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## Association Between Co-Sleeping and Breastfeeding: Does Prenatal Care Make a Difference?

Brynne Kathleen Adams  
*University of Kentucky*

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Brynne Kathleen Adams, Student

Corrine Williams, Sc.D., Committee Chair

Dr. William Pfeifle, Director of Graduate Studies

Association Between Co-Sleeping and Breastfeeding: Does Prenatal Care Make a Difference?

Capstone Project Paper

A paper submitted in partial fulfillment of the

Requirements for the degree of

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In the

University of Kentucky College of Public Health

By

Brynne Kathleen Adams, BA

Lexington, Kentucky

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Corrine Williams, ScD., Chair

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Robin Vanderpool, DrPH, CHES

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Christina Studts, Ph.D.

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Pam Teaster, Ph.D.

Prenatal care is important to ensure a healthy pregnancy for both a woman and her baby. According to the Mayo Clinic, prenatal care should start as soon as there is a positive pregnancy test and should continue throughout the pregnancy.<sup>1</sup> The more prenatal care visits a woman attends, the more opportunities to detect potential problems and offer health education materials to help ensure a healthy pregnancy. Prenatal care visits are also used to discuss what may happen after the woman delivers particularly early infant care and breastfeeding. Mothers who do not receive adequate prenatal care are three times more likely to have a low birth weight baby than mothers who receive adequate prenatal care.<sup>2</sup>

However, women do not always enter care as early as they should. Women sometimes are unaware they are pregnant and delay the start of prenatal care. According to Pagnini et al., a few reasons women delay starting prenatal care may be due to “day- to-day survival concerns” such as an inconvenience in scheduling of the visit as well as making an effort to attend prenatal visits if they do not understand the importance of receiving care.<sup>3</sup> Delays in prenatal care could be due to psychosocial factors and demographic risk factors. Barriers include structural issues such as women traveling a far distance to see a provider, transportation access, as well as “provider care issues.” Provider care issues include a discontinuity of providers demonstrating a lack of communication or lack of trust with a health care provider, and inconveniences such as long waiting periods for appointments and scheduling conflicts.<sup>3</sup>

Women who receive prenatal care were eight times more likely to initiate and continue to breastfeed.<sup>4</sup> Breastfeeding provides protective factors for both mother and baby. Babies who are breastfed are more likely to be healthier than babies who are formula fed, have a lower risk of Sudden Infant Death Syndrome (SIDS), are less likely to suffer from juvenile diabetes, and can have higher IQ scores.<sup>5</sup> Benefits for breastfeeding mothers include a reduced risk of

osteoporosis, a faster recovery from the pregnancy, a reduced risk of ovarian cancer, and an increased attachment of mother and baby.<sup>6</sup> According to the American Cancer Society, breastfeeding has shown some protective factors against breast cancer but the research has varied.<sup>7</sup>

Because of the frequent feeding schedule for breastfeeding infants, researchers speculate parents may choose to co-sleep with their infants for convenience of feeding, fatigue, and to feel close to their infant.<sup>8</sup> Co-sleeping, defined as an individual sharing the same sleep surface with an infant, is a growing concern in the United States. Between 1984 and 2004, the rate of infant mortality attributed to accidental suffocation and strangulation quadrupled from 2.8 to 12.5 deaths per 100,000 live births, often due to co-sleeping. Although the reason for the increase in deaths is unknown, these deaths are completely preventable.<sup>9</sup> Parents or caregivers who choose to co-sleep with infants increase the infant's risk of death by being rolled over on, of suffocation from being smothered by a pillow or blanket, and of SIDS.<sup>10</sup> In addition, there is an increased risk of the infant being hurt by becoming trapped between the headboard or footboard and the bedframe.<sup>10</sup> Ideally, parents receiving early and regular prenatal care would receive information on the dangers of co-sleeping, and would be less likely to co-sleep with their infants. However, there is little research on whether this issue is addressed systematically during prenatal care, and whether women who receive early or adequate prenatal care are less likely to co-sleep.

