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Prenatal Attachment and Postnatal Infant Sleep

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ABSTRACT: This study examined the relationship between maternal prenatal attachment and postnatal infant sleep. Ninety first-time pregnant mothers, between 35 and 40 gestational weeks, completed the Prenatal Attachment Inventory (Müller, 1989), which consists of 21 items and assesses the mother's prenatal attachment to her fetus. After the birth of their infant, the mothers charted their infant's sleep for three consecutive 24-hour periods when the infant was 1 week and 3 months old, using the Sleep/Activity Record (Barnard, 1999). Correlational analysis revealed that PAI scores did not correlate with either infant sleep segments or longest sustained sleep. However, the study found an inverted correlation between PAI scores and infant total sleep at one week. The study extends current literature on prenatal to postnatal continuity.

KEYWORDS: Infant Sleep, Pregnancy, Prenatal Attachment

INTRODUCTION

Pregnancy is a time of transformation, especially for first-time mothers. A pregnant woman undergoes psychological and emotional changes that affect not only her self-identity, but also her sense of self, her character and her self-esteem (Rubin, 1984; Trad, 1991). The relationship with her unborn child is often the impetus of these changes. Psychological and relational processes during pregnancy range from detachment in the first trimester to an affectionate attachment to the fetus in the last weeks of pregnancy (Leifer, 1977). This attachment relationship is referred to as prenatal attachment and is a theoretical construct that has been studied in recent years. Researchers have developed self-administered questionnaires such as the Maternal-Fetus Attachment Scale (Cranley, 1981), the Prenatal

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Attachment Inventory (Müller, 1993), and the Maternal Antenatal Attachment Scale (Condon, 1993) to explore attachment to the fetus. Attachment is viewed as both behavioural and as a representation of internal working models (Müller, 1992; Müller & Ferketich, 1992).

Much of the prenatal attachment research has focused on its correlates such as marital satisfaction (Müller, 1993; Wachter, 2002; Zachariah, 1994), maternal age (Kemp & Page, 1987; Lindgren, 2001; Siddiqui, Hägglöf, & Eisemann, 1999; Wachter, 2002), maternal self-esteem (Cranley, 1981; Gaffney, 1986; Koniak-Griffin, 1988; Mercer, Ferketich, May, Dejoseph, & Sollid, 1988), maternal prenatal depression (Condon & Corkindale, 1997; Lindgren, 2001; Mercer et al., 1988) to name a few. Other research has looked at the relationship between prenatal attachment and postnatal correlates.

Müller believes that the mother's internal representations of attachment influence how she attaches to her unborn and that the attachment relationship with the fetus is unique and affectionate. She tested the prenatal attachment tool that she developed, the Prenatal Attachment Inventory (PAI), for its ability to predict maternal attachment postnatally (Müller, 1996). She compared prenatal scores on three different questionnaires: The Maternal Attachment Inventory (MAI), the How I Feel About My Baby Now Scale (HIFBN), and the Maternal Separation Anxiety Scale (MSAS). The mothers filled out these questionnaires when their babies were approximately 1 month old. Results indicated a positive although modest correlation with the MAI and the MSAS, however the correlation with the HIFBN was non-significant and lower than predicted. Müller concluded that although some correlation between prenatal and postnatal attachment became evident, further research was needed to clarify this relationship.

Other researchers have used the MFAS and the PAI to assess pre- to post-natal attachment continuity. Fuller (1990) compared MFAS scores during the 35th to 40th weeks of pregnancy to the Nursing Child Assessment Feeding Scale and the Funke Mother-Infant Interaction Assessment while the mothers fed their babies on the second and third postpartum day. The study found that the MFAS results significantly and positively correlated with results from both postnatal scales, and thus supported the hypothesis that self-reported prenatal attachment continues through the postnatal period. Siddiqui and Hägglöf (2000) similarly found that prenatal attachment, as measured by the PAI, correlated with mother-infant interaction at 12 weeks postpartum. They explain that mothers who experience greater affection towards, and fantasize more about, their unborn child, generally show more involvement during interaction with their infant.

