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INDONESIAN PEOPLE RISK FACTORS OF NOCTURIA (TWO OR MORE VOIDS PER NIGHT) OLDER THAN 40 YEARS-OLD

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ABSTRACT

Background: Nocturia is a common urinary system disease.
Objective: This study aimed to investigate the causes of nocturia in women Indonesian inhabitants aged≥ 40 years.
Methods: A stratified sample strategy was used to conduct a randomized cross-sectional study on 562 residents under the age of 40 in Malang City, East Java, Indonesia. A questionnaire was completed, which included socioeconomic demographics, lifestyle characteristics, and clinical history. Each night, nocturia was defined as at least two voids. The chi-squared test was used to determine proportional differences between age and gender groups. Multivariate logistic regression analysis was used to assess gender-related factors. This was determined that P0.05 was statistically significant.
Results: Data on 562 people aged 61.60 ± 9.81 years eligible for statistical analysis at the end, comprising 185 (32.92%) men and 377 (67.08%) women. Overall nocturia prevalence was 31.8% (179/562). It rose significantly with age (P<0.001) and reached >48% in those above the age of 70. In both men and women, nocturia was linked with diabetes, hypertension, cardiovascular disease, and the overactive bladder symptom score (OABSS) (P0.05). There was no link discovered between nocturia and education, profession, civil status, BMI, female birth history, or the International Prostate Symptom Score.
Conclusion: Nocturia is linked to aging, cardiovascular disease, hypertension, OABSS, and diabetes in Indonesians over the age of 40.

Keywords: Nocturia, aging, diabetes mellitus, cardiovascular disease, risk factors

Introduction

There are several different types of nocturia. For men and women over 60, the prevalence rate was 25 percent, while for women it was 24 percent.[1] Chronic insomnia can result from nocturia, which is linked to a worse quality of life and higher mortality.[1] The current definition of nocturia has been complained by the International Abstinence Association as that individuals must wake up at night to urinate one or more times, and sleep before and after each urination.[2] Many people believe that nocturia is ≥ 2 urinations per night, as it is typical in the elderly and usually not a complaint that they have to pee at night.[2] Age-related nocturia in both sexes is well-known. Nocturia is frequent, according to Tikkinen et al[1], and affects both men and women equally. In addition, they found that the prevalence of nocturia ranges from less than 10% for persons under 40 to more than 80% for those over 80 years of age.[1]

There has been a significant rise in the percentage of women who have nighttime nocturnal urination from 3.1 percent to 7.2 percent (30-59 years old) and 26.7 percent (60 years old), respectively, in a separate research.[3] In addition to heart disease, hypertension, and depression, nocturia can be caused by a variety of other conditions, including urine incontinence.[4] Other disorders were shown to have no relationship with nocturia.[5] The results of different investigations clearly differ. As a result, more research into the causes of nocturia is required. The goal of this research is to better understand the causes of nocturia among Indonesians so that a cure can be found. Nocturia that occurs more than twice a night qualifies as debilitating.

Methods

Subjects

Cross-sectional survey technique with stratified random sampling was used to conduct an epidemiological survey on 562 over 40-years-old residents in Malang, East Java, Indonesia. The random number table method is used in 3 administrative regions. The staff of the sub-district office provided locals who used to dwell in the region for 5 years and lived in the area during the investigation.

To be eligible, participants must be at least 40 years old, be in good health, be able to complete the survey, and have been in the study region for at least five years. Poor health

conditions that make it difficult to participate, a history of lower urinary tract surgery or cancer, neurogenic diseases that affect urination, and an average fluid intake (including fluid intake from food) of less than 30 ml/kg per 24 hr body weight or more than 50 ml/kg per 24 hr body weight are some of the exclusions from participation.[6] Universitas Brawijaya's Saiful Anwar General Hospital's ethics committee accepted the study with the number 211/EC/KEPK/7/2019. Participant's written informed consent was obtained.

Methods of Data Collections

To collect the data, researchers employed face-to-face interviews with subjects that were done by interviewers who had been trained and certified, such as urologists in training or urology residents in training. To begin, we gathered all of the participants in a community hall and scheduled interviews with both male and female investigators. Last but not least, the individuals were instructed to complete the questionnaire in a separate room away from the researchers and without the presence of an investigator. It is possible to get a fairly accurate questionnaire completion by doing a face-to-face examination.

