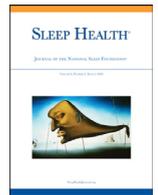




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Understanding sleep facilitators, barriers, and cultural dimensions in Native American urban youth



Alina I. Palimaru, PhD, MPP^{a,*}, Ryan A. Brown, PhD, MA^a, Wendy M. Troxel, PhD, MS^a, Daniel L. Dickerson, DO, MPH^b, Carrie L. Johnson, PhD^c, Elizabeth J. D'Amico, PhD, MA^a

^a RAND Corporation, Pittsburgh, PA, USA

^b UCLA Integrated Substance Abuse Program, Semel Institute for Neuroscience and Human Behavior, David Geffen School of Medicine, Los Angeles, CA, USA

^c Sacred Path Indigenous Wellness Center, Los Angeles, CA, USA

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ABSTRACT

Objectives: American Indian/Alaska Native (AI/AN) youth are a high-risk group for sleep problems and associated chronic conditions. Urban AI/AN youth may face certain challenges, including specific psychosocial stressors (e.g., discrimination) and environmental factors (e.g., noise, light) that render them particularly vulnerable to poor sleep health. However, few studies have explored AI/AN adolescent sleep. To our knowledge, this is the first study to use systematic qualitative methods with AI/AN youth to explore their sleep environment and sleep behaviors.

Design: In-depth interviews with 26 youth.

Setting: Two urban areas in Central and Southern California.

Participants: Urban-dwelling AI/AN youth, age 12–16 years.

Intervention: N/A.

Measurement: N/A.

Results: We identified five main themes, each with subthemes: sleep patterns and desired sleep, sleep barriers inside the home, environmental factors, sleep facilitators, and cultural dimensions. Key concerns discussed were poor sleep hygiene, excessive use of electronics prior to bedtime, issues with temperature regulation, and noise both within and outside the home. Parents can be an important vehicle for messaging around sleep health and for behavior management. Participating adolescents also indicated differing levels of attachment to Native identity, suggesting that culturally-targeted sleep interventions should build in openness and flexibility to a range of identity starting points. Further, we identified cultural practices, such as sweat lodges and dreamcatchers, that could be incorporated in future sleep interventions for this population.

Conclusion: Findings increase our understanding of urban AI/AN youth's sleep environments and behaviors, thus potentially informing program development around sleep health for this vulnerable population.

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Introduction

Sleep has a significant impact on mental health, physical health, and daily functioning.¹ During adolescence, sleep patterns are affected by biological, circadian, behavioral, and psycho-social developmental influences.² Adolescents are at high-risk for poor sleep health, including insufficient or poor quality sleep, and irregular sleep-wake schedules.^{2,3} In turn, poor sleep health in adolescents is linked with daytime sleepiness, diminished cognition, poorer physical and mental health, and behavioral problems.^{4–7}

Few studies have sought to understand sleep patterns and determinants in vulnerable adolescent populations,^{8,9} despite evidence that racial/ethnic minorities are more likely to experience sleep deprivation compared to non-Hispanic whites.^{10–12} In particular, American Indians/Alaska Natives (AI/ANs) are a high-risk group compared to non-Hispanic whites because they have significantly higher rates of chronic diseases that are positively associated with poor sleep health¹³: 1.5 times higher rates of obesity,¹⁴ more than twice the prevalence of diabetes,^{15–17} and roughly twice the rates of substance use.¹⁸

AI/ANs are also exposed to socio-environmental and cultural stressors (e.g., sense of belonging) that may increase their risk for sleep problems.¹⁹ AI/ANs are a particularly vulnerable group for adverse health outcomes, due to multiple historical traumas, including cultural, social, and residential fragmentation resulting from historical dislocation to

* Corresponding author: Alina Ionela Palimaru, PhD MPP, RAND Corporation, 4570 Fifth Ave, #600, Pittsburgh, PA 15213, USA.
E-mail address: palimaru@rand.org (A.I. Palimaru).

urban areas, all of which diminished ties with AI/AN culture.^{20,21} Importantly, approximately 70% of all AI/ANs live in urban areas,²² experiencing high rates of poverty (22%), limited healthcare access,¹⁴ and exposure to discrimination and social injustice.²³

Existing evidence indicates a significantly higher prevalence of habitual short sleep duration among AI/AN adults (34%) compared to non-Hispanic whites (27%).²⁴ Although close to 30% of AI/ANs (1.6 million) are under age 18, sleep and health research on this sub-group is limited.¹⁴ One study identified a positive association between sleepiness and depression among AI youth ages 11–18 living in reservations.²⁵ However, little is known about sleep health among urban AI/AN youth, their sleep patterns, and their sleep environment. This is important to understand, as urban AI/AN youth may be exposed to specific psychosocial stressors and other environmental factors that render them particularly vulnerable to poor sleep health.

Insufficient qualitative research on adolescent sleep in general is another gap in the existing literature. Qualitative research, such as in-depth interviews and focus groups, can provide crucial individual perspectives that can inform subsequent prevention and program design efforts by facilitating culturally-tailored approaches to unique individual and group circumstances. For example, one qualitative study of youth exposed to interpersonal violence highlighted participant-reported barriers to sleep, such as temperature, which had previously not been identified.²⁶ Another study with low-income and minority youth underscored the need for adapting sleep hygiene recommendations to targeted populations.²⁷

Due to a history of unethical research conducted among AI/ANs, utilization of community-based participatory research (CBPR) methods may help foster the trust necessary to successfully conduct a study with this population.^{28,29} Furthermore, utilizing a qualitative approach can provide an opportunity for AI/ANs to “tell their story” in a non-coercive and collaborative manner. Also, a qualitative approach can elicit important beliefs specifically about sleep quality, sleep rituals and routines, sleep patterns, perceptions of the sleep environment, perceived effects of sleep on health, and sleep barriers and facilitators (including cultural factors), which can inform prevention and program development to address sleep health. Past research has shown that integrating cultural activities and identity into substance use programs can be protective for AI/ANs.^{30–32} In this study, we conducted qualitative interviews with urban AI/AN youth to understand their sleep environment and behaviors, as well as knowledge and awareness of AI/AN cultural practices relevant to sleep. The current study fills a significant gap in the existing literature by studying sleep health in a high-risk group with documented health disparities and higher rates of sleep problems. We sought to better understand potential factors associated with sleep health in this population, including cultural factors. Enhancing our understanding of sleep health in this population may also aid in the development of culturally-informed and age-appropriate programs for this population that may improve overall sleep patterns and health behaviors.

