

Daytime napping, daytime sleepiness and the risk of metabolic diseases: Dose-response meta-analysis

Tomohide Yamada, Nobuhiro Shojima, Toshimasa Yamauchi, Takashi Kadowaki

Department of Diabetes and Metabolic Diseases, Graduate School of Medicine, The University of Tokyo, Japan

Abstract

OBJECTIVE-

To investigate the association between daytime sleepiness or napping and the risk of metabolic diseases, and to quantify the potential dose-response relation.

METHODS-

Medline, Cochrane Library, Web of Science, and Science Direct for pertinent articles published by 2015.

RESULTS-

About 300,000 Asian and Western subjects were selected. Pooled analysis revealed that excessive daytime sleepiness and a longer nap time (≥ 60 min/day) significantly increased the risk of type 2 diabetes by about 50% compared with the absence of these factors. In contrast, a short nap (< 60 min/day) did not. Nap time was not associated with an increased risk of obesity.

A dose-response meta-analysis using the cubic spline model showed a J-shaped relationship between nap time and the risk of diabetes or metabolic syndrome, with no effect of napping up to about 40 minutes/day followed by a sharp increase in the risk at longer times.

CONCLUSIONS-

Nap time and diabetes or metabolic syndrome may be associated via a J-curve relation. Further studies are needed to confirm the efficacy of a short nap.

Introduction

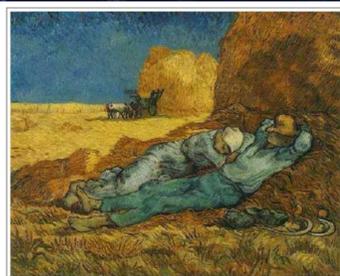
Sleep is an important component of a healthy life, along with a good diet and appropriate physical activity.

Recent studies have shown that a U-shaped curve describes the relation between the duration of sleep (hours of sleep/night) and type 2 diabetes.

However, some people cannot get enough sleep at night due to social life and work life related factors.

We have recently identified a J-shaped relationship between nap time and risk of Cardiovascular disease (Sleep 2015).

We performed a meta-analysis to investigate the association daytime sleepiness or napping and the risk of metabolic diseases.



Vincent van Gogh (1853-1890)
The Siesta (after Millet) 1889



<http://www.ephomeofsuccess.com/2010/06/28/tips-for-studying-last-minute/>

Methods

Searches

Searches of the Medline, Cochrane Library, Web of Science, and Science Direct were conducted from 1950 until 2015 using MeSH "Nap" OR "Siesta" AND "Excessive Daytime Sleepiness" AND "Diabetes" OR "Obesity" OR "Metabolic Syndrome".

Selection

We performed initial screening of study titles or abstracts, while the second screening was based on full-text review. Studies evaluating the relation of type 2 diabetes or obesity or metabolic syndrome to napping (Excessive Daytime Sleepiness) were considered eligible for inclusion if the following criteria were fulfilled: 1) the full text was published in English; 2) the influence of napping or sleeping on the relative risk (risk ratio, hazard ratio, or odds ratio) of events was reported with confidence intervals; and 3) the definitions of events were reported. The STROBE statement and the Newcastle-Ottawa Scale were used to assess the validity of the studies identified.

Meta-Analysis

The pooled relative risk (RR) adjusted for possible confounders and its 95% confidence interval (CI) was calculated for each of the events assessed in each study by the DerSimonian-Laird random-effect model weighted with inverse variance. Cubic-spline dose-response meta-analysis was also performed.

Results

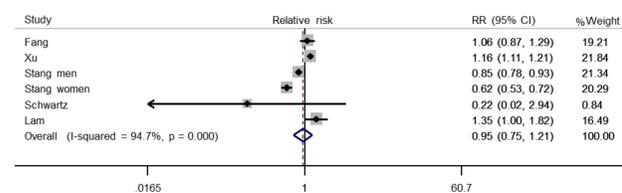
Study selection

307,237 Asian and Western subjects stratified into 21 categories (reports) were selected. In each study, analyses were well adjusted for several confounders.