The survey inquired about the respondent's socioeconomic status, way of life, and medical history. Age, gender, educational attainment (either elementary or secondary schooling), employment (either worker, government servant, retired or veteran, farm owner, self-employed, housewife/househusband), and civil status were all included in the socio-demographic data (single, married, divorced, widowed, separated, cohabiting).

Body mass index (BMI 25, 30, or 30 kg/m2), height (m), and weight (kg) were recorded as an anthropometric measurement. Overactive bladder symptoms score (OABSS), the International Prostate Symptom Score (IPSS), and diabetes mellitus (DM) were all included in the medical history (IPSS). Fluid consumption each day, as well as food-related fluid intake, was also recorded.

The responses to the following questions concerning nocturia are used to compile data on the condition: "How often do you get up throughout the night to pee?" There are four ways to answer a urination-related question: zero, one, two, three, four, and five (five times or more). The definition of nocturia[4] excludes the first urine of the day when a person wakes up.

When the questionnaire was tested in a pilot research with 100 participants, the Cronbach's a coefficient was 0.87. (unpublished data). Patients with benign prostate hyperplasia can benefit from the IPSS, which was designed for them (BPH). How often do you urinate throughout the day? How often do you urinate at night? How often do you urinate? (emptying, intermittency, weak stream, and hesitancy). Assessment of BPH is made easier with this scoring system because of its clinical sensitivity, reliability, efficiency, and responsiveness.[8] The score can be anything from 0 all the way up to 35. The OABSS was created by the Japanese Red Cross Medical Center. The effect of OAB symptoms (daytime frequency, nocturnal frequency, urgency, and urge incontinence) is determined by four questions.[9] It was suggested that participants use the Likert scale to score their OABSS on a scale of 2, 3, 4, and 5. Between zero and fifteen points are possible. An increasing score indicates a worsening of the patient's symptoms.[10,11] All participants had their blood and urine tested for signs of renal disease or an infection in their urinary tracts.

Statistical Analyses

Nocturia was characterized as being either nocturnal urination <2 (coded as 0) or nocturnal urination >2 (coded as 1). Mean standard deviation (SD) is used to represent continuous variables whereas number percentage is used to represent categorical variables (percent). In the chi-squared test, age groups were compared for differences in prevalence. We used the Bonferroni adjustment for multiple comparisons to determine statistical significance at a Pvalue of less than 0.017 (0.05/3). Using a Bonferroni correction, this threshold of significance amounts to 5 percent. Analysis of the data for men and women individually was conducted to see which characteristics connected with nocturia and gender. In addition to sociodemographic data (such as age and education level), anthropometric data (such as height and weight) and medical history, there may be some link between these factors (female birth history, DM, hypertension, cardiovascular disease, OABSS, IPSS). Odds ratios (ORs) and 95 percent confidence intervals (CIs) were determined for each gender using a thorough multivariable model. Statistical significance was set at $P < 0.05$. SPSS v.26.0 software was used to perform the research (IBM Corp., Armonk, NY).

Results

We collected totally 562 subjects, comprising 185 (32.92%) men and 377 (67.08%) women, qualified for data analysis. Table I provides an overview of the study participants' demographics. Overall nocturia prevalence was 31.8% (179/562). It rose significantly with age (P<0.001) and reached >48% in those above the age of 70 (Table II).

Nocturia was found to be linked with aging, cardiovascular disease, hypertension, diabetes mellitus, and OABSS in multiple backward elimination regression models of both sexes (OABSS = [1.68±1.26] in men and [1.82±1.25] in women (p-value < 0.05). (Table III). According to this study, there was no significant link between nocturia and educational level or occupation or civil status or BMI or female birth history or IPSS (P>0.05).

Table 1. Characteristics of Study Participants

Variables	Total (n = 562)	Men	Women
Age (year), n(%)			
40-49	95 (17%)	38 29.2%)	57 (70.8%)
50-59	191 (34%)	56 29.5%)	135 (70.5%)
60-69	174 (31%)	56 32.0%)	118 (68.0%)
>70	102 (18%)	35 34.3%)	67 (65.7%)
BMI(kg/m²),n(%)			
<25	233 41.5%)	66 28.3%)	167 (71.7%)
25-30	255 45.4%)	86 33.7%)	169 (66.3%)
>30	74 (13.2%)	24 32.2%)	50 (67.8%)
Education, n(%)			
Under or primary school	221 39.4%)	46 20.8%)	175 (79.2%)
Middle school	176 31.3%)	67 38.1%)	109 (61.9%)
High School	123 21.9%)	42 34.1%)	81 (65.9%)
Post-secondary school	42 (7.4%)	20 47.6%)	22 (52.4%)

BMI, body mass index.

