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Maternal Stress and Psychological Status and Sleep in Minority Preschool Children

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Abstract

Objectives—Minority women living in inner city environments may be at more risk for psychological distress. Maternal stress, anxiety, depression, and psychological trauma can influence the preschool child's behavior and may have a negative impact on the preschool child's sleep patterns. The purpose of the study was to: (a) examine objective and subjective preschool children sleep patterns and (b) explore the relationship between objective and subjective sleep patterns in preschool children and maternal psychological status.

Design and Sample—A cross-sectional observational design was used. Descriptive analyses and correlations were conducted to examine the data. Twenty-one minority women were recruited from the Special Supplemental Nutrition Program for Women, Infants, and Children Program.

Measures—Preschool children wore wrist actigraphs, and their sleep efficiency, time in bed, and sleep periods were analyzed. Mothers completed measures on depression, anxiety, stress, and psychological trauma.

Results—Mothers self-report of their children's sleep habits indicated at risk scores for sleep problems. Life stress in the mothers was statistically significant and negatively related to preschool child's sleep duration. Mild to severe symptoms of depression and mild anxiety were reported and criteria for Post Traumatic Stress Disorder were found in 12 of the 21 mothers. The results of the study indicate that parent education on sleep and the minority preschool child should be part of community interventions and screening preschool parents for psychological distress should be considered with referrals for support services.

Keywords

child health; minority health; sleep

Background

Sleep problems occur in 15–25% of the preschool aged population (Owens, 2008) and result in psychological (irritability, mood changes), physical (obesity, accidents), behavioral and academic problems (inattention, oppositionality) (Gregory, Van der Ende, Willis, & Verhulst, 2008). Most childhood sleep problems progress to sleep, behavioral, and cognitive executive control problems in adulthood if not treated earlier, as shown in a longitudinal study (Wong, Brower, & Zucker, 2009). In a study by Touchette et al. (2007), reduced sleep duration before the age of 41 months was associated with behavioral problems and lower cognitive performance.

Sleep is the primary activity during early childhood development and more time is devoted to sleep during the 3–5 years of age period than in learning or interacting with the environment (Matricciani, Blunden, Rigney, Williams, & Olds, 2013). The maturation of the sleep-wake cycle system is one of the first markers of early biobehavioral organization and adaptation in early development. Development in early childhood is an interactive emotional communication process in which the parent mediates the child's behavioral and psychological environment, and sleep and awake states depend on the relationship and context in which they develop. Sameroff (2010) developed the transactional model of child development, where environmental forces, caretaker characteristics and child characteristics influence each other and make reciprocal contribution to the outcomes in child development. In this study, we examined subjective and objective preschool children sleep patterns and their relationship to maternal self-reported psychological characteristics. The maternal characteristics include stress, psychological status (depression, anxiety, and psychological trauma symptoms), education, and employment. The diagram presented in Figure 1 examines a component maternal stress and psychological status, preschool child sleep patterns, and home characteristics as noted in the model.

Recommendations by the National Sleep Foundation (2012) indicate that preschool children need between 11 and 13 hours of sleep. Manifestations of sleep problems using objective sleep measures, such as actigraphy, may include sleep efficiency less than 90%, or an average of three or more awakenings per night, shortened sleep duration, sleep onset delays, and night awakenings (Blunden et al., 2004). Sleep efficiency refers to the ratio of total sleep time (actual sleep time) to time in bed (going to bed with the intention to sleep) (Perlis, Jungquist, Smith, & Posner, 2005). In a study of children from lower socioeconomic status families, Acebo et al. (2005) reported later rise times, longer time in bed, and more nocturnal wake minutes. Shortened sleep duration involves less than the normative values in preschool children and can be disruptive to family life if the expectation is that the child is not sleeping enough hours (Tikotzky & Sadeh, 2001). Children may have longer times in bed but the actual sleep time and sleep efficiency can be impacted by variables such as a child's emotional relationship to their mother, environmental sleeping arrangements, such as sleeping with sibling or cosleeping with a parent, and other contextual variables, such as employment status or educational level, which require further exploration.