Escallier (1995) found that the MFAS correlated with infant colic. The author suggests that the psychological state of the mother could possibly affect the organization of fetal behaviour and its regulatory capacities.

Infant Sleep

The attachment system and infant sleep patterns are intimately linked and for the first 3 years of life should be viewed within the context of the dyadic relationship between infant and caregiver (Anders, Goodlin-Jones, & Sadeh, 2000). The separation and reunion of the bedtime experience activates the attachment system between the primary caregiver and the infant. Through consistent and predictable recurring social interaction between the two, the regulation of the sleeping pattern develops. Failure on the part of the caregiver to provide a secure bedtime experience for the infant results in dysregulation (Anders, 1994) (e.g. frequent night waking or sleep-onset difficulty). Sleep problems develop when the caregiver is unable to provide adequate or sufficient regulation (Anders et al., 2000).

Full-term newborn infants sleep between 16 and 18 hours in a 24-hour period and the sleep-wake states alternate in 3- to 4-hour cycles (Anders, 1994). By 1 month, the newborn begins to adapt to the light-dark cycle, and as the infant matures, less sleep fragmentation occurs during the night (Sher, 1998). At 3 weeks the longest sustained sleep is about 215 minutes and increases to 358 minutes by 3 months. Sleep time for the night and percentage of time awake do not change significantly at this age, however these proportions change as the infant matures (Anders, Halpern, & Hua, 1992). By 9 months, the amount of time the infant spends awake increases to about 8 hours in a 24-hour period (St. James-Roberts & Plewis, 1996).

Ingerson and Thoman (1999) found that infants with a higher gestational age and higher birth weight show more quiet sleep at 33 weeks. Furthermore, increased care giving correlates with increased quiet sleep, which may be an indicator that even at this young age dyadic interaction plays an important role in the healthy development of infants.

Anders (1994) considers sleep fragmentation a developmental problem for both infants and parents. Although one must consider biological and temperamental factors, parent-child interactions still merit major consideration in research (Keener, Zeanah, & Anders, 1988). This interaction effect becomes evident in children of mothers who experience high levels of psychological distress. Anders, et al. (1992) found that 3-week-old newborns of these mothers spent less

time in active sleep and infants of depressed mothers were more wakeful—a pattern similar to that of infants who experience other stressors.

Other studies observe that the mother's attachment classification correlates with sleep problems. In a study that focused on the Adult Attachment Interview (George, Kaplan, & Main, 1985) classification of mothers whose toddlers had sleep problems, 100% of these mothers were classified as insecurely attached (Benoit, Zeanah, Boucher, & Minde, 1992). In a similar study that used the Working Model of the Child Interview (Zeanah, Benoit, Hirshberg, Barton, & Regan, 1994), none of the toddlers with sleep disorders had mothers with a "balanced" WMCI classification (Benoit, Parker, & Zeanah, 1997). The underlying mechanism of both interviews is the internal working model of the parent. If parents with a sub-optimal attachment history have not understood or worked through their past problems, it becomes more difficult for them to provide the secure base they need to help regulate their children's emotional states. Sleep problems then worsen from insufficient or inadequate regulation (Anders et al., 2000).

The Study

The present study is interested in furthering an understanding of prenatal to postnatal continuity and is examining the relationship between maternal prenatal attachment and postnatal infant sleep. The construct of prenatal attachment was assessed using the PAI due to its focus on behavioural aspect of attachment and the representation of internal working models of attachment.

