# Association between sleep duration and multimorbidity and mortality using the NHIS data*

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***Abstract*—Sleep disturbances and their far-reaching health consequences have gained increasing attention recently. Sleep is vital in maintaining overall health, yet a substantial portion suffers from poor sleep quality or abnormal sleep durations. Such disturbances have been linked to various adverse outcomes, including increased risks of chronic conditions like cardiovascular disease, diabetes, and depression. When these chronic conditions co-occur, they form what is known as multimorbidity—a situation where individuals live with two or more long-term health conditions. Multimorbidity is associated with worse health outcomes, including a higher risk of mortality**

***Index Terms*—NHIS, Sleep, Morbidity, Mortality,**

## I. Introduction

The literature has overwhelming evidence that sleep duration is associated with morbidity and mortality risk1–7. Though poor sleep has been seen as an outcome of poor health conditions8–11, sleep problems can result in multimorbidity and increased mortality risk, especially among older adults6,7,10. Sleep time outside the recommended 7-9 hours is considered detrimental to health outcomes9,10,12. Sleep problems have been linked with poor health, ranging from immune system suppression11, risk of heart diseases9, metabolism and weight problems13, endocrine and nervous system disruption14, physical impairment, and injuries11,15. Sleep difficulty is associated with the risk of heart disease, hypertension, stroke, and other cardiovascular problems1,3,4. One interesting thing about recent research4,5,12,13,16,17 is that the lack of sleep has been associated with multimorbidity in patients.

## II. Methods

### A. Maintaining the Integrity of the Specifications

Data source The data utilized in this study was sourced from the National Health Interview Survey (NHIS), an extensive database curated by the National Center for Health Statistics (NCHS), which operates under the Centers for Disease Control and Prevention (CDC). Study Population and Research Design The research utilized data from the 2004 NHIS, a cross-sectional survey encompassing 94,597 participants. This dataset is notable for its comprehensive documentation of sleep duration and associated factors, making it ideal for analyzing sleep health and its impacts. This dataset also facilitated a prolonged follow-up period through a linkage with the National Death Index (NDI) mortality records, extending until December 31, 2019.

## III. Results

article [utf8]inputenc Women were overrepresented in all categories, comprising the majority across sleep durations, with the highest proportion seen in the 7–8-hour group (33.39). Married individuals were predominantly in the 7–8-hour sleep group (31.36), while single and separated/divorced/widowed individuals were more common in the short sleep (1–4 hours) and long sleep (10 hours) categories. In terms of smoking and drinking habits, the 7–8-hour group had the highest proportion of never-smokers (44.59) and those with no history of alcohol consumption (22.49). The prevalence of normal BMI was also highest in the 7–8-hour sleep group (25.79), whereas the short sleep group (1–4 hours) and extended sleep group (10 hours) had a more significant proportion of individuals classified as obese. Overall, the 7–8-hour sleep group demonstrated a younger age profile, healthier behaviors, and more stable demographic characteristics than other sleep categories.

## References

[1] Yin J, Jin X, Shan Z, et al. Relationship of Sleep Duration with All-Cause Mortality and Cardiovascular Events: A Systematic Review and Dose-Response Meta-Analysis of Prospective Cohort Studies. J Am Heart Assoc. 2017;6(9). doi:10.1161/JAHA.117.005947

[2] Trivedi R, Man H, Madut A, et al. Irregular Sleep/Wake Patterns Are Associated with Reduced Quality of Life in Post-treatment Cancer Patients: A Study Across Three Cancer Cohorts. Front Neurosci. 2021;15. doi:10.3389/fnins.2021.700923

[3] Wang YH, Wang J, Chen SH, et al. Association of Longitudinal Patterns of Habitual Sleep Duration with Risk of Cardiovascular Events and All-Cause Mortality. JAMA Netw Open. 2020;3(5): e205246. doi:10.1001/jamanetworkopen.2020.5246

[4] Han H, Wang Y, Li T, et al. Sleep Duration and Risks of Incident Cardiovascular Disease and Mortality Among People with Type 2 Diabetes. Diabetes Care. 2023;46(1):101-110. doi:10.2337/dc22-1127

[5] Zhao B, Meng Y, Jin X, et al. Association of Objective and Self-Reported Sleep Duration with All-Cause and Cardiovascular Disease Mortality: A Community-Based Study. J Am Heart Assoc. 2023;12(6). doi:10.1161/JAHA.122.027832

[6] Biswas P, Adebile T V., Sejoro S, et al. Association of sleep duration and all-cause and cancer-specific mortality: results of 2004 national health interview survey (NHIS). Sleep Biol Rhythms. Published online September 3, 2024. doi:10.1007/s41105-024-00551-y

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