Sleep and waking state organization during early development depends on the interpersonal and emotional context of the parent (Touchette, Petit, Tremblay, & Montplaisir, 2009).

Stable sleep patterns are critical to modulate sensory input, to maintain a positive and calm affective state, and regulate behavior (Owens, 2008). Meltzer and Mindell (2007) found a relationship between childhood sleep problems and maternal functioning, overall stress and increased depressive symptoms. Therefore, supportive maternal behaviors may be linked to more stable sleep patterns in children.

Poor women have the highest rates of depression among women ranging from 12% to 59% (American Academy of Pediatrics, 2003). Mothers with elevated depressive symptoms or psychological trauma are at increased risk for emotional dysregulation, poorer maternal interactions, and insecure attachment (Goodman & Brand, 2009). Maternal emotional availability is associated with regulated childhood sleep patterns (Teti, Kim, Mayer, & Countermine, 2010), but may be impacted by a mother's psychological distress. More research is required to understand the nature of psychological distress in minority and low-income families and its relationship to children's sleep patterns. The family context, including maternal anxiety, has been emphasized as a possible marker for disturbances in childhood sleep (Sadeh & Anders, 1993). However, to our knowledge, the association of maternal anxiety with preschool children's sleep patterns using actigraphy has not been examined.

Parental education and employment of the parent can influence sleep patterns in children. Nonstandard work schedules of parents can have a negative influence on childhood outcomes, in particular cognitive outcomes (Han, 2005) and are found more frequently in low-income, single-parent families (Presser, 2003). Family stress and educational level were correlated with sleep quality and frequency of nocturnal awakenings (Warren, Howe, Simmens, & Dahl, 2006). Meltzer, Johnson, Crosette, Ramos, and Mindell (2010) found that 22% of the disadvantaged children were at risk for higher daytime sleepiness, lower academic performance, and hyperactivity, and were more likely to be diagnosed with a sleep disorder. African American children had later bedtimes compared with Caucasian children. Both groups had similar rise times, but the African American children had shorter sleep periods and more daytime sleepiness (Crabtree et al., 2005).

Environmental characteristics can influence preschool children's sleep such as cosleeping, bed sharing, and number of bedrooms (Okami, Weisner, & Olmstead, 2002). In a study of inner-city minority families with children under 5 years of age, 88% of the respondents indicated that cosleeping was common and most caregivers (83%) reported that they had slept with their child the last night previous to the study. Researchers reported that having less than a high school education was associated with cosleeping practices (Weimer et al., 2002). Preschooler had less regular bedtimes, difficulty with falling asleep, more night-waking, and would seek out the parents following awakening during the night when bed sharing was identified (Hayes, Parker, Sallinen, & Davare, 2001). Children living in poverty are at higher risk for sleep problems due to conditions in the home environment (Hale, Berger, LeBourgeois, & Brooks-Gunn, 2009) and poverty is identified as a risk factor for children's mental, emotional, and behavioral disorders (National Research Council & Institute of Medicine, 2009). Maternal characteristics, such as psychological status, stress levels, education, and employment, are implicated in childhood sleep problems (Meltzer & Mindell, 2007). Sleep interventions, such as sleep hygiene or cognitive behavioral therapy,

for preschool children are available to support healthy sleep habits and improve overall behavioral, academic, physical, and mental health functioning (Sadeh, 2005; Tikotzky & Sadeh, 2010). Given the implications that sleep has on the psychological, behavioral, physical, and academic functioning of children, the preschool period is a logical focus of interventions, but gaps in the literature exist regarding risk factors within the maternal and cultural context. Better understanding of the characteristics of sleep in minority children is necessary to design early intervention programs for restorative sleep (refreshing sleep that provides sufficient rest to limit daytime sleepiness) which considers the cultural contextual and maternal psychological status (depression, anxiety, and Posttraumatic Stress Disorder).

In summary, psychological status of minority women has been identified as a risk factor for sleep in children. The contextual factors of living in an urban environment may also impact both mother psychological status and preschool children's sleep patterns. Using objective and subjective sleep measurements may provide greater understanding of factors influencing a minority preschool child's sleep and provide more effective interventions early in the developmental stage of children. Public health nursing focus on improving the quality of preschool child's sleep can be facilitated with culturally and community sensitive educational and interventions programs. This pilot study is a descriptive analysis involving the recruitment and retention of 21 minority mother-child dyads receiving services from WIC.