Participants in this study kept track of their infant's sleep using a sleep log, the Sleep/Activity Record (Barnard, 1999). Sleep researchers disagree over whether to have parents report via sleep logs or to collect data through a more detached, technologically-assisted evaluation of sleep patterns when doing sleep research with infants. In sleep-log assessments, parents track the infants' sleep onset, number of awakenings, and length of waking/sleep. Although this method is more cost-efficient than objective methods (St. James-Roberts & Plewis, 1996), researchers have found it to be less reliable. Parents tend to underestimate the number of awakenings during the night (Sher, Epstein, Sadeh, Tirosh, & Lavie, 1992; Tikotzky & Sadeh, 2001) as well as the amount of time it takes for an infant to fall asleep (Sher, 2001). Actual sleep time and amount of time in quiet sleep and active sleep cannot be determined from these reports. It is reasonable to assume,

however, that when the infant is very young, parents will have a better knowledge of when their infant is awake. At such a young age (1 week to 3 months), infants tend to signal to their parents when they wake at night, due to their physical needs, making parental reports a fairly accurate depiction of the infant's sleep pattern. Daytime patterns of sleep are easily measured through sleep logs since the primary caregiver will likely be awake during that time. This study used parental reports to assess infant sleep patterns. Analyzing the self-report sleep logs was helpful in better understanding the dyadic relationship. However, this study is limited by the vigilance of the parents and effective signaling of the infants.

Postpartum Depression has been recognized to affect the mother-infant relationship and infant sleep (Jones, Field, Fox, Lundy, & Davalos, 1997). They found that 1-month-old infants of depressed mothers had more indeterminate sleep, a finding that was similar to 3-month-old infants of depressed mothers (Field, 1995). Although studies have looked at the relationship between the prenatal attachment and prenatal depression (Lindgren, 2001), the relationship with postpartum depression is less clear, therefore, controlling for postpartum depression by excluding these women from the study was warranted. We used the Edinburgh Postnatal Depression Scale (EPDS) to assess maternal depressive symptoms after the birth of her child.

A number of limitations are inherent in this study's design. First, since the subjects volunteered for the study, they may represent a select sample of participants. Second, we limited the study to first-time mothers of low-risk, singleton pregnancies. As such, results cannot be generalized to high-risk, multiple pregnancies, or women who have given birth previously. Third, the PAI is a fairly short, self-report questionnaire of prenatal attachment. As such, it may not access the fullest picture of a woman's attachment to her fetus. Fourth, the current study did not control for the prenatal environment. Previous studies have shown the effects of hormones such as cortisol on the developing fetus and how this translates into infant behaviour. This study does not assess how such factors may influence the infant's sleep.

Method

Participants

The subjects of this study were 90 first-time mothers between the ages of 20 and 42 years of age, and their newborn babies. This study

was limited to first-time mothers because research has shown that prenatal attachment scores, as assessed by self-report questionnaires, are different between primigravida and multigravida (Mercer et al., 1988). The study was limited to low-risk, singleton pregnancies of full-term babies. Low-risk pregnancy is characterized by an absence of any severe medical condition, such as pregnancy-induced hypertension, severe asthma, or cardiac disease. Furthermore, women who have experienced a miscarriage after the 8th gestational week were excluded from the study. Effort was made to recruit individuals from various ethnic, socio-economic, and educational backgrounds. After receiving ethics approval from Pacifica Graduate Institute and the Conjoint Health Research Ethics Board (CHREB), subjects were recruited from maternity clinics and hospital orientation classes, and through word-of-mouth.

Instruments

The revised version of the PAI (Müller, 1993) measures the affectionate attachment between a mother and her unborn child. The inventory consists of 21 items rating the woman's thoughts, feelings, and behaviours towards the fetus. Examples of items are: "I feel love for the baby"; "I imagine calling the baby by name"; or "I get very excited when I think about the baby." Each item is rated on a 4-point Likert scale: 4 = almost always, 3 = often, 2 = sometimes, and 1 = almost never. Items are summed for a single score between 21 and 84. The higher the score, the greater the attachment. Cronbach's alpha-coefficient of internal consistency for the PAI has ranged from .81 to .91 (Müller, 1996). Müller bases the conceptual framework of the instrument on attachment theory and pregnancy adaptation theory (Müller, 1993).