Sample and recruitment

Native American Youth Sleep Health and Wellness (NAYSHAW) is a longitudinal, mixed-methods study involving both quantitative (e.g., survey, blood sample and actigraphs) and qualitative (e.g., in-depth interview) data to broaden our understanding of sleep and its role in health among urban AI/AN youth. We worked closely with Native elders and community members, recommended by study investigators, to inform the study’s recruitment process, including the sampling approach, and review every aspect of the study protocol, including survey measures, interview questions, and other assessments that were a part of the larger study (e.g., blood draws).

This analysis focuses on the qualitative component of the study within a subset of the larger study sample. Participants were eligible to be interviewed if they were 12–16 years of age (inclusive), self-identified or were identified by parents or community members as AI/AN (or had ancestors who were AI/AN) and could read and converse in English. Exclusion criteria including parent-reported health disorders such as heart disease, kidney disease, diabetes, sleep disorder, or severe cognitive impairment, were selected a priori to enhance generalizability of the sample to a non-clinical sample of adolescents, while ensuring reliability of the data. In addition, recruitment was restricted to one participant per household due to known interdependence of sleep data within families.

Adolescents living in urban communities located in central and southern California were recruited through advertisements at community events and community partner sites. In addition, AI/AN recruiters who had worked with the team on previous projects were hired in each city through our community partner, Sacred Path Indigenous Wellness Center (SPIWC), to go to different community events and have a table with project information. All recruitment, data collection, and analytic procedures were approved by the RAND Institutional Review Board. Because all study participants were under age 18, parental consent and personal assent were obtained for all participants. Participants were offered \$35 remuneration for participation in the qualitative interview. We randomly selected adolescents (with a quota requirement of roughly 50% males and 50% females) to participate in in-depth interviews from the study’s larger participant pool ($N = 82$). However, because we were mostly successful in recruiting females initially, we oversampled males to ensure a balanced sample. Adolescents reported survey demographics, including age, sex, race/ethnicity, and parents reported their education level.

Qualitative data collection

With the exception of one participant (due to personal circumstances), all other interviews were conducted in participants’ homes. All interviews were conducted during the school year (September to June) given considerable variation in teens’ sleep schedules during the school year versus summer. Although we did not control for seasonality, all participants were from southern and central California, which have relatively stable climates. We designed the interview protocol to elicit attitudes and beliefs about sleep, sleep rituals and routines, sleep patterns, the sleep environment, and sleep barriers and facilitators. Questions covered five main topical domains informed by our review of the literature, the study’s scientific goals, and feedback from community members concerning cultural practices relevant to sleep: (1) sleep environment, including room(s) type and size, sleep arrangements, sources of lighting and noise, and presence of electronics; (2) sleep behavior, such as preparing for sleep, awakenings, and napping; (3) quality of sleep; (4) sleep habits and beliefs; and (5) cultural dimensions of sleep (e.g., *What AI/AN or community beliefs and practices are you aware of that relate to sleep habits?; What AI/AN or community beliefs do you know of that relate to how sleep affects your body and health?*) Fig. 1.S (supplemental materials) provides the full interview protocol.

Interviewers were recruited from AI/AN communities by SPIWC to facilitate participation within communities that have been traditionally hard to recruit due to historical trauma and some degree of suspicion regarding research, as well as research “exhaustion” from being over-studied.²¹ Interviewers received a week-long training that addressed cultural sensitivity, motivational interviewing (MI) with youth, and interview techniques and note-taking. Interviewers were trained on MI, an evidence-based strategy that utilizes a nonjudgmental and collaborative approach,^{29,33} to create a positive interviewing experience for teens, and to help them feel more comfortable during the interview process, which helped increase the quality of data collection. All interviews were audio-recorded and transcribed verbatim.

Data analysis

Transcripts were uploaded to Dedoose to facilitate data analysis and interpretation. Dedoose allows multiple coders to work simultaneously through a cloud-based analytic platform.³⁴ It also allows team-based construction of coding hierarchies and code definitions. Using a mix of inductive and deductive reasoning, the two lead authors (AIP and RAB) developed a codebook.^{35–37} Pre-identified domains based on the interview guide, as well as open and in vivo coding were used to establish categories and themes.³⁸ Open coding refers to labeling interview content based on dimensions emerging from it.³⁸ In vivo coding means assigning code labels using words or short phrases directly from the text.³⁸ Coding was performed by two qualitative experts from our team (AIP and RAB) in multiple rounds, each consisting of AIP and RAB coding the same content independently, then meeting to reconcile discrepancies and substantive differences of interpretation. The first and second authors also presented periodic updates to the research team, eliciting feedback on coded content, code definitions, and coding rules. The codebook contained two main sections: one for socioecology of sleep, and one for sociocultural dimensions of sleep (the codebook is available on request).

Inter-coder reliability was estimated using Cohen's kappa.^{39,40} Final kappa scores for the socioecology codes ranged from 0.65–1, with an average of 0.8 across the 43 codes. Kappa scores for the sociocultural codes ranged from 0.68 to 0.94, with an average score of 0.82.