Research questions

Our analysis sought to answer the following research questions:

1. Are there differences in sleep characteristics by child and maternal sociodemographic characteristics?
2. Are maternal psychological states associated with sleep characteristics among their children?

Method

Design and sample

A cross-sectional observational design was used. The women were recruited from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Program. Ninety-two women were approached for enrollment. Mothers were excluded if they were homeless, unwilling or unable to adhere to the study protocol, or did not speak English. Preschool children were excluded if they had serious chronic health problems such as diabetes, neurological, or psychological problems such as epilepsy, autism or diagnosed ADHD, a documented history of sleep disorders, or a disability or tremor that affects mobility of upper extremity.

Measures

The rationale for the selection of instruments is embedded in the bidirectional relationship of the mother's psychological status with preschool children's sleep patterns. We know from the research that psychological distress, including symptoms of anxiety, depression, and

psychological trauma, is prevalent in minority inner-city women (Caldwell & Redeker, 2009), and may influence sleep in their children. In a study by Meltzer and Mindell (2007), researchers found that a child's sleep predicted the quality of maternal sleep, which can also impact maternal mood, where a child's sleep disruptions were significantly related to maternal functioning, greater stress and more depressive symptoms. Furthermore, sleep disturbance, which is typical after events of psychological trauma, is closely linked with Post Traumatic Stress Disorder (PTSD) (Caldwell & Redeker, 2005), especially in childbearing minority mothers living in an inner city (Caldwell & Redeker, 2009). All of the following devices and instruments were used for their capacity to both objectively and subjectively measure preschool children sleep patterns, to evaluate the potential maternal psychological conditions mentioned above (stress, depression, anxiety, and PTSD), and in turn, demonstrate possible interconnectedness between maternal psychological status and the sleep of their children.

Actigraphy—The Basic Micro Mini-Motionlogger (Ambulatory Monitoring, Inc., Ardsley, NY, USA) was used to assess objective sleep patterns, in particular, data on nocturnal sleep duration, time in bed, and nocturnal sleep efficiency for each participant over five consecutive 24-hour periods. Each child wore an actigraph which was initialized using the Sadeh algorithm and validated in infants, children, and adolescents (Sadeh, Acebo, Seifer, Aytur, & Carskadon, 1995). Actigraphy has been used on pediatric populations, such as young children, children with cystic fibrosis, attention deficit/hyperactivity disorder, affective disorders (Sadeh, 2011). In this study, preschool children wore the actigraphs on their nondominant wrists for five consecutive nights, starting on a Monday, consistent with standard practice (Ancoli-Israel et al., 2003). The actigraph variables obtained in this study over the 5, 4 and 3 nights of data collection has adequate levels of stability as demonstrated by the intraclass correlations for sleep efficiency (.796), total sleep time (.812), and sleep time (.800).

Sleep diary—A specialized pediatric sleep diary (Mindel & Owens, 2010) was used to record time put to bed at night, time up from bed for the day, external motions, time when the monitor is off, time when the child is cosleeping and time when the parents are not aware of events in the child's day (out with a relative). Consistent with recommendations for interpretation and scoring of actigraph data (Ancoli-Israel et al., 2003), a sleep diary was used to elicit "lights out" time, duration of time from "lights out" to sleep onset (sleep onset latency) to morning rising time, and number of naps during the past 24 hours. Diaries were completed for five consecutive days concurrent with actigraph recordings.

Children's Sleep Habit Questionnaire (CSHQ)—The CSHQ is a 33-item scale which yields a total score and eight subscales (Owens, Spirito, & McGuinn, 2000). It has demonstrated internal consistency for community ($\alpha = 0.68$) and clinical samples ($\alpha = 0.78$) and can distinguish normal from clinical sleep problems demonstrating discriminant validity. The item format is a 3-point scale ranging from "rarely" to "usually". The test-retest reliability ranged from 0.62 to 0.79. A cutoff score of 41 generated by analysis of the Receiver Operator Characteristics Curve correctly yield a sensitivity of 0.80 and specificity of 0.72. Cronbach's alpha was completed on the CSHQ with the total scale of 0.75.

