

Racial/ethnic differences in the contextual factors influencing infant sleep: a qualitative study

Abstract

Objective: To qualitatively examine contextual factors contributing to differences in infant sleep across race/ethnicity.

Method: We conducted semi-structured interviews with 37 mothers of 7-12-month-old infants across four strata: high-income white, low-income white, high-income Hispanic and/or black, and low-income Hispanic and/or black. Mothers were asked about influences on their infant's daytime and nighttime sleep, including questions about feeding, sleep parenting, and their household structure. We used thematic analysis to analyze the data.

Results: We identified four unique themes of influences to infant sleep that varied by race/ethnicity: environmental influences, maternal stressors and supports, parenting approach or philosophy, and sleep parenting practices. Hispanic and black mothers were more likely to describe disruptions from environmental factors, state that their stress level impacted their infant's sleep, put their infant to sleep later so that they could sleep later themselves, and be influenced by family tradition or specific cultural sleep parenting practices. Hispanic and black mothers were also more likely to engage in sleep parenting practices that have previously been associated with short sleep duration in infants (e.g. feeding infants to sleep, exposing infants to television), likely influenced by the broader context in which they parent.

Conclusion: Results from this study suggest that sleep interventions targeting black or Hispanic mothers of infants could target household stress and parenting practices as levers for improving infant sleep.

Keywords: sleep, infant, race/ethnicity, disparities, mothers

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Introduction

Almost a third of the children in the United States get less than the recommended amount of sleep at least one day per week.¹ Results from a 2004 national survey commissioned by the National Sleep Foundation suggest that infants and toddlers are especially at-risk for not meeting sleep recommendations.² Within this age range and across childhood, those from racial/ethnic minority and low socioeconomic status backgrounds are at the highest risk for insufficient sleep.³⁻⁶ This is concerning given that insufficient sleep in infancy has been linked to adverse outcomes such as socio-emotional functioning impairments and increased risk for obesity.^{6,7} A range of factors have been linked with short sleep duration in infants including maternal mental health, family stress, and certain sleep parenting behaviors.^{2,5,6,8-10} However, investigations of how these factors, especially sleep parenting practices, differ across race/ethnicity for infants are lacking. Studies with older children suggest that compared with white children, Hispanic and black children are less likely to have bedtime routines and more likely to be put to bed with a bottle, have a television in the room where they sleep, and have later bedtimes.¹¹⁻¹⁴ In one study that also included infants, child sleep differences across racial/ethnic groups remained significant even after adjustment for socioeconomic, environmental, and behavioral variables, supporting the need for further investigation on factors contributing to between-group differences in sleep outcomes.¹⁵ The current study was designed to help fill gaps in the literature on infant sleep disparities. Using a

stratified sample of white and black or Hispanic mothers, across a range of income levels, this study examined racial/ethnic differences in mothers' reports of contextual and environmental factors that influence their infant's sleep.

Methods

Participant recruitment

The present study was conducted with a subsample of mothers from the Rise & SHINE (Sleep Health in Infancy & Early childhood), a birth cohort of mother-infant dyads that examined associations between infant sleep patterns and accelerated weight gain during the first two years of life. Details on Rise & SHINE participant recruitment and eligibility criteria have been described elsewhere.³ Purposive stratified sampling was used to recruit participants from four strata (high-income white, low-income white, high-income Hispanic and/or black, and low-income Hispanic and/or black). Families with an annual household income <\$80,000 were classified as low-income, consistent with the U.S. Department of Housing and Urban Development's low-income limit for a family of 3-4 in the Boston area in 2018. The final sample includes 37 mothers, consistent with recommendations to achieve data saturation with interview data.¹⁶ Infants were age-matched +/-1 month across strata and only one of the mothers invited to participate in the interview sub study declined to participate.

Data collection procedures and instruments

Semi-structured phone interviews (~45 minutes in length) were conducted with mothers when their infant was between 6 and 12-months of age by two of the study authors (TA & JB). Verbal consent was obtained from all participants and they were compensated for their time. A semi-structured interview guide with follow-up questions

and probes was used to conduct the interviews. The interview guide was refined after a pilot test with 2 mothers not included in the final sample. Questions were informed by prior research and focused on infant sleep patterns and sleep parenting Table 1. Interviews were audio-recorded and transcribed verbatim. Institution review boards of participating institutions approved the study procedures and materials.

