

Title: Quantity and quality of sleep and incidence of type 2 diabetes. A systematic review and meta-analysis
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Abstract:

Objectives. To assess the relationship between habitual sleep disturbances and the incidence of type 2 diabetes and to obtain an estimate of the risk.

Research design and Methods. We conducted a systematic search of publications using MEDLINE (1955–April 2009), EMBASE, and the Cochrane Library and manual searches without language restrictions. We included studies if they were prospective with follow-up ≥ 3 years and had an assessment of sleep disturbances at baseline and incidence of type 2 diabetes. We recorded several characteristics for each study. We extracted quantity and quality of sleep, how they were assessed, and incident cases defined with different validated methods. We extracted relative risks (RRs) and 95% CI and pooled them using random-effects models. We performed sensitivity analysis and assessed heterogeneity and publication bias.

Results. We included 10 studies (13 independent cohort samples; 107,756 male and female participants, follow-up range 4.2–32 years, and 3,586 incident cases of type 2 diabetes). In pooled analyses, quantity and quality of sleep predicted the risk of development of type 2 diabetes. For short duration of sleep ($<5\text{--}6$ h/night), the RR was 1.28 (95% CI 1.03–1.60, $P = 0.024$, heterogeneity $P < 0.015$); for long duration of sleep ($<8\text{--}9$ h/night), the RR was 1.48 (1.13–1.96, $P < 0.005$); for difficulty in initiating sleep, the RR was 1.57 (1.25–1.97, $P < 0.0001$); and for difficulty in maintaining sleep, the RR was 1.84 (1.39–2.43, $P < 0.0001$).

Conclusions. Quantity and quality of sleep consistently and significantly predict the risk of the development of type 2 diabetes. The mechanisms underlying this relation may differ between short and long sleepers.

