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DIFFERENCES AND ASSOCIATIONS BETWEEN NIGHT-TIME FREQUENCY/NOCTURIA AND SLEEP DISORDERS

Hypothesis / aims of study

While it is postulated that NTF and general sleep status are closely related to each other, it is unclear how NTF/nocturia differ from sleep disorders and whether NTF/nocturia are associated with sleep disorders. We therefore attempted to elucidate the relationship between NTF/nocturia and sleep disorders in a community-based study.

Study design, materials and methods

Randomly selected 6,000 residents in three Japanese towns, 41 to 70 years old men and women, were targets of this study. Self-administered questionnaire, which included the International Prostate Symptom Score (I-PSS), overall incontinence score in the International Continence Incontinence Questionnaire Short Form (ICIQ-SF), the Medical Outcome Study Short-Form 8 (SF-8), the Pittsburgh Sleep Quality Index (PSQI), the Epworth Sleepiness Scale (ESS), other questions regarding sleeping properties, medical history of several diseases, cigarette smoking and alcohol consumption, was mailed to half the target population on the 15 August 2005, and the remaining half on the 13 February 2006. Sleep disorders examined in this study were insomnia (INS), obstructive sleep apnea syndrome (OSAS), restless leg syndrome (RLS) and periodic limb movement disorder (PLM), which were diagnosed according to the criteria applied in previous epidemiological studies. Differences and associations between NTF (twice or more voidings per night) / bothersome nocturnal voiding (BNV) and four types of sleep disorders were analyzed. For statistical analysis, a two-tailed Student t test, the Mann Whitney U test and a logistic regression model were used, and $p<0.05$ was determined as significant. Kyoto University ethical committee approved this study.

Results

A total of 2,283 (38.1%) subjects were eligible for this study. Of these, 506 (22.2%), 234 (10.2%), 352 (15.4%), 52 (2.3%), 173 (7.6%), and 63 (2.8%) were determined to have NTF, BNV, INS, OSAS, RLS and PLM, respectively.

Differences between NTF/BNV and sleep disorders

BNV subjects were older; OSAS subjects were younger, predominantly male and more obese; and INS subjects had a slight female predominance. Most individual scores of the I-PSS, QOL score, and total I-PSS score were significantly higher in the NTF/BNV groups than the INS group. Regarding the PSQI, all or most individual scores were worse in the INS and PLM groups than in the NTF group, but the differences became smaller when comparing BNV with INS and PLM. The scores in the RLS group tended to be higher than those in the NTF group but lower than those in the BNV group. When comparing the BNV and OSAS groups, all individual scores except for sleep duration were lower in the latter. The ESS score was worst in the OSAS group. GHQL was not worse in the NTF group than in any of the four sleep disorder groups. The NTF group was better in three individual domains compared with the INS group, and in the mental health domain compared with the OSAS group. However, the BNV group was worse in the physical function and role-physical domains compared with the INS group, and in the role-physical and social function domains compared with the OSAS group. The RLS and PLM groups were much worse than the NTF/BNV groups in most domains. The mental component summary score was worse for the four sleep disorder groups than for the NTF/BNV groups, and the physical component score of the OSAS group was significantly better than that in the NTF/BNV groups. (Figure 1)

Associations between NTF/BNV and sleep disorders (Table 1)

Other than sleep disorders, age, season, hypertension, stroke and arrhythmia were independent predictors for NTF, and age, season, diabetes mellitus and arrhythmia were independent predictors for BNV. Of the four sleep disorders examined, INS, OSAS and PLM were independently associated with NTF and BNV. However, PLM had a marginal but not a significant correlation with NTF and BNV.

Interpretation of results

NTF/BNV is closely related to sleep disorders, but obviously different from them in several aspects.

Concluding message

Urologists should aware of influences of sleep disorders properly, when treating nocturic patients.