Table 1 Sample questions from the interview guide

Domain	Sample Questions & Probes
Nighttime sleep*	<p>Tell me about your baby's sleep at night.</p> <p>What is your baby's usual bedtime? What time does he/she usually wake in the morning?</p> <p>How often does your baby wake up during the night? Do you wake up with him/her each time?</p> <p>Has his/her sleep pattern changed recently? If so, what caused the change?</p> <p>How do you think your baby sleeps compared to others his/her age?</p> <p>Describe for me where your baby typically sleeps.</p> <p>Can you think of any factors in your home that may impact your baby's naps?</p> <p>Describe the surface he/she usually sleeps on. What is the room like?</p> <p>Who else sleeps in the same room as your baby?</p> <p>Can you think of any factors in your home that may impact your baby's sleep?</p> <p>Can you think of any factors in your neighborhood that may impact your baby's sleep?</p> <p>Tell me about your baby's usual bedtime routine, if he/she has one.</p> <p>Who usually puts your baby to sleep?</p> <p>What things do you do with your baby before you put him/her to bed?</p> <p>Where did you get these ideas?</p> <p>How easy is it put your baby to sleep?</p> <p>(If baby does not have a bedtime routine: Why do you think this is?)</p> <p>What are the reasons your baby usually wakes up during the night?</p> <p>When your baby wakes at night, what do you do? What works best?</p> <p>How long does it usually take him/her to fall back asleep?</p> <p>How easy is it to get your baby back to sleep?</p> <p>Does anyone else ever wake up with your baby during the night?</p> <p>How different is your baby's nap schedule from one day to another?</p> <p>What do you think causes this change night to night? Does it differ on weekdays versus weekends?</p> <p>How would your baby respond if his/her bedtime was delayed?</p> <p>How would he/she respond if he/she were woken up earlier than usual?</p> <p>How would your baby do sleeping the night in a new location?</p>
Sleep Parenting	<p>What do you think would help your baby sleep better or longer?</p> <p>Describe for me a time when your baby seemed tired but couldn't or wouldn't fall asleep.</p> <p>What do you think kept him/her awake?</p> <p>Did he/she finally fall asleep? What, if anything, did you do to help him/her fall asleep?</p> <p>Describe for me a time when your baby didn't seem tired, but you encouraged him/her to sleep.</p> <p>What was your reason for encouraging your baby to sleep?</p> <p>Did he/she fall asleep? What, if anything, did you do to help him/her fall asleep?</p> <p>What are your thoughts about allowing babies to cry if they are having trouble sleeping?</p> <p>How long would/do you allow your baby to cry?</p> <p>Where did you get these ideas?</p>

Table continue

Domain	Sample Questions & Probes
	Is there anything you hope to change or improve about your baby's sleep habits?
	What are your goals for your baby's night sleep? What are your goals for your baby's naps?
	Where did you get these ideas?
	Are there other people that also regularly put your baby to sleep, either naps or at night?
	(If yes: Do you have different ideas about how your baby should sleep?)
	(If yes: How does your baby's sleep routine and habits differ with others? Do these differences ever create problems?)

*Similar questions also asked for naps

Data organization and analysis

The interview transcripts were organized and coded using QSR NVivo 11 and Braun and Clarke's guidelines for thematic analysis.¹⁷ We adopted a hybrid coding approach.¹⁸ After reading 8 transcripts in full, two trained researchers (TA, NK) generated an exhaustive list of codes for contextual factors mentioned by mothers as impacting any aspect of infant sleep. Aspects of infant sleep included nighttime and nap duration, consistency, reasons for waking, and ease or difficulty around putting the infant to sleep. The working codebook included name, definition, inclusion and exclusion criteria, and 2-3 example quotations for each code. The codebook was revised after receiving feedback from an expert in qualitative data analysis at which time the remaining transcripts were read in full and further edits to the codebook were made. Codes and their definitions were subsequently refined based on the existing literature and discussions between the primary (TA) and secondary (NK) coder, resulting in a final codebook of distinct codes with precise definitions. After searching across the transcripts for repeated patterns, the list of codes was grouped into categories. This process involved sorting, recategorizing, and classifying the codes into semantic themes.^{17,19} The themes also underwent a process of reviewing, refining, and defining, with input from the secondary coder, an expert in familial and contextual factors driving the development of children's lifestyle behaviors, a pediatrician and clinical epidemiologist, and an expert in pediatric sleep medicine. Following the thematic analysis, the distribution of the reporting of each theme was examined, and cross strata comparisons were made

using a data matrix and further immersion in the data. Measures taken to assure dependability of data interpretation included an audit trail and data triangulation with Rise & SHINE survey data. Demographic and other descriptive characteristics of the sample were also obtained from survey data.

