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Prevalence of headache among medical students in Universitas Udayana, Denpasar, Bali-Indonesia



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ABSTRACT

Introduction: Headache among medical students is common. The study from the population estimated that the prevalence of headache reached as many as 12 to 18%, depending on the type of the study. Migraine was frequently found among medical students and related to academic underachievement and limiting daily activity. We would like to identify the prevalence and nature of headache among medical students in Udayana University Denpasar, as well as its impact on their quality of life as a whole.

Methods: This was an analytical cross-sectional study, involving medical students of second and sixth semester, Faculty of Medicine Udayana University. The study participants were randomized using random number generator and asked to fill in the multiple questionnaires of various parameters of headache profiles, as well as HIT6 score. All data analysis was conducted using SPSS version 20.

Results: According to HIT6 questionnaire results, more than half of study participants experienced a certain impact of their headache

in their life, with more than 10% of subjects felt substantial and severe implications. More than 80% of study participants experienced headache during the past one year and approximately 67% of them experienced headache within the past 1 to 3 months. The majority (50.8%) of subjects reported headache of pulsating in nature and 78% experienced headache recurrence for up to 5 times a month. Almost half of them (41.3%) experienced impaired activity to a certain extent. More than half (55%) of subjects found their headache so debilitating that they took sick leave of at least one day.

Conclusion: Headache was prevalent among medical students, regardless of their age, gender, and socio-economic status. Although generally mild in intensity, given the nature of its recurrency and debilitating painful quality, medical students often took a leave of absence from class for one or more days, thus potentially impairing the quality of life and academic performance to a certain extent.

Keywords: headache, medical students, clinical profiles, quality of life

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INTRODUCTION

Headache is a relatively common complain in neurology clinic. Study from the population estimated that the prevalence of headache reached as many as 12 to 18%, depending on the type of the study. Migraine was frequently found among medical students and related to academic underachievement and limiting daily activity.¹ The morbidity resulted from headache can bring severe consequences in their future well-being if let to be recurrent or not managed effectively. Prevalence of migraine was commonly studied among professional group, industrial workers, and only a fraction of those used students as their research sample. The estimated prevalence of migraine among medical students was between 11 to 40%.

Headache is relatively common and can be extremely painful to a certain extent. The prevalence of headache among adults was 46% with tension-type headache (TTH) being the most frequent,

i.e. 42% and migraine as many as 11%.² Headache frequently impairs daily activity and lowers patient's quality of life.³

According to this phenomena, we would like to determine the prevalence of headache among medical students of Udayana University, as well as the impact of anxiety to the occurrence of migraine and TTH and its influence on daily activity, as measured using HIT-6.

METHODS

Our study was an analytical cross-sectional study, involving medical students of second and sixth semester, Faculty of Medicine Udayana University. The study was prepared, data was collected and analyzed in July 20 2019. The study participants were randomized using random number generator and asked to fill in the multiple questionnaires pertaining to various parameters of headache profiles, as well as HIT6 score. HIT6 is an abbreviation for Headache

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Impact Test is a questionnaire designed for screening and monitoring of patients with headache and is focused on addressing the consequences of their headache. HIT6 questionnaire has been validated and routinely used for clinical research and practice.⁴ This study has been approved by the Ethical Committee of the Faculty of Medicine Udayana University/Sanglah Hospital. Data were analyzed for normality and tested with either chi-square or independent T test for non-parametric and parametric data, respectively. All data analysis was conducted using SPSS series 20 (IBM, San Fransisco). Informed consent was obtained from all of the participants.

RESULTS

The majority of the students were of 19 and 21 years old (36.8 and 25.9%, respectively) (Table 1). This was in accordance with our target population, i.e. 2nd and 6th-semester medical students (i.e. 61.4 and 38.6%, respectively). Male and female were relatively comparable and homogenous in our study (40.2 vs. 59.8%, respectively). Students of second semester tend to suffer a more severe headache when compared with students of sixth semester (mean difference±SE: 0.55±0.23; 95% CI 0.11 – 0.99; p=0.016).