Given the previous research, this study will explore whether breastfeeding is associated with increased co-sleeping and whether early prenatal care affects the relationship between breastfeeding and co-sleeping. Given that women who receive early prenatal care are more likely to breastfeed, one question is whether this contributes to an increase in co-sleeping with their infants. While prenatal care visits may include information on the dangers of co-sleeping, gaps

exist in understanding how new mothers manage both breastfeeding and co-sleeping. The results of this study will inform how health care providers such as pediatric nurse practitioners, obstetricians, midwives, and nurses need to educate mothers on the benefits of breastfeeding, as well as the dangers of co-sleeping with a clear explanation of what co-sleeping is.<sup>11</sup>

## METHODS

The Pregnancy Risk Assessment Monitoring System (PRAMS) is a population-based survey addressing core issues pertaining to barriers to and content of prenatal care, contraception, maternal stress, maternal use of tobacco and alcohol, obstetric history, physical abuse, early infant development, and economic status.<sup>12</sup> PRAMS data includes a sample of women who have had a live birth using the state's birth certificate registry.<sup>13</sup> Forty states and New York City participate in PRAMS, which accounts for 78% of all live births in the United States.<sup>14</sup> Of the participating states and New York City, 1300-4300 women are sampled each year. Women in higher risk populations are sampled at a higher rate to produce reliable estimates in these samples.<sup>13</sup> The Institutional Review Board at the University of Kentucky waived review of this study because of the use of publically available de-identified secondary data.

### **Participants/Sample**

States participating in PRAMS select mothers from eligible birth certificates. Due to stratification of race and ethnicity, low birth weight babies tend to be over sampled. PRAMS receives information regarding demographics and medical information through the U.S. Standard Certificate of Live Birth supplied through state's vital records.<sup>13</sup>

## **Study Design**

This study is limited to women who completed a PRAMS questionnaire in the years 2009-2011 in the following states: Delaware, Georgia, Hawaii, Maryland, Minnesota, Missouri, New England, New Jersey, New York, Pennsylvania, Tennessee, Texas, Vermont, Washington, Wisconsin, and West Virginia.<sup>14</sup> PRAMS questionnaires contain two parts: core questions established by the CDC and a set of questions chosen from a list of standard questions. States can choose to add additional questions to the PRAMS to research topics of importance.<sup>12</sup> Women in the sample are contacted several times by mail and/or telephone survey. When first selected a participant is sent a pre-letter describing PRAMS, why they were chosen, consent forms, questionnaire instructions, and study incentives. Three to seven days after the woman receives the cover letter about PRAMS, they are sent an initial mail questionnaire packet with a self-addressed, stamped envelope included for easy return. After three mail attempts, any non-respondent receives a telephone follow-up. Telephone numbers of the mothers are received through a variety of methods and up to 15 call attempts are made. With the telephone survey, a call back can be scheduled to accommodate the mother, and the questionnaire is completed by phone.<sup>13</sup> The telephone questionnaire differs slightly from the mail survey to accommodate for the different mode of administration.<sup>12</sup> Using this methodology, the response rate for the PRAMS survey is at least 65% in each state, a requirement of CDC to release the data.<sup>15</sup>

## **Measures**

The measures of interest in this study are breastfeeding, prenatal care, and co-sleeping. All measures are from the PRAMS Core Questions with the exception of the co-sleeping question, which came from the Standard Questions. The outcome variable of co-sleeping will be

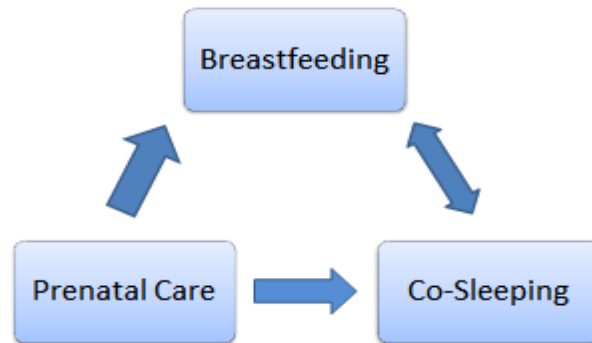
measured using the following question: “How often does your new baby sleep in the same bed with you or anyone else? Always, Often, Sometimes, Rarely, Never” From this we created a yes/no variable where “yes” included always, often, and sometimes and “no” included rarely and never. The predictor variable for breastfeeding will be measured using the following yes/no question: “Did you ever breastfeed or pump breast milk to feed your new baby after delivery, even for a short period of time?”<sup>12</sup>