Results

Participant characteristics

Slightly more than half of the mothers identified as a racial/ethnic minority, while slightly less than half came from low-income households (<\$80,000 per year); almost a third did not have a Bachelor's degree Table 2. About half of the mothers were employed full-time, while nine were employed part-time and eight were not currently employed. All but two mothers were married or cohabitating. For just under half of the mothers, this was their first child, and the age of the infants ranged from seven to twelve months (mean: 9.7, SD: 1.6).

Thematic framework

We observed differences across race/ethnicity for four emergent themes: environmental influences, maternal stressors and supports, parenting approach or philosophy, and sleep parenting practices. A summary of the themes and representative quotes are provided below, with additional quotes by racial/ethnic and income strata provided in Table 3.

Table 2 Sample demographics for the full sample and by strata

	Full Sample	High-income White	Low-income White	High-income Hispanic and/or Black	Low-income Hispanic and/or Black
Infant Characteristics	N=37	N=10	N=7	N=10	N=10
Age (in months) ^a	9.7 (1.6)	9.8 (1.8)	10.0 (1.3)	10.1 (1.5)	9.1 (1.9)
Sex					
Male	16 (43)	5 (50)	5 (71)	5 (50)	1 (10)
Female	21 (57)	5 (50)	2 (29)	5 (50)	9 (90)
Race/Ethnicity					
Non-Hispanic white	17 (46)	10 (100)	7 (100)	0 (0)	0 (0)
Hispanic ^b	16 (43)	0 (0)	0 (0)	9 (90)	7 (70)
Black ^b	6 (16)	0 (0)	0 (0)	3 (30)	3 (30)
Currently Breastfeeding	20 (54)	5 (50)	5 (71)	6 (60)	4 (40)

Table continue

	Full Sample	High-income White	Low-income White	High-income Hispanic and/or Black	Low-income Hispanic and/or Black
Infant Characteristics	N=37	N=10	N=7	N=10	N=10
Primary Daytime Caregivers					
Parents	16 (43)	3 (30)	4 (57)	4 (40)	5 (50)
Other relatives	7 (19)	0 (0)	2 (29)	2 (20)	3 (30)
Daycare	12 (33)	5 (50)	1 (14)	4 (40)	2 (20)
Nanny	2 (5)	2 (20)	0 (0)	0 (0)	0 (0)
Mother Characteristics					
Low-Income	17 (46)	0 (0)	7 (100)	0 (0)	10 (100)
Highest Level of Education					
<Bachelor's degree	11 (30)	0 (0)	3 (43)	0 (0)	8 (80)
Bachelor's degree	10 (27)	3 (30)	0 (0)	7 (70)	0 (0)
Graduate degree	16 (43)	7 (70)	4 (57)	3 (30)	2 (20)
Employment Status					
Full-time	20 (54)	7 (70)	4 (57)	5 (50)	4 (40)
Part-time	9 (24)	1 (10)	2 (29)	3 (30)	3 (30)
Not employed	8 (22)	2 (20)	1 (14)	2 (20)	3 (30)
Marital Status					
Married	31 (84)	10 (100)	5 (71)	10 (100)	6 (60)
Cohabiting	4 (11)	0 (0)	2 (29)	0 (0)	2 (20)
Single	2 (5)	0 (0)	0 (0)	0 (0)	2 (20)
Number of Children					
1	17 (46)	4 (40)	3 (43)	5 (50)	5 (50)
2	16 (43)	6 (60)	3 (43)	4 (40)	3 (30)
3+	4 (11)	0 (0)	1 (14)	1 (10)	2 (20)

