

Prevalence of Nocturia and Its Association with Sleep Quality Among Medical Students During the Covid-19 Pandemic: A Cross-Sectional Study

Besut Daryanto^{1*}, Triana Amelia Lasdianto², Alidha Nur Rakhmani³

¹Department of Urology, Faculty of Medicine, Universitas Brawijaya, Dr. Saiful Anwar General Hospital, Malang, East Java, Indonesia, 65112

²Faculty of Medicine Universitas Brawijaya, Malang, East Java, Indonesia, 65145

³Department of Family Medicine, Faculty of Medicine Universitas Brawijaya, Malang, East Java, Indonesia. 65145

*Corresponding Author

Besut Daryanto

Department of Urology, Faculty of Medicine, Universitas Brawijaya, Dr. Saiful Anwar General Hospital, Malang, East Java, Indonesia, 65112

Email: urobes.fk@ub.ac.id

Introduction. Nocturia is the most common lower urinary tract disease that is characterized by waking up to urinate more than once during the main sleep period and its prevalence increases with age. This study aimed to investigate frequency, bothersome and relation of nocturia with sleep quality during COVID-19 pandemic in medical students.

Methods. This study used a cross-sectional approach and an analytical observation method by distributing questionnaires. Questions include demographic characteristics, frequencies of nocturia, and bother scores related to nocturia.

Results. Data on 90 individuals eligible for statistical analysis. The average age was 19.24 ± 1.08 years. Overall nocturia prevalence was 38.8% medical students had nocturia. The nocturia rate was 42.2% and 35.56% in men and women, respectively ($p = 0.642$). The frequency of nocturia per night was 24.4%, 13.3%, and 0.01% (1, 2, and 4 times, respectively).

Conclusion. Nocturia is common among medical students, especially men and it is not related with sleep quality.

Keywords: COVID-19, medical students, nocturia, sleep quality

Introduction

The International Continence Society (ICS) has defined nocturia as the complaint of waking up at night one or more times to void when each void is preceded and followed by sleep [1]. According to the Indonesian Urological Association (IUA) the prevalence of nocturia in Indonesia with 1555 subjects was 61.4% in men and 38.6% in women. Nocturia primarily affects those in the 55–65 age range [2]. Reduced sleep quality may result from nocturia episodes occurring frequently.3 More significant in young people, particularly in medical students who have a high volume of workload [4]. We aimed to investigate the prevalence and to evaluate whether there is a relation between nocturia and sleep quality among medical students in COVID-19 pandemic.

Materials and Method

We performed a cross-sectional study and questionnaire-based survey conducted among medical students at Faculty of Medicine Universitas Brawijaya by using Google Form from January 1st,

2022 to April 30th, 2022. A total of 90 medical students met the criteria and completed the questionnaires. Gender, age, height, weight, history of nighttime social activities, daily use of sleeping medications, daily intake of caffeinated beverages in the afternoon and/or evening, were among the demographic questions. All patients provided written informed consent to participate in this study.

We conducted our survey based on two internationally validated, reliable, and widely used questionnaires, namely International Consultation on Incontinence Questionnaire Nocturia Module (ICIQ-N) that adapted from ICSmale and BFLUTS questionnaires with Cronbach alpha 0,92 and 0,98 for men and women, Kappa 0,76 ($P < 0.0001$). Pittsburgh Sleep Quality Index (PSQI) questionnaire with Cronbach Alpha 0.79, known group validity ($p < 0.001$).

The PSQI questionnaire includes the sleep quality assessment which include: (1) Sleep quality, (2) Sleep latency, (3) Sleep duration, (4) Habitual sleep efficiency, (5) Sleep disturbance, (6) Use of sleeping medication, and (7) Daytime dysfunction. All the above mentioned parameters were assessed by the scale of 0-3 with specific standardized values.

Ethical approval for this study was obtained from The Health Research Ethics Committee Faculty of Medicine Universitas Brawijaya, Malang with approval number of 364/EC/KEPK-S1-PD/12/2021.

Statistical Analysis

SPSS (v.28) software was used for statistical calculations. The descriptive data were quantitatively assessed, and given as numbers, and frequencies (%). The relationship between groups and responses to questions were analyzed using an appropriate chi-square test (Pearson chi-square or Fisher-Freeman-Halton exact test). P value of <0.05 was specified as the level of statistical significance.

Result

Table 1 shows the respondents have an average age of 9.24 ± 1.08 years old, with equal distribution of male and female, with total respondents of 90. However, men were reported to have higher incidence of nocturia (p value= 0.642). The average body mass index (BMI) of both sexes was 22.73 ± 5.78 . This study also recorded the regular habit of consuming caffeinated beverages in the afternoon,

where 18.8% of the respondents have. This study also recorded the history of social activities in the evening, categorized as not busy, quite busy, busy, very busy.