Parenting Stress Index (PSI)—The PSI is a 120-item parental self-report questionnaire that reflects three domains: Child Domain, Parent Domain, and a Life Stress Domain (Abidin, 1995). The PSI is designed to identify parent-child systems that are under stress and at risk for the development of dysfunctional parenting behaviors or behavior problems in the child. The total scale alpha has been found to be .90 or greater. The need for referral for professional assistance should be considered when the total stress raw score is in the 250 range and the life stress raw score is at 17 or above. In this study, life stress score was the domain used to determine parental stress index.

Posttraumatic Stress Diagnostic Scale (PDS)—The PDS (Foa, 1995), a 49-item self-report instrument based on DSM-IV diagnostic criteria, was used to evaluate symptoms of PTSD. We used the symptom severity score derived from the PDS. It ranges from 0 to 51 and is obtained by summing the response weights of the individual's responses to Items 22–38. A higher score indicates greater symptom severity. The kappa statistic obtained when comparing PDS scores with the Structured Clinical Interview for Diagnosis and Statistical Manual (American Psychiatric Association, 2000) Axis I Disorders was 0.59, and there was 79.4% agreement between the two measures (Foa, 1995). The number of criteria was examined for each participant scored based on the diagnosis of PTSD in the DSM-IV-TR Manual.

Beck Depression Inventory (BDI)—The BDI (Beck, Steer, & Brown, 1996) was used to evaluate depressive symptoms. The BDI is a 21-item instrument, where depression scores range from minimal (0–13), mild (14–19), moderate (20–28), to severe (29–63). Researchers use a score of 10 or greater to indicate a level of impairment in daytime functioning (Lichstein, Durrence, Taylor, Bush, & Riedel, 2003). The internal consistency of the BDI ranges from 0.76 to 0.95.

Beck Anxiety Inventory (BAI)—The BAI (Beck & Steer, 1993) was used to measure symptoms of anxiety. The BAI is a 21-item self-report questionnaire. Each item is rated on a 4-point Likert scale ranging from 0 (“not at all”) to 3 (“severely”) and the total score ranges from 0 to 63 with cutoff points/interpretations as follows: (8–15) mild to moderate (16–25) moderate to severe anxiety, and (26–63) severe anxiety. The BAI was highly correlated with the anxiety subscale of the Symptom Checklist-90-Revised (SCL-90-R) ($r = 0.81$) in adult populations.

The study was approved by the institutional review board. Flyers were placed in the waiting rooms of the WIC Program located in a northeastern inner city academic health center. Twenty-five mothers signed the informed consent to participate in the study. The final sample was composed of 21 mothers and the preschool children due to three problems with the actigraphs, and one child who did not wear it because of illness. Mothers who agreed to participate were escorted to a private conference room and a written informed consent was obtained. The participants completed the semistructured interview that included the completion of the demographic sheet and self-reported questionnaires. The research assistant provided verbal and written instruction on the use of the actigraph and that it needed to be worn for five consecutive days and nights, and removed for bathing. Participants received \$20.00 after the first semistructured interview and \$30.00 after the return of the actigraphy

after five consecutive days to investigators. Each participant was given a letter with three local centers for psychological counseling and the telephone numbers should they feel that they needed additional support after the interview, especially if the score was elevated on any of the instruments.

Analytic strategy

Descriptive analyses were conducted to examine the sleep patterns of children by several sociodemographic characteristics of the mother and children. Univariate data are presented with frequencies and medians. The sleep behavior variables had non-normal distributions within sociodemographic groups. As such, we presented the median scores for sleep behaviors and examined differences in the distributions of sleep behaviors by sociodemographic characteristics using the Mann–Whitney U-test. Pearson's product moment correlation and the Spearman's rank correlation coefficients were used to examine the association between children's sleep behaviors and maternal psychological variables. The Doornik-Hansen test (Doornik & Hansen, 2008) of bivariate normality was first used on each pair of sleep behavior and maternal psychological variables. The Spearman rank correlation was used for pairs of variables where bivariate normality was rejected. Pearson's correlation was used for pairs of variables where bivariate normality was not rejected.

