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ORIGINAL ARTICLE

The association between sleep duration and overweight or obesity in Taiwanese adults: A cross-sectional study

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Received 19 December 2015; received in revised form 20 July 2016; accepted 25 July 2016

KEYWORDS

Sleep duration;
Overweight;
Obesity;
Body mass index;
Adults

Summary

Background/objective: The effect of eating habits and sedentary lifestyle on obesity has been extensively examined and supported; however, few studies have examined the association of sleep duration with obesity in Taiwan. To redress this gap, this study investigated the association of sleep duration with overweight and obesity in community-dwelling Taiwanese adults.

Methods: A cross-sectional study was performed using the 2005–2008 Nutrition and Health Survey in Taiwan (NAHSIT). A logistic regression model was used to calculate the odds ratios (ORs) and 95% confidence intervals (CIs) of the association of sleep duration with overweight and obesity. Nightly sleep duration was divided into three groups: >6 to <9 h (normal), ≤6 h (short), and ≥9 h (long).

Results: A total of 1548 adults aged 20–64 years were examined in this study. The adjusted ORs of obesity for short and long sleep duration relative to a normal sleep duration were 1.31 (95% CI 1.01, 1.76) and 1.64 (95% CI 1.04, 2.61), respectively. No significant association of sleep duration with overweight was observed.

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<http://dx.doi.org/10.1016/j.orcp.2016.07.005>

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Please cite this article in press as: Lin C-L, et al. The association between sleep duration and overweight or obesity in Taiwanese adults: A cross-sectional study. *Obes Res Clin Pract* (2016), <http://dx.doi.org/10.1016/j.orcp.2016.07.005>

Conclusions: The present study suggests that both short and long sleep duration are associated with obesity risk.

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Introduction

Over the few decades, obesity has become a common epidemic disease [1]. Evidence has indicated that obesity negatively affects health outcomes and increases health care costs. Moreover, obesity prevention has become a critical health concern and has been addressed in several countries [2]. A study reported that obesity results from complex multifactorial interactions, such as those involving genes, eating habits, sedentary lifestyle, and environment [3].

Studies have reported an association of short sleep duration with obesity risk [4–6]. Moreover, experimental studies have indicated that a decrease in sleep duration is associated with changes in orexins, including increased ghrelin and decreased leptin [7–9]. By contrast, other studies have reported that no significant association of sleep duration with body mass index (BMI) [10,11]. This contradiction indicates the necessity of further research to verify the relationship between these two factors.

Prior study indicated that the association of sleep duration with obesity may be affected by racial disparities [12]. For instance, African Americans are more susceptible to the curtailment of sleep duration and have a higher risk of obesity than Caucasians [13]. Compared to the Western society or other Asian countries, both sleep duration and obesity have been extensively surveyed [4–6,14,15]. In Taiwan, one study reported that adolescents who frequently obtained 6–8 h per night had a decreased probability of becoming overweight [16]. In addition, the paucity of studies addresses the correlation between sleep duration and weight abnormality in Taiwanese adults. Therefore, this study investigated the association of varying sleep durations with overweight and obesity in Taiwanese adults aged 20–64 years based on the 2005–2008 Nutrition and Health Survey in Taiwan (NAHSIT).

Methods

Data sources

We performed a secondary database analysis using data from the 2005–2008 NAHSIT a population-based cross-sectional study performed using a stratified multistage cluster sampling method. The details of the sampling method have been reported in previous studies [17,18].

Inclusion criteria for participation

The study population included community-dwelling adults aged 20–64 years who participated in the 2005–2008 NAHSIT. In total, 1548 participants who completed both the physical examination and questionnaire form were included in the current analysis.

Definitions of sleep duration, overweight, obesity, waist circumference, hypertension, and type 2 diabetes

The participants described their sleep duration during weeknights (Sunday–Thursday) and weekends (Friday and Saturday) in the previous week. We used the following formula described by Hall et al. to determine sleep duration: $((5 \times \text{weekday standard deviation (SD)}) + (2 \times \text{weekend (SD)})/7)$ [19]. Furthermore, we divided nightly sleep duration into the following three groups according to a previous study [20]: short (≤ 6 h per night), normal (>6 to <9 h per night), and long (≥ 9 h per night).

Overweight/obesity: BMI was calculated as weight (kg) divided by height (m^2) [21]. Height and weight were measured to the nearest 0.1 cm and 0.1 kg, respectively [18]. Overweight and obesity were defined as BMI 24–26.9 and BMI ≥ 27 , respectively, in accordance with criteria for Taiwanese adults defined by the Ministry of Health and

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