Anastasya et al. *Journal of Urban Health Research* (2023) 1:2, p 1-12
e-ISSN 2964-4194

ORIGINAL RESEARCH Open Access

Association between Stress and Tension-Type Headaches in Medical Students of the School of Medicine & Health Science, Atma Jaya University

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Abstract

Introduction: Stress is the body's response to threatening external stimuli. Many medical students experience stress. Stress that medical students share can be caused by learning demands, interpersonal problems, and other things. Even though stress is daily, excessive stress can also cause various health problems, including headaches. Headache is the most common neurological problem in the world. There are several types of headaches, one of which is tension headaches. However, the relationship between stress and headaches, especially tension-type headaches in medical students, has yet to be widely studied.

Methods: This study is a cross-sectional analytic observational study, on 120 pre-clinical students (22 males, 98 females) aged 18-21 from the School of Medicine and Health Sciences, Atma Jaya Catholic University in Jakarta. The questionnaire used to measure the respondent's stress levels were the Depression Anxiety Stress Scale 42 (DASS-42) and Headache Screening Questionnaire (HSQ) to determine the respondent's headache. The data obtained were analyzed statistically using the Chi-square method, with a p-value <0.05.

Results: Out of 120 students, 74.2% experienced stress within normal limits, while 9.2%, 10%, 5%, and 1.7% reported experiencing mild, moderate, severe, and very severe stress levels, respectively. 30.8% of students experienced tension-type headaches, and 69.2% of students did not. The result obtained from the chi-square bivariate test was p = 0.188.

Conclusions: There is no association between stress and tension-type headaches in medical students of the School of Medicine & Health Science, Atma Jaya University.

Keywords: Stress, Tension-Type Headache, DASS-42, HSQ

INTRODUCTION

Stress is a natural response experienced by every human being to external stimuli, such as threatening situations, that can put pressure on the body. However, when stress exceeds normal limits and persists over time, it can have adverse effects on physical and mental health.[1]

There is a significant prevalence of stress in the general population. Salari et al. discovered that stress affects the majority of the general population, with a prevalence rate of 29.6%. However, stress is also prevalent among a significant number of medical students. A study by Musiun et al. on medical students in Sabah showed that 33.3% of the respondents experienced stress.[3] According to the survey, the stress that medical students experience can be caused by several things, such as the high pressure and demands during studies, intrapersonal problems, family problems, or academic problems caused by the COVID-19 pandemic such as online learning, delayed clinical rotations time and other delayed academic activities.[3]

The study by Musiun et al. also showed that the prevalence of stress in every batch differs.[3] In that study, the highest majority of stress was found in third-year medical students, which was as high as 39%. The third-year medical students were experiencing a transition from preclinical studies to clinical studies. The lowest prevalence of stress was found in fifth-year medical students, only 22.8%. The most deficient stress was because the students had adapted to clinical studies.[3] Unmanaged stress can cause several adverse effects, such as decreased academic performance, reduced interest in learning, and other negative symptoms in the body, one of which is headache.[4,5]

Headache is the most common neurological disorder in the world. There are several types of headaches, but the most commonly experienced by many people, including medical students, is a tension-type headache.[6] Almesned et al.'s study in Saudi Arabia revealed that over half (53.78%) of the medical students who participated experienced headaches, with 41.66% of them reporting tension-type headaches. Another study conducted by Anaya et al. in Palestine showed a headache prevalence of 59.8% among medical students.

We are interested in investigating the impact of stress on the human body, as it is important for the general population to have a better understanding of stress and how to manage its effects on the body. As a health worker, it is also crucial to educate the general public about the effects of stress. In addition, not much research has been conducted to assess the relationship between stress and the incidence of tension-type headaches among medical students in Indonesia. Therefore, through this study, we wanted to learn more about the relationship between stress and tension-type headaches in medical students at the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia.

METHODS

Study Design

This study is an observational analytic study with a cross-sectional method and was conducted online in October 2022.

Subject and Sampling Method

The participants of this study were first-year, second-year, third-year, and fourth-year medical students at the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia (FKIKUAJ). Respondents were selected by the purposive sampling method. One hundred twenty respondents (98 women and 22 men) aged 18-21 met the inclusion criteria, and there were no dropouts. The inclusion criteria for this study were experiencing headaches during the semester and never having experienced head trauma that caused a loss of consciousness.

Students who did not suffer from headaches, experienced migraines, and cluster-type headaches were excluded from this study. The other exclusion criteria are students with a history of malignancies, stroke, infections, or mental health disorders, consuming caffeine daily, drinking alcohol before suffering from headaches, using drugs, and having a history of sleeping disorders. Respondents gave consent to participate in the study before completing the questionnaire.