The overall p-value showed that there is no significant difference of nocturia between different genders, BMI, PSQI score, length of sleep, daily use of sleeping medication, daily consumption of caffeine in the afternoon/evening, and history of social activities in the evening.

Figure 1 shows the results of the response regarding the frequency of nocturia. The majority of respondents had a frequency of 1 nocturia per night (24.4%), followed by the frequency of 2 per night (13.3%), and 4 times per night by only 1 respondent.

The bother scores of the respondents according to frequency of nocturia episodes are presented in Figure 2. A total of 14 (34.1%) respondents reported no bother (score of 0) and 21 (65.85%) respondents reported a bother score more than 0 on a scale of 10. Degree bother scores are not included in the overall score but indicate the impact of individual symptoms. Among 35 nocturia respondents, a total of 14 respondents reported no disturbance due to the nocturia. Table 2 shows that men reported more disturbance, ranging from scale 0 to 10.

Table 1. Demographic characteristics and Pittsburgh Sleep Quality Index (PSQI) among respondents

	Nocturia (+)	Nocturia (-)	p-value
Mean age (years)	19.15 ± 0.96	19.18 ± 1.05	0.508
Gender			
Men	19 (42.2%)	26 (57.8%)	0.642
Women	16 (35.56%)	29 (64.4%)	
Mean BMI (kg/m ²)	22.66 ± 3.85	22.80 ± 7.04	0.931
Mean length of sleep (hours)	5.65 ± 1.69	5.85 ± 1.29	0.653
Mean PSQI score	8.00 ± 2.75	6.88 ± 2.64	0.540
Daily use of sleeping medications	1 (2.1%)	1 (0.6%)	0.381
Daily consumption of caffeine at afternoon/evening			0.084
Yes	6 (13.3%)	11 (34.4%)	
No	29 (64.4%)	44 (97.78%)	
History of social activities at evening			0.695
Not busy	10 (22.2%)	16 (35.56%)	
Quite busy	11 (24.4%)	24 (53.3%)	
Busy	7 (15.56%)	7 (15.56%)	
Very busy	7 (15.56%)	8 (17.78%)	

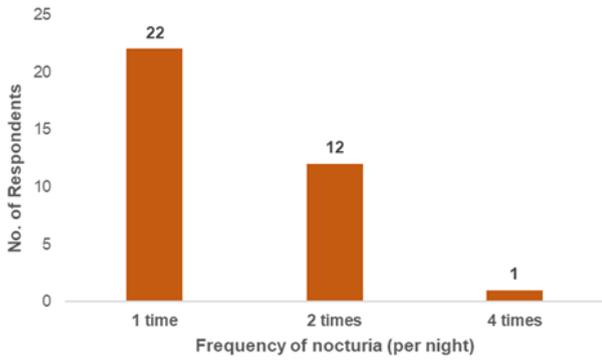


Figure 1. Frequency of nocturia among respondents

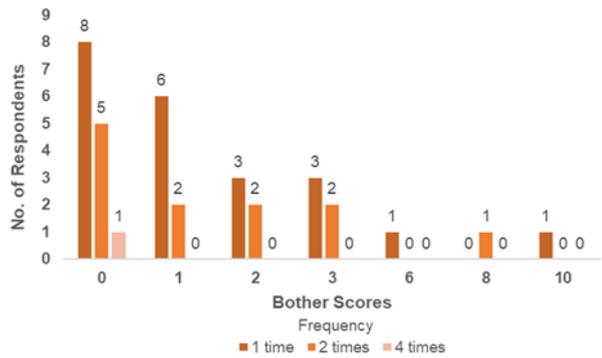


Figure 2. The bother scores of the respondents according to frequency of nocturia episodes

This study also assesses the sleep quality of the respondents (Table 3). The result shows that the majority of respondents (71,1%) rated their sleep quite well (score 1). The majority of respondents have a sleep latency within 30 minutes (score 0 and 1) with sleep duration between 5-7 hours a day, and overall a good sleep efficiency. Mild sleep disturbances (score 1) were common, while only a few had a moderate to severe disturbance (score 2) or slept with no disturbance at all (score 0). The use of drugs is quite rare where only 2 respondents use sleeping medications. This sleep quality leads to

daytime dysfunction that occurs in most of the respondents, with varying intensities.

