Vol 11 No 1, 2026

BULETIN FARMATERA

E-ISSN: 2528-410X

RESEARCH ARTICLES

The Relationship Between Academic Stress And The Occurrence Of Gingivitis In FK UMSU Students, Batch 2019

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Abstract: Students are at a vulnerable age where they will experience a transition period from late adolescence to early adulthood. Individuals who experience stress and depression can increase bad health behaviour, such as irregular brushing of teeth, irregular dental check-ups at the dentist and neglecting oral hygiene. This will cause an increase in plaque accumulation, which is the main cause of periodontal disease, and a decrease in the resistance of the periodontium, which can cause inflammation. This study aims to assess the relationship between academic stress and the occurrence of gingivitis in 2019 FK UMSU students. This research is a cross-sectional study involving 67 students. Subjects were asked to fill out the ESSA questionnaire, and their teeth were examined. The data obtained were analysed using chi-square. From data analysis, it was found that the majority of respondents had the criteria for severe academic stress and mild gingivitis. The p-value obtained is 0.043, which means there is a relationship between academic stress and the occurrence of gingivitis. There is a significant relationship between academic stress and the occurrence of gingivitis in 2019 FK UMSU students.

Keywords: Stress, gingivitis, medical students

INTRODUCTION

Students are enrolled students who study at a particular university. A student is a period when entering adulthood, usually in the age range of 18–25 years. Students can be classified as the final adolescent age group with ages 18-21 and as early adults with ages 22-25. At this age, students will experience a period of transition from late adolescence to early adulthood. This transition period will encourage students to face various demands and adjustments to the new environment. [1]

No one is free from stress. Stress is a state of mental stress or anxiety caused by work, academics, life problems, etc. Stress is a psycho-physiological reaction of the body to various emotional and physical stimuli that interfere with homeostasis. There was a strong relationship between stress and students in the last study. It has been reported

E-ISSN: 2528-410X

that students can experience academic stress at a certain time each semester, with the main causes being academic exams, competition for good grades, and mastery of lecture materials for a short period of time, including the time when facing thesis.[2]

A person's mechanism of behaviour emphasises that people with stress and depression can improve bad health behaviours, such as smoking, unhealthy diet, irregular brushing of teeth, dental examinations to irregular dentists and neglecting oral hygiene. This will lead to an increase in plaque accumulation, which is the main aetiology of periodontal disease, and a decrease in resistance of the periodontium, resulting in inflammation.[3]

Gingivitis is a condition in which inflammation involves the soft tissue surrounding the teeth, the gingiva. Clinical images of gingivitis include the appearance of redness in the margin of the gingiva, enlargement of blood vessels in subepithelial connective tissue, loss of keratinisation on the surface of the gingiva and bleeding that occurs during probing.[4]

A major cause of gingivitis is the accumulation of colony–forming microorganisms, plaque attached to the edges of the gingiva. Secondary causes of gingivitis include local factors such as cavities, restoration failures, piles of leftovers, poorly designed dentures, orthodontic planes and irregular dental arrangements, while systemic factors include nutritional, hormonal, haematological, psychological and drug factors.[5]

According to RISKESDAS in 2018, the proportion of oral health problems in Indonesia based on the characteristics of swollen gingiva is 14.0% and in bloody gingiva is 13.9%. The prevalence of gingivitis in Indonesia has ranked second with 96.58%.

This study aims to assess the relationship between academic stress and the occurrence of gingivitis in 2019 FK UMSU students.

