Mothers' and Fathers' Sleep: Is there a Difference between First-time and Experienced Parents of 6-month-olds?

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Abstract

Sleep disruption and deprivation are highly prevalent among parents of an infant. However, most postpartum sleep studies focus on mothers, and few studies have investigated whether sleep differs between first-time and experienced parents. This study aims to determine whether self-reported sleep duration and quality differ between first-time and experienced mothers and fathers during the postpartum period. One hundred and eleven parents (54 couples and 3 single mothers) of 6-month-old infants completed a 2-week sleep diary to evaluate measures of sleep duration, sleep continuity and sleep quality. An analysis of covariance (ANCOVA) model was used to compare the sleep variables of first-time to experienced parents. Breastfeeding frequency, infant sleep location, depression, education and work status were used as covariables. First-time mothers reported a longer consecutive nocturnal sleep duration (297.34.16 ± 17.15 vs. 246.01 ± 14.79, $p < 0.05$), fewer nocturnal awakenings (1.57 ± 0.20 vs. 2.12 ± 0.17, $p < 0.05$) and rated their sleep quality higher (7.07 ± 0.36 vs. 5.97 ± 0.30, $p < 0.05$) than experienced mothers, while total nocturnal sleep duration did not differ. No differences were observed in subjective sleep measures between first-time and experienced fathers. This study indicates that experienced mothers reported more fragmented sleep and perceived having worse sleep quality than first-time mothers, but that paternal sleep did not differ as a function of parental experience. These findings have clinical implications for healthcare professionals working with families of various configurations and sizes.

Keywords: *sleep, mothers, fathers, infancy, parity, sleep fragmentation*

Among the various life changes associated with having a baby, sleep disruption in parents is one that is very common (Gay, Lee, & Lee, 2004). Remarkably, parents' sleep may not return to pre-pregnancy levels for up to six years following the birth of their first baby (Richter, Krämer, Tang, Montgomery-Downs, & Lemola, 2019). Sleep disruption in parents is due, in part, to nocturnal caregiving needs; infants typically sleep in short periods of three to four hours, although some may begin to consolidate their sleep around five or six months of age (Anders, Halpern, & Hua, 1992; Henderson, France, & Blampied, 2011; Henderson, Motoi, & Blampied, 2013).

One area that requires further investigation is how parity, or the number of children, influences postpartum parental sleep. First-time mothers and fathers, having no prior parental experience, must adapt their lives as they learn how to care for an infant. Experienced parents, on the other hand, are responsible not only for the care of their newborn, but for their older child or children as well. Studies that have investigated parity in the context of parental postpartum sleep yield contradictory findings. Using either subjective or objective measures of sleep, some studies conducted between one and three months postpartum concluded that no differences exist between first-time and experienced mothers' sleep (Christian, Carroll, Porter, & Hall, 2019; Lee, Zaffke, & McEnany, 2000). However, other studies indicate that postpartum sleep is worse in first-time than in experienced mothers, such as more self-reported sleep disturbance at three days following delivery (Tribotti, Lyons, Blackburn, Stein, & Withers, 1988) and worse sleep measured objectively at two weeks and one-month postpartum (Coo Calcagni, Bei, Milgrom, & Trinder, 2012; Waters & Lee, 1996).

On the contrary, actigraphy and a seven-day sleep diary revealed that while experienced mothers spent more time in bed than first-time ones at one-week postpartum, the opposite was

observed at six weeks postpartum (Signal et al., 2007). Another study at two months postpartum yielded conflicting results: while subjective sleep did not differ between first-time and experienced mothers', first-time mothers had worse sleep when measured by actigraphy (Dørheim, Bondevik, Eberhard-Gran, & Bjorvatn, 2009).

It is noteworthy that all these studies were conducted very early in the postpartum period (between two weeks and four months); thus, it remains unclear whether sleep differences between first-time and experienced parents persist beyond the weeks and months immediately following delivery. Research in a different field of postpartum adaptation suggests that challenges experienced by first-time and experienced mothers may evolve throughout the postpartum period. For instance, Gameiro, Moura-Ramos, and Canavarro (2009) report that first-time mothers reported having greater difficulty adjusting soon after giving birth, whereas experienced mothers reported more challenges several months later.

