Associations of the Residential Built Environment with Adolescent Sleep Outcomes

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Over 75% of US high school students obtain insufficient sleep, placing them at risk for adverse health outcomes. Identification of modifiable determinants of adolescent sleep is needed to inform prevention strategies, yet little is known about the influence of the built environment on adolescent sleep. In this prospective study, actigraphy was used to assess sleep outcomes among 110 adolescents for 14 days each in eighth and ninth grades: duration (hours/night), onset and offset, and sleeping ?8 hours. Home addresses were linked to built environment exposures: sound levels, tree canopy cover, street density, intersection density, population density, and housing density. Mixed-effects regression estimated associations of built environment measures with sleep outcomes, adjusting for sex, race, parent education, household income, household size, grade, weeknight status, and neighborhood poverty. A 1-standard deviation (SD) increase in neighborhood sound was associated with 16 minutes later sleep onset (? = 0.28; 95% confidence interval (CI): 0.06, 0.49) and 25% lower odds of sleeping for ?8 hours (odds ratio (OR) = 0.75, 95% CI: 0.59, 0.96). A 1-SD increase in neighborhood tree canopy was associated with 18 minutes earlier sleep onset (? = ?0.31, 95% CI: ?0.49, ?0.13) and 10 minutes earlier sleep offset (?= ?0.17, 95% CI: ?0.28, ?0.05). No associations were observed for density-based exposures. Higher neighborhood sound level was associated with lower odds of sufficient sleep, while higher tree canopy cover was associated with more favorable sleep timing. Neighborhood sound levels and tree canopy cover are potential targets for policies and interventions to support healthier sleep among adolescents.

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