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NIGHT-TIME FREQUENCY DETERIORATE SLEEP AND QUALITY OF LIFE: AN ANALYSIS OF INTERNATIONAL PROSTATE SYMPTOM SCORE AND SLEEP QUESTIONNAIRE

Hypothesis / aims of study
Nocturia has been identified as having a significant impact on a quality of life (QOL). Although night-time frequency is not equal to nocturia, a previous study in Japan reported that night-time frequency is the most bothersome symptom among lower urinary tract symptoms (LUTS) [1]. Recent study reported that IPSS-QOL index, nocturnal urinary volume and maximum flow rate were related with good sleep condition [2]. However, it is unclear how LUTS affects patient's satisfaction for sleep. We investigated relationship between each item of international prostate symptom score (IPSS) and simple sleep-satisfaction questionnaire.

Study design, materials and methods
New outpatients with LUTS who visited our facility from January 1, 2015 to December 31, 2015 were investigated. Patients who were diagnosed as cancer, urolithiasis or urinary tract infection were excluded. Their IPSS, IPSS-QOL index and sleep-satisfaction questionnaire scores were investigated. Sleep-satisfaction questionnaire was simply consisted of five-grade evaluation (i.e., 5 very satisfied, 4 satisfied, 3 moderately satisfied, 2 unsatisfied, 1 strongly unsatisfied). Relationship of each item of questionnaires was examined by Pearson's correlation coefficient or partial correlation analysis. Statistical analysis was performed using IBM® SPSS® version 19. P values less than 0.05 were considered statistically significant.

Results
During from January 1, 2015 to December 31, 2015, 345 new patients with LUTS visited our facility. One hundred and thirty nine patients who did not complete questionnaires were excluded from analysis. A total of 206 patients were investigated. Mean age of patients was 69.1 years old. IPSS total score and number of night-time voiding represented in item 7 of IPSS were significantly correlated with score of sleep questionnaire (Table 1). Patient's age was not correlated with sleep score, but weakly correlated with night-time frequency ($r = 0.275$, $P < 0.001$). Age-adjusted partial correlation analysis revealed that night-time frequency was the most strongly correlate with sleep score (Table 2). Urinary frequency, urgency and IPSS-QOL index were significantly correlated with night-time frequency ($r = 0.484$, $r = 0.448$ and $r = 0.428$, respectively). A significant but weak correlation was recognised between sleep satisfaction and voiding symptoms or storage symptoms (Table 3 and 4).

Interpretation of results
The present study reveals a significant correlation of night-time frequency with low sleep-satisfaction score, suggesting a significance of treating nocturia. A recent post-hoc analysis of a randomized clinical trial in Japan reported that anticholinergic drug can improve nocturia and sleep quality [3]. As both urinary frequency and urgency correlate with night-time frequency, treatment of overactive bladder with anticholinergics or beta3- adrenergic receptor agonist may be beneficial to nocturia and dissatisfaction to sleep. There are several limitations in the present study. Our study population was small and did not completely represent the residents of the communities studied. Furthermore, IPSS was not developed for the evaluation of LUTS in women. Further study which compares the changes in questionnaires after medical or surgical treatment is needed for more detailed analysis.

Concluding message
Night-time frequency appeared to be associated with low satisfactory score of sleep questionnaire.

Table 1. Correlation between sleep satisfaction and IPSS/IPSS-QOL index scores

	Correlation coefficient	*P* value
IPSS_1	0.224	0.001
IPSS_2	0.283	0.000
IPSS_3	0.337	0.000
IPSS_4	0.259	0.000
IPSS_5	0.285	0.000
IPSS_6	0.295	0.000
IPSS_7	0.414	0.000
IPSS_total score	0.419	0.000
IPSS-QOL index	0.363	0.000

Table 2.
Age-adjusted correlation between sleep satisfaction and IPSS/IPSS-QOL index scores

	Correlation coefficient	*P* value
IPSS_1	0.219	0.002
IPSS_2	0.282	0.000
IPSS_3	0.332	0.000
IPSS_4	0.266	0.000
IPSS_5	0.291	0.000
IPSS_6	0.293	0.000
IPSS_7	0.451	0.000
IPSS_total score	0.422	0.000
IPSS-QOL index	0.359	0.000

Table 3. Correlation between sleep satisfaction and IPSS voiding and storage symptoms

	Correlation coefficient	*P* value
voiding symptoms	0.368	0.000
storage symptoms	0.382	0.000

Table 4.
Age-adjusted correlation between sleep satisfaction and IPSS voiding and storage symptoms

	Correlation coefficient	*P* value
voiding symptoms	0.367	0.000
storage symptoms	0.394	0.000

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