The mediator of prenatal care will be measured using the Kotelchuck Index. The Centers for Disease Control and Prevention staff created the Kotelchuck Index using prenatal care measures from birth certificates. The staff members used the month prenatal care began as well as the number of prenatal care visits. The Kotelchuck Index is broken down into four categories: adequate plus, adequate, intermediate, and inadequate. Adequate plus prenatal care is when the mother begins prenatal care by the fourth month of pregnancy and attends 110% or more of the recommended visits. Mothers who received adequate plus prenatal care are seen more often due to an underlying health issue such as hypertension or diabetes. Adequate prenatal care is when the pregnant mother begins prenatal care by the fourth month of pregnancy and a woman attends 80% to 109% of the number of visits recommended by the American College of Obstetricians and Gynecologists (ACOG). Intermediate prenatal care is when the pregnant mother begins prenatal care by the fourth month of pregnancy and received 50-79% of recommended visits. Inadequate prenatal care is when the pregnant mother begins prenatal care after her fourth month of pregnancy and receives less than 50% of recommended visits.<sup>16</sup>

Other covariates included race/ethnicity, maternal age, marital status, and education (see Table 1 for categories).



**Figure 1** Conceptual Model



### **Analytic Plan**

Chi-squared tests were used to evaluate the bivariate associations between (a) co-sleeping and breastfeeding and (b) co-sleeping and prenatal care. Multiple logistic regression was used to estimate adjusted odds ratios (aOR) and 95% confidence intervals for the association between co-sleeping, breastfeeding, and prenatal care using the Kotelchuck Index. Statistical Package for the Social Sciences (SPSS) software Version 21.0 was used. All analyses were conducted in 2013-2014.

### **RESULTS**

Of the 57,069 women in the survey, about half (53%) were Non-Hispanic White, with 17% of women reporting Non-Hispanic Black, 14% were Hispanic, and 17% other race (Table 1). (Note: Vermont is 93% white and every other race was placed in the “other” category). In this sample, most women (81%) reported having ever breastfed their baby, and 22,676 (41%) reporting some co-sleeping.

Table 2 shows the relationships between co-sleeping with any breastfeeding and the Kotelchuck Index. Of the women who reported not breastfeeding, 35% of those mothers reported co-sleeping with their baby compared to the 43% of breastfeeding women who reported they did co-sleep with their baby, a statistically significant difference. Co-sleeping was highest among those women who received inadequate prenatal care (48%), while only 39% of these mothers receiving adequate plus prenatal care reported co-sleeping.

In a simple logistic regression, the crude odds ratio of co-sleeping and breastfeeding illustrated women who breastfed had 1.38 times higher odds of co-sleeping than women who chose not to breastfeed (95% CI, 1.32-1.44; Table 3). After adjusting for prenatal care (Kotelchuck), and maternal age, the odds of co-sleeping were one and a half times higher for breastfeeding mothers (aOR 1.51; 95% CI, 1.44-1.58). Once controlling for maternal demographics, race and maternal age, the odds of co-sleeping by women who breastfed were 1.35 times higher than women who did not breastfeed (95% CI 1.29-1.42). Model 3, controlling for mother's education, age, race, and Kotelchuck Index, breastfeeding mothers had about one and a half times higher odds of co-sleeping than women who did not breastfeed (OR 1.52; 95% CI 1.45-1.60; Table 3). Model 3 illustrates mothers who received adequate prenatal care had 1.04 times higher odds of co-sleeping than the reference group (Adequate Plus). Mothers who received inadequate prenatal care had 1.16 times higher odds than the reference group.

## **Discussion**

These findings are consistent with the hypothesis that breastfeeding is positively correlated with co-sleeping. However, the level of prenatal care the mother had whether adequate plus, adequate, intermediate, or inadequate, played a role in determining if the mother was more likely to co-sleep. This study showed mothers who received inadequate prenatal care

were more likely to co-sleep than the reference group (adequate plus). Before adjusting for other variables, the odds of a mother breastfeeding were lower. Once adjusted for prenatal care, the magnitude of the relationship between breastfeeding and co-sleeping increased. Co-sleeping is occurring more often especially with breastfeeding mothers, and the trend is growing with approximately 13% of parents co-sleeping, doubling in recent years.<sup>17</sup> As stated earlier, breastfeeding mothers tend to co-sleep more often than mothers who do not breastfeed. This would be a great educational opportunity for practitioners to educate mothers about safe sleep practices. This would include “room sharing” instead of “bed sharing.”<sup>8</sup> The American Academy of Pediatrics (AAP) recommends room sharing instead of co-sleeping reducing the risk of the baby suffocating and being rolled over on by a parent or sibling.<sup>8</sup> The AAP and March of Dimes recommend placing the baby on their back in their crib or pack-n-play.<sup>10</sup>

