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RESEARCH ARTICLE

Assessing the frequency with which primary care providers address sleep of infants and young children

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Summary

Sleep problems during early development are common and associated with negative health outcomes. Earlier recognition of poor sleep health permits earlier intervention and improved outcomes. This retrospective cohort study aimed to identify the frequency with which primary care providers assessed sleep health when completing the Rourke Baby Record for infants and young children during routine well-baby visits from 2002 to 2019. Using 1180 electronic medical records from an academic family medicine teaching clinic, we identified the frequency with which primary care providers assessed sleep health at three time intervals in child development: 1 week to 1 month; 2 months to 6 months; and 9 months to 12–13 months. Sleep variables were night waking, healthy sleep habits, and safe sleep. The frequency of having any aspect of sleep addressed was 85.4%, 90.2% and 66.7% at the three respective time intervals. There were no differences in the frequency with which sleep was assessed based on birthweight or sex. Children born during 2002–2015 were approximately half as likely to be assessed for sleep compared with those born during 2016–2019 at the second and third time intervals. In the first and second time intervals, children who were not exclusively breastfed had their sleep assessed significantly less than children who were exclusively breastfed. To our knowledge this is the first study to explore the area of sleep discussions and breastfeeding status in primary care during routine well-baby visits. These results are clinically relevant for clinicians and parents, due to the known associations between sleep issues and sudden infant death syndrome, childhood injuries, and emotional dysregulation.

KEYWORDS
family practice, general practice, infant, newborn, primary care, sleep

1 | INTRODUCTION

Sleeping problems are common among the paediatric population. A study of infant sleep trajectories showed that 69.5% of children experienced night waking at 6 months and 26.6% experienced night waking at 18 months (Hysing et al., 2014), while other sources suggest a prevalence of 10% to 30% (Byars et al., 2012; Mindell et al., 2006; Owens & Mindell, 2011). Poor sleep quality and duration during infancy persist throughout childhood (Byars et al., 2012; Kataria et al., 1987), and are associated with numerous negative cognitive and physical outcomes. Short sleep duration and night waking during infancy are associated with emotional dysregulation 2 years later (Williams et al., 2017) and with internalising symptoms at 24 months (Morales-Muñoz et al., 2020), while poor sleep health at 18 months predicts emotional and behavioural problems at 5 years old (Sivertsen et al., 2015) and increases the odds of being reported as "hyperactive" at 5 years old (odds ratio [OR] 4.2; confidence interval [CI]: 2.7–6.6; Touchette et al., 2009). Additionally, children with

poor sleep patterns sustain a higher number of injuries between 18 months and 4 years old compared with those with healthy sleep patterns (Koulouglioti et al., 2008). Several meta-analyses (Fatima et al., 2015; Magee & Hale, 2012; Ruan et al., 2015) have also shown associations between short sleep in childhood and overweight/obesity.

Conversely, improved sleep health practices are associated with better sleep outcomes (Mindell et al., 2009). Given that infant sleep health is influenced by modifiable factors like parenting practices (Paul et al., 2016), sleep screening during well-baby visits provides an opportunity for primary care providers (PCPs) to intervene and provide anticipatory guidance to parents. Parents may not always recognize abnormal sleep patterns and have been found to underreport their children's sleep problems (Blunden et al., 2004; Chervin et al., 2001), meaning PCPs must initiate this conversation in office visits and not rely solely on parent-reporting (Honaker & Meltzer, 2016). Multiple studies support this idea, finding that parent-focused sleep education interventions improve infant sleep outcomes in the first year of life (Martins et al., 2018; Paul et al., 2016; Stremler et al., 2006; Symon et al., 2005).

However, the literature is inconsistent regarding the frequency with which PCPs discuss children's sleep health. The 2004 *Sleep in America* Poll found that only 55% of parents with infants (0–11 months old) and 60% of parents with toddlers (12–35 months old) reported being asked by their physician about their child's sleep (National Sleep Foundation, 2004). Similarly, the Commonwealth Fund found that 59% of parents with children between 0 and 3 years old had not received anticipatory guidance regarding sleep from their health clinicians (Schuster et al., 2000). More recently, a study using self-reported survey data from Canadian healthcare providers found that 82.4% of respondents regularly assessed paediatric sleep (Gruber et al., 2017).