Results

We conducted 26 interviews in total, 10 in central California and 16 in southern California. Table 1 shows participant demographic characteristics. Youth were aged 12–16, with a mean age of 14.3. Fifty-four percent of the sample was male, and 92% of youth identified as AI/AN. All parents reported their participating adolescent child was of AI/AN heritage; however, not all youth self-identified as AI/AN on the survey, similar to other work in this area.^{41,42} Roughly 20 different tribes were represented. We do not provide tribal affiliation data in order to protect tribal and individual confidentiality.⁴³

About one-third of mothers and 9% of fathers self-reported as college graduates. Forty-one percent of fathers did not finish high school. This sample was comparable to the larger study sample, except for sex: the qualitative sample has 54% males (compared to 34% in the main sample) and 46% females (66% in the main sample).

Table 1
Sample demographics

Age	N (%)
12	1 (4%)
13	4 (16%)
14	11 (42%)
15	6 (23%)
16	4 (15%)
Sex	N (%)
Male	14 (54)
Female	12 (46)
Race	
American Indian/Alaska Native	24 (92%)
Other	2 (8%)
Mother Education	
College grad	7 (27%)
Some college	4 (15%)
High school grad	6 (24%)
Didn't finish high school	5 (19%)
Don't know	4 (15%)
Father Education	
College grad	2 (7%)
Some college	3 (12%)
High school grad	8 (31%)
Didn't finish high school	9 (35%)
Don't know	4 (15%)

Five main themes, each with subthemes emerged, and are discussed below: sleep patterns and desired sleep, sleep barriers inside the home, environmental factors, sleep facilitators, and cultural dimensions.

Sleep patterns and desired sleep

Sleep schedules

On weekdays, four (15%) participants reported going to bed between 8pm and 9pm, eight (31%) said they went to bed between 9pm and 10pm, and ten (38%) acknowledged going to bed after 10pm (see Table 2). Consistent with age-related shifts in sleep timing, older participants reported later bedtimes, and had trouble falling asleep early enough on school nights to get adequate sleep, as indicated by the following quote from a 16-year old female.

"So, it's like I'd say usually I fall asleep at like 10:00, 11:00. It's been getting worse, though, because like before it would be like 9:00 and the next day it was like 10:00, now it's like 11:00." (F16)

School schedule and parental rules were cited as the most common reasons for earlier bedtimes. For example, one participant explained his deliberate effort to go to bed early because he felt getting enough sleep helped with academic performance, whereas another described parental rules for bedtime during school days.

Reported rise times ranged between 6am and 8am, with a majority stating they wake up between 6am and 7am in order to go to school on time.

When asked about their desired amount of sleep, the preferred range was between 7 and 9 h, and desired wake-up times between 6am and 11am (see Table 2).

"I would suggest a good type of sleep is a sleep like around 8 [hours]. . . so I usually get those eight hours. I think it's better if you get more, like nine or ten." (M14)

For the weekends, reported sleep schedules included bedtimes between 10pm and 2am, and rise times between 10am and 11am.

Difficulty falling asleep or staying asleep

Five participants (19%) indicated difficulty falling asleep (i.e., about 30 min to fall asleep). Nineteen (73%) participants talked about nocturnal awakenings, saying they wake up during the night anywhere between "rarely" and "weekly". The most frequent reasons for nocturnal awakenings were needing to use the bathroom and temperature issues. Strategies to fall back to sleep included listening to music, covering themselves with blankets, or thinking relaxing thoughts.

Daytime sleepiness and compensatory strategies

Only 4 respondents said they had difficulty waking up in the morning, yet 19 (73%) participants mentioned that they felt tired or sleepy during the day. Some respondents also talked about compensatory strategies, including consuming caffeinated drinks ($N = 5$), focusing on work ($N = 3$), washing their face with cold water ($N = 2$), and eating ($N = 2$). Napping emerged as the most common compensatory strategy for 15 (58%) participants. Napping frequency ranged from "daily" to "once every other week", and napping duration was between 15 min and five hours. Tiredness was the main reason for napping. Other nap triggers included boredom in class or at home and traveling in a car.

"If I didn't sleep well the night before. Like if I went to sleep at like 2 and then woke up at 6. [I nap] whenever I can." (M13)

"I normally walk home from school, so it'll be like—I go to an after-school homework club. And then I'll go on my phone for maybe like 15 min and then I'll fall asleep like around 5pm and then wake up at like 7pm." (F13)

Table 2
Reported sleep schedule for weekdays and weekends, and desired sleep schedule

