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ORIGINAL ARTICLE

THE RELATIONSHIP BETWEEN STRESS AND RECURRENT APHTHOUS STOMATITIS AMONG STUDENTS OF THE DENTISTRY FACULTY OF LAMBUNG MANGKURAT UNIVERSITY

Hubungan Stres Terhadap Kejadian Stomatitis Aftosa Rekuren pada Mahasiswa Fakultas Kedokteran Gigi Universitas Lambung Mangkurat

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ABSTRACT

Background: Recurrent aphthous stomatitis (RAS) is a yellowish-white ulcer-shaped lesion in the oral mucosa. The prevalence of RAS is estimated to be 20% of the world population. Based on Basic Health Search Indonesia in 2018, the prevalence of RAS was 8% of all oral health problems in Indonesia. Stress is one of the risk factors for recurrent aphthous stomatitis. Someone who is stressed will experience a decrease in the immune system, resulting in tissue destruction in the oral cavity. **Purpose:** To analyze the relationship between stress and RAS in Faculty of Dentistry, Lambung Mangkurat University students. **Methods:** This is analytical observational research with a cross-sectional study design. The study used a simple random sampling technique with a total sample of 57 co-assistants of the Dentistry at Lambung Mangkurat University. RAS was examined using a questionnaire, and the stress level was measured using the Perceived Stress Scale (PSS) questionnaire. The results of the study were analyzed using the chi-square test. **Results:** The result shows that the stress level suffered by the respondents is mainly in the moderate category, with a percentage of 44%. In comparison, the incident of RAS with positive results is mainly experienced by respondents with a percentage of 70.18%. The analysis using the chi-square test showed a significant relationship between stress and SAR with a significance value of 0.01 ($p < 0.05$). **Conclusion:** The higher the stress level experienced will increase the risk of developing SAR.

ABSTRAK

Latar Belakang: *Stomatitis Aftosa Rekuren (SAR) merupakan lesi berbentuk ulser berwarna putih kekuningan terjadi di mukosa mulut.*

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Prevalensi SAR di dunia diperkirakan rata-rata berkisar sebesar 20% dari total populasi dunia. Berdasarkan data Riskesdas tahun 2018 untuk prevalensi SAR tercatat sebanyak 8% dari seluruh masalah kesehatan mulut di Indonesia. Stres merupakan salah satu faktor risiko terjadinya stomatitis aftosa rekuren, seseorang yang stres akan mengalami penurunan sistem imun dan berakibat dalam destruksi jaringan di rongga mulut. ***Tujuan:*** *Menganalisis hubungan stres pada mahasiswa profesi Kedokteran Gigi Universitas Lambung Mangkurat terhadap kejadian SAR.* ***Metode:*** *Penelitian ini merupakan jenis penelitian observasional analitik dengan desain studi cross sectional. Teknik pengambilan sampel pada penelitian menggunakan teknik simple random sampling dengan jumlah sampel 57 mahasiswa profesi Fakultas Kedokteran Gigi Universitas Lambung Mangkurat. Pemeriksaan SAR menggunakan kuesioner dan pengukuran tingkat stres menggunakan kuesioner Perceived Stres Scale (PSS). Hasil penelitian dianalisis menggunakan uji chi square.* ***Hasil:*** *Hasil penelitian menunjukkan tingkat stres yang paling banyak diderita oleh responden adalah tingkat sedang dengan presentase sebesar 44%, sedangkan untuk kejadian SAR dengan hasil positif lebih banyak dialami oleh responden dengan presentase 70,18%. Hasil analisis dengan menggunakan uji chi square menunjukkan terdapat hubungan yang signifikan antara stres terhadap SAR dengan nilai signifikansi sebesar 0,01 (p<0,05).* ***Simpulan:*** *Semakin tinggi tingkat stres yang dialami akan meningkatkan risiko timbulnya SAR.*