According to Table 3, Hispanics were no more likely to co-sleep (OR =1.02) than the reference group (White Non-Hispanic), but both non-Hispanic Blacks and women of other race/ethnicities were significantly less likely to co-sleep. The higher rates among both Hispanic and non-Hispanic white women could be based on cultural traditions passed down from generations. The Hispanic culture relies heavily on extended family for help with the new baby and mother. Family advice is what the new mother follows.<sup>18</sup> An important note for prenatal care providers in caring for Hispanic mothers should be to include appropriate sleep practices for a baby taking into account their cultural values. Providers must be cautious not to offend the mother as they may not return for future prenatal visits. It may be necessary to have a bilingual nurse or practitioner or interpreter to help explain the importance of safe sleep practices.<sup>18</sup>

Findings indicated mothers who were more educated were less likely to co-sleep than mothers who had little education with the exception 0-8 years of education (reference group).

According to Wisconsin's PRAMS data report, young mothers as well as mothers who had less education were 25% more likely to co-sleep than mothers with a higher level of education.<sup>19</sup>

More education about the dangers of co-sleeping is needed for mothers of all ages. In particular, additional attention needs to be paid to younger mothers who may not have the social support of family or loved ones. It cannot be assumed that mothers of any educational level will know of appropriate sleep practices, but cultural values must be factored into the discussion.

The PRAMS survey had a high response rate due to the large sample size. The prenatal care information comes from birth certificates whereas breastfeeding and co-sleeping are self-reported. The PRAMS survey is generalizable and represents a good sample of the population. A couple limitations to this study are social desirability bias and understanding the "missing variables" of family support. This study has social desirability bias in regards to co-sleeping. The new mother may co-sleep with her baby a majority of the time but may say she only co-sleeps rarely. The "missing variable" of family support is a limitation because of the family structure. New mothers tend to listen to their family, especially their own mothers, grandmothers, sisters, and aunts as well as close friends on how to raise their babies. If their mothers and grandmothers raised their children one way, why should they change how they raise their own child?

Given the findings from this study, more research is needed to understand why women who receive inadequate prenatal care were less likely to co-sleep than the reference group (adequate plus). In future studies, researchers should tailor the overarching goals to appropriate race, socioeconomic status, culture, and/or education level. With a growing number of grandparents raising their grandchildren, nurses and practitioners need to be specific when providing information regarding co-sleeping as guidance for safe sleep practices has changed.

Infant sleep practices grandparents of today followed raising their own children do not meet current safe sleep guidelines. Co-sleeping is a practice parents and grandparents need to eliminate. Increased safe sleep instruction by healthcare professionals, keeping cultural values in mind, could reduce the number of families co-sleeping. Also, obstetric practitioners need to be educated on the importance of discussing the related practices of breastfeeding and co-sleeping during visits with mothers as well as other family members to ensure consistent messaging to everyone involved in the care of a baby.

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**Table 1. Demographics from 2009-2011 PRAMS Survey (N=57,069)**

<b>Variables</b>	<b>N (%)</b>
Co-Sleeping	
Always	7452 (13.6)
Often	5861 (10.7)
Sometimes	9363 (17.1)
Rarely	11873 (21.6)
Never	20288 (37.0)
Breastfeed (ever)	
Yes	44846 (81.1)
No	10432 (18.9)
Prenatal Care (Kotelchuck)	
Inadequate	6871 (12.6)
Intermediate	6907 (12.7)
Adequate	22681 (41.7)
Adequate Plus	17891 (32.9)
Race	
White (Non-Hispanic)	29973 (52.5)
African American (Non-Hispanic)	9533 (16.7)
Hispanic	7921 (13.8)
Other	9642 (16.9)
Maternal Age	
<17	1596 (2.8)
18-19	3655 (6.4)
20-24	12737 (22.3)
25-29	15797 (27.7)
30-34	13482 (23.6)
35-39	7828 (13.7)
40+	1970 (3.5)
Marital Status	
Married	33448 (58.6)
Other	23601 (41.3)
Maternal Education (Years)	
0-8	2076 (3.7)
9-11	6876 (12.1)
12	15317 (27.0)
13-15	14743 (26.0)
>16	17636 (31.1)