Data displayed as N (%); †, mean (SD) presented, as opposed to N (%); ††, groups are not mutually exclusive

Table 3 Thematic differences across race/ethnicity with representative quotations

Theme	Difference between	Quotation
Hispanic and black mothers		
compared to white mothers		
Environmental Influences	More likely to mention disruptions due to temperature	“Three weeks ago, we finally got air conditioners for the house. Prior to that, with some of the heat waves and things, he would get really sweaty and hot. That could wake him up.” –H\$\$
		“I think the TV [wakes her], because it's always on. The house is quiet, but the TV is always on, so the light.” –B\$
	More likely to mention disruptions from light, particularly from television	

Table continue

Theme	Difference between	Quotation
Hispanic and black mothers compared to white mothers		
Maternal Stressors & Supports	More likely to describe disruptions from siblings	“She tries to sleep during the day, but her brother doesn’t let her because he makes a lot of noise. At the beginning, she took two or four naps per day, but when she started to be active, maybe around six months, she really matched his nap schedule.” –H\$\$
	More likely to have stress disrupt infant sleep	“I think we sleep the same—I really think we have a connection. Sometimes when I’m worried about something, he can’t sleep well. When I’m worry-free, so I sleep well, he does the same. I think it’s probably the connection there, baby to mom, like one idea.” –H\$\$
		“Me and my mom friends talk about different ideas about what has worked helping our kids get to sleep, stay asleep, and sleep training.” –W\$\$
	Less likely to mention the availability of social support, and receive informational support or appraisal	
Parenting Approach or Philosophy	More likely to utilize culturally-influenced sleep parenting practices	“I put a little bit of rice cereal in his food at night, like two spoons of the rice cereal in the puree, because that’s what my mom said. My family and stuff do that.” –H\$\$
		“I tried to put him to sleep earlier, at like 9:00. He was asleep but then he woke up earlier, and we’re not early birds, so that’s why I put him to sleep late sometimes. I think it’s a little bit later than other babies maybe, but it works for us, for our family.” –H\$\$
	More likely to put infant to bed later so they can sleep later in the morning themselves	“We start noticing when she’s a little cranky. She doesn’t want to play anymore, she’s just tired and crying. That’s one of our cues that she’s ready for a nap.” –H\$
	More likely to act on fussy infant cues (i.e. crying), versus subtle ones	“It got really bad, so then we started reading. One philosophy that I really liked is Resources for Infant Educators. We tried implementing some of those practices.” –W\$
	Less likely to utilize sleep parenting information from resources*	
Sleep Parenting Practices	Less likely to be consistent with sleep timing or routine*	“We do a usual routine. If he isn’t having it, I try to continue and not confuse him by bringing him back into a lighted area or playing with him. I think being persistent helps.” –W\$\$
		“I have to be ready to give him breastmilk, because he knows that after the shower, it’s always breastmilk. He like demands it in some ways.” –H\$\$
	More likely to feed infant to sleep	“After dinner, he gets a bath and then we get him in his PJs. He might play for another 10 or 15 minutes, and then we take him down and give him a bottle and try to keep him awake with lights on through that and then just put him in his crib at 7:00.” –W\$\$
	Less mindful of or intentional about not feeding to sleep	“She naps in her crib, with just a mattress in it and a fitted sheet. She has a sound machine and sleeps with a sleepsack.” –W\$\$
		“We have the TV on a little bit, and that’s what keeps her distracted and tired.” –H\$
		“His number one reason [for waking] would be he’s hungry; it’s past his time to get some food or something. Reason number two would be his diaper is wet.” –H\$\$
	Less likely to use of sleep aids, especially sleepsacks	
		“I generally nurse him to sleep. Although, I have just introduced him to whole milk, but even after he has several ounces of that, he still needs me to nurse him to sleep.” –B\$\$
	More likely to mention direct infant exposure to television*	
		“Once in a while, honestly because of my own survival, if she’s fussy and wants to nurse and I have to be up soon, I know I’m not supposed to, but I’m like you know what, I know this will work and I know you’ll go right to sleep, like out of necessity, I will.” –W\$\$