It is clear that the presence of a newborn represents a significant life event, but surprisingly, there are few postpartum sleep studies that include fathers. To date, only one study compares first-time to experienced parents that incorporates paternal sleep. Richter and colleagues (2019) report that that first-time mothers and fathers perceived having worse sleep satisfaction than experienced ones, but that first-time and experienced mothers' and fathers' perceived sleep duration did not differ.

Conflicting findings between studies can be explained by methodological differences such as sample size, timepoint in the postpartum period, and length or method of sleep measurement. Studies often focus on the weeks or months immediately following birth and tend to report a limited number of sleep variables, which are often measured retrospectively. In sum, a

comprehensive description of parental sleep later in the postpartum period, midway through the first year of the infant's life, is not available.

The objective of this study was to compare indices of perceived sleep duration, fragmentation and quality in first-time and experienced mothers and fathers at six months postpartum.

Methods

Participants

One hundred and eleven parents (54 mother-father couples and three single mothers) of an infant approximately 6 months old (6.00 ± 0.43) were recruited from the Montreal, Quebec community through word of mouth and social media postings. Inclusion criteria comprised being 18 years of age or older and fluent in English or French. Families who reported the presence of a serious medical or psychiatric condition in the infant, mother, or father, were excluded. Written, informed consent was obtained from all participants. Participants took part in a larger, longitudinal study investigating sleep, parental practices, expectations, and mental health in parents and their infant. The study was approved by the ethics committee of the Hôpital en santé mentale Rivière-des-Prairies (CIUSSS-NIM) and McGill University.

Measures

Sleep Diary

For two weeks, both parents independently completed a sleep diary (adapted from (Swain, O'Hara, Starr, & Gorman, 1997)) where they recorded when they were asleep at night. The following variables were created based on data extracted from the sleep diary: total nocturnal sleep duration, longest consecutive sleep duration (without interruption) and number of nocturnal awakenings. Each morning, both parents also rated their subjective sleep quality on a

scale from 1-10, where 1 indicated poor sleep and 10 indicated excellent sleep. A mean was calculated for each sleep variable over a 13-day period.

Sleep Practices Questionnaire

The questionnaire about sleep-related practices during the postpartum period (adapted from the Sleep Practice Questionnaire, SPQ; (Germo, Chang, Keller, & Goldberg, 2007; Keller & Goldberg, 2004)) was used to obtain information about breastfeeding (never, sometimes or always) and infant sleep location (infant sleeps in own room alone or in a room with sibling; infant sleeps in parents' room in a crib; infant sleeps in own room alone or in a room with sibling, but sleeps in parents' bed 1-2 times a week; infant sleeps in parents' room in a crib, but sleeps in parents' bed 1-2 times a week; infant sleeps in parents' room in a crib, but sleeps in parents' bed 3 or more times a week).

Depression

The Center for Epidemiologic Studies Depression Scale (CES-D) was used to measure mood in mothers and fathers (Radloff, 1977). Items are scored on a scale from zero to three based on the past week. Total scores range from zero to 60, where higher scores indicate more depressive symptoms. The CES-D has been validated with parents in postpartum samples (Moszkowski et al., 2009).

Demographic Questionnaire

Demographic variables were also assessed, including number of children, age of parents, marital status, income per household, work status and highest level of education completed. The parity variable categorized parents into either first-time (1 child) or experienced (more than 1 child). Marital status categories included either married or cohabitating, or single. Income categories included: under $50,000, $50,000-$100,000, or more than $100,000, per year. Work

status of mothers and fathers included either working or being a student, or not working. Education levels included completion of either secondary or postsecondary (college diploma or bachelor's degree) or graduate level (master's or doctoral degree).

Statistical Analyses

First, two correlation matrices were constructed separately for mothers and fathers. Both included the dependent variables (sleep variables), parental sleep-related practices (breastfeeding and infant sleep location), depression, and demographic variables (parental age, education, marital status, work status and income). Only variables that were statistically correlated with the sleep variables were used as covariables in the main analyses.

Paired t-tests were conducted to compare mothers and fathers on the four sleep variables (total nocturnal sleep duration, longest consecutive sleep duration, number of awakenings and sleep quality). Single mothers were excluded from these analyses. Discrepancy scores were calculated for each sleep variable (total nocturnal sleep duration, longest consecutive sleep duration, number of awakenings and sleep quality) by subtracting fathers' from mothers' values (mother-father).