Table 1. Demographics of subjects in the study

Parameters	Total (%)
Age	
17 years old	2 (0.5)
18 years old	42 (11.1)
19 years old	139 (36.8)
20 years old	61 (16.1)
21 years old	98 (25.9)
22 years old	32 (8.5)
23 years old	4 (1.1)
Sex	
Male	152 (40.2)
Female	226 (59.8)
Semester	
Second	232 (61.4)
Sixth	146 (38.6)

According to HIT6 questionnaire results, more than half of study participants experienced a certain impact of their headache in their life, with more than 10% of subjects felt substantial and severe impact (11.1 and 10.8%, respectively) [Table 2]. This was considered serious and significant, since more than one-fifth of study participants were bothered in their life to a significant extent, by their headache. The average day with pain resulted from

headache was 2.46±2.23 days. It was relatively long and continuous, thus further aggravating patient's quality of life. In addition, the pain score was less than 4, which can be categorized as a mild pain, but given the nature of continuous, persistent, and recurrent nature of migraine headache, the clinical impact can be much greater than these numbers.

More than 80% of study participants experienced headache during the past one year and approximately 67% of them experienced headache within the past 1 to 3 months (Table 2). This finding indicated that the headache frequently recurs and that 1-3 month period was the most prevalent reported onset due to the possibility of recall bias. However, if the latter were true, the percentage of study participants who did not remember would be significantly higher, which was not the case.

The age of experiencing headache for the first time was 10-15 and 16-20 years old being the most common (40.5 and 43.1%, respectively) (Table 2). The most headache lasts for 30 minutes to 2 hours (65.3%), while a small proportion of study participants suffered headache for more than 4 to 72 hours (4.5%) and more than 72 hours in two subjects. The common location of headache was unilateral, bilateral, or interchangeably (18.8, 23.5, 32.8%, respectively). The frequency of headache within the past one month is quite surprising, i.e. 1 to 5 times in almost 80% of study participants, indicating the relatively high recurrence of headache among medical students.

The main characteristic of the headache was of pulsating in nature (50.8% of study participants) (Table 2). Surprisingly, more than 80% of study participants were still able to carry out daily activity, although almost half of them (41.3%) experienced impaired activity to a certain extent. Almost 82% complained of having no associated nausea or vomiting, but more than 30% of subjects admitted to having headache associated with lightning, 55% accompanied with noise, and 54% was exacerbated by physical activity. Moreover, a significant number of study participants complained of headache associated with flu, toothache, fever, or use of glasses, suggesting that significant comorbidities also exist besides the headache itself. As many as 58 study participants reported their headache to be preceded by reversible visual impairment (e.g. positive phenomenon), and 22 study participants (6.7%) experienced reversible sensory impairment (for instance, pain or stabbed in certain body part) or paresthesia. Also, a significant number of study participants reported that their headache was preceded by physical or mental fatigue (198 subjects), whereas headache influenced by a certain diet or food consumption only occurred in 19

Table 2. Baseline characteristics and profiles of headache of the study participants

Parameters	Total (percentage) or mean±SD
HIT6	49.58±7.84
No impact	177 (46.8)
Some impact	118 (31.2)
Substantial impact	42 (11.1)
Severe impact	41 (10.8)
Day with pain (day)	2.46±2.23
NPRS (numeric pain rating scale)	2.24±2.04
Headache within the last 1 year	
Yes	326 (86.2)
No	51 (13.5)
Last time experiencing headache	
1-3 months ago	253 (66.9)
4-6 months ago	48 (12.7)
7-9 months ago	18 (4.8)
10-12 months ago	9 (2.4)
Don't remember	50 (13.3)
Age at experiencing headache for the first time	
10-15 years old	153 (40.5)
16-20 years old	163 (43.1)
21-25 years old	9 (2.4)
>26 years old	1 (0.3)
Don't remember	52 (13.8)
Duration of headache	
Less than 30 min.	4 (1.1)
30 min to 2 hours	247 (65.3)
>2 to 4 hours	60 (15.9)
>4 to 72 hours	17 (4.5)
>72 hours	2 (0.6)
Location of headache	
Unilateral	71 (18.8)
Bilateral	89 (23.5)
Occasionally unilateral or bilateral	124 (32.8)
Posterior to the head, close or reaching to the neck	35 (9.3)
Periorbital	5 (1.3)
Frequency of headache within past 1 month	
None	52 (13.8)
1-5 times	295 (78)
6-10 times	24 (6.3)
11-15 times	6 (1.6)
>15 times	1 (0.3)
Quality of the headache (n=326)	
Pulsating	192 (50.8)
Tightness in the head	110 (29.1)
Like being pinched	23 (6.1)
Like being burned	1 (0.3)

