Original Research Article

Relationship between Sleep Quality and Primary Headache in Medical Bachelor's Program Students at Udayana University

Joshua Francisco Syofyan[1], I Made Oka Adnyana[2], Desak Ketut Indrasari Utami[3], Ni Made Susilawathi[4]

[1]Medical Student, [2]Professor, Department of Neurology, [3]Associate Professor, Department of Neurology, [4]Associate Professor, Department of Neurology, Udayana University, Bali, Indonesia.

How to cite this article: Joshua Francisco Syofyan, I Made Oka Adnyana, Desak Ketut Indrasari Utami et. al. Relationship between Sleep Quality and Primary Headache in Medical Bachelor's Program Students at Udayana University. Indian Journal of Public Health Research and Development/Volume 15 No. 3, July-September 2024.

Abstract

Background: The issue of headaches is urgent to address as it can have a significant impact on the global community at large. Various factors influence headaches, one of which is the quality of sleep. This research is conducted to investigate the relationship between sleep quality and primary headaches among students in the Medical Bachelor's Program at Udayana University.

Materials and Methods: This study was conducted with a descriptive analysis regarding sleep quality and primary headaches in 164 students. Data collection was done online through questionnaires on primary headaches and the Pittsburgh Sleep Quality Index (PSQI). The data were then analyzed using the contingency coefficient correlation test.

Results: A total of 68.3% of students experienced primary headaches, while 87.8% of students had poor sleep quality. There is a relationship between sleep quality and primary headaches (p=0.017) with a correlation value of 0.183, indicating a very weak relationship between the two.

Conclusion: There is a significant relationship between the quality of sleep and primary headaches among medical undergraduate students of Udayana University with a very weak correlation. Therefore, providing a better understanding of maintaining a more regular sleep schedule to students is recommended.

Keywords: Primary headache, sleep quality, student

Background

Sleep is one of the essential activities for human life. Sleep holds the same importance as eating and drinking for the survival of humans. Sleep affects physical, cognitive, and psychological health. Therefore, attention or research is needed to help improve the quality of sleep.[1,11]

Corresponding Author: Joshua Francisco Syofyan, Department of Neurology, Udayana University, Bali, Indonesia.

E-mail: joshua365mu@gmail.com

Submission date: Dec 20, 2023 **Revision date:** Jan 22, 2024 **Published date:July 4, 2024**

Headache can be described as a painful sensation occurring in the head area. Headaches are caused by the perception of pain and discomfort in structures sensitive to pain in the head and neck, such as the skin, muscles, and blood vessels. Additionally, headaches can radiate from one part of the head to another. Headaches can occur suddenly or gradually.[2]

Sleep has an influence on headaches; for example, insomnia, a sleep disorder, can be associated with Chronic Daily Headache (CDH), a type of headache.[9] Furthermore, a study by Paiva et al. indicates a relationship between sleep disorders and headaches.[16] The results of the study by Boardman et al. show a direct correlation between sleep disorders and the level of headache.[3] This indicates that an increase in sleep problems is associated with an increase in the level of headache.

Therefore, this study aims to determine the correlation between sleep quality and primary headaches in students of the Medical Bachelor's Program at the Faculty of Medicine, Udayana University.[2]

Materials and Methods

This research is an observational analytic study with a cross-sectional design. Subjects were selected using simple random sampling.

The sampling was conducted at the Faculty of Medicine, Udayana University, in the city of Denpasar in the year 2023.

The measuring instrument used in this study is the Pittsburgh Sleep Quality Index (PSQI). PSQI consists of 19 questions that evaluate 7 components, such as subjective assessment of sleep quality, time taken to fall asleep, sleep duration, and other aspects. If the PSQI score is > 5, it indicates poor sleep quality, while a score of PSQI < 5 indicates good sleep quality. Subjects can complete the PSQI questionnaire within 5 to 10 minutes.4

This study recruited subjects from first, third, and fifth-semester medical undergraduate students at Udayana University who agreed to participate through informed consent. Data were collected directly from the research subjects as primary subjects. Online questionnaires were distributed personally or through small group discussions (SGD) among students. Samples that met the inclusion and exclusion criteria were selected as eligible samples.

