

The Relationship Between Stress and Incidence of Sleep Disorder Among Students at The Faculty of Medicine Universitas Sumatera Utara

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Abstract. Stress is a non-specific response of the body to any form of changes. Stress is generally considered synonymous with distress. Long study duration and high academic achievement targets have the potential to cause stress in medical students. Prolonged stress can cause sleep disturbances in a person. Sleep disorders are a group of conditions that can disrupt sleep patterns. **Objective.** The purpose of this study was to determine the effect of stress on sleep disorders in undergraduate students at the Faculty of Medicine, Universitas Sumatera Utara. **Methods.** This research was an analytic study with a cross-sectional design. Respondents are undergraduate students at the Faculty of Medicine, University of North Sumatra, class of 2018-2021. Data was obtained through a questionnaire instrument. **Results.** Of the 103 respondents, 58 (56.3%) reported experiencing stressful events with sleep disturbances. **Conclusion.** There was a significant relationship ($P = 0.047$) between stress and sleep disorders in students at the Faculty of Medicine, University of North Sumatra. In majority, the type of their sleep disorder were nightmares.

Keyword: Sleep Disorder, Stress, Undergraduate Students

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1. Introduction

According to the Mental Health Foundation, stress is the body's response to pressure. Many situations or life events can cause stress. Stress is often triggered when a person experiences something new, unexpected or self-threatening, or when a person feels they have little control over a situation [1].

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According to the World Health Organization (WHO) more than 450 million people in the world have experienced stress. According to Riset Kesehatan Dasar (Riskesdas) 2018 prevalence of mental disorders in the population ≥ 15 years old in the city of Central Java reached 7,71% [2]. Medical students who have a long duration of the study and high academic targets have the potential of experience academic stress [3]. The relationship between stress and quality of sleep in students at the Faculty of Medicine and the Faculty of Accounting Universitas Sumatera Utara had been reported by Putri (2016) and Widya (2018). There was a relationship between stress and poor quality of sleep in Putri's studies [4], while Widya's studies did not find a significant relationship [5]. In both studies, there were no analysis of causal factors of sleep disorder other than stress and types of sleep disorder. This study not only identifies the quality of sleep but also explains the types of sleep disorders who subject to stress categories.

In another study by Abdullah and Piro (2018) on Medical Student at Duhok University, Irak involved 317 participants, 165 (50,2%) students were found to have sleep disorder. The study also explained several factors that cause sleep disorder including the reduced time for fun or entertainment, increased consumption of alcohol, and smoking [6].

Based on the Sherwood (2011), there is an increase of epinephrine, norepinephrine and cortisol during stress which affect the central nervous system, causing a state of wakefulness and increase alertness of the central nervous system [7]. There are many factor that can trigger sleep disorder, such as prolonged exposure of stressor, poor coping of stress, substance abuse and cognitive-emotional disturbance[8].

2. Methods

This study used an analytical method with a cross-sectional study approach. Stress as dependent variables and sleep disorder as independent variables. The population in this study was undergraduate student at the Faculty of Medicine Universitas Sumatera Utara (USU) class of 2018-2021. Respondent (103 male and female) who meet the inclusion criteria were included in the study based on random sampling methods. This study was performed from August to November 2021. Due to the COVID-19 pandemic the data were obtained through a questionnaire instrument which was accessible by online via Google . PSQI (Pittsburgh Sleep Quality Index) questionnaire was used to measure the quality of sleep, DASS (Depression Anxiety Stress Scales) was used to assess the degree of stress, SDQ (Sleep Disorder Questionnaire) for the assessment of sleep disorder, and 10 items of additional questions was used to avoid bias that may cause sleep disorder.

3. Results

These primary data were collected from 103 respondents who are undergraduate students class of 2018, 2019, 2020 at the Faculty of Medicine. Respondents gave their contribution by filling the questionnaire which was distributed through social media. Characteristics of the respondent are present in Table 1.

Table 1 Distribution Characteristic of Respondents

Characteristic Respondent	N	%
Gender		
Male	34	33.0
Female	69	67.0
Age		
17	1	1.0
18	12	11.7
19	30	29.1
20	31	30.1
21	24	23.3
22	4	3.9
23	1	1.0
Class		
2018	42	40.8
2019	29	28.2
2020	32	31.1

Based on item analyses of stress condition, we found that more than half of the respondents are having certain degree of stress (Table 2).

Table 2 The Prevalence of Stress Based on The Degrees of Stress.

No Stress		Stress					
		Mild		Moderate		Severe	
n	%	n	%	N	%	n	%
43	41,7	32	31,3	19	18,4	9	8,7

In students who experience stress, most are mild stress. However, severe stress was also found in a number of students.

We found that the incidence of stress was not different between classes. However, the students in class 2020 tend to have moderate to severe stress comparing to those in higher classes (Table 3).