Table continue

Theme	Difference between	Quotation
Hispanic and black mothers compared to white mothers		
	More likely to attribute wakings to hunger	"He's going to bed a little later, but again, I don't put him to sleep. We co-sleep in my bed." –B\$\$
	More likely to oblige infants feeding for comfort	"We're just so protective of his naps. We make sure that his brother can't get in the room. He's on a separate floor. The sound machine blocks out the noise." –W\$\$
	Less likely to breastfeed during wakings as a last resort or express intentions to refrain	
	More likely to co-sleep, and for the full duration of the night*	
	Less likely to use white noise or music to drown out potential disruptions*	

H, hispanic; B, black; W, white; \$, low-income; \$\$, high-income; *, also varied across income

Environmental influences: When asked to describe environmental factors that might affect their infants sleep, mothers spoke about their household structure and aspects of ambient and external environment. There were no differences across race/ethnicity with regard to noises impacting infant sleep, however there were for temperature and light. All three mothers who spoke about heat disrupting their infant's sleep were racial/ethnic minorities. "Three weeks ago, we finally got air conditioners for the house. Prior to that, with some of the heat waves and things, he would get really sweaty and hot, so that might wake him up, so the weather."—Hispanic mother of higher income. Approximately one in ten white mothers mentioned that light sometimes disrupted their infant's sleep, while one in four Hispanic or black mothers did. Both sunlight and lights in the room disrupted infant sleep, with three racial/ethnic minority mothers describing disturbances from light from a television. "I think the TV [wakes her], because it's always on. The house is quiet, but the TV is always on, so the light."—Black mother of lower income. Finally, all ten of the Hispanic or black mothers with multiple children stated that the infant's sibling(s) often disrupted his/her sleep, which was seldom expressed among white mothers. "She [the infant] tries to sleep during the day, but her brother doesn't let her because he makes a lot of noise. At the beginning, she took two or four naps per day, but then very quickly, when she started to be active, maybe around six months, she really matched his nap schedule."—Hispanic mother of higher income.

Maternal stressors & supports: While mothers across all strata communicated the presence of a range of stressors in their lives, only Hispanic and black mothers described a direct effect of their stress on their infant's sleep. "I think we sleep the same—I really think we have a connection. Sometimes when I'm worried about something, he can't sleep well. When I'm worry-free, so I sleep well, he does the same, so I think it's probably the connection there, baby to mom. It's like one idea."—Hispanic mother of higher income. References to social support also varied across strata. All but one white mother mentioned the availability of social support compared to 16 out of 20 racial/ethnic mothers, and type of support differed. White mothers commonly described receiving informational support (e.g. parenting advice) or appraisal, most often from friends, whereas Hispanic and black mothers often described receiving instrumental support (e.g. baby sitting services) from relatives.

Parenting approach or philosophy: When asked what guided their sleep parenting approach or philosophy, mothers mentioned a variety of factors ranging from motherly instincts to their personality type. Only seven mothers mentioned being influenced by family tradition or culture, with white mothers making broad references, and Hispanic and black mothers describing specific practices. "Normally I put her on my back, and I throw a sheet around [my baby] and walk around. Most of the time that's where she falls asleep. She likes that a lot because the movement and the body... That's a cultural thing that we do, that's normal."—Black mother of lower income. "I put a little bit of rice cereal in his food at night, like two spoons of the rice cereal in the puree, because that's what my mom said. My family and stuff do that."—Hispanic mother of higher income. The most common driving force behind parenting decisions was mothers' desires and goals for themselves and infants. Notably, three racial/ethnic minority mothers made comments about how having their infant go to sleep earlier resulted in early wakings, which conflicted with their own later bedtime or other aspects of family life, so they put their infant to bed later; this did not come up among white mothers.

"I tried to put him to sleep earlier, at like 9:00. He was asleep but then he woke up earlier, and we're not early birds, so that's why I put him to sleep late sometimes. I think it's a little bit later than other babies' maybe, but it works for us, for our family."—Hispanic mother of higher income. "I'm supposed to follow her sleep, but she follows mine, my schedule basically. I think if I went to sleep early, she would go to sleep early. She follows me."—Black mother of lower income. Mothers also commonly stated that they operated based on cues from their infant, but the nature of these cues varied. Hispanic and black mothers frequently described responding to fussiness and crying, while white mothers more often worked off of less disruptive cues such as the infant rubbing his/her eyes. "We start noticing when she's a little cranky. She doesn't want to play anymore she's just tired and crying. That's one of our cues that she's ready for a nap."—Hispanic mother of lower income. "When it's close to her bedtime, around 7:00, she seems like she's tired. She's like ready for bed. She will just go to my mother-in-law or myself and put her head on us, so we know it's time for her to sleep."—White mother of lower income. Fewer Hispanic and black mother referenced using resources, such as books, the internet, and information from the pediatrician, to inform their parenting than white mothers.