subjects.

Surprisingly, an only small percentage of subjects were severely affected by the headache in terms of days of work absence. As many as 45.8% of subjects did not take a leave of absence, while 41.5% of them ask for a sick day leave for one day (Table 2). Only 3 of the study participants who asked more than 7 days of absence due to their headache. The duration of headache experienced by study participants who did not take any analgesics was less than 30 minutes (38.3%) to more than 30 minutes to less than 2 hours (38.7%). As many as 80% of study participants self-medicated themselves with over-the-counter medication, whereas a small proportion of them consulted to their GP (15.3%).

There was no difference between students of second and sixth semester in terms of depression, anxiety, and stress score (Table 3). However, student in their sixth semester tended to have higher score of depression, anxiety, and stress.

Interestingly, students of second semester tend to have a prolonged day with pain than that of sixth semester (Table 4). In which the average day of pain was longer, although it was still within 2-4 days. The difference was statistically significant.

There was no difference between students of second and sixth semester in terms of NPRS score (Table 5). The average pain score was within 2-4, or categorized as mild pain. In addition, students of second semester tend to suffer headache within the past one year more than that of those students of sixth semester, although statistically insignificant (RR 1.02, 95% CI 0.98 – 1.06; p=0.21). In addition, there was no difference of the last time of suffering from headache between second and sixth semester (1-3, 4-6, 7-9, 10-12 months ago) [pearson chi-square 6.48; p=0.166].

There was no difference of the first episode of headache between second and sixth semester (10-15, 16-20, 21-25, >26 years old) [pearson chi-square 10.67; p=0.031]. There was no difference between the duration of headache between second and sixth semester (30 min-2 h, >2-4 h, >4-72 h, >72 h) [pearson chi-square 5.96; p=0.31]. There was no difference of the location of headache between second and sixth semester (unilateral, bilateral, sometimes unilateral or bilateral, beginning unilateral ending with bilateral, occipital radiating through the neck, periorbital) [pearson chi-square 15.14; p=0.019] (the rest of the results can be seen on (Table 6).

There was no difference between the frequency of headache between second and sixth semester in one month (1-5, 6-10, 11-15, >15 times) [pearson chi-square 2.42; p=0.66] (Table 7). There was no difference of the quality or type of headache between

Intensity of the headache (n=378)	
Mild (routine activity can be carried out normally)	154 (40.7)
Moderate (impaired activity, but daily chores can be carried out normally)	156 (41.3)
Severe (impaired daily and other activities)	16 (4.2)
Did not answer	52 (13.7)
Associated symptoms	
Nausea/vomiting	59 (18.1)
None	267 (81.9)
Headache associated with lightning (n=326)	
Yes	116 (30.7)
No	211 (55.8)
Headache accompanied with noise	
Yes	181 (55.5)
No	145(44.5)
Headache exacerbated by routine activity	
Yes	176 (54)
No	151 (46)
Headache associated with flu, toothache, fever, or use of glasses	
Yes	133 (40.8)
No	193 (59.2)
Headache preceded by:	
Reversible visual impairment like positive phenomenon	58 (17.8)
Reversible sensory impairment (pain or stabbed in certain body part) or paresthesia	22 (6.7)
Transient speech impairment	2 (0.6)
Malaise, reduced appetite 1-3 days	59 (18)
None of the above	185 (56.7)
Headache preceded by:	
Emotional disturbance (anxiety, depression)	67 (20.6)
Food/beverage (ice cream, chocolate, meal containing MSG)	19 (5.8)
During menstrual period (for female)	19 (5.8)
Physical/mental fatigue	198 (60.7)
Change in environment (weather, temperature, smells)	23 (7.1)
Days of work absence due to headache (n=378)	
None	173 (45.8)
1 day	157 (41.5)
2 days	30 (7.9)
3 days	8 (2.1)
4 days	2 (0.5)
5 days	3 (1.9)
7 days	2 (0.5)
9 days	1 (0.3)
10 days	1 (0.3)
14 days	1
Duration of headache in the absence of analgesics (n=326)	
<30 minutes	125 (38.3)
>30 min to <2 hours	126 (38.7)
2-24 hours	66 (20.2)