Age (N)	Sex (N)	Reported sleep range	Reasons	Illustrative Quotes
WEEKDAYS				
12 (1)	Female (1)	9:00pm - 6:00am	Parental rules, school schedule	"So at 8:00 is when my little sister has to get ready, but for me, I am allowed to stay up until 9:00 the latest on a school night."
13 (4)	Male (1) Female (3)	9:00pm - 6:30am 8:30pm/10:00pm - 6:00am	None mentioned Parental rules	"I stay on it [phone] till I can't anymore. My mom makes me put my phone up like, in her room, so I don't have it at night."
14 (11)	Male (7)	8:35pm/11:00pm - 6:00am, four said 9:00pm	Parental rules, school schedule	"[I]f you're an adult, I don't know, you can stay up until whenever you want. But if you really care about your education and all that, I would go to sleep like around 9:00 or something like that."
	Female (4)	9:30pm/11pm - 6:00am/6:45am, one is not in school, so no schedule	School schedule	"Their [sleep] is way more and better than mine, because they go to school. [T]hey have bedtimes and I don't have one."
15 (6)	Male (4)	8:00pm/11:30pm - 6:00am/8:00am, three said 10:00pm or later	None mentioned	
16 (4)	Female (2) Male (2)	10:00pm/11:30pm - 6:00am/7:15am 11:00pm-4:00am/6:00am, one is not in school, so no schedule	None mentioned Absence of parental rules, school schedule	"When it comes to my dad, he's like sleep whenever you need to. As long as you're up and you do what you need to do, you can sleep at whatever time. So my dad is very lenient. He doesn't give me rules when it comes to sleep, but if it's something important the next day, he will be like, "Okay. I usually don't give you rules, but you need to be responsible and you just sleep at least by this time." If I go past it, I'm not going to get in trouble, but I mean in the end, I suffered from it, so I understand."
	Female (2)	8:30pm/11:00pm - 6:00am	Difficulty falling asleep	"For me, the right amount of sleep is like seven to eight hours of sleep, and I try to get that much. So like I usually will go to sleep like around 9:00 or 9:15, but now I kind of like limit myself and try to go to sleep light at 8:30 or 8:50 so that way I can go to sleep earlier."
WEEKENDS				
12 (1)	Female (1)	Early bed time - early rise time	Hang out with friends	"Sometimes, I'm trying to go to sleep early because I would like get up early on a weekend and go hang out with my friends and we would like go some other places, and we would get home like later to the point where I have to sleep over."
13 (4)	Male (1) Female (3)	1:00am-2:00am Late bed time - 10:00am	None mentioned None mentioned	
14 (11)	Male (7)	12:00am/7:00am - unspecified rise time	Playing video games	"I'll play with my cousin if he comes over and we'll just stay up until around, I would say... One time I stayed up until 7:00. Sometimes I'll stay up until 5:00 or 6:00."
	Female (4)	11:00pm bed time - unspecified rise time (one respondent only)	None mentioned	
15 (6)	Male (4) Female (2)	12:00am - 11:00am None mentioned	None mentioned None mentioned	
16 (4)	Male (2)	12:00am/2:00am	Late night events, having no school schedule	"So we were there until 11:00. So we drive all the way back. So on the way back, I knocked out in the car. Then I got home around 12:20–12:30. And then the first thing I did was just get ready for sleep and knock out."
	Female (2)	10:00pm bed time - unspecified rise time (one respondent only)	None mentioned	
DESIRED SLEEP SCHEDULE				
12 (1)	Female (1)	9:00pm - 6:00am		"On like a school day I want to get my sleep, because we don't really have that much time. We have to get up early. So she [my sister] knows that if she annoys me, somebody will walk in here and tell her to stop, because we have to go to bed very early and get up very early and get ready for school so we can get there on time."
13 (4)	Male (1) Female (3)	9:00pm - 8:00am None mentioned		
14 (11)	Male (7)	9:00pm - 7:00am; 8:00pm-8:00am; 11pm-11:00am; 7–8 h; 9–10 h		"I would suggest a good type of sleep is a sleep like around 8:00, I believe, is like the best time to sleep. Or 9:00. 8:00 or 9:00, so you can get... I think the daily amount a person should have to be able to sleep is like eight hours, so I usually get those eight hours. I think it's better if you get more, like nine or ten."
	Female (4)	9:30pm - 9:00am; 9:00pm - 8:00am; 8–9 h		
15 (6)	Male (4)	12:00am - 11:00am; 9:00pm - 9:00am; at least 7–8 h		
	Female (2)	None mentioned		
16 (4)	Male (2)	1:00am - 10:00am/11:00am; at least 7 h		
	Female (2)	7–8 h (one respondent only)		

The effect of napping varied, with some participants describing feeling good and energetic, while others indicating feelings of sleep inertia, saying they felt tired, drowsy, or uncomfortable.

"[Napping] is good. Because then you could rest your body for a bit before you do like an activity or something." (F15)

"I feel like I go through that stage again to where I just want to go back to sleep. Like whenever you just wake up and you're still all drowsy." (M14)

Sleep hygiene

Twenty (77%) participants shared their opinions regarding personal habits that they thought were conducive to good sleep quality. These include having an evening routine, keeping electronic devices away from bed or bedroom, preparing for the following day, avoiding high sugar foods and drinks, and engaging in activities that make one sufficiently tired for bedtime.

"Preparing for sleep, I think it's having a set routine. So, like washing your face, brushing your teeth. Because I read somewhere that if you do that every night before you go to bed, it trains your body to start getting tired around when you start doing those things." (F14)

"I would say give yourself an hour off electronics before you go to sleep so that you don't feel like, 'Oh, I need to check my phone.'" (M16)

"Probably have an outfit ready for the next day so I don't have to like worry about that, like getting up and taking more time out of getting ready to pick out an outfit, or maybe getting my bag ready for school." (F12)

Sleep barriers inside the home

Electronics use

For ten (38%) participants, use of electronics such as phones, tablets and game consoles emerged primarily as a barrier to falling and staying asleep (see Table 3). Youth said that using phones for social media activity makes it difficult to stop and set the phone aside, that active notifications prompt individuals to resume phone use through the night, and that playing video games just before bedtime makes people physically and mentally alert, thus preventing falling asleep. Five male and 2 female interviewees said they use devices to play video games, while 4 female and 1 male participant said they use their phones to engage in social media. The amount of time that participants reported spending on electronic devices just before bedtime ranged from 20 min to 2 h. For example:

"I think it doesn't help me out when I go to sleep, because I want to be on it more. Like, instead of sleeping, I will want to be on it." (F13)

"I don't think [my phone] affects me, because I'm just like, on YouTube before I go to sleep. And I still fall asleep like, pretty fast without having trouble fall asleep. [...] I'm like, more awake when I come back to sleep when I'm on PS4." (M14)

"When it comes to sleep, I want to say—with my girlfriend, me and her stay up late. So, we'll be texting. We'll be playing Minecraft at like 12:00 or 1:00. I have like a separate phone that I play with at night." (M16)

While some youth experienced technology use as a barrier, 6 (23%) interviewees explained that using their devices before bedtime makes them tired and helps them fall asleep.