Analysis of covariance (ANCOVA) models were then used to compare sleep measures (total nocturnal sleep duration, longest consecutive sleep duration, number of awakenings and sleep quality) between first-time and experienced parents while controlling for significant covariables. Again, analyses were conducted separately for mothers and fathers. The significance level was set to $p < 0.05$ and all data were analyzed with Statistical Package for the Social Sciences (SPSS; SPSS Inc., Chicago, IL).

Attrition and missing data

Sixty-one couples and three single mothers initially enrolled in the study. Three couples dropped out without completing the sleep diary or questionnaires. Four additional couples did not complete any nights of the sleep diary and were removed from analyses. The final sample size comprised fifty-four mother-father couples and three single mothers.

The demographic item for household income was added later in the study, thus only forty families are represented. The majority of mothers (N = 47, 83%) completed the sleep diary all 13 days, while others ranged from 6 to 12 days. Thirty-nine fathers (74%) completed the sleep diary all 13 days, while others ranged from 7 to 12 days. Parents who completed the diary all 13 days did not differ from those who did not on any sleep variables ($p > 0.05$), except on longest consecutive sleep duration for fathers ($p < 0.05$). The mean calculated for each variable took into account the number of days completed by each participant.

Results

Descriptive Analyses

Participant characteristics are presented in Table 1. On average, mothers were 32.88 ± 3.85 years old and fathers were 35.06 ± 5.18. Almost half of the sample comprised first-time parents and more than half of the sample had an income above $100,000 per household. At the time of study participation, the large majority of mothers were not working or enrolled as a student, while the majority of the fathers were. The majority of the sample held at least a postsecondary degree or diploma. A strong majority of the mothers breastfed and approximately half the sample practiced bedsharing with their infant at least once a week. Ten families had a child who was 6 years or older.

In mothers, the presence of breastfeeding was associated with a shorter longest consecutive nocturnal sleep duration (r = -0.40, $p < 0.01$). Breastfeeding was associated with more nocturnal awakenings (r = 0.37, $p < 0.01$). A higher frequency of bedsharing with the infant was associated with a shorter longest consecutive duration (r = 0.27, $p < 0.05$) and more nocturnal awakenings (r = 0.41, $p < 0.01$). A higher level of education was associated with a shorter total nocturnal sleep duration (r = -0.34, $p < 0.05$; Table 2).

In fathers, while breastfeeding and infant sleep location were not significantly related to any sleep variables, the status of working or being a student was associated with a shorter total nocturnal sleep duration (r = -0.42, $p < 0.01$; Table 2), and depression was associated with worse sleep quality ratings (r = -0.29, $p < 0.05$; Table 2).

Statistically significant correlations between demographic or sleep-related practice variables and sleep variables warranted using them as covariables in the main analyses, separately for mothers and fathers. Mothers' and fathers' total nocturnal sleep duration (r = 0.41, $p < 0.01$; Table 3) and perceived sleep quality (r = 0.62, $p < 0.0001$; Table 3) were significantly positively correlated, but longest consecutive duration and number of awakenings were not.

Table 1. Participant demographics and sleep-related parental practices

	M ± SD (Range)
Maternal age	32.88 ± 3.85 (26-40)
Paternal age	35.06 ± 5.18 (26-52)
Number of children, No. (%)	
1	23 (40.40)
2	25 (43.90)
3	6 (10.50)
4	3 (5.30)
Married or cohabitating, No. (%)	54 (94.70)
Income, No. (%)	
Less than $50,000	4 (10.00)
$50,000-$100,000	12 (30.00)

More than $100,000	24 (60.00)
Mother work status, No. (%)	
Working or student	15 (26.30)
Father work status, No. (%)	
Working or student	51 (96.20)
Education of mother, No. (%)	
Secondary/Postsecondary	32 (58.20)
Graduate	23 (41.80)
Education of fathers, No. (%)	
Secondary/Postsecondary	33 (66.00)
Graduate	17 (34.00)
Breastfed, No. (%)	
Never	5 (8.80)
Sometimes	11 (19.30)
Always	43 (71.90)
Infant sleep location, No. (%)	
Own room or room with sibling	22 (38.60)
Parents' room in a crib	8 (14.00)
Own room, bedshares 1-2 times/wk.	10 (17.50)
Parents' room in a crib, bedshares 1-2 times/wk.	3 (5.30)
Parents' room in a crib, bedshares 3 or more times/wk.	11 (19.30)
Maternal depression total score	9.46 (7.75)
Paternal depression total score	8.04 (6.48)
Maternal nocturnal duration	435.20 (46.54)
Maternal longest consecutive	269.34 (86.90)
Maternal number of awakenings	1.82 (1.05)
Maternal sleep quality	6.45 (1.61)
Paternal nocturnal duration	441.30 (48.37)
Paternal longest consecutive	390.38 (68.17)
Paternal number of awakenings	0.51 (0.49)
Paternal sleep quality	7.11 (1.05)