second and sixth semester (pulsating, heaviness, like being pinched, like being burned) [pearson chi-square 6.57;p=0.16]. There was no difference of headache intensity between second and sixth semester (mild, moderate, severe) (pearson chi-square 4.21;p=0.24) (Table 7).

DISCUSSION

Headache among medical students is a common phenomenon. We found that as many as 86.2% of medical students suffered from headache within the past one year and the majority of them (66%) suffered headache within the past 1 to 3 months, suggesting the recent occurrences of the episode. Our findings were similar to those of Almesned et al. who found that the prevalence of headache was 53.78%.⁵ The potential cause of this high prevalence of headache was not exactly delineated yet, but was thought due to continuous stressful environment, particularly related to the upcoming examinations. This was reflected by the high occurrences of headache among fourth-year and final-year medical students. In this study, we did not formally diagnose subjects with certain headache type, yet the nature of the headache was reported to be of occasionally unilateral or bilateral, bilateral, and unilateral among 32, 23, and 18% of cases, respectively. In addition, more than half of cases were of pulsating in nature, while one-third of them reported the sensation of tightness in the head. Given that the mean pain score was less than 3, the majority of the headache was classified as mild. We deduced that the majority of headache cases in our population was due to tension-type or migraine headache. This was in accordance with a study conducted in Isfahan University, Iran, for example, which found the prevalence of TTH and migraine headache to be approximately 44.2% and 14.2%, respectively. In addition, our study found similar prevalence of headache among male and female, therefore this finding was in accordance with Ghorbani et al. who found similar prevalence of headache across gender.⁶

Regarding the characteristics of the headache itself, not much have been discussed in the previous studies. We found that the headache can take either unilateral or bilateral, with more than one-third of study participants suffered from headache in alternating sides, i.e. occasionally unilateral and bilateral. This was roughly similar finding with those of Almesned et al. who found that approximately 42% of subjects referred their headache as bilateral.⁵ The majority of our subjects suffered from bilateral headache and occasionally alternating from bilateral to unilateral, and approximately one-third of them suffered from tightness in both sides of

1-2 days	7 (2.1)
2-3 days	2 (0.6)
Asking for help when headache (n=326)	
Self-medicated (with OTC medication)	262 (80.4)
Consulted to paramedics (nurse/midwife)	5 (1.5)
Consulted to GP	50 (15.3)
Consulted to neurologist	4 (1.2)
Consulted to other specialists	5 (1.5)
Amount of UKT paid (tuition fee)	
UKT 1	23 (6)
UKT 2	18 (4.8)
UKT 3	95 (25.1)
UKT 4	192 (50.8)
UKT 5	44 (11.6)
Prefer not to answer	6 (1.6)

Table 3. Depression, anxiety, stress

Parameters	Semester	Mean±SD	95% CI	p-value
Depression	Second	6.03±6.68	-1.95 – 0.83	0.43
	Sixth	6.59±6.70		
Anxiety	Second	9.34±5.73	-1.84-0.61	0.32
	Sixth	9.96±6.12		
Stress	Second	11.43±6.99	-2.47-0.42	0.16
	Sixth	12.45±6.90		