The Sleep/Activity Record (Barnard, 1999) is a 7-day, 24-hour record to gather information about pregnant women, newborns, and children's sleep/activity routines. The premise behind it is that sleep/activity routines have an effect on and inform us about the infant's regulation and mother-infant interaction. For the purpose of this study, the SAR was slightly modified to include a 3-day, 24-hour assessment. Although the author suggests a 7-day assessment for the purposes described in the manual, the record can be modified to whatever the needs of the assessment. For research purposes, tracking sleep behaviour for 3 days is an acceptable assessment (St. James-Roberts & Plewis, 1996). It provides a good indication of sleep patterns.

The SAR is comprised of four sections. The top section contains a

place to record demographic information such as parent's and infant's age, gender of infant, usual waking and bedtime, gestational age of child at birth, daytime and sleep location of child, and whether the infant has any sleep difficulties.

The middle section is comprised of two time sections—a day-time grid (6 a.m. to 6 p.m.) and a night-time grid (6 p.m. to 6 a.m.). The grids are made up of 15-minute intervals for recording behaviours. Total behaviour times are recorded at the end of each row and then summed for the total number of days. Day-time and night-time totals are then each divided by the number of days and summed to provide an average 24-hour total.

The lower section contains a place for the suggested symbols used and a place for any other symbols that may be added. Also, a summary area has been added to record the averages for the activities. Parents are encouraged to record behaviours approximately every 4 hours to provide an accurate reading of their infant's activities. The SAR's format is appropriate for research purposes. It can be used to easily assess total hours of sleep, sleep segments, and longest sleep bout.

The Edinburgh Postnatal Depression Scale (EPDS) is a 10-item self-report instrument used by professionals to assess maternal depressive symptoms after the birth of her child. Items are rated on a 4-point scale to produce a summative score ranging from 0 to 30, with higher scores indicating lower maternal mood. Examples of items are: "I have been so unhappy that I have had difficulty sleeping," or "The thought of harming myself has occurred to me." For the current study, a Public Health Nurse administered the EPDS. Any participant who scored higher than a "12" was excluded from the study.

Procedure

We performed an initial interview to ascertain due date and whether the subject fit the participation criteria. Once a fit was determined, we informed the subjects of the participation requirements—filling out questionnaires (the PAI, a demographics form, and a postnatal delivery form) and keeping an infant sleep log for 3 days at 1 week and 3 months of age. If the subject agreed to participate in the study, we determined a mutually acceptable time and location for a meeting to discuss her participation in detail and to complete the relevant forms.

Research participants completed the PAI and the demographics form when they were between 35 and 40 weeks pregnant. We summed the PAI scores to one total score of attachment. After the birth of their

child, the mothers charted their infants' sleep for three consecutive 24-hour periods, when the infant was 1-week-old and 3-months-old, and mailed us the completed SARs and postnatal information form. We summed total number of sleep segments, longest sleep bout, and total sleep and then averaged the scores over the 3 days. The PAI score was then correlated with the scores obtained on the SAR.

Results

Of the original 90 participants, 72% completed the 1-week-old sleep log for their babies for 3 days (n=65) and 74% completed the 3-month-old sleep log (n=67). Public Health Nurses from the Calgary Health Region assessed the participants when their baby was 3 to 6 weeks, for symptoms of postpartum depression. Three participants scored high on the EPDS, two of whom returned incomplete data. Thus the study employs 63 1-week-old sleep logs and 65 3-month-old sleep logs for the final analyses.

The women's ages range from 20 to 42 years old (M=29.82). Eighty-one percent of the participants in this study were Caucasian; the remainder described themselves as African-Canadian, Hispanic/Latino, Asian, East Indian, Middle Eastern, or of Aboriginal descent. Seventy-three percent of the participants in this study reported a household income of $50,000 or higher. Fifty-four percent of the study's participants reported that they have a bachelor's degree or higher. Ninety-one percent of the women were employed at least part time prior to maternity leave, and 95% cited being married or living common-law.