Note. Sample sizes for mothers: Age (n = 57), Education (n = 55), Work status (n = 57), Income (n = 40), Breastfeeding (n = 55), Infant sleep location (n = 54), Depression (n = 57), Total duration (n = 56), Longest consecutive (n = 56), Awakenings (n =56), Quality (n =52). Sample sizes for fathers: Age (n = 54), Education (n = 50), Work status (n = 53), Income (n = 40), Breastfeeding (n = 57), Infant sleep location (n = 55), Depression (n = 53), Total duration (n = 52), Longest consecutive (n = 52), Awakenings (n = 52), Quality (n = 48).

Table 2. *Correlations between sleep variables, demographic variables and sleep-related practices for mothers and fathers*

Variable	*Parental age*	*Education*	*Work status*	*Income*	*Presence of breastfeeding*	*Infant sleep location*	*Depression*	*Total nocturnal duration*	*Longest consecutive duration*	*Number of awakenings*	*Sleep quality*
Parental age	–	*0.23*	*-.20*	*0.02*	*0.05*	*0.05*	*-0.11*	*-0.22*	*-0.16*	*0.10*	*-0.17*
Education	*0.04*	–	*0.01*	*0.35**	*0.22*	*-0.21*	*-0.02*	*-0.34**	*-0.06*	*-0.02*	*0.06*
Work status	*0.12*	*0.14*	–	*-0.21*	*-0.28**	*-0.22*	*0.07*	*0.08*	*0.22*	*-0.25*	*0.15*
Income	*0.03*	*0.22*	*0.27*	–	*0.54***	*-0.33**	*-0.22*	*-0.13*	*-0.03*	*0.10*	*-0.15*
Presence of breastfeeding	*-0.04*	*0.02*	*0.22*	*0.54***	–	*0.06*	*-0.14*	*-0.14*	*-0.40***	*0.37***	*-0.15*
Infant sleep location	*-0.08*	*-0.09*	*-0.01*	*-0.33**	*0.06*	–	*0.10*	*0.03*	*-0.27**	*0.41***	*-0.14*
Depression	*-0.08*	*-0.09*	*0.03*	*-0.15*	*0.08*	*0.11*	–	*-0.07*	*0.16*	*-0.18*	*0.09*
Total nocturnal duration	*-0.08*	*-0.12*	*-0.42***	*-0.05*	*-0.03*	*-0.09*	*-0.05*	–	*0.48***	*-0.10*	*0.06*
Longest consecutive duration	*0.09*	*-0.02*	*-0.09*	*-0.14*	*-0.06*	*-0.10*	*-0.18*	*0.70***	–	*-0.84***	*0.38***
Number of awakenings	*-0.24*	*-0.10*	*-0.22*	*0.13*	*0.03*	*0.44*	*0.17*	*-0.14*	*-0.76***	–	*-0.46***
Sleep quality	*-0.05*	*-0.10*	*0.10*	*-0.07*	*-0.22*	*0.01*	*-0.29**	*-0.20*	*0.01*	*-0.22*	–

Note. Correlations for mothers and fathers were conducted separately, where mothers are represented in the upper half and fathers in the lower half.
** $p < 0.05$. ** $p < 0.01$.*

Table 3. Comparison of mothers' and fathers' sleep

Variable	Mother mean (SD)	Father mean (SD)	t
Total nocturnal sleep duration	433.13 (47.13)	441.30 (48.37)	t (51) = -0.14, p > 0.05
Longest consecutive sleep duration	263.46 (84.72)	390.38 (68.17)	t (51) = -9.02, p < 0.001
Number of awakenings	1.88 (1.06)	0.51 (0.49)	t (51) = 9.12, p < 0.001
Sleep quality	6.47 (1.58)	7.11 (1.05)	t (47) = -3.57, p < 0.01