Table 2. The bother scores of the respondents according to gender

Bother score	Women		Men	
	n	Percentage (%)	n	Percentage (%)
0	6	75.6	8	68.9
1	4	8.9	4	8.9
2	3	6.7	2	4.4
3	2	4.4	3	6.7
6	1	2.2	1	2.2
8	0	0	1	2.2
10	0	0	1	2.2

A maximum score of 5 is categorized as good sleep quality, while a score of 6 and above is categorized as poor sleep quality. In the sample of this study, 74% of respondents had poor sleep quality and 26% of respondents obtained good sleep quality (Figure 3), based on the PSQI questionnaire.. The significance value of Chi-square result between the poor and good sleep report is 0.774, indicating no significant difference in the frequency of nocturia between the good and poor sleep quality groups in this study.

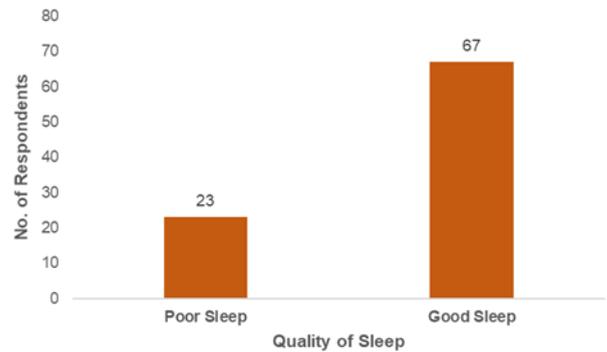


Figure 3. Quality of sleep among respondents

Table 3. Sleep quality assessment among respondents

Indicator	0		1		2		3	
	n	Percentage (%)						
Sleep quality	9	10,0	64	71,1	13	14,4	4	4,4
Sleep latency	50	55,6	31	34,4	5	5,6	4	4,4
Scores of sleep latency	33	36,7	31	34,4	13	14,4	13	14,4
Sleep duration	14	15,6	14	15,6	45	50,0	17	8,9
Habitual sleep efficiency	72	80,0	11	12,2	3	3,3	3	3,3
Sleep disturbance	3	3,3	59	65,6	27	30,0	1	1,1
Use of sleeping medication	88	97,8	1	1,1	0	0	1	1,1

Indicator	0		1		2		3	
	n	Percentage (%)	n	Percentage (%)	n	Percentage (%)	n	Percentage (%)
Daytime dysfunction	7	7,8	57	63,3	24	26,7	2	2,2

Discussion

Among a total of 90 respondents, 38.89% had nocturia, with the majority of the respondents being men. Several studies also show similar reports where the nocturia cases are dominated by men [5-6]. However, several other factors such as age, might influence the different prevalence of nocturia in male and females. Daryanto et al. [8] showed that 32.92% of men and 67.08% of women experienced nocturia in the age group greater than 40 years.

This may be supported by the routine habit of consuming caffeinated beverages in the afternoon or evening, where 1 in 10 male respondents have a regular habit of consuming caffeinated drinks in the afternoon or evening. Even though this study shows no significant difference between the incidence of nocturia with the habit of consuming caffeinated drinks, Lohsiriwat, S et al. [9] stated that caffeine has a diuretic effect and also has a direct effect on bladder smooth muscle so that it can increase urine output [9].

Tikkinen et al. [10] study showed that obesity (usually defined by BMI value) is associated with increased nocturia, more strongly among women than among men. However, this study did not find any association between BMI and nocturia, with some findings reported similar results and argued that the variation across studies may be due to the study population and the age distribution of the respondents [11].

This study found that there is no significant correlation between the quality of sleep and nocturia, which might be due to the reported low frequency of nocturia. Similar findings were also reported by Kupelian et al. [12] where each individual's degree of nocturia disruption may vary. However, poor sleep quality leads to daytime dysfunction that occurs in most of the respondents with varying intensities. Bliwise et al. [13] noted that nocturia has been identified as a possible risk factor for sleep disturbances and was identified as having a significant impact on individuals under the age of 65 who report greater rates of daytime dysfunction compared to those who report lower sleep quality. Nevertheless, the assessment of sleep quality is solely dependent on personal experience.

The degree of bother scores among men is generally higher than women because their nighttime voiding is usually more frequently associated with other underlying, and often progressive, lower urinary tract conditions that lead to higher, more frequent, and more disruptive urination. While the overall prevalence of nocturia is similar between genders, men with nocturia are more likely to have multiple, overlapping causes [14].

Additionally, since this study was conducted during the COVID-19 pandemic, we highlight that 8.2% of COVID-19 patients had nocturia, and that nocturia is the most common lower urinary tract symptom found in COVID-19 patients [15]. This lower urinary tract disease has been shown to increase in severity with the severity of the infection from COVID-19 itself. The severity of COVID-19 has a profound effect on improving lower urinary tract symptoms [15].