Data Collection

The data collection process occurred in October 2022 at the Pluit Campus at School of Medicine and Health Sciences, Atma Jaya University. We conducted data collection in October 2022 to study the chronic stress experienced by the participants, as the lecture semester had already been ongoing for two months. The way to collect data is through google forms which contain questionnaires to compile data regarding the level of stress and headaches experienced by respondents. The form also contained questions about other sources of headaches, which we used to eliminate respondents who didn't meet the criteria. We used Depression Anxiety Stress Scale 42 (DASS-42) to collect the participants' stress levels. The questionnaire contains three scales, and each scales contain 14 questions. A student was considered to have everyday stress if their score was ≤ 14, mild stress if their score was 15–18, medium stress if their score was 19–25, heavy pressure if their score was 26–33 , and severe if their score was ≥ 34.9 The second questionnaire was the Headache Screening Questionnaire (HSQ), which was used to determine the type of headache the participants suffered. The questionnaire contains ten questions about the symptoms the participants were feeling. The headache the participants felt was considered a tension-type headache if their score was ≥ 6.[10] The validity and reliability of

both questionnaires were tested by Damanik (2006) and Mahendra (2020). Additionally, this study has been granted approval by Atma Jaya's Ethics Committee with the letter number: 14/08/KEP-FKIKUAJ/2022.

Statistical Analysis

Data were analyzed by SPSS v22 software. This study used two types of tests: univariate and bivariate analysis. Univariate analysis was used to obtain the distribution of each variable. On the other hand, bivariate analysis was carried out with a Chi-square test, to determine the association between stress and tension-type headaches, with a p-value $\leqslant 0.05$ considered significant.

RESULTS

Among 120 participants, 22 (18.3%) of them were male and 98 (81.7%) of them were female. Most respondents were aged 18 years with a count of 37 respondents (30,8%).

Seventy female participants and nineteen male participants experienced average stress levels. Mild and moderate pressure is found more in women. Meanwhile, only 37 (31 female and 6 male) out of 120 participants suffered from headaches, which consisted of 31 female participants and six male participants (Table 2).

There were some differences in stress prevalence among the classes of respondents. The lowest stress prevalence is found in second-year medical students, while the highest is in first-year medical students, as shown in Figure 1.

The chi-square test determined the relationship between stress and tension-type headache. As shown in Table 3, there is no statistically significant relationship between stress and tension-type headache (P=0.440).

Table 1. Respondents' Demographic Characteristics

Variable	Frequency (n = 120)	%
Gender		
Male	22	18,3
Female	98	81,7
Age		
18	37	30,8
19	23	19,1
20	31	25,8
21	29	24,3
Classes		

Variable	Frequency (n = 120)	%
2019	31	25,8
2020	30	25
2021	24	20
2022	35	29,2

Table 2. Frequency of Stress and Tension-type Headache according to Gender

Variables	Gender			
	Female		Male	
	n = 98	%	n = 22	%
Stress				
Normal	70	71,4	19	86,3
Mild	10	10,2	1	4,54
Medium	11	11,2	1	4,54
Heavy	5	5,1	1	4,54
Severe	2	2,04	0	0
Tension-Type Headache				
Yes	31	31,6	6	27,2
No	67	68,4	16	72,8

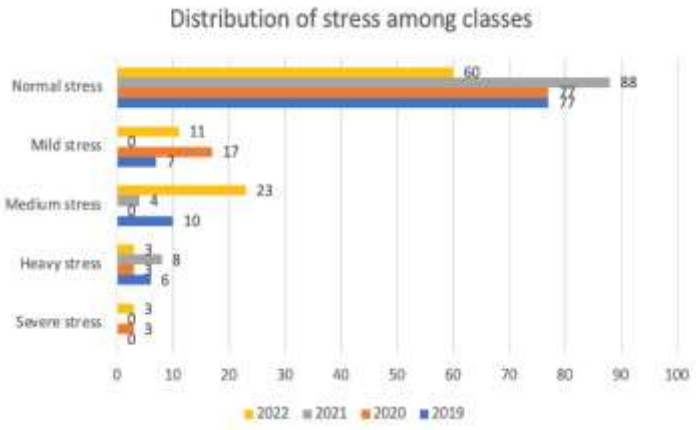

Fig. 1. Distribution of Stress Prevalence among Classes

Table 3. Relationship between Stress and Tension Type Headache

	Tension Type Headache				
	Yes		No		*p-value*
	n	%	n	%	
Stress					
Normal	27	30,3	62	69,7	0,440
Mild	4	36,4	7	63,6	
Medium	2	16,7	10	83,3	
Heavy and Severe	4	50	4	50	

