



Published in final edited form as:

Infant Behav Dev. 2012 December ; 35(4): 884–886. doi:10.1016/j.infbeh.2012.06.005.

Breastfeeding and Short Sleep Duration in Mothers and 6 to 11 Month Old Infants

Jill Radtke Demirci, PhD, RN, IBCLC,
University of Pittsburgh School of Nursing

Betty J. Braxter, PhD, RN, CNM, and
Assistant Professor, University of Pittsburgh, School of Nursing

Eileen R. Chasens, DSN, RN
Assistant Professor, University of Pittsburgh, School of Nursing, 415 Victoria Building, 3500
Victoria Street, Pittsburgh, PA 15261

SUMMARY

This study examined breastfeeding and sleep in 77 dyads of mothers and infants 6 to 11 months old. Data revealed no significant difference in sleep patterns between breastfed and non-breastfed infants. Controlling for variables including breastfeeding status, only infant nighttime sleep duration was significant in predicting maternal short sleep duration.

Keywords

Breastfeeding; infant feeding; short sleep duration; sleep initiation/ maintenance disorders

While many infants are able to sleep through the night by 6 months of age, some continue to wake and disturb their mothers' sleep. The literature suggests that one of the most common causes of disturbances in mothers' sleep may be babies' feeding patterns (Dennis and Ross, 2005; Huang *et al.*, 2004; Hunter *et al.*, 2009). While previous studies with younger infants suggest that breastfeeding may have no effect or a protective effect on maternal sleep (Gay *et al.*, 2004; Montgomery–Downs *et al.*, 2010; Doan *et al.*, 2007; Dorheim *et al.*, 2009; Kendall-Tackett *et al.*, 2011), the relationship between breastfeeding and maternal sleep remains unclear for infants over 6 months of age. It is important to study these infants as a separate group, as 6 month-olds have significant developmental differences and nutritional needs compared to younger infants. Six months is considered a milestone for introduction of solid foods and a marker for infant sleep consolidation (Gartner *et al.*, 2005). The purpose of this study was to examine the association between breastfeeding and maternal/infant sleep patterns in infants from 6–11 months of age and to assess the relationship between breastfeeding and the risk of mothers obtaining insufficient sleep.

© 2012 Elsevier Inc. All rights reserved.

Corresponding Author: Dr. Chasens, University of Pittsburgh, 3500 Victoria Street, Pittsburgh, PA 15261, chasense@pitt.edu
412-624-9380/ Fax: 412-383-7293.

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.

Declaration of Conflicting Interests

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

The National Sleep Foundation's Sleep in America Poll™ (2004) examined factors that affect sleep in young children and their caregivers. A national research firm conducted a scripted telephone survey among a nationwide random sample of households targeted as having children. A summary of findings from the poll is available at the website <http://www.sleepfoundation.org/>. Institutional Review Board approval was obtained from the University of Pittsburgh for examining the de-identified data.

The Sleep in America Poll™ had preset minimum quotas of 50 infants ages 6–8 months and 50 infants ages 9–11 months. The study examined data from 77 infants ages 6–11 months whose information was reported by their mother caregivers. Whether the infant was an only child was inferred from the reported number of children under 11 years in the home, but there may have been older children in the household. Infant age, race, and weight (pounds) were obtained via maternal report. Mothers were queried on their age, race, marital status, level of education, total hours of paid work per week, and household income. Whether the infant was currently breastfeeding was dichotomized as a “yes” or “no” question in the survey. Sleep latency was determined by asking how many minutes it took for the infant to fall asleep; infant sleep duration was assessed for the daytime (8am–6pm) and the nighttime (6pm–8pm). The existence of a bedtime routine, whether the infant was typically awake or asleep when put to sleep, and the usual infant bedtime were assessed.

Mothers were asked their usual nighttime sleep duration and how much sleep they thought they needed. Nighttime sleep duration was dichotomized as “short sleep duration” (< 6 hours/night) and “normal sleep duration” (>6 hours/night). Mothers were asked how many nights per week their children awoke them, how much sleep they lost on an average night because of being awakened, and the frequency of daytime sleepiness being severe enough to interfere with daily activities.

Descriptive and inferential statistics including chi-square and t-tests were done with an alpha level of 0.05. Binary logistic regression was used to assess the association of breastfeeding with the outcome variable of maternal sleep duration < 6 hours per night. Other predictor variables assessed included infant age, gender, additional children in the household, maternal age, and infant sleep duration. This enabled examination of the independent variable of interest while controlling for potential confounding variables. The final model specifies adjusted odds ratios (aORs) and 95% confidence intervals (CIs) for all examined predictor variables in relation to the risk for short maternal sleep duration.