Table 3 The Incidence Degrees of Stress Based on Study Period

Class	Level Stress										<i>p value*</i>
	No Stress		Mild		Moderate		Severe		Very Severe		
	N	%	N	%	N	%	N	%	N	%	
2018	20	47,6	13	31,0	7	16,7	2	4,8	0	0	
2019	13	44,8	9	31,0	4	13,8	3	10,3	0	0	0,34
2020	10	31,2	10	31,2	8	25,0	4	12,5	0	0	

* *Chi square* ($p < 0,05$).

A variety of sleep disorders during the past one month were reported by majority of students (Table 4).

Table 4. The incidence of sleep disorder

Sleep Disorder	n	%
Yes	95	92,2
No	8	7,8

Based on data of experienced stress and sleep disorders among students, analyse of association was conducted using Chi square (Table 5).

Table 5 Incidence of Stress with Sleep Disorder

Stress	Sleep Disorder				<i>p value*</i>
	Yes		No		
	n	%	N	%	
Yes	58	56,3	2	1,9	0,047
No	37	35,9	6	5,8	

* *Chi square* ($p < 0,05$)

There was a correlation between stress and sleep disorder in students at the Faculty of Medical Universitas Sumatera Utara ($P\text{-Value} = 0,047$).

From Table 6 it can be seen most of the respondents had a good quality of sleep. There was no strong relationship between quality of sleep and study period.

Table 6 Quality of Sleep in Study Period

Class	Quality of Sleep				P Value*
	Good		Poor		
	N	%	N	%	
2018	36	87,7	6	14,3	0,97
2019	25	86,2	4	13,8	
2020	28	87,5	4	12,5	

*Chi square

Assessment of quality of sleep showed that most of respondents had a good quality of sleep. And there were no differences between study period.

Table 7 Type of Sleep Disorder

Type of Sleep Disorder	Study Period											
	2018				2019				2020			
	1x	2x	3x	>3	1x	2x	3x	>3	1x	2x	3x	>3
<i>Disomnia</i>												
Frequency (n)	1x	2x	3x	>3	1x	2x	3x	>3	1x	2x	3x	>3
<i>Sleep apnea</i>	0	0	0	0	0	0	0	0	1	0	0	1
<i>Obstructive Sleep Apnea</i>	2	1	0	0	4	0	0	0	4	1	0	0
<i>Restless legs syndrome</i>	1	2	0	0	4	0	0	0	0	3	2	0
<i>Parasomnia</i>												
Frequency (n)	1x	2x	3x	>3	1x	2x	3x	>3	1x	2x	3x	>3
<i>REM sleep related sinus arrest</i>	2	1	0	0	7	1	1	0	4	2	0	0
<i>Sleep walking/ Somnambulism</i>	2	0	0	0	0	0	0	0	0	0	0	0
<i>Bruxism</i>	3	0	0	0	1	1	1	0	0	0	0	0
<i>Sleep terrors</i>	2	0	0	0	2	2	1	0	1	0	0	0
<i>Nightmares</i>	15	3	3	0	11	1	0	1	13	2	0	3
<i>Sleep paralysis</i>	3	2	0	0	6	0	0	0	5	0	0	0
<i>Primer snoring</i>	4	1	0	0	4	1	0	0	3	0	0	0
Sleep Disorder Associated with Medical/Psychiatric Disorder												
Frequency (n)	1x	2x	3x	>3	1x	2x	3x	>3	1x	2x	3x	>3
<i>Panic disorder</i>	4	2	0	0	0	2	0	0	4	0	1	1
<i>Anxiety disorder (muscle tension)</i>	13	2	0	0	11	0	0	0	10	4	1	2
<i>Anxiety disorder (excessive of fear)</i>	5	4	1	0	1	2	2	0	6	6	1	0

<i>Sleep hyperhidrosis</i>	7	6	0	0	6	0	0	1	7	1	1	0
Proposed Sleep Disorder												
Frequency (n)	1x	2x	3x	>3	1x	2x	3x	>3	1x	2x	3x	>3
<i>Terrifying</i>	11	4	7	4	8	2	4	3	11	8	0	3
<i>Hypnogenic Hallucinations</i>												
<i>Myalgia</i>	15	4	1	2	13	2	1	0	14	3	2	4

The data showed it can be seen that the most common type of sleep disorder was nightmares at least once a month 35,7% in the class of 2018, reported 37,9% in the class of 2019 and 40,6% in the class of 2020 (Table 7).

4. Discussion

The result of this study is almost same as previous research conducted by Sabrina (2016), that the majority of students (57%) were having mild stress [4]. When analyzed based on the study period for stress events, classes of 2018 and 2019 had the same percentage (31,0%) for mild stress, although in this study class of 2018 was having longer study period. Class of 2020 which is the lower study period was shown of having higher incidence of stress (31,2%). However there was no relationship between stress events and the study period (*P-value* = 0,34). This can happen because of several aspects that may influence a person's response to stressful situations. For example, mindset relates to how a person assess the situation that is being experienced this is related to how coping with stress in every person [9].