The exclusion criteria in this study are as follows:

1. Having a history of trauma to the head area.

2. Suffering from systemic infections causing fever.

3. Having a history of being treated in the Emergency Department (UGD) in the last 3 months.

4. Headache caused by excessive medication use or medication-overuse headache (MOH).

5. Currently taking medications that affect sleep.

Here are the steps for analyzing the research results:

1. Descriptive analysis based on age, gender, socioeconomic status, and semester to determine subject characteristics.

2. The contingency coefficient correlation test is used to determine the relationship between sleep quality and NKP. The strength of the relationship (r) has several levels: very weak (r = 0.00 – 0.199), weak (r = 0.20 – 0.399), moderate (r = 0.40 – 0.599), strong (r = 0.60 – 0.799), and very strong (r = 0.80 – 1.00). If $p < 0.05$, the relationship between sleep quality and NKP is considered significant. The direction of the relationship is positive if the r value is positive.6

3. The SPSS 16.0 program for Windows will be used to analyze the data obtained in this study.

Results

This study obtained responses from 170 students in the Medical Bachelor's Program at the Faculty of Medicine, Udayana University. Out of these 170 respondents, 164 subjects met the inclusion and exclusion criteria. The following table describes the characteristics of the research subjects.

Table 1: Demographic Characteristics of Research Subjects

Variable	Frequency(n)	Percentage (%)
Age		
17	2	1,2
18	47	28,6
19	61	37,1
20	50	30,4
21	4	2,4
Sex		
Male	71	43,3
Female	93	56,7
Single Tuition Fee		
1 (Rp500.000,00)	11	6,7
2 (Rp1.000.000,00)	11	6,7
3 (Rp13.600.000,00)	65	39,6
4 (Rp19.200.000,00)	41	25
5 (Rp21.400.000,00)	36	22
Semester		
1	50	30,5
3	60	36,6
5	54	32,9
Total	164	100

The relationship between sleep quality and primary headache can be found in the attached Table 2.

Table 2: Correlation between Sleep Quality and Primary Headache

Sleep Qualiy	Primary Headache				Total n (%)	r	P
	Present		Absent				
	n	%	n	%			
Good	9	45	11	55	20 (100)	0,183	0,017
Bad	103	71,5	41	28,5	144 (100)		
Total	112	68,3	52	31,7	164 (100)		

Meanwhile, the correlation values between other factors and primary headaches can be found in the following Table 3.

Table 3: Correlation of Other Factors with Primary Headache

Other Factors	Primary Headache				Total n (%)	r	P
	Present		Absent				
	n	%	N	%			
Sex							
Male	44	39,3	27	51,9	71 (43,3)	0,118	0,129
Female	68	60,7	25	48,1	93 (56,7)		
Total	112	100	52	100	164 (100)		
Age							
17	1	0,9	1	1,9	2 (1,2)	0,117	0,682
18	33	29,5	14	26,9	47 (28,7)		
19	39	34,8	22	42,3	61 (37,2)		
20	37	33	13	25	50 (30,5)		
21	2	1,8	2	3,8	4 (2,4)		
Total	112	100	52	100	164 (100)		
Socioeconomic Status (Single Tuition Fee)							
1	8	7,1	3	5,8	11 (6,7)	0,082	0,893
2	8	7,1	3	5,8	11 (6,7)		
3	43	38,4	22	42,3	65 (39,6)		
4	30	26,8	11	21,2	41 (25)		
5	23	20,5	13	25	36 (22)		
Total	112	100	52	100	164 (100)		

The following Table 4 displays the correlation between other factors and sleep quality.