Sleep parenting practices

Bedtime routines—White mothers were more likely to describe using a consistent sleep schedule or routine for their infant than black and Hispanic mothers. What the infant's bedtime routine consisted of also varied across groups, with racial/ethnic minority mothers much more likely to feed their infant to sleep than white mothers. In contrast, several white mothers communicated intentional efforts to avoid feeding their infant to sleep. *"I have to be ready to give him [milk], because he knows that after the shower, it's always [milk]. He like demands it in some ways."*—Hispanic mother of higher income. *"After dinner, at about 6:30, he gets a bath and then we get him in his PJs. He might play for another 10 or 15 minutes, and then we take him down and give him a bottle and try to keep him awake with lights on through that and then just put him in his crib at 7:00."*—White mother of higher income. White mothers were also more likely than racial/ethnic minority mothers to use sleep aids such as pacifiers and small blankets to help their infant sleep, with only white mothers reporting using sleep sacks. On the contrary, television exposure during bedtime was much more common for racial/ethnic minority infants than white infants.

Responding to night wakings—Hispanic and black mothers were twice as likely to attribute wakings to hunger than white mothers. This had implications for parent feeding practices, with some racial/ethnic minority mothers encouraging their infant to eat more before bed and others offering their infant formula or breastmilk during wakings. Several breastfeeding mothers shared the sentiment that their infant was using breastfeeding for comfort rather than nourishment, but Hispanic and black mothers were more obliging. White mothers, on the other hand, stated they used breastfeeding as a last resort to help the infant settle. *"I generally nurse him to sleep. Although, I have just introduced him to whole milk, but even after he has several ounces of that, he still needs me to nurse him to sleep."*—Black mother of higher income. *"Once in a while, honestly because of my own survival, if she's fussy and wants to nurse and I have to be up soon, I know I'm not supposed to, but I'm like you know what, I know this will work and I know you'll go right to sleep. Like out of necessity, I will."*—White mother of higher income.

Co-sleeping—Racial/ethnic minority mothers were much more likely to co-sleep, especially for the full duration of the night, than white mothers. In all but one case, white mothers who co-slept only allowed their infants to spend part of the night in their bed. *"He falls asleep in my bed. Dad is not usually in the bed yet when he falls asleep. I move him before dad comes to bed"*—White mother of higher income.

Controlling external stimuli—Mothers across all strata commonly limited/reduced lighting and controlled the noise level when their infant was sleeping. However, white mothers were more likely to use white noise and music to mask potentially disruptive noises than racial/ethnic minority mothers. *"We're just so protective of his naps. We make sure that his brother can't get in the room. He's on a separate floor. The sound machine blocks out the noise."*—White mother of higher income

Variation by income

For some racial/ethnic differences, we also observed variation across income, marked by an asterisk in Table 3. Racial/ethnic minority mothers of lower income were more likely to co-sleep and describe direct television exposure to their infant than racial/ethnic minority mothers of higher income. They were also less likely to utilize resources to obtain sleep parenting information, be consistent

with their infant's sleep timing or routine, and use white noise or music to drown out potential disruptions to their infant's sleep than white mothers and mothers of higher income. Finally, while not the focus of this paper, we also observed some differences across income-level only, with low-income mothers less likely to perceive pacifiers as potentially disruptive, receive informational support, be mindful of television exposure, and use trustworthy sources for parenting information, than high-income mothers.