INTRODUCTION

Recurrent aphthous stomatitis (RAS), a common disease in the oral cavity, is an inflammation in the oral mucosa in the form of yellowish-white ulcers (1), which occurs repeatedly, either single or multiple (2). The disease causes discomfort in some people because it interferes with swallowing, mastication, and speech functions (2). Consisting of minor, major, and herpetiform types (3), its prevalence in the world is estimated to be around 20% of the total world population. Based on the Riskesdas (Indonesian Basic Health Research) 2018 data, the prevalence in the country was 8% of all oral health problems (4). RAS was the most common type of oral mucosal disease at Gusti Hasan Aman Dental and Oral Hospital Banjarmasin from 2014 to 2017, with the prevalence of 45.42% out of 397 patients in 2018 (3).

Many factors known to cause RAS are genetics, allergies, stress, trauma (sores in the mouth), and hormonal imbalances (2). The most predisposing factor for 66% RAS cases at Gusti Hasan Aman Oral and Dental Hospital Banjarmasin is stress (34%) since it can decrease human's immune system causing tissue destruction in the oral cavity (1).

A research conducted in Saudi Arabia in 2020 found that the stress level of students majoring in dentistry was higher than those of other majors. As the former have the score of 31 (5), the latter, i.e. students of medical, nursing, and pharmacy, have the scores between 27–28. Further, a research conducted in seven countries in 2018 found that clinical dental students have a higher stress level than preclinical students with the ratio of 1.17 and 1.08 (6), while a similar research in Korean context in 2020 concluded that students of dentistry profession undergone their professional period in the third and fourth years have a high level of fatigue (7). Hence, the purpose of this study is to analyze the relationship between stress and RAS among dental students of Lambung Mangkurat University.

METHODS

This research has received its ethical approval from the ethical committee of the Dentistry faculty of Lambung Mangkurat University through the letter number 013/KEPKG-FKGULM/EC/II/2021. The data of this research was harvested by conducted online surveys using Google Forms. The samples were selected with the criteria of clinical students of the Dentistry Faculty of Lambung Mangkurat University who had RAS in

the last 1-2 years not caused by trauma but have no history of systemic disease. They must have no allergies and must be clinical students who had undergone clinical level for more than 2 years. With the exclusion criteria of having illness and unwilling to be a respondent, 57 people were selected as the respondents.

The respondents' stress level was measured using the PSS questionnaire, whose results were divided into three categories: mild, moderate, and severe. The questionnaire consists of 10 items. As each item ranges from zero to four points, the total score is between zero and forty. The results of the validity and reliability tests indicated that the questionnaire was valid and reliable. The diagnosis of RAS was obtained using RASDX questionnaire. This questionnaire consists of 18 items, intended to indicate RAS positive or negative. The results of the validity and reliability tests showed that the RASDX questionnaire was valid and reliable. The data of this study were analyzed using the Chi-Square test, which determines the correlation between stress and RAS in question.

RESULTS

The characteristics of the respondents can be seen in Table 1.

Table 1
Distribution of Respondent's Characteristics

Variable	n	(%)
Gender		
Male	9	16%
Female	48	84%
Stress		
Mild Stress	13	22.81%
Moderate Stress	25	43.86%
Severe Stress	19	33.33%
Recurrent aphthous stomatitis		
Negative	17	29.82%
Positive	40	70.18%
Total	57	100%

Table 1 shows that most respondents are female (48 people or 84% of the total sample), while male respondents are only nine people or respondents 16%. The stress level of the respondents was measured using the Perceived Stress Scale questionnaire. Most respondents have moderate stress levels (25 people or 44%). The minor portion is for mild stress, experienced by 13 respondents or 22.81%. RAS was examined using the Recurrent Aphthous Stomatitis Diagnostic questionnaire, resulting in positive or negative. The results show that 40 respondents (70.18%) are RAS-positive, while the remaining 17 (29.82%) are unfavorable. The results of the stress test were then adjusted based on gender.