DISCUSSION

Stress is a normal thing that is experienced by every human being. Several things, such as academic pressure, family problems, personal problems, and other things, can cause stress experienced by medical students.[3] In this study, the result shows that some participants were experiencing stress above normal limits. This result is similar but lower than the study done by Jennifer G in 2020.[11]

The difference in results can be caused by the time the study was done. The previous study was done during the COVID-19 pandemic, while this study was done when COVID-19 cases in Indonesia were decreasing and the academic system was transitioning from online classes to offline classes. The transition period from offline to online courses and worries about health and family could cause elevated stress levels during the COVID-19 pandemic in medical students.[12] A study done by Awadalla et al. also showed that the prevalence of stress was higher during the COVID-19 pandemic.[13]

The level of stress was also different among the classes in this study. This study showed that the prevalence of anxiety in first-year medical students is higher than the others. This result was consistent with a study done by Melaku et al., which also showed that the prevalence of stress in first-year medical students was higher.[14] A lot of things could cause this high prevalence of anxiety. One of the most common causes is transitioning from high school to university. There is also a difference between the result of this study and the study done by Melaku et al. In the study by Melaku et al., the lowest prevalence of stress is found in final-year students. However, in this

study, the most inferior majority of pressure is found in second-year students. Cultural differences and curriculum differences between countries can cause this. Furthermore, the third-year and final-year students were doing their thesis, which is one of the requirements to graduate, which could have affected the stress that they were experiencing.

Stress is also influenced by gender. This study shows that the prevalence of stress in women is higher than in men. This result is consistent with the studies done by Ndoen et al. and Graves et al.[15,16] The difference in stress response between men and women causes higher stress in women. The activity of the HPA axis and the sympathetic nervous system causes the difference. The sympathetic nervous system gives negative feedback to the body when it is experiencing stress. In men, the response from HPA axis and the sympathetic nervous system is higher than in women, influencing the response toward stressors. Women are more susceptible to experiencing high levels of stress due to the fact that sex hormones in women decrease the response from the HPA axis and sympathetic nervous system. This finding is also backed up by Kneavel et al.'s study, which demonstrated that women tend to experience more stress than men.[18]

In this study, only a few participants suffered from a tension-type headache. The result is similar but higher than the result from a survey done by Ekenze et al.[19] According to a study done by Nabeel et al., headaches can be caused by numerous factors, such as academic stressors, psychosocial stressors, decreased quality and quantity of sleep, and reduced caffeine intake.[20] The different result between this study and the study by Ekenze et al. is caused by some differences in the research procedure. Ekenze et al. used the diagnosis from a neurologist, so it was more accurate than the results from questionnaires.[19] While the result from the study by Nabeel et al. shows that the prevalence of students suffering from tension-type headaches was higher than the prevalence in this study. The difference was caused by the amount of inclusion and exclusion criteria in Nabeel et al.'s study, which was lower than the number of measures in this study.[20]

The participants in this study who suffered from tension-type headaches mostly came from the participants who were experiencing average amounts of stress. According to a study done by Haque et al., tension-type headaches can be caused by things other than stress, like cold and hot weather, prolonged exposure to sunlight, fatigue, and even long road travel. These uncontrollable factors could affect the results and cause the tension-type headache these participants suffered.[21]

Like stress, the prevalence of tension-type headaches in this study is also higher in

women than men. This result is consistent with the study done by Stovner et al.[22] Several things can contribute to the difference in the prevalence of tension-type headaches between men and women. A study by Susanti et al. showed that tension-type headaches are 1.5 times more likely in women than men.[23] The difference in muscle structure between men and women and the higher amount of active trigger points in women causes this.[22] Another study conducted by Abboud et al. also said that women have a lower pain threshold, which makes women more sensitive to pain than men.[24] In addition, the large number of female students compared to male students at FKIKUAJ could also be a factor in the higher prevalence of tension-type headaches in female students than male students.

This study found no statistically significant relationship between stress and tension-type headaches. This result is inconsistent with an investigation by Omogbiya et al. in 2020, which showed an association between stress, especially academic stress, and tension-type headaches.[25] According to Omogbiya's research, respondents experienced headaches during lecture days with dense and intense learning activities, causing increased stress experienced by respondents. The difference in results could be caused by the difference in samples, questionnaires used, and the type of stress being studied.

