of separate cribs for each infant.

When devising strategies to maximize safe sleeping practices in families with twins, clinicians must acknowledge potential barriers to adherence. Socioeconomic status may influence sleeping arrangements. Cobedding may be a necessity for families who cannot afford the additional furniture required to provide separate sleeping areas for their multiple birth infants. Although cobedding is discouraged, Australian SIDS guidelines recommend that when twins must be placed in the same crib, they should be head to head on opposite ends of the crib, not side by side, and swaddled separately or placed in separate sleep sacks without the use of bedding or barriers (27).

Conclusion

Findings from this study document a high rate of cobedding, with more than 50% of twins cobedded by their parents at 4 and 9 weeks of age. Additionally, a low rate of room sharing was observed, with less than 50% of the sample room sharing with at least one parent at 13 weeks of age. Although findings from this study suggest that many families of twins did not follow recommended safe sleeping practices to reduce SIDS risk, parents' rationale for choosing a particular sleeping arrangement is not known. Identification of factors that influence the choice of a particular sleeping arrangement would provide valuable insight to address existing barriers faced by parents of twins regarding safe sleep practices. Future studies that assess the use of all SIDS risk reduction strategies by US parents of twins including the supine position for sleep, breastfeeding, and pacifier use will assist in the development of targeted strategies aimed at reducing SIDS risk for twins.

Acknowledgments

Supported in part by the National Institute of Nursing Research (R15-NR009797) and The Foundation for Neonatal Research and Education

References

1. Ball HL. Caring for twin infants: sleeping arrangements and their implications. *Evid Base Midwifery*. 2006; 4(1):10–16.
2. Ball HL. Together or apart? A behavioural and physiological investigation of sleeping arrangements for twin babies. *Midwifery*. 2007; 23(4):404–412. [PubMed: 17126966]
3. Hutchison BL, Stewart AW, Mitchell EA. The prevalence of cobedding and SIDS-related child care practices in twins. *Eur J Pediatr*. 2010; 169(12):1477–1485. [PubMed: 20607285]
4. National Association of Neonatal Nurses. NANN Position Statement #3053: Cobedding of Twins or Higher-Order Multiples. 2011; 3053 Available at: http://www.nann.org/uploads/files/Cobedding_of_Twins_or_Higher-Order_Multiples_2011.pdf.
5. Tomashek KM, Wallman C. Committee on Fetus and Newborn, American Academy of Pediatrics. Cobedding twins and higher-order multiples in a hospital setting. *Pediatrics*. 2007; 120(6):1359–1366. [PubMed: 18055686]
6. Colson ER, Bergman DM, Shapiro E, Leventhal JH. Position for newborn sleep: associations with parents' perceptions of their nursery experience. *Birth*. 2001; 28(4):249–253.