Table 4: Correlation of Other Factors with Sleep Quality

Other Factors	Sleep Quality				Total n (%)	r	P
	Good		Bad				
	n	%	N	%			
Sex							
Male	9	45	62	43,1	71 (43,3)	0,013	0,869
Female	11	55	82	56,9	93 (56,7)		
Total	20	100	144	100	164 (100)		
Semester							
1	1	5	49	34	50 (30,5)	0,207	0,026
3	11	55	49	34	60 (36,6)		
5	8	40	46	32	54 (32,9)		
Total	20	100	144	100	164 (100)		
Socioeconomic Status (Single Tuition Fee)							
1	0	0	11	7,6	11 (6,7)	0,169	0,306
2	0	0	11	7,6	11 (6,7)		
3	8	40	57	39,6	65 (39,6)		
4	5	25	36	25	41 (25)		
5	7	35	29	20,2	36 (22)		
Total	20	100	144	100	164 (100)		

Discussion

It is known that the focus of this research is on students of the Medical Bachelor's Program at the Faculty of Medicine, Udayana University, aged between 17 to 21 years. The majority of them were 19 years old, comprising 37.1% of the total subjects. The research subjects were students from the Medical Bachelor's Program at the Faculty of Medicine, Udayana University, distributed across semesters 1, 3, and 5. The percentage distribution between male and female subjects in this study is 43.3% for males and 56.7% for females. There is no significant difference in the number of male and female subjects in this study. Additionally, the classification of subjects based on the single tuition fee is used to measure socioeconomic status. Most subjects pay single tuition fee level 3, amounting to Rp13,600,000.00, which is approximately 39.6%.

Table 2 provides information on the number of research subjects experiencing primary headache based on sleep quality, whether good or poor. Out of 20 research subjects with good sleep quality, around 9 individuals (45%) experience primary headache, while out of 144 research subjects with poor sleep quality, approximately 103 individuals (71.5%) experience primary headache. About 11 subjects with good sleep quality (approximately 55%) do not experience primary headache, while 41 research subjects (approximately 28.5%) with poor sleep quality do not experience primary headache.

By using the contingency coefficient correlation test on two equivalent nominal variables, a significant correlation was found between sleep quality and Primary Headache ($p<0.05$). The correlation value between them is 0.183 ($r=0.000$-0.199), indicating a very weak level of correlation.[6]

The prevalence of primary headache in the age group is quite high, as found in this study, at 68.3%. This prevalence is higher than in a meta-analysis study that investigated 76,782 children and adolescents, showing a prevalence of NKP of 62%.[15] This study aligns with another research on children and adolescents in Zambia, indicating a headache prevalence of 85.8%. Among these headaches, migraines and tension-type headaches (TTH) account for 53.2% and 12.1%, respectively. Therefore, the prevalence of primary headache in that study was 65.3%.[10]

The prevalence of poor sleep quality obtained in this study is very high, reaching 87.8%. A study on students at Bogotá University in Colombia found a prevalence of deteriorated sleep quality to be 58.9%7. Both of these studies align with research on university students in America in 2010, where 34.1% of respondents had poor sleep quality. Therefore, the prevalence of poor sleep quality in that study was 65.9%.[12]

The high prevalence of sleep quality disorders and headaches in adolescents in this study emphasizes the importance of understanding the relationship between the two. Data from this research indicate that 62.8% of research subjects experiencing poor sleep quality also experience primary headache. This high percentage suggests a potential connection between poor sleep quality and the onset of primary headaches in adolescents. Statistical test results confirm the presence of a significant correlation between sleep quality and primary headaches.

Table 3 presents the correlation values (p) and correlation levels (r) between several other factors and primary headache. Each of these factors shows a non-significant correlation with primary headache.

A study at Taibah University involving 488 medical students found no significant correlation between the prevalence of primary headache and the age of the respondents.8 These findings align with this study, where the prevalence of primary headache varies at different ages of the subjects, namely 50% at the age of 17, 70.2% at the age of 18, 63.9% at the age of 19, 74% at the age of 20, and 50% at the age of 21.

