GW23-e2492

EPIDEMIOLOGICAL EVIDENCE FOR THE LINKS BETWEEN SLEEP DURATION AND HIGH BLOOD PRESSURE: A SYSTEMATIC REVIEW AND META-ANALYSIS

doi:10.1136/heartjnl-2012-302920d.35

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Objectives To assess whether the relationship between short or long sleep duration and hypertension is present from epidemiologic evidence, and investigate the relationship quantitatively.

Methods We performed a comprehensive search of cross-sectional and longitudinal studies using PubMed and the Cochrane Library through February 2012. This was supplemented by review of reference lists of original and relevant reviews. After the related data were extracted by two investigators independently, pooled ORs or relative risks (RRs) were estimated using a random-effects model or a fixed-effects model. Publication bias was evaluated, and sensitivity and meta-regression analyses were performed.

Results Thirty-two articles met our inclusion criteria (24 studies among adults and 8 among children and adolescents), with age ranging from 3 to 106 years. Twenty-one adult studies involving 225 858 subjects were included in the meta-analysis. The pooled result from cross-sectional studies showed that short sleep duration was associated with a greater risk of hypertension (OR: 1.21; 95% CI 1.09 to 1.34, $p < 0.001$), and long sleep duration also increased the risk of hypertension (OR: 1.11; 95% CI 1.04 to 1.18, $p = 0.003$). There was no evidence of publication bias. Pooled analysis from longitudinal studies indicated a significant association between short sleep duration and hypertension (RR: 1.23; 95% CI 1.06 to 1.42, $p = 0.005$), but an insignificant relationship between long sleep duration and hypertension (RR: 1.02; 95% CI: 0.91 to 1.14, $p = 0.732$). The effects of sleep duration differed by gender, location of the populations and definitions of short or long sleep duration. Meta-regression analysis including seven variables did not find the sources of heterogeneity. After a descriptive analysis of related studies among children and adolescents, we found this association was controversial.

Conclusions Among adults, a U-shaped relationship between habitual sleep duration and hypertension was found in a cross-sectional level. Short sleep duration was associated with a higher risk of hypertension even longitudinally. More attention needs to be paid to this lifestyle factor.