In light of this inconsistent evidence, this retrospective cohort study aims to identify whether PCPs in a Canadian academic family medicine teaching clinic are assessing sleep health when completing well-baby visits. Well-baby visits are regularly scheduled preventative care appointments that monitor the growth and development of children. These visits are scheduled at 1 week, 2 weeks, 1 month, 2 months, 6 months, 9 months, 12–13 months, 15 months, 18 months, 2 years, and 4–5 years. A Canadian resource used at these appointments is the Rourke Baby Record (RBR), an evidence-based surveillance tool that provides a standardized framework for care of children up to 5 years old (Riverin et al., 2015). The RBR recommends that three aspects of sleep health should be discussed with caregivers: safe sleep; night waking; and healthy sleep habits. Safe sleep involves sleep position, bed sharing, crib safety, and swaddling. Night waking incorporates positive bed routines and rewarding health sleep behaviours. Healthy sleep involves meeting the recommended 24-hr sleep requirements: 12–14 hr for infants 4–12 months old; 11–14 hr for 1–2 year olds; and 10–13 hr for children aged 3–5 years (Rourke Baby Record, 2017).

In this study we sought to determine the proportion of records in which sleep was assessed, up to 12–13 months, to better characterize current surveillance practices. We anticipated that the frequency of sleep assessments would be similar to those previously reported in the literature.

2 | METHODS

The study was approved by a local Research Ethics Board (file number 1025702).

2.1 | Participants

This retrospective cohort study included patients who had presented for at least one well-baby visit between 1 week and 12–13 months old at a Canadian academic family medicine teaching clinic from 2002 to 2019.

2.2 | Eligibility criteria

Eligible participants were children who had presented to the clinic for well-baby visits and whose electronic medical charts contained a RBR smartform. Individuals who had not attended at least one well-baby appointment were excluded.

2.3 | Procedure

Participants were identified using the billing codes V202 and V069, which are used for well-baby visits. The data contained in the RBR smartforms were exported to an Excel spreadsheet and identifiers were removed. The independent variables included sex, birthweight (< 2500 g, 2500–3999 g, and ≥ 4000 g), year of birth, and exclusive breastfeeding. The outcome variables extracted from the RBR were “safe sleep”, “night waking” and “healthy sleep habits”.

2.4 | Consensus for data treatment

The authors chose to group the well-baby visits into three Time Intervals: 1 week to 1 month (Time Interval 1); 2 months to 6 months (Time Interval 2); and 9 months to 12–13 months (Time Interval 3). The variable “year of birth” was then dichotomized into: (a) 2002–2015; and (b) 2016–2019, a decision based on the release of sleep recommendations for children by the American Academy of Sleep Medicine in 2016, which might have influenced the frequency of discussions about sleep health.

Breastfeeding data are routinely collected three times in both Time Intervals 1 and 2, but not in Time Interval 3. To incorporate breastfeeding into our data analysis as a single value of “0” or “1”, several rules were made to combine data from the three visits within each Time Interval (Appendices A and B).

We determined the proportion of records that were assessed for each of these variables at each Time Interval. Whether these outcome variables were assessed by a PCP was determined by the presence or absence of a checkmark in the relevant box in each RBR smartform, exported into the Excel spreadsheet as "0" or "1". Documentation of multiple "1"s (e.g. child was assessed for safe sleep at 1 week and at 1 month) was treated as equivalent. Additionally, in order to identify the number of children who had any aspect of sleep assessed, we combined the three outcome variables into a single sleep outcome variable ("combined sleep") for each of the three Time Intervals.

2.5 | Statistical analyses

The data were then entered into SPSS version 26 for statistical analysis. Means and frequencies were used to describe the sample, and bivariate analyses were undertaken. Binomial logistic regression was used to predict the outcome variables. Alpha was set at 0.05.

3 | RESULTS

Of the 1180 unique records, 49.2% of the children were male and 50.8% were female (Table 1). The mean birthweight of the participants was 3405 g (SD = 557 g; range 1200–5289 g). At Time Intervals 1 and 2, 80.8% and 54.2% of the records indicated exclusive breastfeeding.

3.1 | Frequencies

At Time Intervals 1, 2 and 3, the frequency with which night waking was assessed was 60.4%, 69.3% and 58.6%, while healthy sleep habits were assessed at frequencies of 62.4%, 72.9% and 64.5% (Table 2). Safe sleep was assessed in 73.4% and 81.8% of the patient records during Time Intervals 1 and 2, respectively.