In Table 2, the distribution of the respondents' stress frequency by gender was observed. Most male respondents had mild stress (4 people or 45%), while most female respondents had moderate stress (22 people or 46%). The results of the RAS examination above were then adjusted according to the respondent's gender. The distribution of respondents' RAS frequencies by gender is presented in Table 3.

The results of the RAS frequency based on gender are available in Table 5. Positive RAS is mainly experienced by females, i.e., 34 people, or 71%. The respondents' stress level and RAS diagnosis will be subjected to a chi-square test to see the relationship between stress level and RAS incidents among the respondents. The results of the test are provided in Table 4. Based on Table 4, the most combination between stress and RAS was found in people with moderate stress (25 people), followed by severe stress (19 people), and mild stress (13 people).

The results of the Chi-square test analysis show that the p-value is 0.01, which is smaller than the alpha value of 0.05. Hence, there is a significant relationship between stress levels and the incidence of RAS in Lambung Mangkurat University dental students. The test of the effect of stress on the incidence of RAS among the students can be seen in Table 5. The results show that students with mild stress had a 7.12 times greater risk of having RAS than those with moderate stress. Further, students with mild stress have a 19.13 times greater risk of developing RAS than those with severe stress.

Table 2
Distribution of Respondent's Stress by Gender

		Stress Level			Total
		Mild	Moderate	Severe	
Gender	Male	4 (45%)	3 (33%)	2 (22%)	9 (100%)
	Female	9 (19%)	22 (46%)	17 (35%)	48 (100%)

Source: Primary Data

Table 3
Frequency of Respondents to RAS by Gender

		RAS		Total
		Positive	Negative	
Gender	Male	6 (67%)	3 (33%)	9 (100%)
	Female	34 (71%)	14 (29%)	48 (100%)

Source: Primary Data

Table 4
The Relationship between Stress and Recurrent Aphthous Stomatitis

		RAS		Total	*p-value*
		Negative	Positive		
Level Stress	Mild	9 (69.23%)	4 (30.77%)	13 (100%)	0.01
	Moderate	6 (24%)	19 (76%)	25 (100%)	
	Severe	2 (10.53%)	17 (89.47%)	19 (100%)	
Total		17 (100%)	40 (100%)	57 (100%)	

Source: Primary Data

Table 5
Test the Association of Stress on The Incidence of Recurrent Aphthous Stomatitis

Variable	RAS				OR (95%CI)
	Negative		Positive		
	n	%	n	%	
Level Stress Mild and Moderate					
Mild	9	69.23	4	30.77	7.125
Moderate	6	24	19	76	1.60 – 31.72
Level Stress Mild and Severe					
Mild	9	69.23	4	30.77	19.13
Severe	2	10.53	17	89.47	2.92 – 125.32
Level Stress Moderate and Severe					
Moderate	6	24	19	76	2.68
Severe	2	10.53	17	89.47	0.48 – 15.13

DISCUSSION

This study's measurement of stress level was conducted using the PSS questionnaire, resulting in the finding that the most common type of stress experienced by the respondents is moderate, i.e., 96.83%. Meanwhile, the diagnosis for RAS in this study used the RASDX, suggesting that most of the respondents (70.18%) had RAS (8). Furthermore, differences between genders regarding their ways of dealing with stress are factors that cause females to be more vulnerable to severe stress. This can be worsened by other factors such as a lack of confidence to become a dentist, feelings of fear of failure, academic factors, education at the clinical level, and handling patients while undergoing clinical treatment education (9). The different levels of estrogen, oxytocin, and sex hormones in females and males make females more susceptible to stress than males (9,10).

