

Social and Demographic Factors Related to Sleep Duration

Commentary on Basner M et al. American time use survey: Sleep time and its relationship to waking activities. *Sleep* 2007; 30:1085-1095, and on Hale L & Do DP. Racial differences in self-reports of sleep duration in a population-based survey. *Sleep* 2007; 30:1096-1103.

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Since an association between sleep duration and mortality was first described over 40 years ago,¹ interest in sleep as a risk factor for adverse health has grown. Studies have generally confirmed the presence of a U-shaped association between sleep and mortality. In other words, individuals with both short and long sleep durations have a greater mortality risk than those with intermediate sleep durations. More recently, publications have begun reporting that sleep duration can also predict an ever growing number of diseases.^{2,3}

At the same time, relatively little interest has been paid to determining what factors predict or influence an individual's sleep duration. This issue is of importance for a number of reasons. First, in order to demonstrate that the association between sleep duration and adverse health outcomes is causal in nature, it is necessary to ensure the observed associations are not confounded. By definition, a confounder must be a predictor of the exposure of interest (i.e., sleep duration). Thus, understanding the important determinants of sleep duration will allow for the design of studies that can appropriately control for confounders and provide an unbiased measure of the true effect of sleep duration. Second, if extreme sleep durations do have a causal effect on health outcomes, knowledge of the determinants of sleep duration will allow for identification of subgroups at highest risk for sleep related morbidity. Finally, understanding how an individual's sleep habits are defined will be vital for the development of effective interventions to alter those habits. Initial studies have identified socioeconomic status as one of the strongest correlates of sleep duration.⁴ Low income levels, living alone, and low self-perceived societal status all predict extremes of sleep duration, demonstrating the potential importance of the social environment on sleep habits. In this issue of *SLEEP*, two studies make further inroads into defining what determines an individual's sleep duration.

Hale and Do investigate how race, ethnicity, and urban environment influence self-reported sleep duration.⁵ Basner et al take a different approach analyzing time use data to consider what activities are exchanged for greater or lesser amounts of sleep.⁶ Both studies utilize data from tens of thousands of individuals and both

were designed to provide a representative sampling of the U.S. population ensuring generalizability of their findings.

Hale and Do confirm previous reports that African Americans are more likely to have extreme sleep durations than Caucasians.⁷ These associations diminish but do not disappear after adjusting for socioeconomic status. A similar but weaker association was observed in other minority groups. Given the known difficulties in disentangling race from socioeconomic status⁹ as well as potential differences in cultural attitudes towards sleep, further work is needed before concluding a biologic difference in sleep exists across races. Whatever the reason for the association, a provocative but important question raised by these findings is whether the poorer health of minority populations may be due in part to their poorer sleep.

A novel finding of this work is that living in an urban environment, independently of race and socioeconomic status, also increases the likelihood of short sleep. The potential mechanisms by which increased urbanization might reduce sleep are manifold ranging from greater amounts of ambient light and noise to an increased number of late night alternatives to sleep (e.g., nightclubs and bars). In addition, the types of jobs and work hour requirements in a large city likely differ from rural settings.

The importance of work hours on sleep duration is highlighted in the study by Basner et al. Using survey data on how Americans spend their time, the authors investigate what short sleepers do with the additional time they have available. The number of work hours was strongly and inversely correlated with sleep hours, such that each hour reduction in sleep is associated with about 30 additional minutes spent on work. Individuals who sleep less also spend substantially more time on travel and personal care. Interestingly, both short and long sleepers spend more time watching television suggesting not all of the associations can be explained through economic models where sleep time is exchanged for other activities perceived to be more valuable. Rather, long sleepers must have some underlying feature that makes them choose to both sleep more and watch more television.

A limitation of both works is their cross-sectional designs, making inferences regarding causality premature. Of note, clinical trial data do suggest reducing work hours can increase sleep duration.¹⁰ Nevertheless, these studies highlight the need for future research on sleep duration and health outcomes to collect covariate data on variables such as race, neighborhood, work hours, and commuting time, so that the independent effect of sleep duration can be assessed. For this to occur, epidemiologic studies designed to investigate the effects of sleep duration are needed rather than data from cohorts in which a question about sleep was added as an afterthought.

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A more important problem with both studies and with the field in general relates to understanding what it is that we are measuring. Very little work has been done to validate questionnaire assessments of sleep duration. The two studies, surveying similar cohorts but using very different instruments to assess sleep duration, report highly divergent findings. Hale and Do report 9.5% of Americans get 9 or more hours of sleep while Basner and colleagues find 23.9% get 9.5 hours or more. The prevalence of short sleep (24.6% versus 14.4%) is similarly discordant. The large night-to-night variability in sleep, the increasing prevalence of shiftwork causing nontraditional sleep routines, and the difficulties in distinguishing actual sleep from time spent trying to sleep all complicate attempts to accurately measure sleep duration. Research is sorely needed to test, compare, and validate various questionnaire measures of sleep duration against each other and against objective measures. While such methodological work will not be as flashy as studies reporting short sleep to be a risk factor for yet another disease, until this fundamental work is done, our ability to understand the true effects of curtailed and extended sleep will continue to be hampered.

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