

■ Letter

Link between Short Sleep Duration and Hypertension

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To the Editor

I read with great interest the article by Song et al.,¹⁾ titled “The association between sleep duration and hypertension in non-obese premenopausal women in Korea”. The investigators showed the association between short sleep duration (<6 hours a night) and hypertension in non-obese premenopausal women, but not in obese premenopausal women. In contrast, long sleep duration (>8 hours a night) was not associated with hypertension in either non-obese or obese women.¹⁾

As this study provides valuable information, I would like to discuss a few points. First, this study may have an information bias that leads to the incorrect classification of variables. For example, sleep duration measures were self-reported. This study could be improved by more objective measures, such as actigraphy and polysomnography, to address subjective or false reports. Understandably, it is difficult to adopt objective measures in the Korean National Health and Nutrition Examination Survey because they are costly and inconvenient, and therefore, several previous studies have accepted the limitation of self-reports. On the contrary, this study is strengthened by the fact that the hypertension variable was based either on self-report of physician diagnosis or on two blood pressure readings. As hypertension frequently goes undiagnosed, using only self-report of physician diagnosis, as has been done in many other studies, can create misclassification bias. Second, studies investigating the relationship between sleep duration and hypertension include various other variables (age, sex, menopause, socioeconomic status, smoking, caffeine/alcohol consumption, obesity-related variables, cardiovascular diseases, depression, snoring, or sleep apnea) and consider them as either potential confounders or mediators of the relationship. In my opinion, obesity should be regarded as a partial

mediator between short sleep duration and hypertension. Therefore, stratification and additive adjustment in model 3 for obesity in this study might result in attenuation away from the true association (that is, over-adjustment).²⁾ Third, it was found in this study that long sleep duration was not associated with hypertension in study subjects. To the best of my knowledge, no published longitudinal studies have shown the association between long sleep duration and hypertension, although some cross-sectional studies have shown this.³⁻⁵⁾ In fact, there is little biological plausibility that long sleep duration itself has adverse health effects.⁶⁾ Instead, those with hypertension may have elevated proinflammatory cytokines, which presumably induce sleepiness and fatigue.^{7,8)} Considering this, it is likely that long sleep duration is an epiphenomenon of hypertension rather than a cause. Fourth, this study was conducted among premenopausal women with a mean age of 35.5 years old. Interestingly, many epidemiological studies have indicated that the relationship between short sleep duration and hypertension is stronger in female subjects.⁹⁻¹²⁾ Cappuccio et al.⁹⁾ in the Whitehall II study pointed out a few potential mechanisms, including true biological interaction between short sleep duration and sex, differential self-reporting of sleep duration, and distribution differences of correlates of short sleep duration (for example, incidence of depression may be higher in women reporting short sleep duration). Moreover, study subjects restricted to premenopausal and relatively younger women may heighten the strength of association between short sleep duration and hypertension, compared to postmenopausal women who already have major hormonal changes and psychosocial stress.^{11,12)} Accordingly, the selection of subjects in this study does make sense.

Despite inconsistent results in subpopulations, there are lines of evidence from experimental sleep deprivation stud-

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ies¹³⁾ and population-based epidemiological studies^{3-5,9-12)} suggesting that short sleep duration is linked with hypertension. A recent meta-analysis of longitudinal studies also found short sleep duration to increase the risk of hypertension.¹⁴⁾ Sleep restriction can activate several biological pathways, such as augmented activity of the sympathetic nervous system, altered hormone levels (elevated cortisol, elevated ghrelin, and reduced leptin), increased oxidative stress/inflammation, and accelerated atherosclerosis.¹³⁾ All of these changes are thought to be responsible for the link between short sleep duration and hypertension.¹³⁾

In conclusion, there is sufficient evidence that short sleep duration acts as a risk factor for hypertension. Thus, primary care providers should pay attention to early detection and prevention of hypertension in subjects with sleep deprivation.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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