Table 4. Day of pain

Parameters	Semester	Mean±SD	95% CI	p-value
Day of pain	Second	2.67±2.34	-1.05 – 0.99	0.016*
	Sixth	2.12±2.0		

Table 5. NPRS difference between student of second and sixth semester

Parameters	Semester	Mean±SD	95% CI	p-value
NPRS (numeric pain rating scale)	Second	2.22±2.04	-0.47 – 0.38	0.64
	Sixth	2.27±2.06		

Table 6. Spearman Correlation of NPRS with Headache Parameters

Parameters	Spearman correlation coefficient	p-value
Headache location	0.06	0.29
Headache frequency within one month	0.16	0.05*
Quality and type of headache	0.02	0.78
Headache intensity	0.23	0.001*
Headache accompanied with nausea/vomiting	-0.06	0.26
Headache with impairing lightning sensation	-0.17	0.002*
Headache with noisy sounds	-0.13	0.016*
Headache aggravated by routine activities	-0.04	0.53
Headache with simultaneous influenza, common cold, and use of glasses	0.07	0.20
Headache preceded by certain symptoms	-0.11	0.05*

*Statistically significant at P<0.05

the head. Although we did not formally diagnose them with certain types of primary headache, given the clinical characteristics, we suspected that the majority of them suffered from TTH.⁶

Our study was the first among the kind which evaluated the frequency and severity of headache and its impact towards subjects' quality of life and well-being, including their academic performance. Herein we reported that the headache was quite severe and debilitating as shown by 41.5% of them ask for a sick day leave for one day and 41.3% of them also reported impairment in performing daily activity. Even worse, 3 of the study participants asked more than 7 days of absence due to their headache. Although the pain intensity was considered as mild (NPRS score of less than or equal to 4) in majority of subjects, given the highly recurrent nature of the illness and that the duration can last for up to 2 hours among 39% of participants, the condition is considered serious and management should be oriented to not only curing the symptoms, but also to prevent its recurrence.

Students in their sixth semester tended to have higher score of depression, anxiety, and stress. In fact, the role of emotional stress due to examination and various academic issues had been reported as one of the predictors for migraine headache among medical students in Saudi Arabia.⁷ Another study also found that the prevalence of anxiety and depression were significantly higher among those students who suffered from TTH.⁸ Furthermore, it was also found that anxiety, depression, and behavioural problems are associated with recurrent headache among children and adolescents, requiring routine assessment and screening.⁹

As was expected previously, study participants tended to self-medicate themselves by over-the-counter medication. As many as 80% of study participants self-medicated themselves with over-the-counter medication, whereas a small proportion of them consulted to their GP. Almesned et al. reported that headache was associated with lower socio-economic status as medical students commonly have no sustained financial support.⁵ However, in our study, students who belonged to higher socio-economic status (i.e. UKT 4, therefore higher tuition fee) tended to have higher headache prevalence (50.8%). The predominant underlying reason for this phenomenon was mostly unknown.

We also performed Spearman correlation between numerical pain rating score (NPRS) with several headache parameters. We found that increased headache frequency within one month linearly correlated with increased pain score, albeit a very small correlation can be observed ($r=0.16$; $p=0.05$). Indeed, headache intensity was correlated

Table 7. Spearman Correlation of HIT6 with Headache Parameters

Parameters	Spearman correlation coefficient	p-value
Days with headache	0.09	0.12
NPRS	0.36	0.001*
Headache location	-0.01	0.83
Headache frequency within one month	0.17	0.003*
Quality and type of headache	0.096	0.083
Headache intensity	0.38	0.001*
Headache accompanied with nausea/vomiting	-0.14	0.01*
Headache with impairing lightning sensation	-0.31	0.001*
Headache with noisy sounds	-0.24	0.001*
Headache aggravated by routine activities	-0.14	0.012*
Headache with simultaneous influenza, common cold, and use of glasses	0.38	0.49
Headache preceded by certain symptoms	-0.19	0.001*

with increased pain score ($r=0.23$, $p<0.001$). The phenomenon could be due to the psychological effect due to recurrent unpleasant events, such as headache.