The data from the RASDX survey indicate that the incidence of RAS among students in the Dentistry faculty of Lambung Mangkurat University was very high. RAS has three classifications: minor, central, and herpetiform. The minor type is characterized by shallow ulcers of less than 1 cm in diameter that usually heal within 7–14 days. This type of RAS is covered by a yellow membrane and is surrounded by redness. Various sources state that the minor type is the most common of the three classifications of RAS, accounting for about 80% of all RAS cases (11). The primary type of RAS is the most severe of the three types. The diameter of the ulcer is 1 to 3 cm. Compared to the minor RAS, this causes much more pain, takes longer to heal (up to six weeks), and can cause scarring, so the patient will have difficulty eating, which causes a decrease in immune response and, in some cases, limits mouth opening until psychological stress conditions occur. The most commonly affected areas are the labial mucosa, soft palate, and palatine tonsils (12).

Female students mainly suffer from RAS in this study. A study conducted in Saudi Arabia found that the prevalence of RAS in dental students is 11.78% for females and 9.95% for males. This study also discovered that females experience RAS more, with a ratio of 1.2:1 (13). This is consistent with data released by the Ministry of Health of the Republic of Indonesia in 2018 that shows females are 9% more vulnerable to RAS than males, who have 7% vulnerability (4).

Females are more inclined to RAS due to their high level of anxiety. As they are more likely to use their feelings when dealing with stressors, their counterparts tend to use their logic. Then, females have more adrenocorticotropic hormone (ACTH) than males. When released, ACTH stimulates the adrenal cortex to produce cortisol, which contains glucocorticoids. The bodily response of glucocorticoids is that if a person experiences stress, his immune function will be suppressed, or his self-protection against microbes and tissue resistance will be hindered. As a result, he will be susceptible to infection (1,14).

Further, this research primarily found RAS in respondents with moderate stress. The results of the Chi-square test indicate that there is a relationship between stress and RAS among dental students. This finding agrees with a study conducted in India (15) and Saudi Arabia (16).

RAS is a recurrent ulcer that affects the oral cavity without a definite cause. The causes are very multifactorial, including stress or anxiety (17,18). One of the factors that destroys homeostasis in a person's body is stress. Each individual reacts differently when faced with stressors; some feel severe and mild symptoms. According to Hernawati's research on the relationship between cellular and molecular mechanisms of stress and the occurrence of RAS, stress conditions activate the central nervous system (CNS), causing the hypothalamus to release corticotropin hormone (CRH). The released CRH will stimulate the pituitary gland to release Adrenocorticotropic Hormone (ACTH). When released, ACTH stimulates the adrenal cortex to produce cortisol, which contains glucocorticoids (14). The bodily response of glucocorticoids is that if a person experiences stress, his immune function will be suppressed, or his self-protection against microbes and tissue resistance will be hindered. As a result, he will be susceptible to infection (19,20).

Decreased immunity due to stress can make microorganisms adhere to the mucosa easily, so microorganisms can freely enter the mucosa. Microorganisms will also be challenging to phagocytize, eventually leading to infections, such as RAS (16,20). The higher a person’s stress level,

the more the likeliness of that person to have RAS (15).

Based on the explanation above, the respondents' stress level is primarily moderate (44%), and most (70.20%) are RAS positive. The Chi-square analysis results show a significant relationship between stress and RAS suffered by co-assistants at the Dentistry Faculty of Lambung Mangkurat University with a significance value of 0.01 (p 0.05).

CONCLUSION

The results of the analyses show that there is a relationship between stress levels and the incidence of RAS among dental students at Lambung Mangkurat University. Students with moderate to severe stress are more susceptible to RAS than those with mild stress. Therefore, students with moderate to severe stress should be given more attention by providing emotional support. The Dentistry faculty of Lambung Mangkurat University must provide stress prevention programs for students through stress management assistance.

CONFLICT OF INTEREST

There was no conflict of interest when this research was conducted, either in research licensing, research funding, research data collection, or research report preparation.

AUTHOR CONTRIBUTION

RH was in charge of analyzing the data, presenting the research results, and publishing them. AF was responsible for research ethical consideration, instrument validity and reliability assessment, data collection and processing, and report preparation. MLA coordinated the research ethics tests and provided input on the research results.

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