Discussion

Although disparities in sleep duration between white and racial/ethnic minority children have been observed during infancy, few studies have examined the contextual factors contributing to these differences. To our knowledge, this is the first study to do an in-depth investigation on how contextual factors contributing to infant sleep differ between different racial/ethnic groups. A primary strength of this study is that mothers were purposively recruited from high and low-income strata in attempt to permit the separation of racial/ethnic differences from the role of income. While differences by race/ethnicity were seen across four emergent themes, the majority of the differences were in regard to sleep parenting practices and parenting approach or philosophy, likely influenced by the broader context in which mothers raise their children. In this sample, black and Hispanic mothers were more likely to state that their stress level impacted their infant's sleep and were less likely to receive social support (especially informational support or appraisal), than white mothers. Black and Hispanic mothers were also more likely to attest to environmental disturbances from temperature, light, and siblings, than white mothers. Differences in these factors likely contribute to the observed differences in parenting approach or philosophy and practices. Black and Hispanic mothers were more likely to be influenced by specific tradition or cultural sleep parenting practices, describe that their own late bedtime influenced when they put their infant to bed, act on fussiness cues as opposed to less disruptive ones, and less likely utilize resources for sleep parenting information than white mothers. Black and Hispanic mothers were also more likely to engage in parenting practices associated with worse sleep outcomes (e.g. lack a consistent sleep schedule or routine, feed the infant to sleep, allow television exposure, co-sleep) than white mothers. Conversely, they were less likely to utilize sleep aids and or white noise to help their infant sleep. These findings align with prior studies demonstrating that Hispanic and black mothers more commonly engage in sleep parenting practices associated with short sleep duration compared to white mothers,^{11–14,20} and expand the range of parenting behaviors and other contextual factors that may explain infant sleep disparities.

For some contextual factors, we observed particularly marked differences across strata when considering both race/ethnicity and income level. For example, while more Hispanic and black infants were exposed to television than white infants, the difference was more pronounced among low-income infants, with television exposure by far the highest for low-income Hispanic or black children. These findings are not only in line with the previous literature showing that race/ethnicity and socioeconomic status are independent predictors of sleep, but also suggestive of a double disparity among individuals who are both racial/ethnic minorities and of low socioeconomic status. This is particularly concerning given the association between race/ethnicity and socioeconomic status in the United States. Taken together, the findings of this study can inform both future quantitative analyses of contextual factors influencing infant sleep across race/ethnicity and potential intervention targets. Investigations using path analysis would provide estimates of the magnitude and significance

of causal connections between race/ethnicity, the contextual and parenting differences we observed in this study, and infant sleep outcomes. In terms of interventions, this study supports the need for efforts to promote specific sleep parenting practices that promote healthy infant sleep (e.g. adopting consistent bedtime routines) while taking into consideration the broader context in which mothers care for their children (e.g. finding ways to help mitigate household stress). Further, our findings regarding culturally influenced sleep parenting practices and parenting approach or philosophy in general also highlight the importance of formative research for interventions targeting high risk populations such as mothers who identify as racial/ethnic minorities.

Despite the aforementioned contributions to the literature, the present study is not without limitations. The sample was limited to mothers in the Boston, MA area already enrolled in a larger birth cohort study and who spoke English. Boston is a comparatively affluent northeastern city, as demonstrated by the city-specific threshold of <\$80,000 for low-income. The role of income and its interplay with race/ethnicity may be more apparent when mothers with lower income levels are included. Additionally, using a single threshold for low-income has limitations, especially considering variations in family structure across the sample. Thus, it is possible that some of the observed racial/ethnic differences were at least in part due to differences in income between the racial/ethnic minority and white mothers. There were also demographic differences across the strata beyond race/ethnicity and income, such as marital status, which may also contribute to some of the differences we observed. A final limitation of the present study is that black and Hispanic mothers were grouped together as racial/ethnic minority. Heterogeneity both between and within these groups can be tremendous and future studies with specific high-risk subgroups are important.

Conclusion

This study revealed that many different contextual factors that influence infant sleep vary by race/ethnicity. Differences in environmental influences, maternal stressors and supports, and parenting approach or philosophy were observed across groups, with Hispanic and black mothers more likely to engage in parenting practices that have been previously associated with worse sleep outcomes. Our findings are also suggestive of a potential double disparity among individuals who are both racial/ethnic minorities and of low socioeconomic status. This is particularly concerning given the association between race/ethnicity and socioeconomic status in the United States. Given observed disparities in childhood sleep as early as infancy, these findings can help inform intervention targets for subgroups of infants who are at increased risk for insufficient sleep and subsequent health consequences.

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