In Omogbiya's research, the samples taken were from medical faculty and other faculties.[24] This could affect the prevalence of stress obtained. In addition, there are differences in the questionnaire used to diagnose tension-type headaches. This study used the HSQ questionnaire, while the Omogbiya study used a self-created and validated questionnaire which could lead to differences in the diagnosis of tension-type headaches. In Omogbiya's analysis, the type of stress studied was more specific, namely, stress caused by academics, in contrast to this study which did not specifically examine stress.[25] The explanation above could also lead to differences in the level and prevalence of stress experienced by the respondent himself.

The relatively significant difference could also influence the number of male and female respondents. This difference in numbers could be due to many exclusion criteria, so many male respondents still needed to meet the exclusion criteria. The implementation of the online study can also affect the results because it can lead to miscommunication and different perceptions regarding the meaning of variables and research between researchers and respondents. After all, researchers need to explain in detail to respondents.

There are several limitations to this study. The first limitation is the charging process of the DASS-42 itself. Because respondents filled out the DASS-42 questionnaire without being

directly supervised, the results could be inaccurate if they deliberately filled them out dishonestly. The second limitation is using the HSQ questionnaire to determine TTH sufferers. The accuracy of the HSQ itself for determining TTH sufferers is lower when compared to the diagnosis of doctors who have carried out adequate examinations. In addition, recall bias can also occur if the respondent who fills out the questionnaire needs to remember the symptoms they are experiencing and fill in the questionnaire according to the signs and conditions they are experiencing. Filling out online questionnaires can also cause misunderstandings between researchers and respondents, where miscommunication and misperceptions can occur regarding tension-type headaches since the researchers couldn't explain tension-type headaches and other types of headaches to the respondents. In the future, it is recommended to use different sampling methods so that future research can obtain an equal amount of female and male respondents.

CONCLUSION

No significant association exists between stress and tension-type headaches among medical students of the School of Medicine & Health Sciences, Atma Jaya University. In further studies, it is recommended to do the research offline to avoid miscommunications between researchers and participants so that the researchers can explain more about the research in detail to the participants.

ACKNOWLEDGEMENT

The author would like to thank all the civitas of the School of Medicine & Health Sciences, Atma Jaya University, especially those who participated in this study. The author would also acknowledge colleagues and friends who supported the author during this research.

CONFLICT OF INTEREST

The author declares that there was no conflict of interest.

REFERENCES

1. Stress and Your Health [Internet]. MedlinePlus. [cited 2022 Jun 1]. Available from: https://medlineplus.gov/ency/article/003211.htm
2. Salari N, Hosseinian-Far A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: A systematic review and meta-analysis. Vol. 16, Globalization and Health. BioMed Central; 2020.
3. Musiun A, Awang Lukman K, Saffree Jeffree M, Robinson F, Rohaizat Hassan M, Faisal Ghazi H, et al. Prevalence Of Stress And Its Associated Factors Among Medical Students In Sabah,

Malaysia Borneo. Vol. 19, Malaysian Journal of Public Health Medicine. 2019.

4. Yaribeygi H, Panahi Y, Sahraei H, Johnston TP, Sahebkar A. The impact of stress on body function: A review. Vol. 16, EXCLI Journal. Leibniz Research Centre for Working Environment and Human Factors; 2017. p. 1057–72.
5. Tension Headaches [Internet]. John Hopkins. [cited 2022 Jun 2]. Available from: https://www.hopkinsmedicine.org/health/conditions-and-diseases/headache/tension-headaches
6. Headache Disorders [Internet]. World Health Organization. [cited 2022 Jun 2]. Available from: https://www.who.int/news-room/fact-sheets/detail/headache-disorders
7. Almesned I, Alqahtani N, Alarifi J, Alsaawy T, Agha S, Alhumaid M. 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.
8. Anaya F, Abu Alia W, Hamoudeh F, Nazzal Z, Maraqa B. Epidemiological and clinical characteristics of headache among medical students in Palestine: a cross sectional study. BMC Neurol. 2022 Dec 1;22(1).
9. Damanik, ED, Rusli E. Pengujian reliabilitas, validitas, analisis item dan pembuatan norma Depression Anxiety Stress Scale (DASS): Berdasarkan penelitian pada kelompok sampel Yogyakarta dan Bantul yang mengalami gempa bumi dan kelompok sampel Jakarta dan sekitarnya yang tidak mengalami gempa bumi. Thesis. Universitas Indonesia. 2006. https://lontar.ui.ac.id/detail?id=94859
10. Mahendra AK. Hubungan Kecemasan Dengan Kejadian Tension-Type Headache Pada Mahasiswa Kedokteran Universitas Muhammadiyah Sumatera Utara Tahun 2020 [Internet]. [Medan]: Universitas Muhammadiyah Sumatera Utara; 2020 [cited 2022 Jun 2].Available from: http://repository.umsu.ac.id/bitstream/handle/123456789/5167/1608260101%20Skripsi.pdf?sequence=1
11. Gabriella J. Gambaran Tingkat Stres Mahasiswa Preklinik Angkatan 2017-2019 Fakultas Kedokteran dan Ilmu Kesehatan unika AtmaJaya pada Masa pandemi Covid-19. KTI. Program Studi