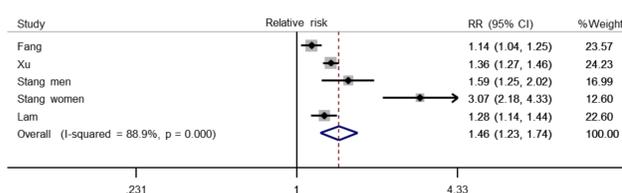
Association of Excessive daytime sleepiness (EDS) or napping with the risk of type 2 diabetes

EDS vs. No EDS Relative Risk 1.56 (1.13-2.14, $p < 0.01$; N=7)

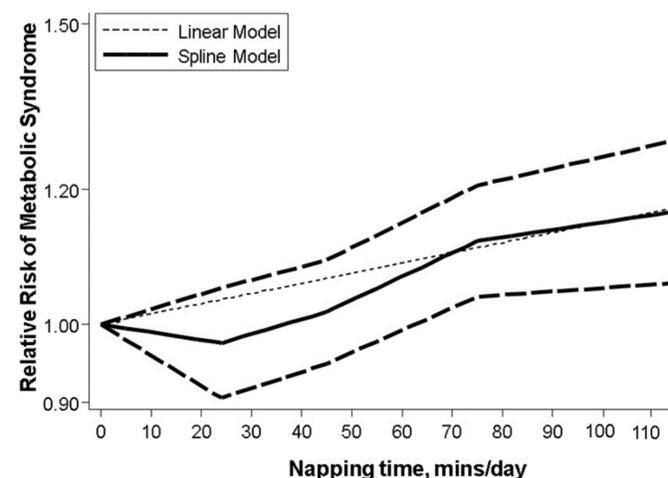
Short Nap (<60 min/day) vs. No Nap



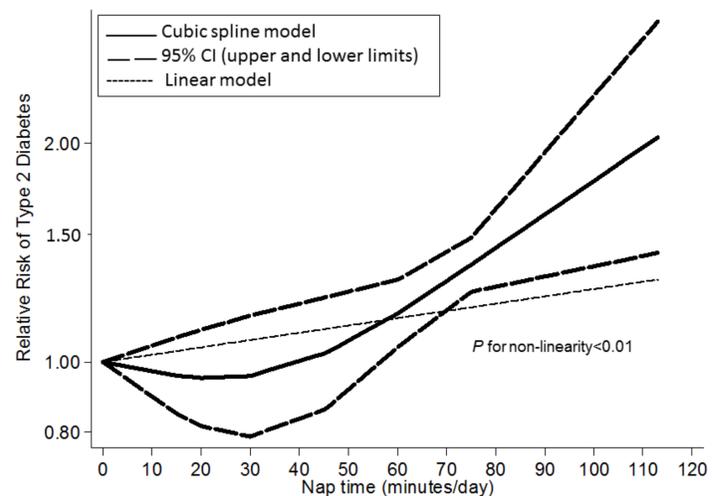
Long Nap (≥ 60 min/day) vs. No Nap



Nap time and the risk of metabolic syndrome

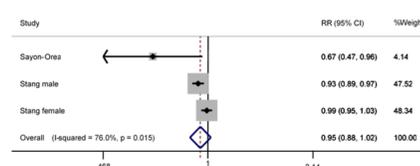


Nap time and the risk of type 2 diabetes

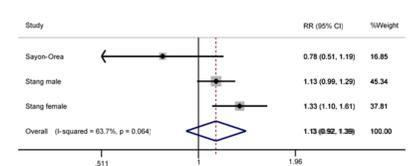


Association between napping and the risk of obesity

Short Nap (<60 min/day) vs. No Nap

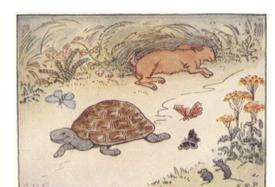


Long Nap (≥ 60 min/day) vs. No Nap



Conclusions

Nap time and diabetes or metabolic syndrome may be associated via a J-curve relation. Further studies are needed to confirm the efficacy of a short nap.



COI: There is no conflict of interest in this research.