Insomnia Symptoms With Subjective Short Sleep Duration in a Random Sample From the United Kingdom

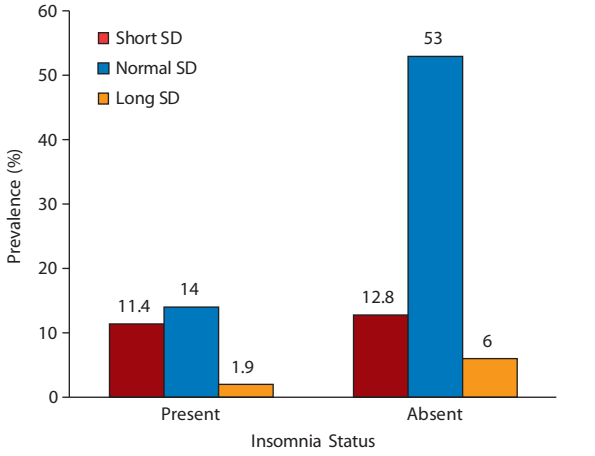
Ilia Kritikou, MD[a]; Philip R. Gehrman, PhD[b,c]; Diego R. Mazzotti, PhD[b]; and Subhajit Chakravorty, MD[b,c,*]

Insomnia and short sleep duration (SSD, sleep duration <6 hours per day) are linked to increased morbidity from cardiometabolic and neuropsychiatric disorders.[1,2] Furthermore, insomnia with objectively assessed short sleep duration is a severe phenotype of insomnia related to a range of comorbidities.[3] However, very little information exists on the prevalence of insomnia with subjective SSD (I + SSD), a complex sleep phenotype, in community-dwelling, middle-aged subjects. The aim of this preliminary investigation was to explore the prevalence and common clinical correlates of I + SSD. The knowledge gained will improve our understanding of this insomnia subtype and identify these patients based on its preliminary prevalence estimates and associations with common characteristics.

Methods

We evaluated a random sample of 5,000 subjects to assess the feasibility and preliminary associations before conducting sophisticated modeling using the entire UK Biobank sample. The UK Biobank is a large population-based study that was conducted between 2006 and 2010 and involved participants aged 37–73 years.[4] Insomnia symptoms were evaluated in this survey using the question, "Do you have trouble falling asleep at night or do you wake up in the middle of the night?" Responses were recorded as a binary variable, with cases defined as those reporting insomnia symptoms "usually" or "sometimes" and the control subjects as "never/rarely."[5] Sleep duration was assessed using the question, "About how many hours sleep do you get in every 24 hours?" We evaluated subjective sleep duration as a continuous measure as well as an ordinal variable (short: ≤6 hours, normal: 7–8 hours, and long: ≥9 hours of sleep) after excluding values ≥19 hours from the analysis.[5,6] Sociodemographic correlates included age, sex, body mass index (BMI), Townsend Deprivation Index (TDI),[7] and a history of psychiatric evaluation. The TDI, a measure of social deprivation, is generated as a sum of 4 variables. These variables include the percentage of homes that are not owner occupied, the percentage of economically active residents who are unemployed, the percentage of households that do not have access to a car, and the percentage of households with more than 1 person per room. A positive value on the TDI indicates higher material deprivation, negative values represent relative affluence, and a score of 0 indicates an area with overall mean values.[7,8] Independent sample *t* tests, Mann-Whitney test, analysis of variance, linear or logistic regression, and χ^2 square tests, as appropriate, were used to evaluate the association between sleep-related traits and other variables. We also conducted a sensitivity analysis. In the results, we classified subjective sleep duration as very SSD (VSSD, ≤5 hours), SSD (6 hours), normal sleep duration (NSD, 7–8 hours), and long sleep duration (≥9 hours).[9]

Figure 1. Prevalence of Insomnia and Insomnia Comorbid With Sleep Duration Abnormalities in the Sample[a]



[a]$\chi^2 = 443.8$, $P < .0001$.
Abbreviation: SD = sleep duration.

Results

Our sample consisted predominantly of middle-aged individuals with a mean ± SD age of 56.3 ± 8.0 years, BMI of 27.4 ± 4.8 kg/m^2, and TDI score of −1.3 ± 3.0. About half of the sample were women (55.2%), and 11.0% had a history of psychiatric problems. Among the sample, 27.4% complained of insomnia symptoms, 24.2% reported SSD (5.4% with VSSD and 19.0% with SSD), and 11.4% endorsed I + SSD (Figure 1). Individuals with insomnia symptoms were relatively older (57.5 ± 0.2 versus 55.9 ± 0.1 years, $P < .00001$), were more likely to be women (17.1% versus 10.3%, $P < .0001$), had a

[a]University of Crete Medical School, Crete, Giofirakia, Greece
[b]Perelman School of Medicine, Philadelphia, Pennsylvania
[c]Cpl. Michael J. Crescenz VA Medical Center, Philadelphia, Pennsylvania
*Corresponding author: Subhajit Chakravorty, MD, MIRECC, 2nd Floor, 116 Cpl. Michael J. Crescenz VA Medical Center, Philadelphia, PA 19104 (Subhajit.Chakravorty@uphs.upenn.edu).

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higher BMI (27.9 ± 5.4 versus 27.2 ± 4.5 kg/m^2, $P < .0001$), had a higher TDI score (−1.1 ± −0.08 versus −1.3 ± 0.05, $P = .03$), and were less likely to have psychiatric problems (4.3% versus 6.7%, $P < .0001$) compared to those without insomnia.

When compared to those with NSD, individuals with subjective SSD had a higher BMI (28.1 ± 5.5 versus 27.0 ± 4.4 kg/m^2, $P < .0001$) and a lower TDI score (−0.9 ± 3.2 versus −1.4 ± 2.9, $P < .0001$) and reported a lower prevalence of psychiatric disorders (3.3% versus 6.1%, $P < .001$). No difference in age or sex was evident between these sleep duration categories. In the sensitivity analyses, we found similar trends when VSSD, SSD, and NSD were compared. The shorter sleep duration categories (VSSD, SSD, and NSD, respectively) were associated with relatively higher BMI (29.3 ± 6.3, 27.8 ± 5.2, 27.0 ± 4.4 kg/m^2, $P < .0001$), lower TDI scores (−0.02 ± 3.3, −1.1 ± 3.0, and −1.4 ± 2.9, $P < .0001$), lower prevalence of psychiatric disorders (1.1%, 2.3%, and 6.1%, $P < .001$), and increasing age (56.6 ± 7.7, 56.3 ± 7.6, 56.1 ± 8.1 years, $P < .0005$), but there were no differences in sex prevalence. Compared to the other groups (insomnia symptom status across remaining sleep duration categories), those with I + SSD were more likely to be older, women, and overweight; endorsed higher TDI scores; and had higher rates of psychiatric comorbidity ($P \leq .0001$ for all comparisons).

Conclusion

Most of the middle-aged subjects with insomnia symptoms also met the criteria for I + SSD. Those endorsing comorbid I + SSD were more likely to be older, female, and overweight; had higher social deprivation scores; and were more likely to have comorbid neuropsychiatric disorders. The higher prevalence of I + SSD in middle-aged individuals, women, and those with social deprivation is in line with that seen in prior studies.[10,11] Our use of subjective sleep duration in the interactive sleep phenotypes makes it challenging to compare our results with many previous studies (wherein investigators evaluated sleep duration objectively). Future studies should investigate the prevalence of I + SSD with subjective and objective sleep measures simultaneously using a larger sample size and explore their associations with other clinical variables.

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