"Yeah, it [my phone] does [help me] because I like to watch videos on my phone and then it helps me sleep at times." (F16)

"I feel like [my phone] it's like a distraction. It like helps my mind like rest, like get more tired." (F15)

Noise

Nine (35%) participants described how noises inside the home were disruptive and a barrier to falling asleep. These included family members moving about the house at night, family members snoring or crying, pets, noise from own or family members' electronic devices, and family members talking. For example:

"My nephew used to live with us, and he would cry a lot because he was a baby. . . that's when I would mainly stay awake." (F14)

"They [brothers] just talk too much." (M14)

Light

Sources of light inside the home included lights inside the bedroom, lights from other rooms or hallways in the house, and lights from own electronics (e.g., phone, TV) or the electronics used by other family members. Light did not emerge as a factor affecting sleep, primarily because participants seemed able to control their exposure by shutting doors, covering windows with curtains and blankets, or positioning themselves away from the light source within the sleeping environment. Thirteen (50%) participants talked about how if they were to have lights on while trying to fall asleep it would be difficult for them to fall and/or remain asleep.

Six (23%) participants explained that having some source of light in the room facilitates their falling asleep process.

"I recently got this like salt candlelight. That was next to my bed, and you can dim it, and you can like make it brighter. It's really nice, because sometimes when I can't go to sleep, I'll just like turn it on so it's dim enough that it won't keep me that awake." (F12)

Temperature

Fourteen (54%) participants mentioned temperature as an important factor in their sleep environment: seven described how cold bedrooms negatively affected their ability to sleep, whereas thirteen talked about heat preventing them from sleeping well.

"It's usually cold over there [at grandparents' house], like really cold. We have to sleep on the floor once in a while like every time we visit." (M15)

In response to these factors, thirteen participants described strategies to regulate temperature in their bedrooms. Strategies to deal with excessive heat included opening doors or windows ($N = 3$), switching a fan or air conditioner on ($N = 3$), sleeping on the couch or floor ($N = 2$), separating bunkbeds into two regular beds ($N = 1$), resting against the wall to cool down ($N = 1$), and sleeping with no clothes on ($N = 1$). For example:

"If it's hot, like. . . You know how it gets hot up higher, like on the beds. Yeah. I'll go and put a blanket down and then just fall asleep like with a pillow and all that on the floor. If not there, I'll go right here on the couch." (M14)

Strategies to cope with cold sleeping environments included using multiple blankets ($N = 4$).

Environmental factors

Sleeping arrangements

All participants described their sleeping arrangements. All participants identified a bedroom as their primary sleep location. For example:

Table 3
Reported use of electronics just before bedtime

Age (N)	Sex (N)	Reported devices in bedroom	Reported activity with devices	Perceived disruption	Time spent with device immediately before sleep	Perceived facilitative role	Illustrative Quotes
12 (1)	Female (1)	Phone	Edit videos; chat with friends	Not affected by phone light	1 h		
13 (4)	Male (1)	Phone	Watch YouTube; play video games	Phone is distracting	30 min		
	Female (3)	Phone, laptop, one person not allowed devices in bedroom	Laptop for homework; social media; Netflix	Notifications are distracting, but 2 respondents not affected by phones	30 min	Phone facilitates tiredness	"I stay on it till like, I can't anymore. My mom makes me put my phone up like, in her room, so I don't have it at night." "I think it doesn't help me out when I go to sleep, because I want to be on it more. Like, instead of sleeping, I will want to be on it."
14 (11)	Male (7)	Phone, laptop, tablet, game consoles	Laptop for homework; social media	Two were not distracted by phone use, but one mentioned notifications as disruptive	1–2 h	Laptop facilitates tiredness	"I don't think it affects me, because I'm just like, on YouTube before I go to sleep. And I still fall asleep like, pretty fast without having trouble fall asleep." "My videogames or like my PC doesn't affect me. But the one thing I probably would say affects me is probably my phone and my iPad, because every time I get a notification, I either want to look at it just to see what it is, or I want to just maybe look at it just to see what is it. Sometimes I'll look at it, but other times, I'll just ignore it and just try to sleep." "I feel like it's just like more time for me to get tired while I'm just doing those things."
	Female (4)	Phone, laptop	Laptop for homework; social media; games with family; listen to music	Phone and notifications are distracting	30 min to 1 h	Phone facilitates falling asleep	"My laptop is usually on my bed. And then my phone and/or tablet on my dresser. Sometimes I sleep with my phone down. I would put my phone in the kitchen. It's very rarely in my room when I'm sleeping. It's usually plugged in the kitchen." "I barely use it [my phone], because of my grades. But most of the time when I have it, I just put music on right before I go to sleep with it." "I feel like it's like a distraction. It like helps my mind like rest, like get more tired."
15 (6)	Male (4)	Phone, game consoles	Play video games with little brother; listen to music	Phone light is unpleasant			
	Female (2)	Phone, tablet	Social media	Not affected by phone light; social media engagement delays sleep	20 min, but one respondent does not use phone before bed due to parental rule	Watching videos facilitate falling asleep	"If I do [use them before sleep] I'll get distracted and I won't go to sleep. Because on my tablet I read some books, so like if I read my books on my tablet, like I'll get so concentrated on it that I forget the time and then I forget I need to go to sleep. And when I'm done and I look at the time, I realize that it's late and then I have to go to sleep."
16 (4)	Male (2)	Phone, game consoles, radio	Texting, play video games, listen to music	Phone texting is disruptive, as well as staying up late playing video games	30 min	Phone facilitates tiredness	"I would say I get distracted off my phone, because like I'll be texting someone, or I'll be texting friends and then like I kind of want to say good night, but then they're telling something serious or something is going on, and I don't want to feel bad, so I'm like, "Okay, keep going." "When it comes to sleep, I want to say—with my girlfriend, me and her stay up late. So we'll be texting. We'll be playing Minecraft at like 12:00 or 1:00. I

(continued on next page)

Table 3 (Continued)

