



Sleep Hygiene and Sleep Health in a Sample of Urban Children with and without Asthma



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Introduction

- Sleep plays an important role in children's health. Sleep hygiene, or the practice of utilizing consistent sleep behaviors (e.g., bedtime routine), and a healthy sleep environment (e.g., eliminating sleep disruptions) promote good sleep health (Mindell et al., 2009).
- Socioeconomic disparities exist with respect to children's sleep health and urban contextual stressors may affect sleep outcomes (El-Sheikh et al., 2013). Urban children with asthma are at an increased risk for poor asthma control and poor sleep outcomes, and managing asthma may further challenge optimal sleep health (Koinis-Mitchell et al., 2015).

Goals of Study

- 1) Describe sleep hygiene behaviors and sleep environment characteristics in urban children with and without asthma
- 2) Examine whether having asthma is a risk factor for poor sleep hygiene above and beyond urban context.
- 3) Examine association between sleep hygiene and sleep outcomes in children with and without asthma.

We hypothesized that the added challenge of managing asthma would negatively effect sleep hygiene. We expected that optimal sleep hygiene would predict better sleep outcomes in both groups.

Methods

Participants: Children, 7-9 years old (M=8.3, Male 53%), with (N=216) and without asthma (N=130) from urban districts and from African American (AA, 33%), Latino (45%), or non-Latino white (NLW, 21%) backgrounds were included. 63% of families had incomes at or below the poverty threshold.

Procedures: Families participated in a 4-week home-monitoring period in which the child wore an actigraph to assess sleep duration. Sleep questionnaires were administered halfway through monitoring period.

Measures

- **Asthma Diagnosis and Severity:** Persistent asthma was confirmed by a study clinician using guidelines-based approaches (NHLBI, 2007)
- **Poverty Status:** Determined by comparing each family's income to the US federal per capita poverty threshold for a family of their size
- **Neighborhood Risk:** Determined utilizing census block membership and a risk score assigned based on neighborhood characteristics
- **Sleep Hygiene:** Children's Sleep Hygiene Scale (Harsh, 2002) assessed physiological, cognitive, emotional, environmental, routine, and sleep stability sleep as well as total score
- **Sleep Environment:** General Sleep Inventory (Hale et al., 2009) assessed: 1) bedroom sharing, 2) bed sharing, 3) sleep shifting, 4) home or neighborhood noise disturbance, and 5) number of people in the home
- **Daytime sleepiness:** Daytime Sleepiness subscale of the Children's Sleep Habits Questionnaire (Owens et al., 2000)
- **Sleep duration:** Measured using actigraph sleep monitors (MiniMitter Company, Bend, OR, USA). Sleep duration was defined as the total time between sleep onset and offset (Acebo et al., 2005)

Results

Preliminary Analyses

- Age, poverty status, and neighborhood risk were negatively associated with sleep hygiene (r 's = -.13, -.14, -.18, respectively, p 's < .05) and sleep duration (r 's = -.27, -.14, -.13, respectively, p 's < .05).
- In both groups, NLW children had more optimal sleep hygiene, longer sleep duration, and less daytime sleepiness. With the exception of sleep duration, these ethnic sleep disparities disappeared when controlling for poverty ($F(3, 314) = 1.61, p = .20$).

Sleep Hygiene and Environment in Children with and without Asthma

- Children without asthma had more optimal sleep hygiene behaviors; however, after controlling for poverty, hygiene scores did not differ across groups ($F(2,315) = 2.35, p > .05$).
- Children with asthma were more frequently disturbed by noises in the home ($F(1,339) = 5.37, p < .05$). All other environment factors were similar.

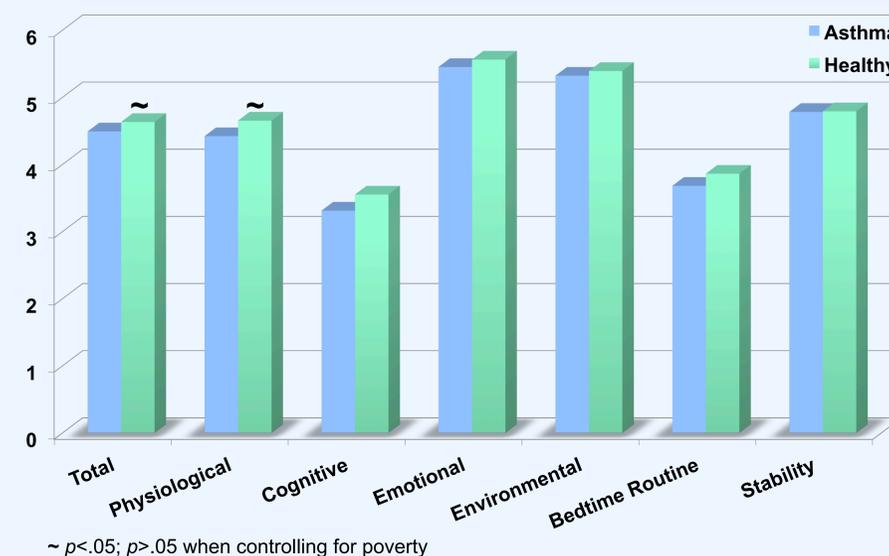
Urban Context, Asthma, and Sleep Hygiene