All statistical analyses were conducted in Stata 11 (StataCorp, 2011). Associations were considered statistically significant at $p < .05$. However, we note in tables where relationships have $p < .10$.

Results

Table 1 presents a sociodemographic description of child and maternal characteristics. The sample was entirely minority children, with a 2:1 ratio of African Americans to Hispanic preschool children. Slightly more than half of the preschool child sample was male. More than two thirds of the children were 3 years of age while the rest were 4 years old. Nearly a quarter (23.8%) of the children had a health problem (five children had asthma, but were symptom free at the time of the study), but mothers reported that the children only used medication when having symptoms. The majority of the children attended preschool, and almost 20% shared a bed with either a sibling or parent at night.

Six mothers were either married or living with a partner, half of the mothers (52.4%) were unemployed, and 13 mothers (61.9%) received some form of welfare. The median score on the BDI was 13, while the BAI had a median score of 5. The total life stress index had a median score of 17 and the median number of criteria met for PTSD was 3. Twelve women reported some type of psychological trauma with three women meeting full DSM criteria for a PTSD diagnosis and four women had five of the six criteria.

Fourteen children wore the actigraph for five nights, six children wore the actigraph for four nights, and one child wore the actigraph for three nights. Table 2 presents sleep behaviors by sociodemographic characteristics of the children and mothers. Overall, the median sleep hours was 7.083, while the medians were 9.317 for time in bed, 79% for sleep efficiency, and 53 for Total CSHQ. The distribution of sleep efficiency differed significantly by

maternal employment status. Among children of employed mothers the median sleep efficiency was 68%, while among children with unemployed mothers the median was 81 ($U = 25.5$; $n_{\text{employed}} = 10$, $n_{\text{unemployed}} = 11$, $p < .05$). The distribution of sleep minutes, time in bed, sleep efficiency, or Total CSHQ did not differ significantly by any other child or maternal sociodemographic characteristics.

Table 3 shows bivariate correlations for maternal psychological variables and sleep behaviors among their children. The association between maternal total life stress and child's mean time in bed was negative and statistically significant, such that higher scores on total life stress are associated with less time in bed (Spearman's $\rho = -.638$, $p < .05$). No other correlations between maternal psychological variables and child's sleep behaviors were statistically significant.

Discussion

The findings from this study indicate that the mothers' total life stress score was negatively correlated and statistically significant with the preschool children's sleep duration (time in bed). Even though this sample included Hispanic children, as well, our findings are partially supported by Meltzer and Mindell's (2007) work that demonstrated that African American children had shorter sleep periods than Caucasian children.

According to Abidin (1995), life stress provides a measure of situational stressors that are beyond the mothers' control and is outside the mother-child relationship. Half of the women were unemployed and 13 were on welfare which may increase financial burdens in living day to day. PSI life stress scores (17 or above) and high total stress scores are usually indicators that the family needs additional supports. With high life stress in the families, the children may spend less time in bed due to mothers' work schedules or having difficulty managing bedtime. In this study, mothers who were unemployed had children with higher sleep efficiency compared with working mothers (81.6% vs. 69.1%). Working mothers although, reported somewhat less sleep problems in their children than nonworking mothers (50.8 vs. 54.7).

In this study, Hispanic children had higher sleep efficiencies than African American children (81% vs. 78.3%), but still well below the normative data presented in the Acebo et al. (2005) study. For the minority child, less than adequate sleep efficiency can have a serious impact on neurobehavioral growth and academic achievement. In a study with white children in the middle class, Acebo et al. (2005) reported that sleep efficiency was 84.5% for 3-year-olds, 87% for 4-year-olds, and 86.3% for 5-year-olds.

Less time in bed may be related to mothers' schedules or children watching television in the evening. Cosleeping (with parent or sibling) was noted in five of the 21 children, but not a significant difference in sleep efficiency (79.0% vs. 79.3%). Studies on cosleeping report discrepant findings where children have adequate sleep quality and in some studies, there are more frequent awakenings (Jenni, Fuhrer, Igoilwstein, Molinari, & Largo, 2005). Cosleeping and the physical quality of sleep arrangements may also influence sleep (Milan, Snow, & Belay, 2007).