Age (N)	Sex (N)	Reported devices in bedroom	Reported activity with devices	Perceived disruption	Time spent with device immediately before sleep	Perceived facilitative role	Illustrative Quotes
	Female (2)	Phone, game consoles	Play video games, watch YouTube	None mentioned	Right before bed time, but one respondent does not use before bed due to parental rule	Phone facilitates going to sleep	<p>have like a separate phone that I play with at night."</p> <p>"We talk about like if anything is bothering us. Then I think after that, that's usually when we feel a little bit more connected and close, and then we'll go knock out. I think it's really cool that I do that with them. That's why I have problems staying up like on my phone, because it's usually at night where we kind of talk about personal stuff."</p> <p>"I know it's bad, but . . ."</p> <p>"Yeah, it does [help me] because I like to watch videos on my phone and then it helps me sleep at times."</p> <p>"My 3DS is just a little game console. I'll play that sometimes in the night if I'm bored of watching YouTube. But that's sometimes. I usually always just watch YouTube. I like hearing stories or I like hearing stuff like to fall asleep to. I can't just sleep in the dark, no nothing, I can't. That's not me. I have to have like stuff going on for me to fall asleep. So like I'll put a video on, I won't even watch it. I'll just like put it on the side, just listen to whoever's talking on the video and I'll eventually fall asleep."</p> <p>"I don't use it all night, because my mom kind of monitors my screen time. My mom has rules since I'm still like under her rules. I usually put my phone with her in her room, and so I don't really get distracted by my phone."</p>

“Usually, if it’s my two other brothers and my mom... Sometimes two of my brothers sleep in there with my mom or my little brother would sleep out here, but usually I would not have to share this area. I would just have the couch to myself and my brother could just sleep on this one.” (M14)

Eleven (42%) participants identified secondary sleeping arrangements, including a parent’s room, couches in the living room, floors, another parent’s house, or grandparents’ house. Reasons for these arrangements ranged from shared parental custody to accommodating visiting relatives. Among the 15 (58%) participants who shared a room, 5 expressed negative feelings about the arrangements, including loud and disruptive brothers, sisters, or cousins. For example:

“Well, [my little brother] is just like dirty, leaves everything around. And sometimes he shakes in the bed and keeps me awake at night sometimes.” (M14)

Others ($N = 2$) expressed positive views about sharing the sleeping environment.

[“The sleep was] really comforting because I had my grandma staying with us, so she was in the same room with me. So, I felt like really happy in a way because I used to live with her when I was younger, so it felt like more complete in a way.” (F14)

Noise outside the home

Sources of noise outside the home affected four (15%) interviewees, and included neighbors partying, street traffic, dogs barking, domestic animals, wind, and pedestrians talking. For example:

“I don’t really hear noise. And then like since we’re right here by traffic, we really don’t hear it. The only time we do is maybe on weekends, because the neighbors over there have like parties and super-loud music.” (M14)

Sleep facilitators

Background noise

Four (15%) participants talked about the need to have background noise inside the sleeping environment to facilitate falling asleep, such as shows and music.

“I usually always just watch YouTube. I like hearing stories, or I like hearing stuff like to fall asleep to. I can’t just sleep in the dark... So, like I’ll put a video on, I won’t even watch it. I’ll just like put it on the side, just listen to whoever’s talking on the video and I’ll eventually fall asleep.” (F16)

Parental involvement

Parental involvement around sleep was mentioned as a key facilitator for adhering to a sleep schedule. Fifteen (58%) participants made implicit or explicit statements about the extent of their parents’ or grandparents’ involvement in their sleep routines. Examples of such involvement ranged from strict monitoring of device screen time before bedtime and expression of parental beliefs about sleep to absence of any rules on sleeping schedules. Ten participants explained how parents would set up the sleep environment to facilitate sleep, including establishing phone cut-off times during weekdays and removing phones from the bedroom ($N = 8$), establishing bedtimes ($N = 2$), closing windows and pulling curtains at night ($N = 1$), and preparing tea ($N = 1$).

“I don’t use it [the phone] all night, because my mom kind of monitors my screen time.” (F16)

Five participants described their parents expressing their beliefs about why sleep was beneficial for health and school performance, as well as beliefs about good pre-sleep habits (e.g., the importance of having a routine every night and not using electronic devices).

“They [my family] feel like it’s important for me, because I need to get as much recovery since I play sports. So, sleep is basically—it means a lot.” (M14)

“They always tell me, ‘You need a good night’s sleep in order to have a good day the next time, like the next day.’ They’re always yelling at me to go to sleep too. My mom will walk by like when I’m on my phone like about to go to sleep, she’s like, ‘Turn it off, go to bed.’” (F14)

The parents of two participants were not buying sodas because they were concerned about the effects that sugary drinks may have on health and sleep. A few participants ($N = 2$) offered examples of grandparents being generally more lenient with late-night use of electronic devices compared to parents.

“They’re old, so they sleep around like 9:00pm, 10:00pm. They’ll take my littler brothers with them to bed. In the end, they only go, because she [grandmother] gives them her phone, and they’re up playing on the phone until like 12:00 or something.” (M16)

Cultural dimensions

Cultural identity

As part of understanding factors that may affect sleep habits and to determine how to best culturally tailor a sleep program for this population, we also asked youth about their culture. Youth indicated a wide range of attachment to AI/AN cultural identity, including statements about their degree of cultural knowledge, level of participation in cultural practices, and relationships with other AI/AN individuals.

Twenty youth (77%) made at least one positive statement about their attachment to AI/AN identity. In most cases, such statements were as simple or straightforward as stating attachment to one or more tribal identities and listing family members who identified as AI/AN or describing attendance at multiple cultural events. For example:

“I’ve never been to a reservation before. I’ve been to a couple of pow-wows. They’re pretty cool. I’ve been to some of those little cultural things that they have like where everyone just hangs out and then like the girls, they dance and then like all the guys are like drumming, they sing and that.” (F15)

In some cases, youth added further descriptive details on what their AI/AN identity meant to them and how it affected their life. *“What’s different is that like I learn more about like my ancestors, or like things that are like way back then. Like when I look at my friends, I know they’re more of this generation. They probably don’t get a good perspective or anything of their culture, and they probably know nothing about their culture.” (F16)* Some youth described detailed knowledge of AI/AN events and cultural activities.