Sarjana Kedokteran - Fakultas Kedokteran dan Ilmu Kesehatan Unika Atma Jaya.2020

12. O'Byrne L, Gavin B, Adamis D, Lim YX, McNicholas F. Levels of stress in medical students due to COVID-19. J Med Ethics. 2021 Jun 1;47(6):383–8.
13. Awadalla NJ, Alsabaani AA, Alsaleem MA, Alsaleem SA, Alshaikh AA, Al-Fifi SH, et al. Increased mental stress among undergraduate medical students in south-western Saudi Arabia during the COVID-19 pandemic. PeerJ. 2022 Aug 15;10.
14. Melaku L, Mossie A, Negash A. Stress among Medical Students and Its Association with Substance Use and Academic Performance. J Biomed Educ. 2015 Dec 2;2015:1–9.
15. Ndoen DR, Lestari Anakaka D, Aipipidely D. Fakultas Kesehatan Masyarakat Universitas Nusa Cendana The Description of Stress Levels among Medical Students Fakultas Kesehatan Masyarakat Universitas Nusa Cendana. Vol. 3, Journal of Health and Behavioral Science. 2021.
16. Graves BS, Hall ME, Dias-Karch C, Haischer MH, Apter C. Gender differences in perceived stress and coping among college students. PLoS One. 2021 Aug 1;16(8 August).
17. Dwina Rahmayani R, Gusya Liza R, Afrainin Syah N. Gambaran Tingkat Stres Berdasarkan Stressor pada Mahasiswa Kedokteran Tahun Pertama Program Studi Profesi Dokter Fakultas Kedokteran Universitas Andalas Angkatan 2017 [Internet]. Vol. 8, Jurnal Kesehatan Andalas. 2019. Available from: http://jurnal.fk.unand.ac.id
18. Kneavel M. Relationship between Gender, Stress and Quality of Social Support. Psychological Reports. 2020;124(4):1481–501.
19. Ekenze OS, Ezeala-Adikaibe BA, Orjioke C, Mbadiwe N, Ijoma UN, Onyekonwu C, et al. Prevalence and Pattern of Migraine, Tension Type Headache and Chronic Daily Headache among Medical and Nursing Students in Enugu, South East Nigeria. Health N Hav. 2018;10(10):1283–93.
20. Nabeel Qutub W, Shakir Magharbel R, Walid Adham S, Mahmoud Bardisi W, Abdulkader Akbar N. Prevalence and determinants of tension headache among medical students during their clinical years at King Abdulaziz University in Jeddah, 2019. The Journal of Community Health Management. 2020 May 28;7(1):14–21.

21. Haque, B., Rahman, K. M., Hoque, A., Hasan, A. H., Chowdhury, R. N., Khan, S. U., … Mohammad, Q. D. (2012). *Precipitating and relieving factors of migraine versus tension type headache. BMC Neurology, 12(1).*doi:10.1186/1471-2377-12-82
22. Stovner LJ, Hagen K, Linde M, Steiner TJ. The global prevalence of headache: an update, with analysis of the influences of methodological factors on prevalence estimates. Vol. 23, Journal of Headache and Pain. BioMed Central Ltd; 2022.
23. Susanti R, Kedokteran F, Andalas U, Padang MD, Kemerdekaan JP, Timur S, et al. Potential Gender Differences In Pathophysiology Of Migraine And Tension Type Headache. Vol. 5. 2020.
24. Abboud J, Marchand AA, Sorra K, Descarreaux M. Musculoskeletal physical outcome measures in individuals with tension-type headache: A scoping review. Cephalalgia. 2013 Dec;33(16):1319–28.
25. Omogbiya AI, Anachuna KK, Umukoro EK, Moke EG, Nzei A. Academic-related stress and prevalence of migraine and tension-type headaches amongst undergraduates of Delta State University, Abraka, Nigeria. Res J Health Sci. 2020 Jul 10;8(2):133–45.