This study notes that the prevalence of primary headache tends to be higher in females, reaching 73.1%, while males have a prevalence of primary headache of 62%. These findings align with the results of a study in Kuwait, where the prevalence of primary headache in females reached 47.98%, while in males, the prevalence was 34.36%.[18]

A study conducted in Germany indicates a correlation between the frequency of primary headache and socioeconomic status. The research found that an increase in socioeconomic status

is associated with a decrease in the frequency of primary headache.14 The results of this study differ, as individuals with a high socioeconomic status still have a high prevalence of primary headache. This research found that students with a single tuition fee level of 4, classified as a high socioeconomic status, have the highest prevalence of primary headache among all single tuition fee levels, at 73.2%.

Table 4 shows the correlation values (p) and correlation levels (r) between sleep quality and various other factors. Gender and socioeconomic status do not exhibit a significant relationship with sleep quality. However, there is a significant relationship between sleep quality and the number of semesters ($p<0.05$). The correlation between these two factors reaches 0.207, which can be categorized as a weak level of correlation ($r=0.20-0.399$).[6]

In the study conducted by Madrid-Valero and colleagues in 2017, females were found to be twice as likely to experience poor sleep quality compared to males.13 However, these results differ from the findings of this study, where sleep quality in females and males is almost equivalent. About 88.2% of female subjects and 87.3% of male subjects have poor sleep quality.

This study investigated students from three different semesters, namely the 1st, 3rd, and 5th semesters. The following are the percentages of students with poor sleep quality in each semester: 98% in the 1st semester, 81.7% in the 3rd semester, and 85.2% in the 5th semester. This is consistent with a study in Japan where first-year students had less than 7 hours of sleep, while fourth-year students had more than 7 hours of sleep. This leads to an improvement in sleep quality in students with higher semesters.[1]

This study notes that students with a high socioeconomic status show a good level of sleep quality. The identification of socioeconomic status in this research is based on the single tuition fee categories for students, consisting of five levels where level 1 is the lowest or most affordable, while level 5 is the highest or most expensive. These findings indicate that the prevalence of poor sleep quality in students with single tuition fee levels 3, 4, and 5, or with a high socioeconomic status, reaches 87.7%, 87.8%, and 80.6%, respectively.

Meanwhile, students with single tuition fee levels 1 and 2 have a 100% prevalence of poor sleep quality for both levels. These results align with other studies conducted at various universities in New York, USA, indicating that students with low socioeconomic status have the strongest association with poor sleep quality.[17]

Conclusion

There is a significant relationship between sleep quality and primary headaches in students of the Medical Bachelor's Program at Udayana University, with a very weak level of correlation. Other outcomes in this study include:

- There is no significant relationship between primary headaches and other factors, namely gender, age, and socioeconomic status.
- There is no significant relationship between sleep quality and gender or socioeconomic status.
- There is a significant relationship between sleep quality and the number of semesters, with a weak correlation.

Based on the results of the conducted research, the researchers would like to propose several recommendations or suggestions:

1. There are several variables that influence sleep quality but were not investigated in this study. Some unexamined factors that potentially affect sleep quality include genetic aspects, the use of electronic devices, and caffeine consumption. It is advisable for future research to be expanded to explore the relationship between sleep quality and these various factors.
2. This study did not examine certain factors influencing primary headaches, such as body posture, caffeine consumption, and alcohol consumption. Subsequent research could delve deeper into the relationship between primary headaches and these factors.
3. Improvement can be made by increasing the number or size of samples to better represent students who experience primary headaches and poor sleep quality.

Conflict of Interest: We declare that there is no conflict of interest.

