

## IMPACT OF NOCTURIA ON MEDICAL CARE USE AND ITS COSTS IN AN ELDERLY POPULATION: 30 MONTH PROSPECTIVE OBSERVATION OF NATIONAL HEALTH INSURANCE BENEFICIARIES IN JAPAN.

### Hypothesis / aims of study

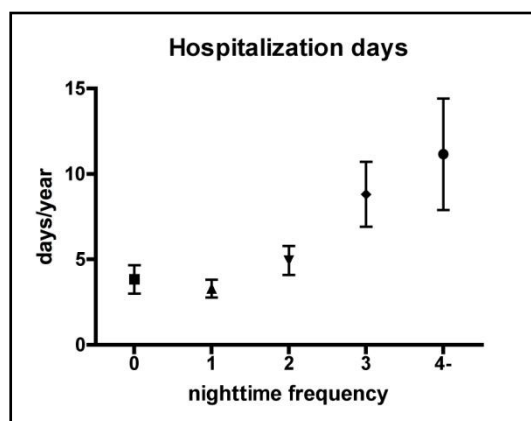
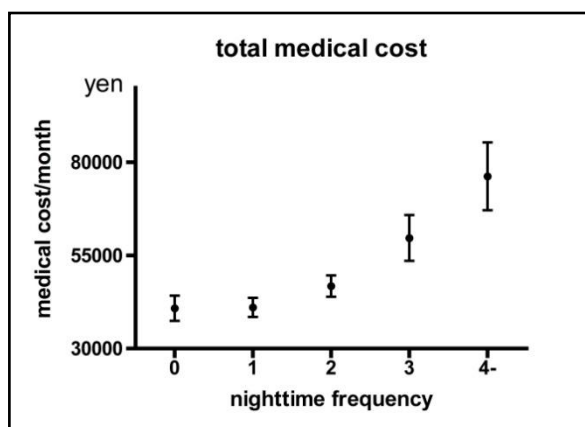
Nocturia is a common problem for the elderly. In many cases, it is related to an excessive production of urine at night (nocturnal polyuria), which is thought to be associated with a decline in the secretion of antidiuretic hormone, arginine vasopressin. Other conditions that may cause nocturia include cardiovascular disease, diabetes mellitus, sleep apnea syndrome, renal dysfunction, lower urinary tract dysfunction and sleep disorders. Previous studies have reported that nocturia is associated with an increased risk of fractures<sup>1)</sup> and mortality<sup>2)</sup>, and our group has previously reported that this increased mortality risk may be independently associated with nocturia, even when adjusting for other possible contributing comorbidities. The aim of this population-based study was to explore the additional direct healthcare costs which are incurred for elderly people with severe nocturia ( $\geq 3$  voids per night) compared with those with  $\leq 2$  voids per night.

### Study design, materials and methods

We conducted a Comprehensive Geriatric Assessment of all residents who were  $\geq 70$  years of age in 2003 in an urban district of northern Japan. The population-based cross-sectional survey was conducted using an extensive health interview for each participant. We investigated medical care use and its cost for 30 months using the data from the national health insurance claim history. Medical care use and its costs were identified using the number of hospitalization days and medical costs (total cost, inpatient cost and outpatient cost) reported in insurance claims. Differences in hospitalization days and medical costs according to the presence or absence of nocturia ( $\geq 3$  voids per night) were examined by analysis of covariance.

**Table 1.**  
Prevalence of severe nocturia ( $\geq 3$  voids per night) by age and sex

	nocturia n (%)	p
<b>Age</b>		
70-74	51 / 427 (11.9%)	<0.0001
$\geq 75$	88 / 353 (24.9%)	
<b>SEX</b>		
male	79 / 354 (22.3%)	0.0019
female	60 / 426 (14.1%)	



nighttime frequency	≤2 (A)	≥3 (B)	Ratio (B/A)	p
Number of subjects	641	139		
hospitalization days (days/year)	9.32	14.27	1.53	< 0.001
total medical cost (Yen/month)	77887	98131	1.26	0.0002
outpatient medical cost (Yen/month)	46445	52463	1.13	0.024
inpatient medical cost (Yen/month)	33673	48774	1.45	0.003

Adjusted for age, sex, hypertension, stroke, coronary disease, malignant disease and current smoker

### Results

Of the 780 Japanese people included (28.6% participation rate), 426 were female and 354 were male. The mean age was 74.9 ± 4.47 years (range 70 to 97). Prevalence of nocturia in the sample is shown in Table 1. Nocturia (≥3 voids/night) was significantly more common in men than women (p=0.0019), and in people ≥75 years of age than in younger people (p<0.0001).

Both total medical costs and hospitalization days increased with increasing frequency of nighttime micturition (Fig.1, 2). The multivariate odds ratios showed that number of hospitalization days, total medical costs, outpatient medical cost and inpatient medical cost are all significantly increased for individuals with ≥3 voids/night (Odds ratios: 1.53 [p<0.001], 1.26 [p=0.0002], 1.13 [p=0.024] and 1.45 [p=0.003], respectively, adjusting for age, sex, hypertension, stroke, coronary disease, malignant disease and smoking; Table 2).

### Interpretation of results

In this study we found that medical costs and hospitalization days increased with nocturia even after adjustment for age, sex and various diseases/risk factors. In a previous study, nocturia was reported as a risk factor for hip fractures<sup>1)</sup>. It is therefore possible that falls and fractures due to nighttime voiding are one of the principal means by which nocturia contributes to increased hospitalization and medical care costs. Nocturia may also be an indication of a number of physiological conditions; although we controlled for several of these, it is possible that some underlying factors may be undiagnosed and could contribute to increased healthcare needs in nocturia. It is therefore important to investigate the causes of nocturia in people reporting frequent nighttime voiding. This would enable effective treatment of the condition, and in turn, may lead to a reduction in fractures, improvement of patients' overall quality of life, and a reduction in the significant medical costs associated with the condition.

### Concluding message

We conclude that there is a significant increase in medical costs and hospitalization days associated with the presence of three episodes of nocturia per night or more. Thorough investigation of the aetiology of the condition is required, and appropriate treatment should be selected in order to improve the quality of life of patients and reduce healthcare costs.

### References

1. Arch of Gerontol Geriatr. 43 319–326, 2006
2. Br J Urol. 84 297–301, 1999

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<b>Is this a clinical trial?</b>	No
<b>What were the subjects in the study?</b>	HUMAN
<b>Was this study approved by an ethics committee?</b>	Yes
<b>Specify Name of Ethics Committee</b>	The Ethics Committee Tohoku University School of Medicine
<b>Was the Declaration of Helsinki followed?</b>	Yes
<b>Was informed consent obtained from the patients?</b>	Yes