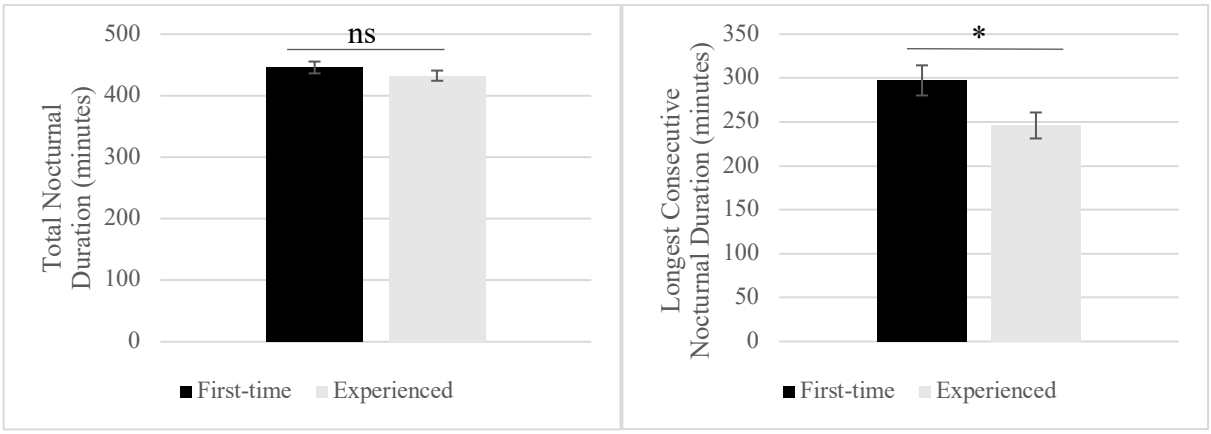
Note. Excludes single mothers.

Comparison between first-time and experienced maternal sleep

Controlling for breastfeeding frequency, infant sleep location and education, there was no significant difference between first-time and experienced mothers for total nocturnal sleep duration (445.86 ± 9.62 vs. 432.55 ± 8.30; $F(1, 46) = 1.03$, $p > 0.05$; Figure 1a). However, first-time mothers reported a longer consecutive nocturnal sleep duration (297.34 ± 17.15 vs. 246.01 ± 14.79; $F(1, 46) = 4.81$, $p < 0.05$; Figure 1b), fewer nocturnal awakenings (1.57 ± 0.20 vs. 2.12 ± 0.17; vs. $F(1, 46) = 4.25$, $p < 0.05$; Figure 1c) and rated their sleep quality higher (7.07 ± 0.36 vs. 5.97 ± 0.30; $F(1, 43) = 5.28$, $p < 0.05$; Figure 1d) than experienced mothers.

Figure 1

a) Total nocturnal sleep duration **b)** Longest consecutive nocturnal sleep duration



c) Number of nocturnal awakenings **d)** Subjective sleep quality

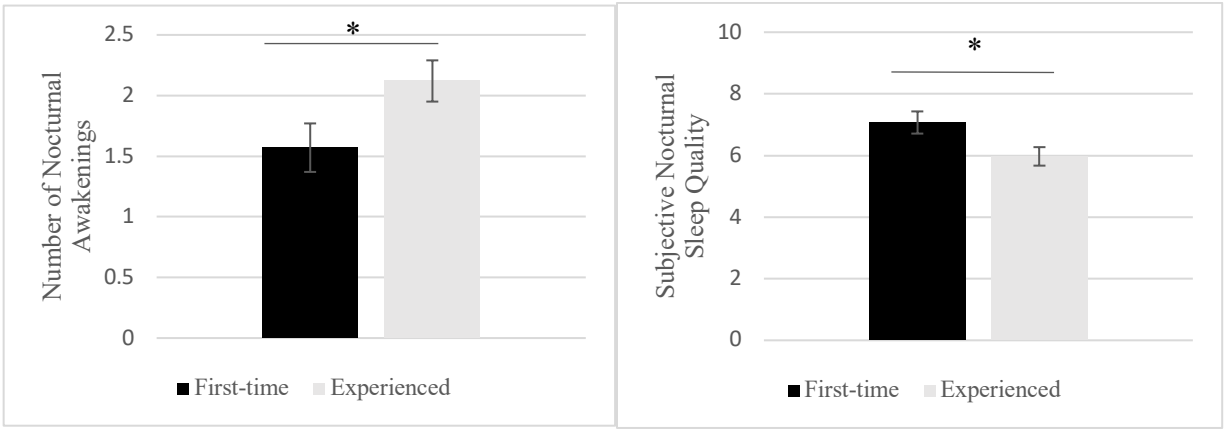


Figure 1. Mean ± SEM for sleep variables derived from a 13-day sleep diary comparing first-time to experienced mothers.