Table 2. Prevalence of Nocturia in Different Age Groups

Age (year)	Nocturia	Prevalence (%)	X^2	p-Value
Both genders[a]				
40-49	18/95	18.95%	421.2	<0.001
50-59	49/191	25.65%		
60-69	63/174	36.21%		
≥70	49/102	48.04%		
Total	**179/562**	**31.8%**		
Men[a]				
40-49	7/38	18.42%	233.6	<0.001
50-59	14/56	25.0%		
60-69	21/56	37.5%		
≥70	20/35	57.14%		
Total	**82/185**	**44.32%**		
Women[a]				
40-49	11/57	19.30%	204.5	<0.001
50-59	35/135	25.93%		
60-69	42/118	35.59%		
≥70	30/67	44.78%		
Total	**118/377**	**31.30%**		

[a] There is a statistically significant variation in the prevalence of nocturia between the age groups. (p<0.001) using X^2 test. The Bonferroni test shows a significant difference in the age groups when comparing multiple comparisons. (p < 0.017).

Table 3. Nocturia in Men and Women: Multivariate Correlations*

Variables	Nocturia (%)	OR (95% CI)	p-Value
Men			
Age (mean [60.40 ± 11.81])		1.026 (1.011-1.041)	0.001
Hypertension (n = 42/185)	13 (30.95%)	1.293 (1.052-1.574)	0.014
DM (n = 31/185)	16 (51.61%)	1.597 (1.154-2.182)	0.005
CVD (n = 22/185)	9 (40.91%)	1.592 (1.175-2.176)	0.003
OABSS		11.201 (9.163-13.449)	0.000
Women			
Age (mean [63.42 ± 10.89])		1.042 (1.021-1.051)	0.001
Hypertension (n = 98/377)	42 (42.86%)	1.293 (1.052-1.574)	0.014
DM (n = 66/377)	39 (59.09%)	1.937 (1.341-2.201)	0.005
CVD (n = 40/377)	14 (35.00%)	1.290 (1.041-1.599)	0.020
OABSS		13.969 (12.154-16.068)	0.000

DM, diabetes mellitus; CVD, cardiovascular disease; OABSS, overactive bladder symptom score.

*All of the variables are statistically relevant.

Discussion

One of the most common causes of sleep deprivation is nocturia. Deprivation of sleep has been linked to exhaustion and sadness, both of which have a negative impact on one's personal and professional life.[12] An age-stratified prevalence of 31.8% was significantly lower than previously reported (36.21 percent in subjects over 60 years and 48.04 percent in those over 70 years). 58.5 percent of Alabama people under 65 years of age have nocturia, according to the state's data.[13] As defined by Bing et al.[14], nocturia prevalence in a 60–80-year-old Danish population was 36 percent. As to why there is a discrepancy, it remains unknown. Differences in racial and cultural background may have had an impact on these outcomes. Prevalence may be affected by differences in questionnaire design, data collecting, and geographic variation.[10] One-third of the individuals in our study had only a basic educational level. As a result, the researchers, who were all doctors, should make the questionnaires explicit so

that the participants can better grasp them. Indonesians, on the other hand, have a high level of faith in their physicians and are more likely to give them the truth about their medical conditions, even if it means disclosing intimate details. As a result, professional interviewers conducted face-to-face assessments to address the issue of subjects who were unable to read the questionnaire correctly. We believe that both study quality and accuracy have been much enhanced.