The average age of infants was approximately 8.5 months; their reported weight ranged from 13 to 28 pounds. Breastfed infants were 1.5 months younger and weighed approximately 2 pounds less than non-breastfed infants on average (*p values* >0.05). There were slightly more female infants (55%) in the sample, but there was no difference by gender in breastfeeding status. The majority of the infants were White (87%). Approximately 44% of the infants were the only children in the household (range: 1–5 children).

The mean age of mothers was 31 years (*SD*=5.27). The majority were married (92%), White (87%), well-educated (52% with a bachelor's or advanced degree), economically stable (75% with annual household income < \$40,000 a year), and without a paid job (*n*=44; 57%). There were no statistically significant differences in maternal demographic variables between those who breastfed and those who did not. Mothers—both breastfeeding and not breastfeeding, identified themselves as the primary caregivers (90%) who attended to the infant at night.

Infants fell asleep quickly; almost 90% took less than 15 minutes, and there was no difference by feeding method. Daytime, nighttime, and total sleep duration was not

significantly different between breastfed and non-breastfed infants (mean nighttime sleep=9.39 hours \pm 1.99; daytime sleep = 3 hours \pm 1.19; total sleep duration= 12.4 hours \pm 2.24).

Many infants had short sleep duration. 25% slept \leq 8 hours per night; over 50% of the infants were put to sleep for the night after 9 pm. There was no significant difference in bedtimes between breastfed and non-breastfed infants. Infants who went to bed before 9 pm had significantly longer total sleep duration than infants who went to bed after 9 pm ($M=13.03 \pm 2.18$ hours vs. 11.98 ± 1.96 hours, respectively; $p=0.036$). There was a negative association between the number of nights per week the infant awoke and infant nighttime sleep duration ($r=-0.36$, $p=0.002$). The majority of infants had a stable nighttime routine (94%) that did not differ between weeknights and weekend nights (80%). Slightly more than half (57%) of the infants were put to bed sleepy but awake; more breastfed infants were put to bed sleepy but awake compared to non-breastfed infants (60% vs. 40%, respectively).

The majority of mothers reported not receiving the amount of sleep they felt that they needed ($M=1.5$ hours inadequate sleep, $SD=1.28$). Almost 40% of the mothers reported \leq 6 hours of sleep per night. There was no significant difference in sleep duration between mothers who breastfed and those who did not ($M = 6.76 \pm 1.31$ vs. 6.42 ± 1.18 hours, respectively; $p = 0.244$). Mothers who breastfed were awakened more nights per week than non-breastfeeding mothers ($M=5$ vs. 3 nights; $p=0.015$). Although mothers who breastfed their infants were awoken more frequently by their infant at night (1.13 ± 0.17 vs. 0.90 ± 0.15 , respectively; $p=0.024$), there was no statistical difference in the amount of time the mothers were awake during the night or in daytime sleepiness between breastfeeding and non-breastfeeding mothers.

Mothers who received \leq 6 hours of sleep per night complained of being awakened more nights per week ($p=0.058$), losing more sleep during the night ($p=0.001$), having insomnia symptoms ($p=0.037$), feeling tense about care giving ($p=0.042$), and having more daytime sleepiness ($p=0.012$). These mothers also had infants with significantly shorter sleep duration compared to mothers who slept more than 6 hours per night (nighttime sleep $M=8.75 \pm 2.27$ hours vs. 9.79 ± 1.70 hours, respectively; $p<0.05$).

Binary logistic regression analysis revealed that breastfeeding status was non-significant in predicting the risk for short maternal sleep duration when controlling for other variables potentially related to maternal sleep. The regression model did indicate that longer nighttime infant sleep duration was associated with reduced risk of a mother receiving \leq 6 hours of sleep per night (aOR=0.771, 95% CI: 0.597–.996, $p=0.047$). No other examined variables reached statistical significance in the model (Table 1).

This analysis extends current knowledge of maternal/infant breastfeeding and sleep patterns for 6 to 11 month old infants who are potentially physically mature enough to sleep through the night. Our results suggest that breastfeeding does not have a negative effect on maternal or infant sleep duration, similar to study findings within younger infant populations (Gay *et al.*, 2004; Montgomery – Downs *et al.*, 2010; Doan *et al.*, 2007; Dorheim *et al.*, 2009). While breastfeeding was not predictive of mothers who obtained 6 or less hours of sleep per night, infants with short nighttime sleep duration increased the risk of their mothers being sleep deprived. Mothers with inadequate nighttime sleep had daytime sleepiness that affected their ability to function, potentially placing them at increased risk for negative consequences that are associated with short sleep duration.