TABLE 1 Baseline characteristics of study participants

Independent variable	Categories	Frequency (%)
Sex	Male	581 (49.2)
	Female	599 (50.8)
Birthweight, g (N = 798)	< 2500	44 (5.5)
	2500–3999	644 (80.8)
	≥ 4000	109 (13.7)
Exclusive breastfeeding (Interval 1)	Yes	798 (80.8)
	No	190 (19.2)
Exclusive breastfeeding (Interval 2)	Yes	541 (54.2)
	No	458 (45.8)
Year of birth	2002–2015	756 (64.1)
	2016–2019	424 (35.9)

3.2 | Birthweight

Bivariate analyses showed a significant relationship between birthweight group and sex, with male babies being heavier than female babies ($p = 0.041$). When examining the relationship between birthweight and the outcome variables, no differences were observed with the exception of safe sleep in Time Interval 1.

3.3 | Year of birth

Night waking was assessed significantly more often for children born during 2016–2019 than those born during 2012–2015 at each time interval ($p < 0.001$; $p < 0.001$; $p = 0.004$, at Time Intervals 1, 2 and 3), while children born in later years were also assessed more frequently for healthy sleep habits at Time Interval 1 ($p = 0.018$; Table 3). Bivariate analysis of the "combined sleep" variable showed that children born during 2016–2019 had significantly more documented assessments at Time Intervals 2 and 3 ($p = 0.004$; $p = 0.019$). Children born during 2002–2015 were approximately half as likely to have their sleep assessed in Time Interval 2 (OR 0.52; 95% CI: 0.28–0.94) and in Time Interval 3 (OR 0.59; 95% CI: 0.39–0.91).

3.4 | Exclusive breastfeeding

In Time Interval 1, children who were exclusively breastfed had documentation of safe sleep discussions more often than those not breastfed exclusively ($p = 0.001$; Table 3). Exclusive breastfeeding was associated with increased assessment of safe sleep ($p < 0.001$), night waking ($p = 0.021$) and healthy sleep habits ($p = 0.048$) at Time Interval 2 (Table 4). Children who were not exclusively breastfed were less likely to have a recorded sleep discussion at both Time Interval 1 (OR 0.56; 95% CI: 0.33–0.95) and Time Interval 2 (OR 0.33; 95% CI: 0.19–0.58; Table 5).

4 | DISCUSSION

This study found that the frequency of having any aspect of sleep addressed was 85.4%, 90.2% and 66.7% at Time Intervals 1, 2 and 3. Also, exclusively breastfed children were assessed for sleep significantly more often than children who were not exclusively breastfed at Time Intervals 1 and 2. Finally, children born during 2016–2019 had a higher frequency of sleep discussions in Time Intervals 2 and 3 compared with children born during 2002–2015.

Our results suggest that discussions of sleep happen more frequently than previously reported (55% [National Sleep Foundation, 2004] and 59% [Schuster et al., 2000]) and, when the sleep variables

TABLE 2 Number and percentage of visits with documented assessment of night waking, safe sleep, healthy sleep habits, and any sleep variable at Time Intervals 1, 2 and 3

Sleep variables	Total number of children with appointments in each time interval	Number of children for whom sleep was addressed (%)
Night waking Interval 1	989	597 (60.4)
Safe sleep Interval 1	989	726 (73.4)
Healthy sleep habits Interval 1	444	277 (62.4)
Combined sleep Interval 1	989	845 (85.4)
Night waking Interval 2	997	691 (69.3)
Safe sleep Interval 2	997	816 (81.8)
Healthy sleep habits Interval 2	435	317 (72.9)
Combined sleep Interval 2	997	899 (90.2)
Night waking Interval 3	765	448 (58.6)
Healthy sleep habits Interval 3	265	171 (64.5)
Combined sleep Interval 3	765	510 (66.7)

TABLE 3 Association between independent variables and sleep variables at Time Interval 1

Variable	Night waking		Safe sleep		Healthy sleep habits		Sleep variables combined	
	χ^2	p	χ^2	p	χ^2	p	χ^2	p
Sex (df = 1)	0.056	0.813	0.510	0.475	2.856	0.091	0.036	0.849
Birthweight (df = 2)	2.429	0.297	9.321	0.009*	2.807	0.246	5.918	0.052
Interval 1 breastfeeding (df = 1)	0.599	0.439	10.190	0.001*	1.963	0.161	18.016	< 0.001*
Year of birth (df = 1)	90.756	< 0.001*	0.980	0.322	5.620	0.018*	3.480	0.062

*$p < 0.05$.