7. Stainton C, Jozsa E, Fethney J. Responses to co-bedding of low birth weight twins in neonatal intensive care. *Neonat Paediatr Child Health Nurs* 7. 2005; 8(2):4–12.
8. Gromada, KK. *Mothering multiples : Breastfeeding & caring for twins or more*. 3rd rev.. Schaumburg, Ill: La Leche League International; 2007. La Leche League International.
9. Luke, B.; Eberlein, T. *When you're expecting twins, triplets, or quads : proven guidelines for a healthy multiple pregnancy*. Rev. ed.. New York: Harper Resource; 2004.
10. Weissbluth, M. *Healthy sleep habits, happy twins : A step-by-step program for sleep-training your multiples*. New York: Ballantine Books; 2009.
11. Damato EG, Zupancic J. Strategies used by parents of twins to obtain sleep. *Appl Nurs Res*. 2009; 22(3):216–220. [PubMed: 19616171]
12. Moon RY. Task Force on Sudden Infant Death Syndrome. SIDS and other sleep-related infant deaths: expansion of recommendations for a safe infant sleeping environment. *Pediatrics*. 2011; 128(5):1030–1039. [PubMed: 22007004]
13. Kochanek KD, Xu JQ, Murphy SL, Minino AM, Kung HC. Deaths: Preliminary data for 2009. *National vital statistics reports*. 2011; 59(4) Available at: http://www.cdc.gov/nchs/data/nvsr/nvsr59/nvsr59_04.pdf.
14. Malloy MH, Freeman DH Jr. Sudden infant death syndrome among twins. *Arch Pediatr Adolesc Med*. 1999; 153(7):736–740. [PubMed: 10401808]
15. Martin JA, Hamilton BE, Ventura SJ, Osterman MJK, Kirmeyer S, Mathews TJ, et al. Births: Final data for 2009. 2011; 60(1) Available at: http://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_01.pdf.
16. American Academy of Pediatrics AAP Task Force on Infant Positioning and SIDS Positioning and SIDS. *Pediatrics*. 1992; 89(6 Pt 1):1120–1126. [PubMed: 1503575]
17. Changing concepts of sudden infant death syndrome: implications for infant sleeping environment and sleep position. American Academy of Pediatrics. Task Force on Infant Sleep Position and Sudden Infant Death Syndrome. *Pediatrics*. 2000; 105(3 Pt 1):650–656. [PubMed: 10699127]
18. American Academy of Pediatrics Task Force on Sudden Infant Death Syndrome. The changing concept of sudden infant death syndrome: diagnostic coding shifts, controversies regarding the sleeping environment, and new variables to consider in reducing risk. *Pediatrics*. 2005; 116(5): 1245–1255. [PubMed: 16216901]
19. Hauck FR, Signore C, Fein SB, Raju TN. Infant sleeping arrangements and practices during the first year of life. *Pediatrics*. 2008; 122(Suppl 2):S113–S120. [PubMed: 18829826]
20. Barnard KE, Eyres SJ. Health assessment, Part 2: The first year of life. *Health Manpower References*, DHEW Publication HRA. 1979:79025.
21. Mindell, JA.; Owens, JA. *A clinical guide to pediatric sleep: Diagnosis and management of sleep problems*. Philadelphia: Lippincott Williams & Wilkins; 2003.
22. Ancoli-Israel S, Cole R, Alessi C, Chambers M, Moorcroft W, Pollak CP. The role of actigraphy in the study of sleep and circadian rhythms. *Sleep* 1. 2003; 26(3):342–392.
23. Snyder-Halpern R, Verran JA. Instrumentation to describe subjective sleep characteristics in healthy subjects. *Res Nurs Health*. 1987; 10(3):155–163. [PubMed: 3647537]
24. Aaronson LS, Teel CS, Cassmeyer V, Neuberger GB, Pallikkathayil L, Pierce J, et al. Defining and measuring fatigue. *Image J Nurs Sch*. 1999; 31(1):45–50. [PubMed: 10081212]
25. Evans ML, Dick MJ, Shields DR, Shook DM, Smith MB. Postpartum sleep in the hospital. Relationship to taking-in and taking-hold. *Clin Nurs Res*. 1998; 7(4):379–389. [PubMed: 9919094]
26. Wambach KA. Maternal fatigue in breastfeeding primiparae during the first nine weeks postpartum. *J Hum Lact*. 1998; 14(3):219–229. [PubMed: 10205434]
27. SIDS and KIDS National Scientific Advisory Group. [Accessed January 6, 2012] Information statement: Co-bedding twins. 2010. Available at: <http://www.sidsandkids.org/wp-content/uploads/Cobedding-twins2.pdf>

Table 1

Demographic Characteristics of Parents

Characteristic	Mothers (N=104)	Fathers (N=90)
Age in years [M (SD)]	31.63 (5.69)	33.46 (5.23)
Education in years [M (SD)]	15.68 (2.49)	16.09 (2.86)
Race [n (%)]	N=101	N=87
Asian	5 (5%)	5 (5.7%)
Black	21 (20.8%)	14 (16.1%)
White	74 (73.3%)	67 (77%)
Native Hawaiian or PI	--	1 (1.1%)
More than one race	1 (1%)	--
Ethnicity [n (%)]	N=102	N=89
Hispanic	4 (3.9%)	5 (5.6%)
Not Hispanic or Latino	98(96.1%)	84 (94.4%)
Other Children [n (%)]		
None	45 (43.3%)	
One	43 (41.3%)	
Two	16 (15.4%)	
Annual Income [n (%)]	N=102	
< \$30,000	15 (14.7%)	
\$30,000–59,000	24(23.6%)	
\$60,000–79,000	17 (16.7%)	
> \$80,000	46(45.1%)	

Table 2

Infant Demographics

Birth weight in grams [M (SD)]	Twin A	2609.89 (414.29)
	Twin B	2545.04 (401.94)
Chronologic Age in days [M (SD)]	T1	28.77 (10.44)
	T2	64.57 (6.78)
	T3	91.69 (7.38)
Method of Delivery [n (%)]	Vaginal	32 (30.8%)
	Cesarean	68 (65.4%)
	Vaginal/Cesarean	4 (3.8%)

