

## BIDIRECTIONAL RELATIONSHIP BETWEEN NOCTURIA AND INSOMNIA IN A LONGITUDINAL STUDY AMONG JAPANESE MEN AND WOMEN

### Hypothesis / aims of study

To our knowledge, very few studies have explored the bidirectional relationship between nocturia and insomnia [1]. We investigated this relationship in a longitudinal study among Japanese men and women.

### Study design, materials and methods

A longitudinal evaluation of the status of nocturia and insomnia among Japanese men and women in 2003 and 2007 was conducted in the Fukui health screening program. Both phenotypes were collected using a questionnaire. Nocturia was defined as two or more voids per night (experienced "sometimes" or "always"). Insomnia was defined as self-perceived sleeping difficulties. We analyzed the bidirectional relationships between nocturia and insomnia using logistic regression models. P-values  $\geq 0.05$  were considered statistically significant.

### Results

We collected data on 13,536 individuals (4,167 males and 9,369 females). The mean age of participant was 65.8 years (23-95 years) in 2003. The overall prevalence of nocturia ( $\geq 2$  voids/night) in 2003 and 2007 was 11.0% and 13.2%, and the prevalence was higher in older age groups. The overall prevalence of insomnia in 2003 and 2007 was 10.2% and 11.2%.

Of the participants with nocturia in 2003 and 2007, 34.5% (n=515) and 33.5% (n=603) had insomnia. Conversely, of the participants with insomnia in 2003 and 2007, 37.2% and 39.7% had nocturia (Table 1).

(1) Insomnia as a risk factor for the incidence of nocturia (Table 2).

In the multivariate analysis adjusting for age, sex and BMI, regardless of insomnia status in 2007, insomnia at baseline had a two-fold increased risk for nocturia onset in 2007 (Odds ratio (OR) = 2.30, 95% CI = 1.90-2.82). Chronic insomnia (defined as insomnia in both 2003 and 2007) had an OR 1.41 (95% CI = 1.08-1.88) for incidence of nocturia in 2007.

(2) Nocturia as a risk factor for the incidence of insomnia (Table 3).

In the multivariate analysis adjusting for age, sex and BMI, participants with nocturia in 2003 had an OR of 1.63 (95%CI = 1.31-2.04) for incidence of insomnia in 2007. Nocturia reported in both 2003 and 2007 (chronic nocturia) yielded a two-fold increased risk for incidence of insomnia in 2007 (OR = 2.13, 95%CI = 1.60-2.84).

Table 1. Changes in the prevalence of nocturia and insomnia from 2003 to 2007 (n=13,536).

	No insomnia	Insomnia
No nocturia	11,174 → 10,821	868 → 917
Nocturia	979 → 1,195	515 → 603

Table 2. Insomnia at baseline (2003) as a risk factor for the incidence of Nocturia after 4-years (2007)

	Insomnia			
	Baseline (2003)		Both 2003 and 2007	
	OR	95%CI	OR	95%CI
Univariate	2.10	1.73-2.55	1.46	1.11-1.91
Multivariate*	2.30	1.90-2.82	1.42	1.08-1.88

\* Adjusted for Age, Sex, and BMI

Table 3. Insomnia at baseline (2003) as a risk factor for the incidence of Nocturia after 4-years (2007)

	Nocturia			
	Baseline (2003)		Both 2003 and 2007	
	OR	95%CI	OR	95%CI
Univariate	1.48	1.19-1.84	2.25	1.67-2.99
Multivariate*	1.63	1.31-2.04	2.13	1.60-2.84

\* Adjusted for Age, Sex, and BMI

### Interpretation of results

Our results indicate a bidirectional causal relationship between nocturia and insomnia. It remains unknown whether therapy to improve insomnia improves nocturia, although improving nocturia improves sleep disturbance. Further studies are needed to investigate the potential mechanisms underlying this association.

### Concluding message

Our study confirmed the bidirectional relationship between nocturia and insomnia among Japanese men and women. Clinicians should carefully assess for sleep disorders in patients who present with nocturia.

### References

1. Araujo, et al. The Journal of Urology, 2014, 191.1: 100-106.

### Disclosures

**Funding:** Japan Society for the Promotion of Science(JSPS) **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** The Ethical Committee of the University of Fukui **Helsinki:** Yes **Informed Consent:** Yes