



Investigation of ways to minimize the risk of health problems associated with accumulated sleep loss

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Middle-aged adults have increased roles both at home and at work, which makes it difficult for them to get enough sleep. Based on the epidemiological findings that people who sleep around 7 h have the lowest risk of developing lifestyle-related diseases and death, 6–8 h is considered an appropriate sleep duration for adults [1–3]. However, according to the survey conducted by Japan's Ministry of Health, Labour and Welfare, half of Japanese aged 40–59 years sleep less than 6 h per day on average, and a quarter of them sleep less than 5 h [4]. Since accumulated sleep loss (sleep debt) increases the risk of various diseases [5], it is desirable for society to change to become a place where people of all ages can get enough sleep each day. However, it is actually quite difficult to achieve this in a short period of time, because this issue is closely linked to socio-economic status. Given this current situation, it is necessary to investigate ways to avoid health problems caused by sleep debt.

Weekend catch-up sleep (CUS) is a common way to recover from sleep debt incurred on weekdays. However, it remains uncertain whether weekend CUS cancels out the risks of health problems associated with sleep debt. In the current issue of *Sleep and Biological Rhythms*, Dr. Takuya Yoshiike and co-authors shed light on the preventive effect of weekend CUS on mortality in middle-aged adults (40–64 years) [6]. They examined the longitudinal association of weekend CUS and sleep duration with mortality (median follow-up period, 12.3 years) using data from the Sleep Heart Health Study, and found that short weekend CUS (1 h) was associated with lower mortality compared to no weekend CUS in those who slept more than 6 h (hazard ratio (HR), 0.48). When stricter cutoffs were applied for sleep duration, among the participants who slept less than

5.5 h, those with long weekend CUS (2 h or more) showed mortality rates similar to those who slept more than 6.5 h, while those with short weekend CUS (1 h) showed higher mortality rates (HR, 1.84).

Although the study has some limitations, mainly with respect to the methods of evaluating sleep duration and weekend CUS, the current report provides several insights into human sleep and the significance of CUS for health. First, among middle-aged adults who get the recommended minimum of 6 h of sleep, some may not get enough sleep of the necessary quality to maintain their health [1–3]. Second, for these individuals, short CUS on the weekend may offset the risk of health problems associated with sleep debt. Third, if accumulated sleep debt is excessive, however, sleep debt might not be paid back by short weekend CUS.

It is inevitable that the middle-aged adult population will contain a certain number of sleep-deprived individuals. Therefore, public health promotion should include education on how to minimize the risk of health problems associated with sleep debt, such as CUS.

Declarations

Conflict of interest The author has received research grants from Mochida Pharmaceutical and Shionogi Pharma, research grants and speaker's honoraria from EA Pharma, Eisai, Otsuka Pharmaceutical, Sumitomo Pharma and Takeda Pharmaceutical, and speaker's honoraria from Meiji Seika Pharma, MSD, Viatrix, and Yoshitomi Pharmaceutical, and payment for expert testimony from Mochida Pharmaceutical, outside the submitted work.

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