Title:	Meta-analysis of short sleep duration and obesity in children and adults
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Abstract:

Background. Recent epidemiological studies suggest that short sleep duration may be associated with the development of obesity from childhood to adulthood.

Objectives. To assess whether the evidence supports the presence of a relationship between short sleep duration and obesity at different ages, and to obtain an estimate of the risk.

Methods. We performed a systematic search of publications using MEDLINE (1996-2007 wk 40), EMBASE (from 1988), AMED (from 1985), CINHAL (from 1982) and PsycINFO (from 1985) and manual searches without language restrictions. When necessary, authors were contacted. Criteria for inclusion were: report of duration of sleep as exposure, BMI as continuous outcome and prevalence of obesity as categorical outcome, number of participants, age, and gender. Results were pooled using a random effect model. Sensitivity analysis was performed, heterogeneity and publication bias were also checked. Results are expressed as pooled odds ratios (OR [95% confidence intervals, CIs]) and as pooled regression coefficients (β; 95% CIs).

Results. Of 696 studies identified, 45 met the inclusion criteria (19 in children and 26 in adults) and 30 (12 and 18, respectively) were pooled in the meta-analysis for a total of 36 population samples. They included 634,511 participants (30,002 children and 604,509 adults) from around the world. Age ranged from 2 to 102 years and included boys, girls, men and women. In children the pooled OR for short duration of sleep and obesity was 1.89 (1.46 to 2.43; P < 0.0001). In adults the pooled OR was 1.55 (1.43 to 1.68; P < 0.0001). There was no evidence of publication bias. In adults, the pooled β for short sleep duration was -0.35 (-0.57 to -0.12) unit change in BMI per hour of sleep change.

Conclusions. Cross-sectional studies from around the world show a consistent increased risk of obesity amongst short sleepers in children and adults. Causal inference is difficult due to lack of control for important confounders and inconsistent evidence of temporal sequence in prospective studies.

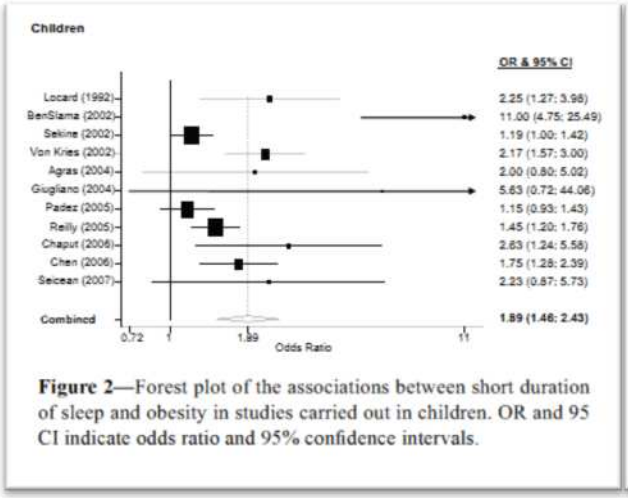

Figure 2—Forest plot of the associations between short duration of sleep and obesity in studies carried out in children. OR and 95 CI indicate odds ratio and 95% confidence intervals.

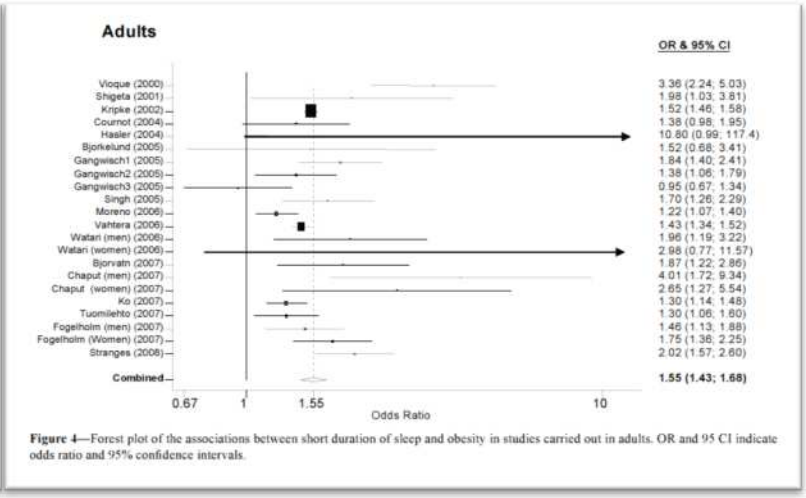

Figure 4—Forest plot of the associations between short duration of sleep and obesity in studies carried out in adults. OR and 95 CI indicate odds ratio and 95% confidence intervals.