**Table 2. Bivariate Associations with Co-Sleeping from 2009-2011 PRAMS Survey  
(N=57,069)**

	<b>Co-Sleeping</b>			
	<b>No</b>	<b>Yes</b>		
	<b>N (%)</b>	<b>N (%)</b>	<b>X<sup>2</sup></b>	<b>P-Value</b>
<b>Total Co-Sleeping</b>	<b>20288 (37.0)</b>	<b>34549 (63.0)</b>		
<b>Breastfed Ever**</b>			<b>202.952</b>	<b>P&lt;.0001</b>
<b>No</b>	<b>6699 (64.9)</b>	<b>3626 (35.1)</b>		
<b>Yes</b>	<b>25374 (57.2)</b>	<b>18974 (42.8)</b>		
<b>Kotelchuck Index**</b>			<b>202.016</b>	
<b>Inadequate</b>	<b>3320 (51.7)</b>	<b>3097 (48.3)</b>		
<b>Intermediate</b>	<b>3741 (56.0)</b>	<b>2934 (44.0)</b>		
<b>Adequate</b>	<b>13246 (59.9)</b>	<b>8871 (40.1)</b>		
<b>Adequate Plus</b>	<b>10443 (61.2)</b>	<b>6608 (38.8)</b>		



**Table 3. Unadjusted and Adjusted Logistic Regression Predicting Co-Sleeping from 2009-2011 PRAMS Survey**

	<b>Crude OR (95% CI)</b>	<b>Model 1 (95% CI)</b>	<b>Model 2 (95% CI)</b>	<b>Model 3 (95% CI)</b>
<b>Breastfeeding (Ever)</b>				
<b>Yes</b>	1.38 (1.32-1.44)	1.51 (1.44-1.58)	1.35 (1.29-1.42)	1.52 (1.45-1.60)
<b>Kotelchuck (PNC)</b>				
<b>Adequate Plus</b>		Reference		Reference
<b>Adequate</b>		1.05 (1.01-1.09)		1.04 (1.00-1.08)
<b>Intermediate</b>		1.25 (1.14-1.28)		1.10 (1.04-1.17)
<b>Inadequate</b>		1.43 (1.35-1.52)		1.16 (1.09-1.24)
<b>Maternal Age</b>				
<17		Reference	Reference	Reference
18-19		1.68 (1.46-1.94)	1.55 (1.34-1.78)	1.33 (1.14-1.55)
20-24		1.40 (1.24-1.57)	1.31 (1.17-1.48)	1.18 (1.04-1.34)
25-29		1.06 (.96-1.17)	1.05 (.95-1.16)	.95 (.86-1.06)
30-34		.90 (.82-1.00)	.93 (.84-1.03)	.90 (.81-1.00)
35-39		.83 (.75-.92)	.84 (.76-.93)	.87 (.78-.97)
40+		.89 (.80-1.00)	.88 (.79-.98)	.91 (.82-1.02)
<b>Race</b>				
<b>White (Non-Hispanic)</b>			Reference	Reference
<b>Black (Non-Hispanic)</b>			.35 (.34-.37)	.33 (.35-.38)
<b>Hispanic</b>			1.02 (.96-1.09)	1.00 (.94-1.07)
<b>Other</b>			.68 (.64-.72)	.61 (.57-.65)
<b>Education</b>				
0-8 Years				Reference
9-11 Years				1.69 (1.52-1.88)
12 Years				1.37 (1.27-1.47)
13-15 Years				1.25 (1.18-1.32)
>16 Years				1.23 (1.17-1.29)
<b>R<sup>2</sup></b>	.004	.015	.063	.066

## **Biographical Sketch**

This capstone was completed by Brynne Adams. In preparation for graduate school, Brynne attended the University of Kentucky receiving a Bachelor of Arts in Political Science. She was a member of the University of Kentucky Student Public Health Association and earned the Maternal and Child Health graduate certificate. If you would like to contact her see below.

Address: 699 Gingermill Lane

Lexington, Kentucky 40509

Phone: 859-361-1949

Email: [brynne.adams@uky.edu](mailto:brynne.adams@uky.edu)

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