Of the original 90 participants recruited, approximately 29% withdrew from the study. Most often they cited "feeling overwhelmed" as the reason for withdrawal. Another common reason for withdrawing from the study was a difficult delivery and recovery. Several participants did not complete the 1-week-log for these reasons, but later completed the 3-month-log.

All participants gave birth to full-term babies. Thirteen percent (n=9) of the women gave birth naturally, with no pharmaceutical or medical intervention, and 8.9% (n=6) used drugs other than an epidural. Twenty-eight percent (n=19) of the women delivered via a caesarean section. The remaining participants (n=33; 49%) were given epidurals or required interventions such as forceps or vacuum and an epidural.

All participants completed the PAI in the initial meeting. One subject did not complete one item of the inventory, and as such, her

score was not used to calculate reliability. Cronbach's alpha for the PAI was .89 (Table I). This score indicates high internal consistency. The mean PAI score was 63.64 (*SD*=9.81) and scores ranged from 41 to 80 (possible range = 21 – 84).

The mean sleep segment score at 1 week of age was 7.48 (*SD*=1.71), with scores that ranged from an average of 5 to 13 sleep segments during a 24-hour period (Table 1). The longest sleep time was recorded as an average, taken over the course of the 3-day period, and resulted in a mean score of 3.52 hours (*SD*=.81) with scores ranging from 2.33 to 7 hours. The mean total sleep for a 1-week-old was 14.72 (*SD*=2.18) with scores ranging from 10.58 to 22.17.

TABLE 1
Descriptive Statistics—Sleep log of 1-week-old

Sleep	*N*	*Minimum*	*Maximum*	*Mean*	*Standard Deviation*
Segments	63	5	13	7.48	1.71
Longest	63	2.33	7	3.52	0.81
Total	63	10.58	22.17	14.72	2.18

The mean sleep segment score at 3 months was 6.31 (*SD*=1.64), with scores ranging from an average of 3 to 10 sleep segments during a 24-hour period (Table 2). The mean longest sleep score was 6.35 hours (*SD*=2.04), with scores ranging from 3.25 to 12.58 hours. The mean total sleep for a 3-month-old was 13.59 (*SD*=1.35), with scores ranging from 10.67 to 16.50.

TABLE 2
Descriptive Statistics—Sleep log of 3-month-old

Sleep	*N*	*Minimum*	*Maximum*	*Mean*	*Standard Deviation*
Segments	63	5	13	7.48	1.71
Longest	63	2.33	7	3.52	0.81
Total	63	10.58	22.17	14.72	2.18

The relationship between mother's PAI score and infant sleep segments at 1 week was not significant (r=-.075, p>.05) (Table 3). Similarly the relationship between mother's PAI score and infant sleep segments at 3 months was not significant (r=.15, p>.05), and the relationship between mother's PAI score and infant longest sleep bout was not significant at 1 week (r=.056, p>.05) or at 3 months (r=-.15, p>.05).

TABLE 3
Correlations for 1-week-old and 3-month-old infants

	PAI	*3-month-old Segments*	*3-month-old Longest Sleep*	*3-month-old Total Sleep*
PAI		.146	-.151	.052
1-week-old Segments	-.075	.440**		
1-week-old Longest Sleep	.056		.202	
1-week-old Total Sleep	-.282*			.334*

*p≤.05; **p≤.01

However, the mothers' PAI scores and 1-week-old babies' total sleep time (r=-.282; p≤.05) revealed a significant negative correlation. As the mothers' scores on the PAI increased the babies' total sleep time decreased. The mothers' PAI scores and the babies' total sleep time at 3 months of age showed no significant correlation (r=.05; p>.05).

