A Reappraisal on the Associations between Sleep-disordered Breathing, Insomnia, and Cardiometabolic Risk

To the Editor:

Sleep-disordered breathing (SDB) and insomnia are highly prevalent conditions in general population and exhibit significant and independent associations with cardiometabolic risk (e.g., hypertension [HT] and diabetes [DM]) (1, 2). The major effort to define the incremental risk has been directed to SDB or insomnia as isolated conditions, even though both can frequently cooccur. Indeed, comorbid insomnia and sleep apnea (COMISA) has recently emerged as a topic of significant interest (3), whereby despite the obvious clinical divergence of the cardinal symptoms and signs of each of these entities, the two sleep disorders share many common symptoms, which may hinder recognition, diagnosis, and treatment, and hamper the adequate management of patients with COMISA (4).

The hypothesis has been put forth of mutually interactive, bidirectional effects between insomnia and SDB, in which the adverse consequences of COMISA will be enhanced, particularly regarding the cardiovascular system (5, 6). In addition, alterations in the circadian timing system may also interfere with the mechanisms underlying COMISA-associated end-organ morbidities and ultimately potentiate such risks (7–9).

In this context, we eagerly read the recent paper by Li and colleagues (10), which prospectively confirmed the associations between SDB and insomnia with incident HT and DM in U.S. Hispanic/Latino subjects. Because this particular sector of the U.S. population has been recognized as carrying a higher risk of SDB (41.9% and 10.1%) or the isolated insomnia group (10.1% and 1.8%) (P < 0.001). Excessive diurnal sleepiness scores were higher in the COMISA and SDB groups when compared with the insomnia group (Table 1). Significant reductions in daily total sleep duration emerged in the COMISA group compared with the SDB and insomnia groups (P = 0.001), which could independently, or via interactions with the circadian timing system, influence several cardiometabolic outcomes (8, 9). Also, the trend toward later sleep-onset times in the COMISA group may also operate as an important cardiometabolic risk factor (11).

Thus, our findings not only corroborate those of Li and collaborators (10) in another cohort, whereby SDB and insomnia appear to contribute to cardiovascular and metabolic risk, but also expand on such findings and reveal the potentiation of these adverse consequences when both are concurrently present as in patients with COMISA. Further studies examining the underlying mechanisms contributing to this enhanced risk appear warranted.

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Table 1. Comparison of Characteristics among the Moderate/High Risk Groups for COMISA, OSA, and Insomnia

| Variable                                      | COMISA (n = 173) | OSA (n = 322) | Insomnia (n = 168) | P Value |
|-----------------------------------------------|------------------|---------------|--------------------|---------|
| Sex, M, n (%)†                               | 98 (54.7)        | 210 (65.2)    | 49 (26.6)          | <0.0001 |
| Age, yr†                                      |                  |               |                    |         |
| Median (interquartile range)                 | 51 (39–60)       | 50 (37–60)‡   | 36 (31–52)§        | <0.0001 |
| Mean ± SD                                    | 49.8 ± 13.8      | 48.5 ± 14.8‡  | 41 ± 13.8§         |         |
| BMI, kg/m²†                                   |                  |               |                    |         |
| Median (interquartile range)                 | 30 (25–35)       | 29 (26–34)‡   | 25 (23–27)§        | <0.0001 |
| Mean ± SD                                    | 31 ± 6.3         | 30.8 ± 6.5‡   | 25.3 ± 3.8§        |         |
| Neck circumference, cm†                       |                  |               |                    |         |
| Median (interquartile range)                 | 44 (37–50)       | 42 (37–48)‡   | 34 (31–38)§        | <0.0001 |
| Mean ± SD                                    | 44.2 ± 8.9       | 44.2 ± 9.1‡   | 35.2 ± 5.5§        |         |
| Epworth scale score†                          |                  |               |                    |         |
| Median (interquartile range)                 | 10 (5–14)‡       | 11 (7–16)‡    | 8 (5–13)           | <0.0001 |
| Mean ± SD                                    | 10.4 ± 6.8‡      | 11.9 ± 6.2‡   | 10.2 ± 6.6         |         |
| SAH, n %*                                     | 94 (54.3)        | 135 (41.9)    | 17 (10.1)          | <0.0001 |
| Diabetes, n (%)†                              | 23 (13.3)        | 35 (10.9)     | 3 (1.8)            | <0.0001 |
| Uses caffeine, n (%)*                        | 113 (63.1)       | 212 (65.8)    | 96 (52.2)          | 0.009   |
| Smoker, n (%)†                                | 15 (8.4)         | 15 (4.7)      | 4 (2.2)            | 0.023   |
| Uses alcoholic beverages, n (%)*             | 84 (46.9)        | 170 (52.8)    | 75 (40.8)          | 0.032   |
| Practices physical activity, n (%)*          | 71 (39.7)        | 137 (42.5)    | 78 (42.4)          | 0.804   |
| Time to go to bed, median (interquartile range), h† | 23:00 (22:30–00:00) | 23:00 (22:00–23:30) | 23:00 (22:00–23:30) | <0.0001 |
| Wake-up time, median (interquartile range), h† | 6:00 (5:00–7:00) | 6:00 (5:30–6:30) | 6:00 (5:30–7:00) | 0.009   |
| Total sleep time, median (interquartile range), h† | 7:00 (6:00–8:00) | 7:10 (6:30–8:00) | 7:15 (6:30–8:00)§ | 0.001   |

Definition of abbreviations: BMI = body mass index; COMISA = comorbid insomnia and sleep apnea; OSA = obstructive sleep apnea; SAH = systemic arterial hypertension.

*Simple and relative frequencies.
†ANCOVA or Kruskal-Wallis (Bonferroni) tests.
‡OSA versus insomnia: P < 0.005.
§COMISA versus insomnia: P < 0.005.
¶COMISA versus OSA: P < 0.005.

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