February 3, 2025

Relationship Between Sleep and Nutrition with App Data: A Large-scale Study

Researchers from University of Tsukuba conducted a large-scale study utilizing 4,825 data recorded in smartphone applications related to diet management and sleep. They found that individuals with higher protein intake had longer total sleep time than those with lower protein intake. Moreover, individuals who consumed more dietary fibers had longer total sleep time but shorter sleep latency (time taken to fall asleep) and wakefulness after sleep onset, among other observations.

Tsukuba, Japan—Diet and sleep, which are essential for human survival, are interrelated. However, recently, various services and mobile applications have been introduced for the self-management of health, allowing users to record and gather data on their eating and sleeping habits.

In response to these trends, this study examined the relationship between nutrients and sleep using data from people who simultaneously used the dietary management application "ASKEN" (Asken, Inc.) and the sleep game application "Pokémon Sleep" (Pokémon, Inc.). The analysis utilized 14 nutrients quantified from daily diet records in ASKEN and the total sleep time, sleep latency, and wakefulness after sleep onset obtained from the three-axis accelerometer data built into smartphones in Pokémon Sleep. Data from 4,825 users, who gave their consent, were analyzed considering the interdependence of the major nutrients. The results showed that (1) the higher the total energy, the shorter the total sleep time and the longer the wakefulness after sleep onset, (2) participants with high protein intake had longer total sleep time, (3) participants with high intake of monounsaturated fatty acid and polyunsaturated fatty acids and (4) those with high intake of polyunsaturated fatty acids have shorter sleep latency and wakefulness after sleep onset, whereas those with high intake of monounsaturated fatty acids have longer sleep latency and wakefulness after sleep onset, (5) participants with high dietary fiber intake have longer total sleep time and shorter sleep latency and wakefulness after sleep onset, and (6) participants with high sodium intake (high sodium-to-potassium ratio) had shorter total sleep time and longer sleep latency and wakefulness after sleep onset.

Correspondence

Professor Masashi Yanagisawa
International Institute for Integrative Sleep Medicine (WPI-IIIS), University of Tsukuba
URL: https://sleepymouse.jp/

Funding

This work was supported by the World Premier International Research Center Initiative (WPI) from the Ministry of Education, Culture, Sports, Science and Technology (MEXT) to M.Y.; Japan Agency for Medical Research and Development (AMED) JP21zf0127005 to M.I. and M.Y.; and the

COI STREAM initiative launched in 2013 by MEXT, as well as the COI-NEXT initiative launched in 2020 by MEXT JPMJPF2017 to J.S.

Article

"Relationship Among Macronutrients, Dietary Components, and Objective Sleep Variables Measured by Smartphone Applications: A Real-World Cross-Sectional Study." *Journal of Medical Internet Research*, 30.01.2025.
DOI: 10.2196/64794

Keywords

Primary keyword: Sleep
Secondary keywords: Sleep onset latency; High fat diets; Obesity; Health care policy; Malnutrition; Nutritional physiology; Metabolism; Nutrition counseling; Nutrition