TABLE 4 Association between independent variables and sleep variables at Time Interval 2

	Night waking		Safe sleep		Healthy sleep habits		Sleep variables combined	
	χ^2	p	χ^2	p	χ^2	p	χ^2	p
Sex (df = 1)	2.155	0.142	1.518	0.218	0.537	0.464	6.029	0.014*
Birthweight (df = 2)	0.261	0.877	3.321	0.190	0.644	0.725	3.634	0.162
Interval 2 breastfeeding (df = 1)	5.320	0.021*	19.872	< 0.001*	3.897	0.048*	22.221	< 0.001*
Year of birth (df = 1)	29.248	< 0.001*	2.727	0.099	1.634	0.201	8.322	0.004*

*$p < 0.05$.

are combined, that sleep is assessed at a similar frequency to that reported in a survey of Canadian health care providers (82.4%; Gruber et al., 2017). In their study, co-sleeping was the most assessed (42.3%) sleep issue. This is consistent with our results; safe sleep was the most frequently assessed sleep variable (73.4% and 81.8% at Time Intervals 1 and 2), and co-sleeping is a component of this variable.

While our results are encouraging, they highlight the need for more frequent assessment of safe sleep. Particularly concerning is that bedsharing occurs frequently. The 2015–2016 Canadian Community Health Survey found that of 110,095 women aged 15–55 years who had given birth in the past 5 years, 32.7% reported sharing a bed with their child every day or almost every day (Gilmour et al., 2019). The Canadian Joint Statement on Safe Sleep highlights associations between bedsharing and overheating, threats to breathing (suffocation, strangulation), and sudden infant death syndrome (Public Health Agency of Canada, 2021). Furthermore, there is ongoing need for education regarding infant sleep position. In 2015, data collected by the Centers for Disease Control and Prevention found that 21.6% of infants were routinely placed in a non-supine sleeping position (Bombard et al., 2018), while a later study (Colson et al., 2017) found that only 43.7% of mothers who intended to place their infant in an exclusively supine position truly did in practice. The latter study also acknowledges the important of intervention by a PCP. They found that mothers who received

TABLE 5 Association between independent variables and sleep variables at Time Interval 3

	Night waking		Healthy sleep habits		Sleep variables combined	
	χ^2	*p*	χ^2	*p*	χ^2	*p*
Sex (df = 1)	0.801	0.371	0.003	0.956	1.154	0.283
Birthweight (df = 2)	2.808	0.246	1.471	0.479	0.722	0.697
Year of birth	8.277	0.004*	1.658	0.198	5.544	0.019*

*$p < 0.05$.

advice regarding sleep position from a physician were less likely to report their infant in a prone position (aOR 0.6; 95% CI: 0.39–0.93) or on their side (aOR 0.5; 95% CI: 0.36–0.67), highlighting the importance of screening and recognizing education opportunities.

To our knowledge, our study is the first to demonstrate that exclusive breastfeeding is associated with frequency of infant sleep assessments. This may be explained by previous reports of exclusively breastfed infants experiencing more sleep problems. Galbally et al. (2013) reported that breastfeeding was associated with increased odds of night waking (OR 1.67; 95% CI: 1.44–1.91) and infants not sleeping alone (OR 1.66: 95% CI: 1.29–2.14), while another source reported that breastfeeding infants had night waking occurrences more often than infants who were not breastfeeding ($p = 0.02$; 78.0% versus 63.3%; Hörnell et al., 1999). Increased night waking of breastfed infants has been attributed to the nutritional composition of breastmilk and these infants requiring more frequent night feedings (Galbally et al., 2013). As expected, mothers who are breastfeeding are also two–three times more likely to bed share with their infant consistently (Gilmour et al., 2019). As discussed above, this places breastfed infants at an increased risk of safety concerns, and recognition by a PCP is important. While breastfed infants have a higher prevalence of sleep problems, night waking is not an issue exclusive to them and occurs in 20% of those who do not require night feeding (Rourke Baby Record, 2017). Given the association of night waking and poor outcomes such as emotional dysregulation (Williams et al., 2017) and internalizing symptoms (Morales-Muñoz et al., 2020), it is important for PCPs to have sleep discussions with all infant caregivers early on in development. Intervention as early as the first 3 weeks of life has been associated with reduced night waking incidence (Rourke Baby Record, 2017).

