

## Insomnia and the Risk of Atrial Fibrillation: A Population-Based Cohort Study

Hsiu-Hao Lee,<sup>1,2</sup> Yueh-Chung Chen,<sup>3,4</sup> Jien-Jiun Chen,<sup>5</sup> Shih-Hsiang Lo,<sup>2</sup> Yue-Liang Guo<sup>1,8,9</sup> and Hsiao-Yun Hu<sup>6,7</sup>

Dear Editor:

We thank Dr. Tomoyuki Kawada for his insightful comments on our paper.

After our study<sup>1</sup> was published, we were pleased that the study<sup>2</sup> of Han et al. on the same topic with different methods was published. Interest in the association between the effects of insomnia and atrial fibrillation (AF) development is certainly growing.

Both Han et al. and we reported that AF development was associated with the effects of insomnia. Han et al. revealed that among all age groups, participants younger than 40 years exhibited the strongest association between insomnia and AF.<sup>2</sup> They thus concluded that age < 40 years is a key factor in the association between insomnia and AF. However, as described in the limitations section, their study had a cross-sectional design and hence could not explore the cause-effect association between insomnia and AF.<sup>3</sup> Furthermore, the AF onset time of the AF group before and after insomnia onset time was indeterminate in their study. These might suggest that AF causes insomnia, particularly among those younger than 40. Ours was a cohort study, which

is a more effective design for exploring the cause-effect association between insomnia and AF. Moreover, we excluded cases of AF development before insomnia. Our study revealed that patients older than 65 years with insomnia had a higher rate of AF development. In response to Dr. Kawada's first concern, we stated that our study could more precisely investigate the cause-effect association between insomnia and AF. Although our results were inconclusive, we hope that our study and that of Han et al. made a strong case for randomized control trials to ascertain which age range will be more susceptible to the effect of insomnia on AF development.

Dr. Kawada's second concern regarding the medical resource utilization of patients with insomnia warrants further investigation. We performed insomnia frequency analysis in accordance with a reviewer's suggestion because medical resource utilization might be a confounding factor. We agree with Dr. Kawada that patients with insomnia might visit their doctors more frequently with more complaints; however, insomnia severity was not directly related to the number of visits. Dr. Kawada also suggested that if patients with insomnia do visit their doctors more frequently, diagnosing AF would be more likely and that the dose-response relationship between the medical resource utilization of patients with insomnia and AF should be investigated in future research. Our study did not determine whether a dose-response relationship exists between the medical resource utilization of patients with insomnia and AF development.

Finally, Dr. Kawada expressed concerns about the types of AF in our respective studies. Information on AF severity was not analyzed in both studies. This was a lamentable limitation of our studies. We believed that Dr. Kawada's concern was appropriate and that it will prove valuable for researchers undertaking similar studies in the future.

Received: January 11, 2018 Accepted: January 25, 2018

<sup>1</sup>Institution of Occupational Medicine and Industrial Hygiene, National Taiwan University College of Public Health; <sup>2</sup>Department of Internal Medicine, Taipei City Hospital, Zhongxing Branch; <sup>3</sup>Graduate Institute of Medical Sciences, National Defense Medical Center; <sup>4</sup>Division of Cardiology, Department of Internal Medicine, Taipei City Hospital, Renai Branch, Taipei; <sup>5</sup>Cardiovascular Center, National Taiwan University Hospital, Yun-Lin Branch, Douliou; <sup>6</sup>Department of Education and Research, Taipei City Hospital; <sup>7</sup>Department of Public Health, Institute of Public Health, National Yang Ming University; <sup>8</sup>National Institute of Environmental Health Sciences, National Health Research Institutes; <sup>9</sup>Environmental and Occupational Medicine, National Taiwan University (NTU) College of Medicine and NTU Hospital, Taipei, Taiwan.

Corresponding author: Dr. Hsiao-Yun Hu, Department of Education and Research, Taipei City Hospital; Department of Public Health, Institute of Public Health, National Yang Ming University, Taipei, Taiwan. Tel: 886-2-2709-3600 ext. 3816; Fax: 886-2-2826-1002; E-mail: hyhu@ym.edu.tw

## DISCLOSURE STATEMENT

The authors declared no conflict of interest.

## REFERENCES

1. Lee HH, Chen YC, Chen JJ, et al. Insomnia and the risk of atrial fibrillation: a population-based cohort study. *Acta Cardiol Sin* 2017;33:165-72.
2. Han X, Yang Y, Chen Y, et al. Association between insomnia and atrial fibrillation in a Chinese population: a cross-sectional study. *Clin Cardiol* 2017;40:765-9.
3. Munnangi S, Boktor SW. Epidemiology, study design. StatPearls. Treasure Island (FL) 2017.