The babies' longest sleep period at 1 week and at 3 months (r=.202; p>.05) revealed no significant correlation. However, significant relationship exists between the babies' sleep segments at 1 week and 3 months (r=.440; p≤.01). Furthermore, the babies' total sleep at 1-week-old showed a significant positive correlation with the babies' total sleep at 3-months-old (r=.334; p≤.05).

DISCUSSION AND CONCLUSION

The study sample drew from a metropolitan Canadian city with a population of 871,140 according to the Statistics Canada 2001 census.

The demographic results indicate that the study sample mirrored the ethnic demographics of the city. Education and household income are also similar to the demographic makeup of the city. Caesarean section and epidural rates in our sample reflect the rates of the general population of the city.

The present study assessed sleep in terms of total sleep, number of segments of waking and sleeping, and longest sleep in a 24-hour period. In the Anders, et al. (1992) study, an infant's longest sustained sleep at 3 weeks was approximately 215 minutes and 358 minutes at 3 months. Similarly, the present study indicated the average infant's sleep at 1 week as 211 minutes and 381 minutes at 3 months. Anders (1994) found that newborn infants sleep between 16 and 18 hours in a 24-hour period. The present study found average 1-week-old infant's total sleep to be 14.7 hours (SD=2.18) in a 24-hour period, with total sleep ranging from 10 to 22 hours. The present study found the average number of segments for a 1-week-old to be 7.48 (SD=1.71), whereas Barnard's 1985 studies (as cited in Barnard, 1999) found that 1-month-old infants' mean sleep segments was 6 (SD=1.31). In the present study 3-month-old infants exhibited an average of 6.3 segments (SD=1.64), a figure slightly higher than Barnard's findings (M=5, SD=1.34).

In our assessment of prenatal attachment and postnatal infant sleep, no significant correlation existed between mother's PAI score and the 1-week-old baby's sleep segment or longest sleep period. We examined the same constructs when the infants were 3 months. No significant correlation was found. Although previous studies have indicated a relationship between attachment and toddler sleep using the AAI (Benoit et al., 1992), the present study did not support this finding for infants. A possible explanation for the present findings may arise from the way that attachment is defined and assessed in the PAI, which measures the more conscious behaviour and feelings of attachment between a mother and her baby. As a self-report measure, the PAI may not fully access underlying internal working models, a component of attachment security. Therefore scores on this measure may not be able to predict the mother's ability to regulate her infant's sleep postnatally. Thus, due to the nature of the mother-fetus relationship in the last months of pregnancy, a mother-to-be may describe her relationship in a way that is distinct from her ability to regulate infant sleep; that is, the mother's description of her relationship does not necessarily reflect her ability to affect her baby's internal regulation.

However, a significant negative correlation existed between PAI

score and baby's total sleep at 1 week. As mother's prenatal attachment increased, baby's total sleep decreased. This finding warrants further discussion. Perhaps mothers who see themselves as more attached to their fetuses, spend more time with their baby postnatally, especially in their initial hours and days together. Researchers have indicated the importance of the initial bonding experience between a mother and her baby, especially immediately after birth (Anisfeld & Lipper, 1983). Perhaps a mother with higher self-reported prenatal attachment becomes more aware of her bond with her baby, and thus they interact more; the baby experiences increased general arousal when actively engaged by a strongly attached and active mother.