Note. * $p < 0.05$.

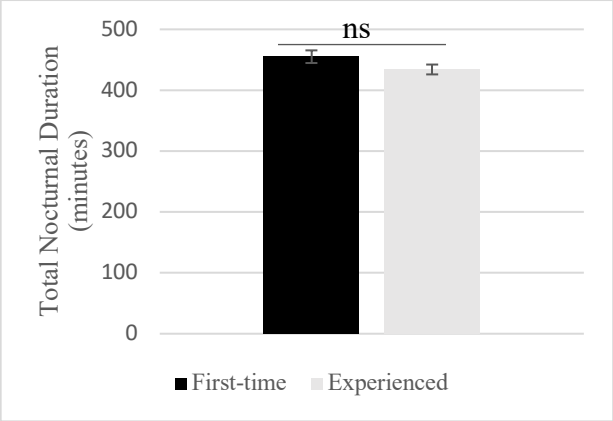
Comparison between first-time and experienced paternal sleep

Controlling for work status and depression, there was no significant effect for parity between first-time and experienced fathers on reported total nocturnal sleep duration (455.10 ± 10.39 vs. 434.10 ± 8.10; $F(1, 46) = 2.51$, $p > 0.05$, Figure 2a), longest consecutive sleep duration (398.29 ± 16.13 vs. 383.65 ± 12.59; $F(1, 46) = 0.48$, $p > 0.05$, Figure 2b), nocturnal awakenings (0.56 ±

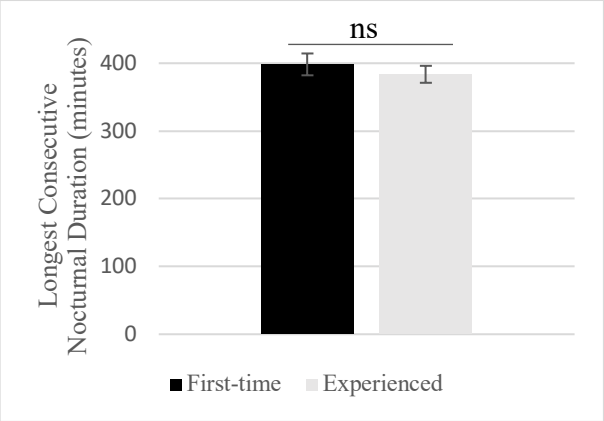
0.11 vs. 0.50 ± 0.09; $F(1, 46) = 0.19$, $p > 0.05$, Figure 2c), or sleep quality ratings (7.32 ± 0.25 vs. 6.99 ± 0.20; $F(1, 42) = 1.02$, $p > 0.05$, Figure 2d).