HIT6 demonstrated weak linear correlation with pain intensity, as well as its frequency, and headache exacerbation by noise. This was reasonable since increased headache intensity was supposed to be negatively associated with decreased quality of life, thus lowering HIT6 score as well. Indeed, a study conducted in Brazil among medical students found that as many as 18.6% of medical students who suffered from headache had reported a severe intensity when assessed with HIT6 questionnaire.¹⁰

CONCLUSION

Headache was prevalent among medical students, regardless of their age, gender, and socio-economic status. Although generally mild in intensity, given the nature of its recurrency and debilitating painful quality, medical students often took a leave of absence from class for one or more days, thus potentially impairing the quality of life and academic performance to a certain extent. More measures should therefore be sought and applied to prevent and minimize the morbidity associated with headache among medical students.

CONFLICT OF INTEREST

The author declares there is no conflict of interest regarding publication of current study.

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ETHICAL CONSIDERATION

All participant were signed written informed consent prior to any data collection.

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REFERENCES

- Smitherman TA, McDermott MJ, Buchanan EM. Negative impact of episodic migraine on a university population: quality of life, functional impairment, and comorbid psychiatric symptoms. *Headache*. 2011;51(4):581-9. doi:10.1111/j.1526-4610.2011.01857.x.
- Stovner L, Hagen K, Jensen R, Katsarava Z, Lipton R, Scher A et al. The global burden of headache: a documentation of headache prevalence and disability worldwide. *Cephalalgia*. 2007;27(3):193-210. doi:10.1111/j.1468-2982.2007.01288.x.
- Falavigna A, Teles A, Velho M, Vedana V, Silva R, Mazzocchin T et al. Prevalence and impact of headache in undergraduate students in Southern Brazil. *Arquivos de neuro-psiquiatria*. 2010;68:873-7. doi:10.1590/S0004-282X2010000600008.
- Yang M, Rendas-Baum R, Varon SF, Kosinski M. Validation of the Headache Impact Test (HIT-6) across episodic and chronic migraine. *Cephalalgia*. 2011;31(3):357-67. doi:10.1177/0333102410379890.
- Almesned IS, Alqahtani NG, Alarifi JA, Alsaawy TN, Agha S, Alhumaid MA. Prevalence of primary headache among medical students at King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia. *J Family Med Prim Care*. 2018;7(6):1193-6. doi:10.4103/jfmpc.jfmpc_240_18.
- Ghorbani A, Abtahi SM, Fereidan-Esfahani M, Abtahi SH, Shemshaki H, Akbari M et al. Prevalence and clinical characteristics of headache among medical students, Isfahan, Iran. *J Res Med Sci*. 2013;18(Suppl 1):S24-7.
- Ibrahim NK, Alotaibi AK, Alhazmi AM, Alshehri RZ, Saimaldaher RN, Murad MA. Prevalence, predictors and triggers of migraine headache among medical students and interns in King Abdulaziz University, Jeddah, Saudi Arabia. *Pak J Med Sci*. 2017;33(2):270-5. doi:10.12669/pjms.332.12139.
- Song T-J, Cho S-J, Kim W-J, Yang KI, Yun C-H, Chu MK. Anxiety and Depression in Tension-Type Headache: A Population-Based Study. *PLOS ONE*. 2016;11(10):e0165316. doi:10.1371/journal.pone.0165316.
- Blaauw B, Dyb G, Hagen K, Holmen T, Linde M, Wentzel-Larsen T et al. Anxiety, depression and behavioral problems among adolescents with recurrent headache: the Young-HUNT study. *The journal of headache and pain*. 2014;15:38. doi:10.1186/1129-2377-15-38.
- Cmo DA, Pam DS. Headache-related disability among medical students in Amazon: a cross-sectional study. *Arq Neuro-Psiquiatr*. 2015;73(12):5.



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