The major limitation of the study was small sample size and lack of voiding frequency charts or bladder diaries to determine exact pathology of nocturia. The research design used in this study was not strong enough to assess the cause and effect of nocturia.

Conclusion

Nocturia is a frequent symptom among medical students especially in men. In most of the cases the bother is related with frequency of nocturia. Although higher PSQI scores were observed among students with nocturia, no statistically significant association between nocturia and sleep quality was found in this study population.

Conflict of Interest

The authors declare no conflict of interest.

References

- [1] Hashim H, Blanker MH, Drake MJ, Djurhuus JC, Meijlink J, Morris V, et al. International

- Continence Society (ICS) reports on the terminology for nocturia and nocturnal lower urinary tract function. *Neurourology and Urodynamics*. 2019;38(2):499-508. doi: 10.1002/nau.23917.
- [2] Daryanto B, Rahardjo HE, Mochtar CA, Tjahjodjati, Widia F, Rizaldi F, et al. Panduan diagnosis dan tatalaksana nokturia. Jakarta: Ikatan Ahli Urologi Indonesia; 2020. p. 4-15.
- [3] Negoro H, Fukunaga A, Setoh K, Kawaguchi T, Funada S, Yoshino T, et al. Medical history of nocturnal enuresis during school age is an independent risk factor for nocturia in adults: The Nagahama study. *Neurourol Urodyn*. 2020;(40)1:326-333. doi: 10.1002/nau.24562.
- [4] Dewi EU. Pengaruh kecemasan saat pembelajaran daring masa pandemi covid-19 terhadap prestasi belajar mahasiswa Stikes William Surabaya. *Jurnal Keperawatan*. 2020;9(1):18-23. doi: 10.47560/kep.v9i1.210.
- [5] Weiss JP, Blaiwas JG, Bliwise DL, Dmochowski RR, Dubeau CE, Lowe FC, et al. The evaluation and treatment of nocturia: a consensus statement. *BJU Int*. 2011;108:6-21. doi: 10.1111/j.1464-410X.2011.10175.x.
- [6] Rahardjo HE. The management of nocturia by Indonesian Urologist. *eJournal Kedokteran Indonesia*. 2020;7(3):195-199. doi: 10.23886/ejki.7.11352.
- [7] Coskun B, Yurdakul T, Kaygisiz O, Koca N, Yavascaoglu I. How frequent is nocturia in medical students. *The European Research Journal*. 2017;(3)1:68-72. doi: 10.18621/eurj.267257.
- [8] Daryanto B, Purnomo AF, Budaya TN, Prayitnaningsih S, Dewi NA. Indonesian people risk factors of nocturia (two or more voids per night) older than 40 years-old. *Malang Neurology Journal*. 2022;8(2):104-108. doi: 10.21776/ub.mnj.2022.008.02.6.
- [9] Lohsiriwat S, Hirunsai M, Chaiyaprasithi B. Effect of caffeine on bladder function in patients with overactive bladder symptoms. *Urology Annals*. 2011;3(1):14-8. doi: 10.4103/0974-7796.75862.
- [10] Tikkinen KA, Auvinen A, Huhtala H, Tammela TL. Nocturia and obesity: a population-based study in Finland. *Am J Epidemiol*. 2006 Jun 1;163(11):1003-11. doi: 10.1093/aje/kwj139.
- [11] Burgio KL, Johnson TM 2nd, Goode PS, Markland AD, Richter HE, Roth DL, et al. Prevalence and correlates of nocturia in community-dwelling older adults. *J Am Geriatr Soc*. 2010 May;58(5):861-6. doi: 10.1111/j.1532-5415.2010.02822.x.
- [12] Kupelian V, Fitzgerald MP, Kaplan SA, Norgaard JP, Chiu GR, Rosen RC. Association of nocturia and mortality: results from the Third National Health and Nutrition Examination Survey. *J Urol*. 2011 Feb;185(2):571-7. doi: 10.1016/j.juro.2010.09.108.
- [13] Bliwise DL, Wagg A, Sand PK. Nocturia: a highly prevalent disorder with multifaceted consequences. *Urology*. 2019;133S:3-13. doi: 10.1016/j.urology.2019.07.005.
- [14] Yuen JW, Wong IY, Chiu PK, Teoh JY, Chan CK, Yee C, et al. A comprehensive community-based prevalence study on nocturia in Hong Kong male adults. *Int. J. Environ. Res. Public Health*. 2021;18(17):9112. doi: 10.3390/ijerph18179112.
- [15] Daryanto B, Janardhana A, Purnomo AF. The effect of covid-19 severity on lower urinary tract symptoms manifestations. *Med Arch*. 2022;76(2):127-130. doi: 10.5455/medarh.2022.76.127-130.