Figure 2

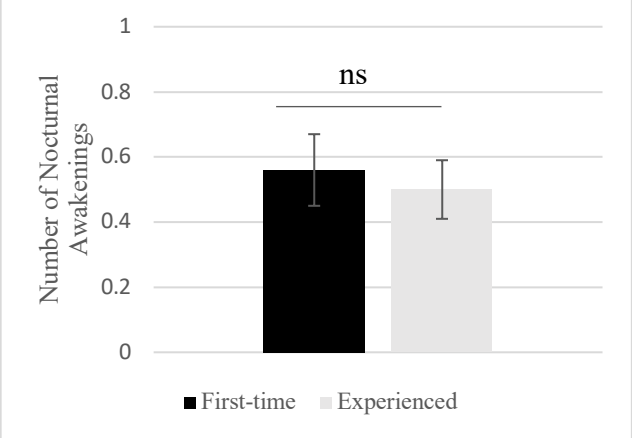
a) Total nocturnal sleep duration



b) Longest consecutive nocturnal sleep duration



c) Number of nocturnal awakenings



d) Subjective sleep quality

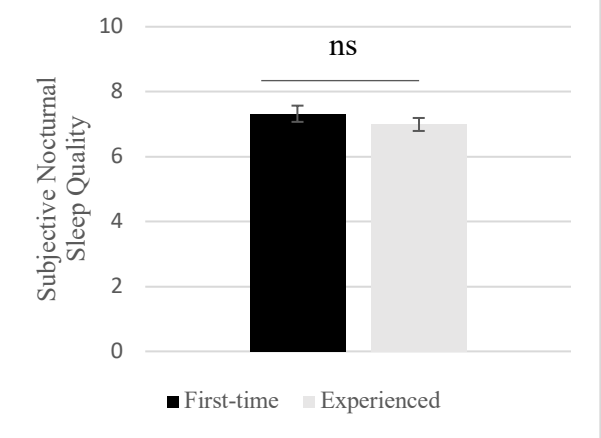


Figure 2. Mean ± SEM for sleep variables derived from a 13-day sleep diary comparing first-time to experienced fathers.

Note. * $p < 0.05$.

Discrepancies between mothers' and fathers' sleep

Discrepancy scores between mothers and fathers showed that compared to parents with one child, those with more than 1 child had a bigger discrepancy for longest consecutive sleep duration (-85.55 ± 22.63 vs. -154.95 ± 16.37; $F(1, 51) = 6.50$, $p < 0.05$), number of awakenings (0.81 ± 0.20 vs. 1.75 ± 0.18; $F(1, 51) = 11.38$, $p < 0.01$) and sleep quality (-0.08 ± 0.26 vs. -1.04 ± 0.22; $F(1, 47) = 7.90$, $p < 0.01$). However, no significant difference was observed for total nocturnal sleep duration discrepancy score (-3.28 ± 12.74 vs. -11.48 ± 8.58; $F(1, 51) = 0.31$, $p > 0.05$).

Discussion

Results of this study show that several self-reported sleep measures differ between first-time and experienced mothers at six months postpartum, but not between first-time and experienced fathers. First-time mothers had a longer consecutive nocturnal sleep duration, fewer nocturnal awakenings and rated their sleep quality higher than experienced mothers, while total nocturnal sleep duration did not differ.

The present findings are in contradiction with results of other studies showing that no differences existed between first-time and experienced parents (Christian et al., 2019; Lee et al., 2000) or that first-time parents experienced worse sleep (Coo Calcagni et al., 2012; Dørheim et al., 2009; Richter et al., 2019; Waters & Lee, 1996). These discrepancies could be due to differences in methodology such as the use of questionnaires (Christian et al., 2019), polysomnography (Lee et al., 2000), or the age of the child or children. Moreover, one of these studies included a high proportion of clinically depressed mothers (Dørheim et al., 2009), a condition known to be linked with sleep perturbations (Ford & Cooper-Patrick, 2001).

However, findings from this study are similar to results from one study using actigraphy and sleep diaries over seven nights, at one and six weeks postpartum (Signal et al., 2007). While these timepoints are relatively early in the postpartum period compared to the present study and the method of measurement is different, the longer measurement period (7 nights vs. only 2-3 nights among other studies) may offer a more accurate description of parental sleep. It is possible that a longer measurement period over several consecutive days is necessary to capture the differences between first-time and experienced parents' sleep.

Another explanation for these discrepancies is that parental sleep may evolve over the postpartum period. It was reported that first-time mothers had more difficulty adapting early in the postpartum period, whereas experienced parents reported more challenges later in the postpartum period (Gameiro et al., 2009). Although this was apparent particularly for negative emotional reactivity, their findings may be applicable in the context of sleep as well. Studies conducted in the days or weeks immediately following the birth of the infant do not offer insight into maternal sleep later in the postpartum period, as their sleep pattern may evolve over time (Coo Calcagni et al., 2012; Tribotti et al., 1988; Waters & Lee, 1996).

In comparison with our findings for mothers, no significant differences were observed between first-time and experienced fathers on any subjective sleep variable. This supports findings about sleep satisfaction reported by the only other known study to date comparing the sleep of first-time to experienced fathers (Richter et al., 2019). One possible explanation might be that 96% of fathers were working within our sample. Thus, couples may have decided that mothers, instead of fathers, would wake up during the night to care for the infant. Whether this situation was acknowledged and discussed by both parents, or if it occurred naturally, remains to be investigated.