Table 3

Sleeping Arrangements of Parents and Twins at T1, T2, and T3

	<u>T1</u>	<u>T2</u>	<u>T3</u>
<u>Cobedding</u>			
	N=102	N=96	N=93
No (separate cribs)	35 (34.3%)	46 (47.9%)	54 (58.1%)
Yes (same crib)	67 (65.7%)	50 (52.1%)	39 (41.9%)
<u>Room sharing</u>			
	N=104	N=95	N=94
Parents in one room, twins together in another room	32 (30.8%)	41 (43.2%)	49 (52.1%)
Parents in one room, twins in two separate rooms	0 (0%)	2 (2.1%)	0 (0%)
Father in one room, mother in the same room as the twins	12 (11.5%)	10 (10.5%)	8 (8.5%)
Mother in one room with one twin, father in other room with other twin	3 (2.9%)	2 (2.1%)	4 (4.3%)
Both parents and both twins in one room	52 (50%)	30 (31.6%)	26 (27.7%)
Other	5 (4.8%)	10 (10.5%)	7 (7.4%)

Table 4
 Mother's Mean Sleep Duration in Minutes by Sleeping Arrangement Status at T1, T2, and T3

	<u>Mean Sleep Duration</u>		<u>Mean Sleep Duration</u>		<u>Mean Sleep Duration</u>	
	<u>T1</u>		<u>T2</u>		<u>T3</u>	
	<u>N</u>	<u>M (SD)</u>	<u>N</u>	<u>M (SD)</u>	<u>N</u>	<u>M (SD)</u>
No cobedding, no room sharing	14	377.71 (42.70)	20	416.40 (54.38)	28	406.93 (48.14)
Cobedding, no room sharing	16	338.14 (73.45)	17	393.82 (87.21)	14	406.23 (70.75)
Room sharing, no cobedding	13	360.87 (90.89)	8	396.74 (62.90)	9	412.73 (46.01)
Room sharing, cobedding	34	359.93 (76.45)	17	330.25 (50.92)	12	369.96 (58.47)

Table 5

Mother's Mean Sleep Quality Scores by Sleeping Arrangement Status at T1, T2, and T3

	Mean Sleep Quality			Mean Sleep Quality			Mean Sleep Quality		
	T1			T2			T3		
	N	M (SD)	N	M (SD)	N	M (SD)	N	M (SD)	
No cobedding, no room sharing	15	40.93 (12.92)	22	50.95 (15.71)	34	61.88 (18.55)			
Cobedding, no room sharing	17	45.00 (14.21)	19	55.47 (17.79)	15	58.47 (17.79)			
Room sharing, no cobedding	14	45.21 (16.11)	9	46.56 (12.32)	11	53.36 (12.56)			
Room sharing, cobedding	37	43.97 (12.73)	21	45.57 (9.03)	14	54.43 (14.69)			

Table 6
 Father's Mean Sleep Duration in Minutes by Sleeping Arrangement Status at T1, T2, and T3

	<u>Mean Sleep Duration</u> <u>T1</u>			<u>Mean Sleep Duration T2</u>			<u>Mean Sleep Duration T3</u>		
	<u>N</u>	<u>M (SD)</u>		<u>N</u>	<u>M (SD)</u>		<u>N</u>	<u>M (SD)</u>	
No cobedding, no room sharing	11	385.29 (52.52)		17	397.15 (49.70)		24	406.49 (50.91)	
Cobedding, no room sharing	16	339.54 (63.15)		17	408.53 (51.99)		12	401.36 (61.94)	
Room sharing, no cobedding	12	330.80 (61.87)		6	329.62 (63.12)		8	373.98 (32.48)	
Room sharing, cobedding	24	365.88 (60.48)		9	309.50 (107.49)		8	338.57 (105.15)	

Table 7
 Father's Mean Sleep Quality Scores by Sleeping Arrangement Status at T1, T2, and T3

	Mean Sleep Quality			Mean Sleep Quality			Mean Sleep Quality		
	T1			T2			T3		
	N	M (SD)	N	M (SD)	N	M (SD)	N	M (SD)	
No cobedding, no room sharing	13	47.15 (12.02)	19	59.05 (17.68)	33	61.27 (14.69)			
Cobedding, no room sharing	17	52.18 (14.06)	18	57.44 (15.99)	13	55.08 (15.44)			
Room sharing, no cobedding	12	52.92 (14.43)	7	46.29 (17.13)	9	54.44 (20.12)			
Room sharing, cobedding	28	47.61 (14.79)	12	51.00 (11.42)	8	52.13 (12.54)			