Not all youth voiced strong attachment to AI/AN identity, cultural knowledge, or connection to other AI/ANs as has been shown with other research with urban AI/AN teens.⁴⁴ Three respondents (12%) (2 females, 1 male) did not discuss AI/AN cultural identity at all during their interviews. Another three respondents (12%) (3 females) discussed this topic with interviewers but voiced disavowal, lack of knowledge, or lack of connection to AI/AN identity. For example, one 15-year-old female respondent said, *“... I don’t know too much about my culture. I’m not really taught much about it.” (F15)* Furthermore, among the 20 (77%) respondents who made positive statements

about AI/AN identity, seven of these youth also made statements indicating lack of knowledge, lack of attachment, or lack of connection to certain parts of AI/AN identity.

Cultural activities

Youth discussed involvement in many different AI/AN cultural activities. When asked about cultural activities connected with sleep, 14 youth respondents (54%) mentioned dream catchers. Youth who talked about dream catchers indicated a range of knowledge and cultural meaning. Some youth simply described the presence of dream catchers in the house. Some youth attributed little or no cultural meaning to dreamcatchers, even if they did have them in the house. For example, one 15-year-old female said, *“It’s more for decoration to me, because I don’t know too much about my culture. I’m not really taught much about it.”* (F15)

Other youth were more aware of the cultural meaning in relation to sleep. For example, one 12-year-old female respondent said that the family always had dreamcatchers in their rooms; *“There is one in our room. We haven’t touched it in a while. We do hang it up in our rooms every time we move into like a new house. It will always be hanging by a window.”* (F12) And some youth had very detailed, sophisticated narratives about their family’s dreamcatchers and their cultural significance. For example, one respondent described how her father blessed every dreamcatcher before they hung it in the house:

“Dreamcatcher, it’s like you have a nightmare, they get caught in it—of course, it’s a dreamcatcher—but my dad, when he gives it to us, he blesses them himself, puts his own energy into it. So even though he’s not with us, he’s there and he’s protecting us as we sleep. . . Yeah, before he gives anything Native-wise, he blesses it. He has everyone leave the room. He’s alone for about like 30, 40 min alone just blessing it.” (F14)

Five youth (19%) also described some AI/AN family beliefs related to the meaning of dreams. For example, one 13-year-old female said, *“I think they [AI/AN community] would say like, probably dreams would like, not tell, but give you an idea of what like, what the future has like, in store for you, or whatever.”*

Youth also described a range of cultural practices with less overt connection to sleep. For example, 13 youth (50%) mentioned sage or cedar burning. Respondents made less overt connections between sage burning and sleep, mostly noting the ability of sage to cleanse one’s house of evil spirits. When one interviewer noticed sage burning in the house, the respondent said, *“That’s for like to bless the house and clean the house out from all the evil spirits and all that.”* (M14) Another respondent said, *“Well, they usually hang sage in like a little pot like on the ceiling or something like that at least trying to get rid of evil spirits from sage.”* (M15)

Discussion

To our knowledge, this is the first qualitative study to address sleep health in urban AI/AN youth. Findings build on previous sleep research in disadvantaged populations by taking a community-based approach toward furthering our understanding of sleep attitudes and beliefs, sleep rituals and routines, sleep patterns, the sleep environment, and multiple levels of sleep barriers and facilitators in this under-studied and vulnerable population. Our interview protocol was informed by AI/AN community members to be culturally sensitive, and included questions about sleep perceptions and behaviors in the community, and asked youth about multi-generational family dynamics and sleep, as well as cultural practices and beliefs related to sleep in the AI/AN community. We examined sleep behavior in the home and family context, with a view to developing a program suited for this community context. This work fills a significant gap in

qualitative research on adolescent sleep in general as little work exists to understand the barriers and facilitative factors that may affect teens’ sleep. This is also the first study to explore sleep behavior among urban AI/AN youth, which is especially important given the majority of AI/ANs live in urban areas.²² The in-depth individual perspectives can inform subsequent program design efforts by facilitating culturally-tailored approaches for urban AI/AN youth. For example, such a design might incorporate beliefs about the connection between sleep and holistic health, the meaning of dreams, or relaxing night-time rituals such as smudging (burning sage). Follow-on research will seek to understand more about how youth could incorporate such beliefs and practices into their sleep-related routines and behaviors.

Similar to other racial/ethnic groups, urban AI/AN teens reported many overlapping issues: getting insufficient sleep, late bedtimes, mid-day napping, and pre-sleep use of electronic devices, suggesting that they too experience difficulties in sustaining healthy sleep behaviors.⁴⁵ Our findings also align with prior results on youth sleep as we found that AI/AN youth reported a wide window of bedtimes, with older participants stating that they go to bed later than 10pm.^{27,46} In addition, although youth reported desired amounts of sleep that align with recommendations for this age group (between 8 and 10 h), there was a large discrepancy between what they expressed as the desired amount of sleep, and what they actually do in practice. Other researchers observed this discrepancy between adolescents’ sleep beliefs and actual behavior.^{46,47} For sleep quality, we found that the majority of youth reported experiencing nocturnal awakenings, most often due to the need to go to the bathroom, which is also similar to other sleep work with adolescents from other ethnic/racial groups.⁴⁷

Napping was a coping strategy when tired for more than half of the youth, which also aligns with results from other studies with youth.^{47,48} Some prior work has shown that regular midday napping among adolescents partially reversed detrimental effects of sleep deprivation,⁴⁹ and was significantly associated with higher happiness, self-control, reduced behavioral problems, and better academic achievement.⁴⁸ Other studies have discouraged napping in order to achieve healthy sleep patterns in adolescents.^{50,51} These conflicting results underscore the need to further explore the role of tailored napping strategies in promoting healthy sleep behavior among urban AI/AN adolescents.