Stress can have implications on physiological mechanisms of sleep, resulting in sleep disorders of students [8]. In this study, it was found that there was a very dominant student of stress with sleep disorder, at least half of respondents (56,3%). As shown by Chi-square analysis *P value* = 0,047, there is a significant relationship between stress and sleep disorder in student Faculty of Medicine USU. The same studies by Ratnaningtyas and Fitriani at The Universitas Sumatera Utara (2019) reported a significant relationship between stress and quality of sleep in students (*P Value*=0,016) [10].

The type of sleep disorder that most students experienced is nightmares. Nightmares are associated with the REM sleep phase [11]. In the REM phase, there is an increased of visual activity and limbic system (emotional and this pattern) this pattern will then make dreams based on the emotions that they have [7]. Another study (Angelica, 2017) showed that 24,3% of students experienced nightmares that could occur 3 times a week accompanied by the criteria for the stress conditions that were being experienced by students[12].

5. Conclusion

The majority of Undergraduate Student at the Faculty of Medicine, Universitas Sumatera Utara reported stress with sleep disorder (56,3%). There was a significant relationship between stress and sleep disorder (P -Value = 0.047) at the Faculty of Medicine, Universitas Sumatera Utara. Nightmares was type of sleep disorder that most Undergraduate Student experienced at the Faculty of Medicine, Universitas Sumatera Utara.

REFERENCES

- [1] Mental Health Foundation, "stress?," *Bulletin of the Royal College of Psychiatrists*, 2020. <https://www.mentalhealth.org.uk/a-to-z/s/stress> (accessed Mar. 29, 2021).
- [2] Kemenkes RI, "Laporan Provinsi Jawa Tengah Riskesdas 2018," *Kementerian Kesehatan RI*, 2019. <http://ejournal2.litbang.kemkes.go.id/index.php/lpb/article/view/3641> (accessed Feb. 10, 2021).
- [3] A. Agusmar, V. AT, and S. Wahyuni, "Perbandingan Tingkat Stres pada Mahasiswa Angkatan 2018 dengan Angkatan 2015 Fakultas Kedokteran Universitas Baiturrahmah," *Heal. Med. J.*, vol. 1, no. 2, pp. 34–38, 2019, doi: 10.33854/heme.v1i2.238.
- [4] S. dwi Putri, "Hubungan Tingkat Stres Dengan Kualitas Tidur Pada Mahasiswa Semester VII Fakultas Kedokteran Universitas Sumatera Utara Tahun 2016," Universitas Sumatera Utara, 2016.
- [5] widya rizkina Choir, "Hubungan Tingkat Stres Dan Kualitas Tidur Pada Mahasiswa Kedokteran Dan Mahasiswa Akuntansi Skripsi," Universitas Sumatera Utara, 2018.
- [6] Deldar Morad Abdulah & Rasoul Sabri piro., "Sleep disorders as primary and secondary factors in relation with daily functioning in medical students," *Ann. Saudi Med.*, vol. 38, no. 1, pp. 537–544, 2018, doi: 10.5144/0256-4947.2018.537.
- [7] L. Sherwood, *Textbook of Human Physiology*, 8th ed., vol. 1, no. 5277. Amerika Serikat: Yolanda Cossio, 2014.
- [8] D. A. Kalmbach, J. R. Anderson, and D. & Christopher L., "The impact of stress on sleep: Pathogenic sleep reactivity as a vulnerability to insomnia and circadian disorders," *J. Sleep Res.*, vol. 27, no. 6, 2018, doi: 10.1111/jsr.12710.
- [9] Musradinur, "Stres Dan Cara Mengatasinya Dalam Perspektif Psikologi," *J. Edukasi*, vol. 2, no. 2, p. 183, 2016, doi: 10.22373/je.v2i2.815.
- [10] T. O. Ratnaningtyas and D. Fitriani, "Hubungan Stres dengan Kualitas Tidur pada Mahasiswa Tingkat Akhir," *Edu Masda J.*, vol. 3, no. 2, pp. 181–191, 2019.
- [11] kimsco e. Barret, B. Scote, L. brooks Heddwen, and susan M. Barman, *Ganong Buku Ajar Fisiologi Kedokteran Fisiologi Kedokteran Ganong*, 24th ed. New York, America, 2012.
- [12] S. A. Anita, A. Friedrich, and M. Claßen, "Sleep problems in university students," *Neuropsychiatr. Dis. Treat.*, pp. 1989–2001, 2017, [Online]. Available: <http://dx.doi.org/10.2147/NDT.S142067>.