Intrinsic limitations of this secondary analysis include the modest sample size and the subjective nature of survey data. Only associations can be reported and causation cannot be inferred. Infant weight, which can change significantly during this developmental period,

was not objectively measured. Breastfeeding was dichotomized, however many mothers combine feeding methods. In addition, it is likely that a large proportion of infants in the sample were receiving foods in addition to formula or breast milk. No data was collected on the existence of any parental pre-existing sleep disorders, bedtime routines or habits that might adversely affect sleep.

In conclusion, this study strengthened the evidence that breastfeeding is not associated with shortened maternal sleep duration and extended these findings to an older infant population. Parents need to be educated on the benefits of breastfeeding beyond 6 months and reassured that breastfeeding is not implicated in mothers receiving inadequate sleep. Likewise, mothers should be made aware of the importance of adequate sleep for both themselves and their infants.

Acknowledgments

The authors would like to thank the National Sleep Foundation for generously sharing the questionnaire and data from the 2004 *Sleep in America™ Poll*. A fuller report of findings will be provided upon request. The authors would also like to acknowledge Katherine L. Delle, BSN and Michelle S. Maramag, BSN who assisted in the project while in the Undergraduate Research Mentorship Program at the University of Pittsburgh School of Nursing.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was partially supported by the National Institute of Nursing Research (NINR), Ruth F. Kirschstein National Research Service Award. (F31NR0115 62), the funding source had no involvement in the conduct or writing of this paper.

References

- Dennis GL, Ross L. Relationships among infant sleep patterns, maternal fatigue and development of depression symptomatology. *Births*. 2005; 32:187–193.
- Doan T, Gardiner A, Gay CL, Lee KA. Breast-feeding increases sleep duration of new parents. *J Perinat Neonatal Nurs*. 2007; 21:200–206. [PubMed: 17700096]
- Dorheim SK, Bondevik GT, Eberhard-Gran M, Bjorvatn B. Sleep and depression in postpartum women: A population-based study. *Sleep*. 32:847–855. [PubMed: 19639747]
- Gartner LM, Morton J, Lawrence RA, Naylor AJ, O'Hare D, Schanler RJ, Eidelman AI. Breastfeeding and the use of human milk. *Pediatrics*. 2005; 115:496–506. [PubMed: 15687461]
- Gay CL, Lee KA, Lee SY. Sleep patterns and fatigue in new mothers and fathers. *Biol Res Nurs*. 2004; 5:311–318. [PubMed: 15068660]
- Huang CM, Carter PA, Guo JL. A comparison of sleep and daytime sleepiness in depressed and non-depressed mothers during the early postpartum period. *J Nurs Res*. 2004;12, 287–296.
- Hunter LP, Rychnovsky JD, Yount SM. A selective review of maternal sleep characteristics in the postpartum period. *J Obstet Gynecol Neonatal Nurs*. 2009; 38:60–68.
- Kendall-Tackett K, Cong Z, Hale TW. The effect of feeding method on sleep duration, maternal well-being, and postpartum depression. *Clinical Lactation*. 2:22–26.
- Montgomery-Downs HE, Clawges HM, Santy EE. Infant feeding methods and maternal sleep and daytime functioning. *Pediatrics*. 2010; 126:1562–1568.
- National Sleep Foundation. Sleep and Children. Sleep in America Poll; 2004. <http://www.sleepfoundation.org/article/sleep-america-polls/2004-children-and-sleep>

Highlights

- One of the most common causes of sleep disturbances in mothers of infants is waking for infant nighttime feedings.
- Previous studies in infants under 6 months of age suggest that breastfeeding may have a protective effect on maternal sleep.
- This study strengthens the evidence that breastfeeding is not associated with shortened maternal sleep duration and extended these findings to an older infant population.

Table 1

Binary regression model predicting sleep duration 6 hours/night in mothers of infants ages 6–11 months ($N=75$)

Variable	B	SE	aOR	95% CI	
				LL	UL
Age of infant*	-0.057	0.159	0.944	0.691	1.290
Male gender (infant)	-0.230	0.506	0.794	0.294	2.143
More than 1 child	-0.451	0.531	0.637	0.225	1.805
Age of mother*	-0.033	0.051	0.968	0.875	1.070
Infant Nighttime Sleep Duration*	-0.260	0.131	0.771	0.597	0.996
Breastfeeding Status (yes)	-0.123	0.554	0.884	0.298	2.622

* =continuous variable; B=intercept/coefficient of the constant; SE=standard error; CI=confidence interval; LL=lower limit, UP = upper limit; aOR=adjusted odds ratio