Ethical Clearance: Research Ethics Committee Faculty of Medicine Universitas Udayana. Ref no 2510/UN14.2.2.VII.14/LT/2023 dated 23 November 2023

Source of Funding: Self

References

1. Crivello A, Barsocchi P, Girolami M, Palumbo F. The Meaning of Sleep Quality: A Survey of Available Technologies. IEEE Access. 2019;7:167374–90.
2. Ketut Indrasari Utami D, Oktaviany Gabur M. A Wake–Sleep Regulation. Int J Res Publ. 2022;94(1):294–300.
3. Bigley GK. Clinical Methods: The History, Physical, and Laboratory Examinations. In: Walker HK, Hall WD, Hurst JW, editors [Internet]. 3rd ed. Boston: Butterworths; 1990. Available from: https://www.ncbi.nlm.nih.gov/books/NBK377/
4. Kamelia L, Adnyana MO, Budyarsa I. Nyeri kepala dan gangguan tidur. J Ilm Kedokt. 2015;44(2):101–4.
5. Paiva T, Farinha A, Martins A, Batista A, Guilleminault C. Chronic headaches and sleep disorders. Arch Intern Med. 1997;157(15):1701–5.
6. Boardman HF, Thomas E, Millson DS, Croft PR. Psychological, sleep, lifestyle, and comorbid associations with headache. Headache. 2005;45(6):657–69.
7. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. PSQI article.pdf. Vol. 28, Psychiatry Research. 1989. p. 193–213.
8. Dahlan M. Besar Sampel dan Cara Pengambilan Sampel dalam Penelitian Kedokteran dan Kesehatan. Ed II. Jakarta; 2009.
9. Onofri A, Pensato U, Rosignoli C, Wells-Gatnik W, Stanyer E, Ornello R, et al. Primary headache epidemiology in children and adolescents: a systematic review and meta-analysis. J Headache Pain [Internet]. 2023;24(1):1–16. Available from: https://doi.org/10.1186/s10194-023-01541-0
10. Kawatu N, Wa Somwe S, Ciccone O, Mukanzu M, Uluduz D, Şaşmaz T, et al. The prevalence of primary headache disorders in children and adolescents in Zambia: a schools-based study. J Headache Pain [Internet]. 2022;23(1):1–10. Available from: https://doi.org/10.1186/s10194-022-01477-x
11. Gómez-Chiappe N, Lara-Monsalve PA, Gómez AM, Gómez DC, González JC, González L, et al. Poorsleep quality and associated factorsin university students in Bogotá D.C., Colombia. Sleep Sci. 2020;13(2):125–30.
12. Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep Patterns and Predictors of Disturbed Sleep in a Large Population of College Students. J Adolesc Heal [Internet]. 2010;46(2):124–32. Available from: http://dx.doi.org/10.1016/j.jadohealth.2009.06.016
13. Hawalah A, Al-Mutairy S. Prevalence and Characteristics of Primary Headache as well as Coping Strategies among Medical Students of Taibah University. J Fam Med. 2022;9(3).
14. Shuaibi S. Prevalence of Primary Headache Disorder Among Primary and middle School students in Kuwait. 2020;1–13.
15. Müller B, Gaul C, Reis O, Jürgens TP, Kropp P, Ruscheweyh R, et al. Headache impact and socioeconomic status: findings from a study of the German Migraine and Headache Society (DMKG). J Headache Pain [Internet]. 2023;24(1):1–14. Available from: https://doi.org/10.1186/s10194-023-01564-7
16. Madrid-Valero JJ, Martínez-Selva JM, Ribeiro do Couto B, Sánchez-Romera JF, Ordoñana JR. Age and gender effects on the prevalence of poor sleep quality in the adult population. Gac Sanit. 2017;31(1):18–22.
17. Asaoka S, Komada Y, Aritake S, Morita Y, Fukuda K, Inoue Y. Effect of delayed sleep phase during university life on the daytime functioning in work life after graduation. Sleep Med [Internet]. 2014;15(9):1155–8. Available from: http://dx.doi.org/10.1016/j.sleep.2014.05.017
18. Peltz JS, Bodenlos JS, Kingery JN, Rogge RD. The role of financial strain in college students' work hours, sleep, and mental health. J Am Coll Heal [Internet]. 2021;69(6):577–84. Available from: https://doi.org/10.1080/07448481.2019.1705306.