METHOD

This study is a descriptive analytical study with a Cross-Sectional approach by filling out the Stress Scale for Adolescents (ESSA) questionnaire and dental examination on the study subjects. Ethics approval was obtained from the Health Research Ethics Commission of the Faculty of Medicine, University of Muhammadiyah, North Sumatra, No. 1 in Indonesia. 1023/KEPK/FKUMSU/2023. This research was conducted from June to July 2023 at the Faculty of Medicine, University of Muhammadiyah, North Sumatra. Primary data was obtained by conducting a dental examination of the respondent, and the respondent was asked to fill out a questionnaire. This study involved 67 respondents with inclusion criteria: students of the Faculty of Medicine, Muhammadiyah University of North Sumatra, who still have complete teeth (incisivus, caninus, premolar and molar), and are willing to be the subjects of research. Exclusion criteria: incomplete teeth of the teeth to be examined from the inclusion criteria, students with dental care at dentists, and pregnant students. The data obtained is analysed using chi-square.

RESULT

It contains the results of the research conducted. There are several characters from the subject involved in this study, with the results shown in Table 1.

E-ISSN: 2528-410X

Table 1. Results of Academic Stress Frequency Distribution

Academic Stress	Frequency	Percentage
Mild	0	0
Moderate	33	49.3
Severe	34	50.7
Total	67	100

Based on the table above, it can be seen that out of 67 respondents included in the study, 0 respondents had mild academic stress (0%), 33 respondents had moderate academic stress (49.3%), and 34 respondents had severe academic stress (50.7%).

Table 2. Frequency Distribution of Gingivitis Occurrence

Occurrence of Gingivitis	Frequency	Percentage
Normal	14	20.9
Mild	38	56.7
Moderate	15	22.4
Severe	0	0
Total	67	100

Based on the table above, it can be seen that out of 67 respondents included in the study, 14 respondents were categorised as normal (20.9%), 38 respondents were categorised as mild (56.7%), 15 respondents were categorised as moderate (22.4%), and 0 respondents were categorised as severe (0%).

Table 3. The Relationship between Academic Stress and the Occurrence of Gingivitis

Stress Academic		Occurrence of Gingivitis			Total	P-Value
		Normal	Mild	Moderate		
Moderate stress	n	11	15	7	33	
	%	33.3%	45.5%	21.2%	100.0%	
Severe stress	n	3	23	8	34	0.043
	%	8.8%	67.6%	23.5%	100.0%	
Total	n	14	38	15	67	

E-ISSN: 2528-410X

	%	20.9%	56.7%	22.4%	100.0%

Based on the table above, it can be seen that among respondents with moderate academic stress, there were 33 respondents, consisting of 11 respondents with normal gingivitis criteria (33.3%), 15 respondents with mild gingivitis criteria (45.5%), and 7 respondents with moderate gingivitis criteria (21.2%). Among respondents with severe academic stress, there were 34 respondents, consisting of 3 respondents with normal gingivitis criteria (8.8%), 23 respondents with mild gingivitis criteria (67.6%), and 8 respondents with moderate gingivitis criteria (23.5%). The p-value obtained was 0.043, which is < 0.05; therefore, H0 is rejected and H1 is accepted. Based on these results, it can be concluded that there is a relationship between academic stress and the occurrence of gingivitis."

DISCUSSION

The results of the study showed that 33 respondents experienced moderate academic stress (49.3%), and 34 respondents experienced severe academic stress (50.7%). Medical education is a long journey with a career path that carries high demands, placing students at risk of stress and burnout. Stress symptoms consist of psychological, physical, and behavioural aspects. Psychological symptoms may include anxiety and tension. Physical symptoms include increased blood pressure, heart rate, headaches, and nausea. Behavioural symptoms may involve a decline in the quality of interpersonal relationships, whether with friends or family members. Stress experienced by the subjects in this study occurred due to stressors. Several types of stressors underlie the occurrence of stress in students, including academic stress, intrapersonal and interpersonal relationships, study-related relationships, desires and self-control, and group activities.[8]