Although experienced mothers reported more sleep fragmentation than first-time mothers, total nocturnal sleep duration did not differ, which has been found in previous studies (Montgomery-Downs, Insana, Clegg-Kraynok, & Mancini, 2010). In addition, it is possible that second, third, or fourth-time mothers reported more sleep disruption than first-time mothers not only to feed and care for their infant, but to care for their older children as well. While first-time and experienced mothers may ultimately attain similar total sleep durations, it is possible that experienced mothers have more extended bedtime to waketime periods, with more frequent awakenings and longer wake bouts throughout the night. These findings have also been detected when comparing maternal to paternal sleep, where mothers report similar or even more total nocturnal sleep compared to fathers, but experience more sleep fragmentation (Gay et al., 2004; Insana & Montgomery-Downs, 2013). It is likely that the presence of sleep fragmentation leads to lower reported sleep quality.

In mothers, frequent bedsharing with their infant was associated with more perceived nocturnal awakenings, which has been found in other studies as well (Volkovich, Ben-Zion, Karny, Meiri, & Tikotzky, 2015). Furthermore, breastfeeding was associated with a shorter perceived longest consecutive sleep duration and with more reported nocturnal awakenings in mothers. Studies show that breastfeeding mothers are more likely to practice co-sleeping (Goldberg & Keller, 2007; Teti, Crosby, McDaniel, Shimizu, & Whitesell, 2015) and are more likely to have more awakenings and poorer sleep quality than bottle-feeding mothers (Gay, Lee & Lee, 2004; Quillin & Glenn, 2004; Volkovich et al., 2015). While the presence of breastfeeding was not significantly correlated with infant sleep location in our sample, the majority of mothers were breastfeeding and almost half of the sample reported a bedsharing arrangement at least 1-2 times a week.

Fathers' work or student status was negatively associated with total nocturnal sleep duration. This may be because fathers who are working or enrolled as a student must balance their career with attending to family and childcare needs, which may lead to a shorter nocturnal sleep duration. However, this finding should be interpreted with caution given that only three fathers were not working or enrolled as a student.

Interestingly, mothers and fathers (first-time and experienced) had similar perceived total nocturnal sleep durations, even though mothers' and fathers' reported awakenings, consecutive nocturnal sleep durations and sleep quality were all statistically different from each other. This is in line with previous research (Gay et al., 2004; Insana & Montgomery-Downs, 2013). These findings also support the hypothesis that mothers are primarily responsible for nocturnal infant care not only due to breastfeeding, but also because fathers have to work during the day. Another possible explanation is that these practices may be engrained in social norms; traditional practices of women being the primary caregiver may have persisted despite an increase in parents sharing childcare responsibilities.

It is noteworthy that discrepancy scores between mothers and fathers for longest consecutive sleep duration, number of awakenings and sleep quality were statistically different between first-time and experienced parents, while the discrepancy score for total nocturnal sleep duration was not. This finding suggests that experienced mothers probably take care of the older sibling as well as the infant during the night. Furthermore, siblings in the present study were quite young, with only ten of fifty-seven families having a child six years or older. Whether these results would be different in the presence of older children in the family remains to be determined.

Limitations

This study has certain limitations that should be considered. One is that we used a subjective measure of sleep. Future studies could incorporate the use of objective measures such as actigraphy or polysomnography to determine whether these differences can be observed objectively as well. However, while a subjective measure is subject to bias, it is a reflection of parents' perception of sleep in their day-to-day lives. Another limitation is that our sample primarily comprised heterosexual couples with a high household income, which may limit generalizability to the general population. Furthermore, future studies should consider whether parents have a history of insomnia. A final consideration for future studies is to investigate whether the ages of other children in the home have an effect; for instance, whether experienced parents are affected differently if their other child or children are older and require less care.

Conclusion

Despite some limitations, our study offers insight into postpartum sleep of first-time and experienced parents. These findings indicate that using self-reported sleep measures within a healthy sample of parents from the general population, mothers differed depending on parental experience, while fathers did not. It appears that although mothers' total nocturnal sleep duration did not differ depending on whether they have one child or more than one, experienced mothers' sleep was perceived as being more fragmented than that of first-time mothers. Tension in the marital relationship may transpire if childcare is one-sided and not discussed collaboratively. Future studies could aim to explain the differences between mothers and fathers and determine why mothers with more than one child report worse sleep. In turn, interventions by healthcare providers targeting an equal distribution of day and nighttime childcare tasks can be developed. It is possible that first-time and experienced mothers and fathers require interventions at different

timepoints during the postpartum period; interventions should be tailored to each family member, depending on their situation.

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