Diabetic nocturia has been linked to diabetes in a variety of ways.[1] Diabetic nocturia was linked to diabetes in both men and women in the FINNO trial, but only in women in the multivariate analysis.[1] In a population-based assessment of 2,799 Danish men and women aged 60–80, a link between nocturia and diabetes was also found.[15] People with diabetes were shown to have nocturia, regardless of gender. A study in Turkey found that 74% of men and 69% of women had impaired bladder function, including OAB, frequency, and nocturia.[16,17] Additionally, diabetics were shown to suffer from nocturia as a result of reduced renal function.[18] Diabetic osmotic diuresis can lead to 24-hour polyuria and increased nocturia if the disease is poorly treated.[19] Differences in results may be due in part to different definitions of nocturia and different methods of self-reporting.[15]

Nocturnal urinary incontinence has been linked to cardiovascular illness, particularly hypertension. According to Salam et al.[20], there was no statistically significant link between nocturia and hypertension. No link was found between nocturia and treatment for hypertension, angina, and congestive heart failure by Rembratt et al. Fitzgerald et al.[22] found that respondents with cardiovascular illness had a higher rate of nocturia, which contrasts with our findings and is in line with previous research. Lower urinary tract symptoms (LUTS) are said to be exacerbated when high blood pressure activates the sympathetic nervous system.[20] Cardiovascular disease-related renal insufficiency may be exacerbated by elevated levels of atrial natriuretic peptide. Although the link between nocturia and hypertension is contentious in the scientific literature[20], additional research is needed in the future to resolve this question for certain.

Human anthropometric measures and nocturia are becoming more closely linked. Obesity and nocturia have been linked in previous research.[24,25] However, our study found no link between BMI and nocturia, in accordance with the findings of others[13] who have argued that variations across studies may be due to the study populations and age distributions of the participants.[13] Even though nocturia is included in the OAB syndrome[10], not all patients with OAB have it. Despite this, there are clear links between OAB and nocturia.[26] A whopping 17% of nocturia patients in a population-based survey of 6,000 people in Finland said they had OAB.[26] In contrast, nocturia was reported by 80% of individuals with OAB.[27] OAB-induced detrusor overactivity and nocturia are both caused by a decrease in nighttime bladder capacity and exacerbated by an increase in OAB.[27] Patients with BPH can use the IPSS to gauge the severity of their LUT symptoms.[8,28,29] The multivariate investigation led by Burgio et colleagues found that BPH was not a significant contributor to nocturia.[13] According to our findings, nocturia is not associated with IPSS in Indonesians under the age of 40. OABSS and IPSS' link to nocturia raises problems, and it may not be possible to compare the prevalence of nocturia with OABSS and IPS. OABSS and IPSS scores without

nocturia can be dissected, but we refuse to agree that they define the impact of OABSS and IPSS on nocturia. A more advanced technique should be used to study this area in the future.

In all studies of nocturia, the increase in nocturia with age is a common theme. Necessary nocturia was found to increase with age in the study of 439 Korean males ages 65 and older.[5] Age was found to be a risk factor for both sexes in our study. Elderly people may suffer from nocturia because of impaired renal function, decreased bladder capacity, and erratic ADH secretion.

In our study, we discovered no correlation between nocturia and educational level, occupation, or civil status. There have been conflicting results from several research. Schatzl et al.[3] stated that there was no correlation between nocturia and schooling level, however Burgio et al.[13] portrayed the inverse association between the two. Group, environment, and race are all possible explanations for the differences.

There are limitations to the scope of our investigation. The male-to-female ratio didn't accurately reflect the population's makeup. Men are more likely than women to work outside the home, thus scheduling the interview during the day could have played a role. In addition, many men were turned away because of their medical history with prostate problems.

Nausea can be categorized into 24 hour polyuria, overnight polyuria, long-lasting or night time bladder capacity subtraction, and essential or secondary sleep problem according on the etiology.[2] However, our analysis was unable to identify any further nocturia subtypes. Despite these limitations, our findings shed light on the high nocturia proportion and associated variables found in those over the age of 40.

Conclusion

The prevalence of nocturia is notably high among Indonesian elders, especially those under the age of 70. Diabetic kidney disease, heart disease, and OAB are all closely linked to nocturia in some way or another. Elderly persons should have their nocturia assessed as part of routine health exams because to the accompanying health risks. In elderly Indonesians, particularly those under the age of 70, the prevalence of nocturia is significant. There is a strong link between nocturia and a number of disorders, including diabetes, heart disease, and OAB. As nocturia is connected with morbidity, elderly adults should have their nocturia assessed during health assessments.

Acknowledgement

Conflict of Interest

There is no conflict of interest.

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