Minority preschool children, living at or below the poverty level, are at higher risk for specific sleep problems and reduced sleep time than other children (El-Sheikh, Buckhalt, Keller, Cummings, & Acebo, 2007). The participants' median score for the CSHQ was 53.0, which indicates that they are at risk for sleep problems. Any CSHQ score over 41 is considered at risk for clinical sleep problems. Since the participants' CSHQ total score indicated that this sample had sleep problems as noted by their mother's self report, there may be a relationship between the shorter sleep time and other sleep problems as noted in the questionnaire.

The children in this study may be at greater risk of sleep problems not only based on CHSQ score, but also as noted in the lower sleep efficiency and shorter sleep period. In this study, only two children had CHSQ total scores less than 41 placing the majority of the children at risk for sleep problem as reported by the mother. A recent study by Teti et al. (2010) found that mother's emotional availability was inversely related to overall perceptions of child's sleep problems. At risk children from this study may need further follow-up for education of parents on good sleeping practices in preschool children and maternal emotional availability. In a study by Brown and Low (2008), chaotic living situations that involve noise, unstable living arrangements and lack of structure, can predict helpless/hopeless academic behaviors that are partially mediated by sleep problems. Problematic living conditions may play an important role in socioemotional adjustment of preschool children and maternal availability (Evans, Gonnella, Marcynyszyn, Gentile, & Salpekar, 2005).

Even though maternal psychological status (depression, anxiety or PTSD) was not significantly related to preschool children's sleep characteristics (except for maternal life stress), these mothers still demonstrated clinically significant levels of depression and psychological trauma. Mothers' median depression score was 13, indicating mild range for depression but meeting the cut-point for being clinically significant, while a minimal anxiety median score of 5.0 was found. When maternal depression combines with other psychological conditions or life adversity such as poverty, single parenting, or poor living environments, risk to the parent-child system may be increased, difficulties with emotional regulation as well as less optimal attachments may occur, and adaptive childhood developmental progress may be disrupted (Goodman & Brand, 2009). Mildly depressed mothers may be at higher risk for difficulties in being attentive to their child, communicating warmth, and having children acquire developmental milestones, such as stable sleep patterns.

In this study, mother's psychological trauma scores indicate a moderate level of chronic psychological trauma with a median of 3.0 criteria. Three women met full criteria for PTSD and four women met 5 criteria. This level of PTSD for this small sample is clinically significant and is associated with physiological and psychological symptoms, such as impaired sleep, intrusive thoughts, and restricted range of emotions, which may impact their capacity to both parent and function effectively in work and home environments.

Maternal psychiatric illness, such as depressive symptoms, has been known to contribute to childhood sleep habits including bedtime problems, increased duration of awakenings, and short sleep times (Warren et al., 2006). In our study, we found that increased maternal life

stress was inversely correlated with preschool children's mean time in bed. Another finding was that minority mothers had clinically significant psychological trauma as evidenced by a mean DSM IV-TR criteria score of 3.0.

Public health nurses are in a unique position to influence the quality of sleep in minority families. These minority families, living in urban environments, are extremely stressed and are in need of assessment and interventions related to supports and referrals. The increased rate of psychological traumas can cause mothers to struggle with their own symptoms of sleep and depressed mood and increased stress as they carry the burden of raising children in single-parent households. Parental education in settings across community agencies and schools on the importance of preschool children's sleep hygiene (structured time for sleep time and rise time, same quiet location, nurture with reading a book or a quiet song, etc.) should be considered a priority. Sleep and obesity has been linked in children and this relationship can be addressed with parents also (Cappuccio et al., 2008).