Figure 1: Average scores of SF-8

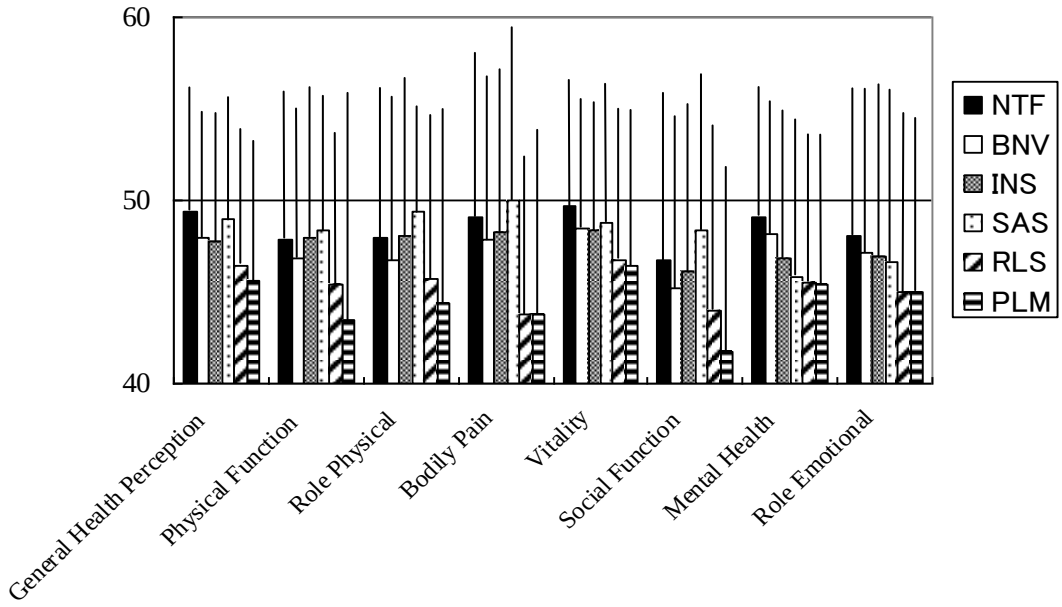

Table 1: Factors associated to NTF/BNV determined using a logistic regression model

		NTF			*BNV*		
			Multivariate			Multivariate	
Risk Factors		p-values	odds ratio	(95% CI)	p-values	odds ratio	(95% CI)
Season	(winter/summer)	0.002	1.40	(1.13-1.74)	0.022	1.44	(1.05-1.96)
Age	(per 1 year)	<0.001	1.07	(1.05-1.08)	<0.001	1.09	(1.06-1.11)
Gender	(male/female)	0.21	-	-	0.12	-	-
Body Mass Index	(per 1 kg/m^2)	-	-	-	-	-	-
Hypertension	(yes/no)	0.015	1.35	(1.06-1.72)	0.09	-	-
Diabetes Mellitus	(yes/no)	0.26	-	-	0.016	1.72	(1.11-2.68)
Stroke	(yes/no)	0.020	1.99	(1.11-3.56)	0.18	-	-
Arrhythmia	(yes/no)	0.020	1.49	(1.06-2.09)	0.048	1.57	(1.00-2.46)
Coranary Artery Disease	(yes/no)	0.19	-	-	0.85	-	-
Renal Disease	(yes/no)	0.08	-	-	0.18	-	-
Lung Disease	(yes/no)	-	-	-	-	-	-
Malignant Disease	(yes/no)	0.21	-	-	0.33	-	-
Alcohol comsumption	(yes/no)	0.33	-	-	-	-	-
Cigarette Smoking	(yes/no)	0.37	-	-	-	-	-
INS	(yes/no)	<0.001	2.48	(1.91-3.24)	<0.001	6.24	(4.54-8.58)
SAS	(yes/no)	<0.001	3.65	(1.97-6.75)	<0.001	4.77	(2.28-9.98)
RLS	(yes/no)	0.07	-	-	0.07	-	-
PLM	(yes/no)	0.012	2.07	(1.17-3.66)	<0.001	3.46	(1.87-6.24)

Specify source of funding or grant	**None**
Is this a clinical trial?	**Yes**
Is this study registered in a public clinical trials registry?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**Kyoto University Ethical Committee**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**