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Consideration of nondipping heart rate during ambulatory blood pressure monitoring to improve cardiovascular risk assessment. Response

La frecuencia cardiaca nondipper *durante la monitorización ambulatoria de la presión arterial mejora la estratificación del riesgo cardiovascular. Respuesta*

To the Editor,

We appreciate the commentary by Baka et al. Elevated asleep heart rate (HR), and mean and blunted sleep-time relative HR decline (index of HR dipping), both determined by around-the-clock ambulatory blood pressure (BP) monitoring (ABPM), have been identified in several prospective studies as significant prognostic markers of increased cardiovascular disease (CVD) risk. Corroborating and extending these findings, our previously reported evaluation of the data from 18 078 participants in the Hygia Project recruited up to 2015, assessed periodically by 48-hour ABPM, documented the asleep HR mean (per 1-SD elevation, adjusted hazard ratio, 1.16; 95% confidence interval (95%CI), 1.10-1.23; $P < .001$) and the sleep-time relative HR decline (0.81; 95%CI, 0.76-0.86; $P < .001$) were significant markers of CVD outcome, but office HR (1.05; 95%CI, 0.99-0.11; $P = .060$) and awake ambulatory HR mean (1.03; 95%CI, 0.97-1.09; $P = .318$) were not.[1] Furthermore, results of the time-dependent Cox regression analysis documented that the increase during follow-up in sleep-time relative HR decline toward a more normal dipper HR pattern was significantly associated with reduced CVD risk (0.90; 95%CI, 0.81-0.99; $P = .032$).[1]

We used an extended database with 19 949 participants in the Hygia Project without previous CVD events to document the marked limitations of current CVD risk stratification models, including the CVD Framingham risk score, based exclusively on office BP.[2] In so doing, we replaced office BP by the stronger ABPM-derived prognostic markers of CVD risk, namely asleep systolic BP mean and sleep-time relative systolic BP decline, but kept for proper comparison all other variables—age, sex, smoking, total and HDL-cholesterol, hypertension treatment, and diabetes—of the original Framingham scale. The resulting CVD stratification model showed significantly improved calibration, diagnostic accuracy, discrimination, and performance (always $P < .001$), but it is not a completely optimal or representative approach for ABPM-based CVD risk assessment. Beyond sleep-time relative HR decline (0.87 [0.83-0.92]; $P < .001$), other highly significant confounding variables, including chronic kidney disease, glomerular filtration rate, and fasting glucose, must also be incorporated into a more accurate CVD stratification model. Further investigation on how the sleep-time relative HR decline can be efficiently increased by therapy is warranted.

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All authors have contributed equally in composing this response letter.

CONFLICTS OF INTEREST

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Ramón C. Hermida,[a,*] Artemio Mojón,[a] Michael H. Smolensky,[b,c] and José R. Fernández[a]

[a]*Laboratorio de Bioingeniería y Cronobiología, Atlantic Research Center for Information and Communication Technologies (atlanTTic), Universidad de Vigo, Pontevedra, Spain*
[b]*Department of Biomedical Engineering, Cockrell School of Engineering, The University of Texas at Austin, Austin, Texas, United States*
[c]*Department of Internal Medicine, McGovern School of Medicine, The University of Texas Health Science Center at Houston, Houston, Texas, United States*

[*] Corresponding author:
E-mail address: rhermida@uvigo.es (R.C. Hermida).

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