Most urban AI/AN teens said that their use of electronic devices affected their ability to get to sleep, with a majority indicating that they used their phones for social media, and that it was difficult to stop because they felt compelled to answer notifications and messages. Prior work with teens from the general population has indicated their emotional investment in social media communication, which is very disruptive to sleep patterns when this communication occurs late at night.⁵² Thus, programs to enhance sleep behaviors in this group should consider motivations for electronic device use around bedtime. Other research among the general U.S. population has shown a gender divide, with girls being more affected by this emotional investment in social media communication, while boys tend to play video games on their devices.⁴⁷ Our findings also indicated that male participants tended to use their devices predominantly to play video games and watch YouTube videos, whereas females described their electronics use as primarily for texting with friends and being on social media. This warrants further exploration in larger and more representative samples of urban AI/AN teens, especially with a view to informing program development addressing sleep health.

Other important sleep disruptors were noise inside the home and temperature. To date, sleep interventions for adults and teens have sought to improve sleep by predominantly reducing exposure to noise and light in the sleeping environment.^{53–57} Noise continues to remain an important sleep barrier for adults and teens alike. In addition, we identified temperature as a prominent hindrance to sleep, which was only recently identified in a study of 65 teens.²⁶ This

finding suggests that temperature regulation strategies should form an important component in future programs among urban AI/AN teens. Overall, the barriers to sleep that teens discussed cohere with emerging research focused on policy-level changes to improve neighborhood and housing conditions as a means to reduce racial/ethnic and socioeconomic factors of sleep and other health outcomes within urban areas.^{58,59}

Parents were essential in promoting the importance of sleep to their teens and enforcing healthy sleep behavior, similar to recent work in this area.⁴⁷ Parental involvement ranged from strict monitoring of device screen time before bedtime and expression of parental beliefs about the importance of sleep to absence of any rules on sleeping schedules. Notably, however, 42% of our adolescents did not mention parental involvement in supporting their sleep. Consistent with these findings, a systematic review of the literature on parental knowledge about healthy sleep practices and children's sleep found 1) variation in knowledge by parent education levels, 2) very poor parental knowledge about signs or consequences of sleep problems in children, and 3) poor long-term retention in parental knowledge following educational interventions.⁶⁰ Therefore, although many youth in this sample (58%) did endorse parental involvement as important for their sleep behavior, there is still clearly a need to develop sleep health literacy programs for urban AI/AN adolescents and their parents.

Previous systematic reviews focused on various racial/ethnic groups have underscored the importance of developing tailored programs with age- and culturally-informed motivational components to enhance and sustain healthy sleep behaviors.^{27,46,61} Similarly, prior work with urban AI/ANs emphasizes the need for integrating culture within prevention and treatment programs^{29–32,62–64}. Also, community leaders, health administrators, and elders serving urban AI/ANs emphasize the need for providing AI/AN youth with the opportunity to learn more about their culture, which they believe will help them lead healthier lives.⁴⁴ Given our focus on developing a culturally relevant program for sleep, we also asked youth about their culture and whether they engaged in any cultural practices related to their sleep habits. As expected, urban AI/AN youth in our study described a wide range of attachment to their AI/AN cultural identity, from strong endorsement to outright rejection, which is important to recognize in sleep health program design. For example, it is important to create a nonjudgmental prevention or sleep health promotion environment that can integrate culture in a way that is comfortable for urban AI/AN youth with a range of cultural experiences.

Participants described two main cultural practices directly related to sleep: (1) the use of dreamcatchers to capture nightmares, and (2) family discussions regarding the spiritual dimensions or other deep meanings of dreams. Youth also described a range of other cultural practices that may relate to sleep, including cleansing and prayer ceremonies that have elements of meditation and mindfulness. These have been linked with neural mechanisms underlying emotion regulation and psychological well-being in previous work,^{65–67} including young adolescents.⁶⁸ Participants also described involvement in complex, sometimes multi-day traditional practices, such as powwows and sweat lodges, which have a known impact both on sleep and psychological health.^{69,70} Thus, it may be helpful to incorporate this information into sleep programs for urban AI/AN youth to enhance their cultural appropriateness by recognizing the inter-relatedness of the physical, emotional, mental, and spiritual dimensions of health recognized by many AI/AN tribal groups.⁶⁴ Development of culturally informed sleep programs for urban AI/AN youth may also consider the utilization of traditional practices, including dream catcher educational workshops, sweat lodge ceremonies, and other traditional practices that have relaxing or other healthy psychological and behavioral elements that could be integrated with other sleep intervention components that have been shown to work for diverse populations of youth in the U.S.

Limitations

Qualitative research has some limitations. First, generalizability is hindered by the relatively small sample size. Our participants also come from central and southern California urban areas, hence not representative of experiences across the U.S. However, this qualitative sample was randomly selected from a larger pool of comparable respondents. Furthermore, the team-based, systematic analysis of the data ensured rigorous coding and reduced likelihood of any potential prior biases regarding content and focus. Finally, although all interviewers received sustained training throughout the interviews, some discrepancies in style and rapport may have occurred.

Conclusion

In sum, our findings for this AI/AN urban youth sample indicate that these teens have similar concerns as teens from other ethnic/racial groups in the U.S., including not getting enough sleep and excessive use of electronics prior to bedtime. They also talked about how temperature and noise inside and outside the home affected their sleep. Of great importance was the finding that many teens acknowledged that their parents played a key role in supporting their sleep health. Finally, results suggest that culturally-targeted sleep programs should be open and flexible for this population given their range of cultural experiences.

Compliance with ethical standards

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Research involving human participants and/or animals

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individuals included in the study.

Declaration of Competing Interest

The authors declare that they have no conflict of interest.

Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.sleh.2020.03.004>.

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