Stern (1995) explains that when a mother interacts with her infant, some of her internal representations are activated. These representations provide meaning and emotion to the moment-by-moment inter-activity. During the first weeks of life, the interactive tasks focus on regulating the infant's feeding, sleep-wake, and activity cycles. The majority of social exchanges centre on these tasks and more often are nonverbal. According to Stern (1995), the interactions between the infant and the caregiver are influenced by the internal working models of both. However, it is through the actual overt interactions that the parents' most critical representations, wishes, fears, and fantasies are acted out. The interaction between the parent and the infant is the bridge between the parent's and the infant's representations. These interactions need to be viewed in terms of daily activities between the parent and the infant—activities that are experienced daily and repetitively. These activities are the most salient for the young child in the first months of life. Stern calls these activities "microevents" (p. 63) and signifies the mother's representations of her infant. However, he contrasts them with what he terms "macroevents" (p. 62) such as maternal depression. He explains that, if, for example, maternal depression exists in the relationship, the infant experiences it as a string of a number of interactive experiences over time. These interactions are experienced daily and repetitively. Therefore, it is not the depression as such that affects the infant, for the infant has no understanding of depression. Rather, it is the experience, through daily and repetitive interactions, that the infant experiences and is affected by maternal depression. The mother, who describes herself as well-attached prenatally, would likely then participate in more interactivity with her newborn. As a result, she and her baby experience increased reciprocal arousal. Conversely, the mother who displays lesser attachment to her fetus

may engage the infant less, and thus the infant's state will be less aroused.

That this correlation was not manifest at 3 months may indicate the nature of the relationship at 1 week and the mother's representation of the relationship. By 3 months, the mother's focus has moderated from a desire to be with the baby continually, to a focus on helping the infant establish a predictable routine; early infatuation may have tempered to a more conscious need for security and stability in the infant's life, changing the interactive dynamic.

The present study found a significant correlation between infant's sleep at 1 week and at 3 months; number of segments and total sleep correlated between these time periods. This finding will contribute significantly to the literature on sleep and infant state regulation. Zuckerman, Stevenson, & Bailey (1987) found that 41% of infants with a sleep problem at 8 months continued to have problems at 3 years. The present study observed that sleep consistency already exists in the first months of life. The relevance of this finding suggests that early measures should be taken to help parents develop strategies that promote healthy sleep patterns for their children. However, longest sustained sleep at 1 week did not correlate with 3 month longest sustained sleep. This difference between sleep segments and longest sustained sleep may indicate that these two sleep variables provide us with very different understandings of infant sleep. Further research is warranted to better understand these variables and their importance in regards to infant sleep.

Participation in this study required women to complete the PAI during pregnancy and track their infants' sleep during the postnatal period. During this 4 month period, almost 30% of the participants withdrew from the study. Adjustment to pregnancy can be seen as a process in which the mother's mood improves over time (Fleming, Ruble, Flett, & Van Wagner, 1990). Reasons for withdrawing from this study were cited as a feeling of being overwhelmed and/or having experienced a difficult delivery and having difficulty adjusting. This finding is similar to Levy-Shiff, Dimitrovsky, Shulman, & Har-Even's (1998) study that found that mothers who experienced the adjustment to parenting as stressful and threatening, experienced this as most intense immediately following birth and that this assessment decreased over time. Perhaps the withdrawal rate in this study would not have been so high had the mothers had more time to adjust to motherhood before being asked to track their infant's sleep.

The current study indicated that a significant correlation exists between infant sleep at 1 week and 3 months. Future research might

assess the continuity of this sleep pattern. In light of the research indicating a relationship between attachment and toddler sleep (Benoit et al., 1992), continuing assessment of infant sleep patterns in the first and second year of child's life will further inform us of the extent to which infant sleep patterns become stable.

This study's use of a self-report attachment measure primarily provided a conscious understanding of the relationship between a mother and her fetus. Perhaps the use of an extensive interview such as the AAI, administered prenatally, would provide additional information with regard to the relationship between attachment and infant sleep at this early age.

In conclusion, the relationship between a mother and her infant illustrates a unique connection that begins before birth. Understanding this relationship has important implications for how the community works with mothers pre- and post-natally. Maternal mental health has a far-reaching impact on the well-being of children. Helping a woman with her emotional well-being and attachment relationship with her child prenatally can be a precursor to developing a secure attachment relationship with her newborn. Furthermore, assisting parents in the facilitation of healthy sleep habits early in the infant's development can help promote continuing healthy sleep habits as the infant matures.

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