- Higher neighborhood risk or poverty status predicted poorer sleep hygiene above and beyond asthma status ($\beta = -.17, p < .01; \beta = -.13, p < .05$).

Sleep Hygiene, Sleep Duration, and Daytime Sleepiness

- For children with asthma, better sleep hygiene predicted longer sleep duration ($\beta = .24, p < .001$) and lower levels of daytime sleepiness ($\beta = -.39, p < .001$) controlling for poverty.
- In children without asthma, more optimal sleep hygiene predicted lower levels of daytime sleepiness ($\beta = -.46, p < .001$), but did not significantly predict sleep duration, controlling for poverty.

Sleep Hygiene



Neighborhood Risk, Asthma, and Sleep Hygiene

	β	t	R^2 adj.
Step 1			
			.03**
Neighborhood risk	-.18	-3.30**	
Step 2			
			.04
Neighborhood risk	-.17	-3.13**	
Asthma	.10	1.86	

Poverty, Asthma, and Sleep Hygiene

	β	t	R^2 adj.
Step 1			
			.02**
Poverty	-.14	-2.55*	
Step 2			
			.03
Poverty	-.13	-2.31*	
Asthma	.09	1.53	

* $p \leq .05$, ** $p \leq .01$

Summary and Conclusions

- The current study provides further evidence for the important role of urban contextual factors in sleep health in children.
- Sleep evaluations with urban children should incorporate identification of urban risk factors that may negatively affect sleep behaviors and recommendations should focus on what may be within the families' abilities to control.
- For example, it may be that sleep routine assessment needs to consider multiple individuals who sleep in the child's bedroom (e.g., same-aged children or other family members) who can be integrated into sleep recommendations to minimize noise and disruptions.
- Children with chronic illness, such as asthma, may have unique sleep health needs. Integration of sleep health recommendations and consideration of urban risk factors when developing asthma management plans may be particularly important.

References

- Acebo C, Sadeh A, Seifer R, Tzischinsky O, Hafer A, Carskadon MA. (2005). Sleep/wake patterns derived from activity monitoring and maternal report for healthy 1-to 5-year-old children. *Sleep*, 28(12),1568-1577
- El-Sheikh, M., Bagley, E. J., Keiley, M., Elmore-Staton, L., Chen, E., & Buckhalt, J. A. (2013). Economic adversity and children's sleep problems: Multiple indicators and moderation of effects. *Health Psychology*, 32(8), 849.
- Hale L, Berger LM, LeBourgeois MK, Brooks-Gunn J. (2009). Social and Demographic Predictors of Preschoolers' Bedtime Routines. *Journal of Developmental & Behavioral Pediatrics*, 30(5), 394-402.
- Harsh, J. R., Easley, A., & LeBourgeois, M. K. (2002). A measure of children's sleep hygiene. *Sleep*, 25, A316.
- Koinis-Mitchell, D., Kopel, S. J., Boergers, J., McQuaid, E. L., Esteban, C. A., Seifer, R., LeBourgeois, M. (2015). Good Sleep Health in Urban Children With Asthma: A Risk and Resilience Approach. *Journal of Pediatric Psychology*, jsv046.
- Mindell, J. A., Meltzer, L. J., Carskadon, M. A., & Chervin, R. D. (2009). Developmental aspects of sleep hygiene: findings from the 2004 National Sleep Foundation Sleep in America Poll. *Sleep Medicine*, 10(7), 771-779.
- National Heart Lung and Blood Institute. (2007) *Guidelines for the Diagnosis and Management of Asthma*. National Institutes of Health.
- Owens, J., Spirito, A., McGuinn, M., & Nobile, C. (2000). Sleep habits and sleep disturbance in elementary school-aged children. *Journal of Developmental & Behavioral Pediatrics*, 21(1), 27-36.