

Risk of Cardiovascular Diseases in Patients With Insomnia: A Nationwide Population-Based Cohort Study in Taiwan

Chi-Wen Kao^a, PhD; Min-Huey Chung^b, PhD, RN

^a Department of Nursing, Tri-Service General Hospital, Taipei, Taiwan; ^b School of Nursing, College of Nursing, Taipei Medical University, Taipei, Taiwan

Purpose:

Sleep is a dynamic process with important cardiovascular homeostatic functions. Sleep disturbance may lead to adverse effects on the cardiovascular consequences. However, most research conducted to date has revealed the relationship between insomnia and the risks incident to hypertension. Few studies have investigated insomnia in relations to risk for other cardiovascular diseases. Therefore, we analyzed the population-based data to identify the relationship between insomnia and cardiovascular disease.

Methods:

This study used the data of National Health Insurance Research Database (NHIRD) from 2002 to 2010. We marked 4,440 patients who had been diagnosed with insomnia (ICD-9-CM codes: 307.41, 307.42, or 780.52) and prescribed with medications. To select the comparison group, every patient was matched randomly with four subjects according to age, gender and year of insomnia diagnosis. A total of 17,760 patients were included in comparison cohort. Every patient was tracked from their index date to the first date diagnosed of cardiovascular disease, which included ischemic heart disease (ICD-9-CM: 410.xx~414.xx), heart failure (ICD-9-CM: 428.xx), essential hypertension (ICD-9-CM: 401.xx), and cardiac dysrhythmias (ICD-9-CM: 427.xx). The multivariate Cox proportional hazard regression model was used to compute adjusted hazard ratios.

Table 1. Incidence and adjusted Hazard ratios (AHR) for cardiovascular disease among chronic insomnia patients during the 9-year follow-up period.

Presence of cardiovascular diseases	Chronic insomnia patients (n=4,440)	Comparison patients (n=17,760)
Ischemic Heart Disease (n, %)	817(18.40%)	2188(12.32%)
Incidence per 100 person-years(95%CI)	2.79(2.60-2.98)	1.71(1.64-1.78)
AHR (95% CI)	1.52(1.40-1.65)**	1.00
Heart Failure (n, %)	181(4.08%)	592(3.33%)
Incidence per 100 person-years(95%CI)	0.56(0.48-0.65)	0.44(0.40-0.47)
AHR (95% CI)	1.12(0.94-1.33)	1.00
Essential Hypertension (n, %)	1350(30.41%)	4523(25.47%)
Incidence per 100 person-years(95%CI)	5.01(4.74-5.27)	3.81(3.70-3.93)
AHR (95% CI)	1.25(1.17-1.32)**	1.00
Cardiac Dysrhythmias (n, %)	594(13.38%)	1482(8.34%)
Incidence per 100 person-years(95%CI)	1.96(1.80-2.12)	1.13(1.07-1.19)
AHR (95% CI)	1.65(1.49-1.82)**	1.00

Results:

The highest incidence rate of cardiovascular diseases in chronic insomnia patients was essential hypertension. The log-rank test revealed that chronic-insomnia patients had a significantly higher 9-year cumulative hazard rate of cardiovascular diseases than comparison patients. After adjusting for patient's region, urbanization level, and Charlson Comorbidity Index, patients with chronic-insomnia had a significant greater risk of developing ischemic heart disease, essential hypertension, and cardiac dysrhythmias than the comparison group during the 8-year follow-up period.

Conclusion:

The present study provides the evidence that patients with chronic-insomnia are at a high risk of developing cardiovascular diseases. It was suggested to prevent and manage cardiovascular diseases in clinically patients with insomnia in order to reduce the medical cost for patients and society.

Figure 1. Kaplan-Meier failure curve of cardiovascular diseases for patients with chronic insomnia and non-chronic insomnia controls.