The occurrence of gingivitis among the 2019 cohort medical students of the Faculty of Medicine, Universitas Muhammadiyah Sumatera Utara, showed that 14 respondents were classified as normal (20.9%), 38 respondents as mild (56.7%), and 15 respondents as moderate (22.4%). The main aetiology of gingivitis is bacterial infection originating from the accumulation of plaque on the tooth surface. Debris and calculus are factors that facilitate plaque retention. Debris consists of food remnants that can be removed from the tooth surface by saliva flow and the mechanical action of the lips, tongue, and cheeks. Debris provides a substrate for bacterial metabolism. Calculus is a hard deposit formed from the mineralisation of dental plaque and is usually covered by plaque due to its rough surface. A key factor influencing dental and oral health problems is behaviour. When knowledge is sufficient, it influences behaviour in maintaining oral and dental health. The higher the education level of an individual, the greater the knowledge they possess. Knowledge is an essential domain in the formation of behaviour.[9]

Based on the analysis conducted using the Chi-Square test, a significance value of 0.043 was obtained, which is < 0.05. This indicates that there is a relationship between academic stress and the occurrence of gingivitis among the 2019 cohort medical students of the Faculty of Medicine, Universitas Muhammadiyah Sumatera Utara. The majority of students with academic

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E-ISSN: 2528-410X

stress, whether moderate or severe, experienced mild gingivitis, with more respondents in the severe stress group experiencing gingivitis. This finding is consistent with the study by Tantawi et al. (2021), which stated that stress is associated with the occurrence of gingivitis.[10]

This research is also in line with a previous study by Rizky Darmawan, Sunnati, and Sri Rezeki titled *"The Relationship Between Academic Stress and Gingivitis among Dental Students of Universitas Syiah Kuala"*, which concluded that there is a significant relationship between academic stress and gingivitis among dental students at Universitas Syiah Kuala.[11]

Currently, the term stress is frequently used to describe recurrent negative experiences related to everyday discomfort, relationship problems, academic pressures, as well as health issues and debilitating phobias. Both medical and dental students experience higher levels of stress. The *post-underestimation* component significantly increases during undergraduate examinations compared to post-examination periods. In conclusion, academic stress negatively affects plaque levels and gingival status. Mental health status influences oral hygiene to some extent. Poor oral hygiene due to stress can lead to plaque accumulation and, over time, the occurrence of gingivitis and periodontitis.[12]

Stress has a substantial impact on a person's psychological state, including cognition, emotions, and behaviour, and can even cause or exacerbate illness. Stress also plays a role in periodontal disease. Individuals experiencing stress have been found to suffer from more severe periodontal disease. Stress affects the immune system and inflammatory responses through the central nervous system by activating the HPA axis (Hypothalamic-Pituitary-Adrenal) and the autonomic nervous system by activating the SAM system (Sympathetic-Adrenal-Medullary). Stress also triggers the HPA axis to release cortisol, which suppresses immune function, particularly sIgA, IgG, and neutrophil cells. On the other hand, through the autonomic nervous system, stress causes the adrenal medulla to release epinephrine and norepinephrine, stimulating the production of prostaglandins and proteolytic enzymes, which, if secreted continuously, indirectly lead to periodontal tissue damage.[13]

Stress can modify an individual's immune response. Stress-induced immune system alterations may also increase the production of pro-inflammatory cytokines and induce vascular damage. Individuals experiencing stress may also neglect their oral hygiene due to reduced motivation and interest. This factor increases the risk of gingivitis. Additionally, some individuals increase their sugar and refined carbohydrate consumption when stressed. A higher frequency of refined carbohydrate intake between meals can increase the risk of gingivitis. The risk of moderate/severe gingivitis through plaque accumulation may be more strongly influenced by sugar consumption than by tooth brushing frequency.[14]

CONCLUSION

Based on the results of this study, it can be concluded that there is a relationship between academic stress and the occurrence of gingivitis among 2019 cohort medical students of the Faculty of Medicine, Universitas Muhammadiyah Sumatera Utara. Further research is needed by expanding the sample and assessing other factors besides gender and age, in order to gain a broader

E-ISSN: 2528-410X

understanding of potential confounding factors.

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