Further research is needed to understand how sleep in minority preschool children intersects with behavioral problems at home and in the school in disadvantaged neighborhoods. Larger sample sizes would provide greater insight into the extent of the problems and effective interventions, as well as provide the possibility of finding statistically significant associations between minority preschool children's sleep and these clinically significant reported levels of depression and trauma in their mothers. Focus groups involving mothers and fathers would be necessary to explore the cultural and contextual issues. Given the contextual factors found in this study, minority preschool children may benefit from more thorough in depth sleep assessment during health care visits to their primary care practitioner. As a part of this process, education of parents on the sleep hygiene and sleep practices should be discussed and problems addressed. Single mothers should be offered opportunities to explore problems and psychological issues and referrals for counseling and parenting support groups. This study highlights the importance of psychological wellbeing of the parents and the link to childhood sleep in minority children and the potential interventions that can be utilized to support the emotional health of minority families.

This study has several limitations. The sample size is small and there is a lack of control variables which limits generalizability. Furthermore, the self-report nature of the CSHQ is vulnerable to bias, and also, the sleep diary could have corroborated the actigraph readings. There was no data collected with fathers who would be involved in caring for their child which could alter the reported results on the self-reported questionnaires. Mothers may not have reported any illness that may have contributed to the low sleep efficiency in sleep logs. Since the bedroom environment is important to understanding the sleep patterns of children, not having access to what may be a chaotic and disorganized and congested bedroom is problematic. Also, cosleeping with the mother or sibling may impact sleep quality and could be associated with changes in sleep efficiency.

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Preschool Child Sleep Patterns

Figure 1.
Conceptual Model

TABLE 1**Sociodemographic Description of Child and Maternal Characteristics**

	<i>N</i>	% median
Child characteristics		
Gender		
Boy	11	52.4
Girl	10	47.6
Ethnicity		
Hispanic	7	33.3
Black/African American	14	66.7
Age		
3 years	15	71.4
4 years	6	28.6
Health problems		
Yes	5	23.8
No	16	76.2
Shares bed		
Yes	5	23.8
No	16	76.2
Preschool		
Attend	16	76.2
Do not attend	5	23.8
Maternal characteristics		
Marital status		
Married/lives with partner	6	28.6
Single	15	71.4
Employment		
Employed	10	47.6
Unemployed	11	52.4
Welfare		
Yes	13	61.9
No	8	38.1
Psychological		
Depression	21	13
Anxiety	21	5
Total stress	21	17
Number of PTSD Criteria met	21	3

TABLE 2

Sleep Behaviors by Child and Maternal Sociodemographic Characteristics

Child characteristics	Sleep minutes Median	Time in bed Median	Sleep efficiency Median	Total CSHQ Median
Gender				
Boy	425.0	522.0	79.0	54.0
Girl	421.5	562.0	79.3	52.5
Race/Ethnicity				
African American	409.5	558.5	78.3	53.5
Hispanic	432.0	559.0	81.0	48.0
Shares bed				
Yes	415.0	509.0	79.0	51.0
No	426.5	561.0	79.3	53.5
Has health problems				
Yes	415.0	560.0	79.0	51.0
No	428.5	557.0	79.0	54.0
Attends preschool				
Yes	420.0	557.5	81.0	52.0
No	428.0	559.0	69.0	55.0
Maternal characteristics				
Marital status				
Single	432.0	562.0	81.0	54.0
Married/lives with partner	376.0	511.5**	74.0	50.0
Employment status				
Unemployed	428.0	562.0	81.0	52.0
Employed	363.5	549.5	68.0*	54.5
Welfare status				
Receives	428.0	560.0	81.0	52.0
Does not receive	363.5	549.5	68.0**	54.5

*
 $p < 0.05$ **
 $p < 0.10$.

TABLE 3

Bivariate Correlations for Maternal Psychological Variables and Childs Objective and Subjective Sleep Variables

Correlations	Mean sleep efficiency	Mean time in bed	Mean sleep minutes	Total CSHQ
Anxiety	-0.116 ^a	-0.117 ^a	-0.041 ^a	0.116 ^a
Depression	-0.015	-0.132 ^a	0.075 ^a	-0.076
Total life stress	0.036	-0.638 ^{a*}	-0.308 ^a	-0.114
Post-traumatic stress criteria	0.002 ^a	0.078 ^a	0.054 ^a	-0.291 ^a

^a Spearman's rank correlation.

* $p < .05$.