When examining the relationship between the birthweight groups and sleep variables, no significant differences were observed, with the exception of safe sleep in Time Interval 1. This finding was unexpected, as the literature suggests that infants born with a low birthweight may be at increased risk for sleep problems. Pesonen et al. (2009) studied a cohort of neonates with a mean birthweight of 3596.1 g (± 448.8 g). They reported that for every 1-SD decrease in birthweight, infants were 1.7 times more likely to have low sleep efficiency. Another study found that infants who were small for gestational age (body weight below the 2.5th percentile for sex and GA) were 1.3 times (95% CI: 1.01–1.70) more likely to have short sleep duration at 6 months, and 1.54 times (95% CI: 1.15–2.07) more likely at 18 months (Hysing et al., 2019).

This study has several limitations. As this is a retrospective study, its results depended on proper data entry into the RBR, and it cannot be confirmed whether the aspects of sleep that were discussed are reflected appropriately in the record. Additionally, this study was conducted using data from a teaching clinic. It is possible that sleep and other variables are discussed more frequently than other family medicine clinics in an effort to demonstrate best practice to learners. This may lead to an over-estimation of the frequency with which sleep health is discussed when compared with other clinics. Finally, there is no documentation of who initiated the sleep discussions, PCPs or parents/caregivers. This means we cannot differentiate whether it was public health and caregiver knowledge that prompted discussions, or the medical training and screening behaviours of staff members. This would have been valuable information as it would help indicate where future education efforts should focus.

5 | CONCLUSION

Compared with two decades ago, this study suggests that the frequency of sleep health assessments of infants and children is increasing. While this is encouraging, PCPs should ensure that each of the individual sleep variables are being discussed and that assessments of sleep health occur with the caregivers of all infants, not just those at increased risk. Future research could be aimed at identifying the prevalence of sleep assessments in non-academic centres, as well as evaluating the efficacy of early sleep screening for immediate and long-term health outcomes. Lack of sleep screening by PCPs may be due to lack of comfort addressing this issue, time, or focus on other presenting issues. While we encourage all components of sleep to be assessed, our results demonstrate that is not always happening in current practice. It is important to identify the factors impeding sleep discussions and attempt to find ways to modify practice to overcome these barriers to infant sleep health.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to disclose.

AUTHOR CONTRIBUTIONS

PI was responsible for conducting literature searches, data cleaning and drafting the manuscript. SI performed data analyses and manuscript editing.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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APPENDIX A

METHOD FOR DEFINING INTERVAL 1 BREASTFEEDING DATA

	Rourke Baby Record Data			Value Exported to Excel
	1 Week	2 Weeks	1 Month	
Example 1	0	0	0	0
Example 2	0	0	1	1
Example 3	1	0	0	1
Example 4	0	1	0	1
Example 5	1	0	1	1
Example 6	1	1	0	1
Example 7	0	1	1	1
Example 8	1	1	1	1
Example 9	999	999	999	999
Example 10	999	999	1	1
Example 11	1	999	999	1
Example 12	999	1	999	1
Example 13	1	1	999	1
Example 14	999	1	1	1
Example 15	1	999	1	1
Example 16	999	999	0	0
Example 17	999	0	999	0
Example 18	0	999	999	0
Example 19	0	0	999	0
Example 20	0	999	0	0
Example 21	999	0	0	0
Example 22	1	0	999	1
Example 23	1	999	0	1
Example 24	0	1	999	1
Example 25	0	999	1	1
Example 26	999	1	0	1
Example 27	999	0	1	1

0 = Not exclusively breastfeeding.

1 = Exclusively breastfeeding.

999 = Data missing.

APPENDIX B

METHOD FOR DEFINING INTERVAL 2 BREASTFEEDING DATA

	Rourke Baby Record Data			Value Exported to Excel
	1 Week	2 Weeks	1 Month	
Example 1	0	0	0	0
Example 2	0	0	1	0
Example 3	1	0	0	0
Example 4	0	1	0	0
Example 5	1	0	1	1
Example 6	1	1	0	1
Example 7	0	1	1	1
Example 8	1	1	1	1
Example 9	999	999	999	999
Example 10	999	999	1	1
Example 11	1	999	999	0
Example 12	999	1	999	1
Example 13	1	1	999	1
Example 14	999	1	1	1
Example 15	1	999	1	1
Example 16	999	999	0	0
Example 17	999	0	999	0
Example 18	0	999	999	0
Example 19	0	0	999	0
Example 20	0	999	0	0
Example 21	999	0	0	0
Example 22	1	0	999	0
Example 23	1	999	0	0
Example 24	0	1	999	0
Example 25	0	999	1	1
Example 26	999	1	0	0
Example 27	999	0	1	0

0 = Not exclusively breastfeeding.

1 = Exclusively breastfeeding.

999 = Data missing.