

Correlation Between Stress and Recurrent Aphthous Stomatitis on Bank Employees in Tulungagung, East Java: An Observational Analytic

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ABSTRACT

Recurrent Aphthous Stomatitis (RAS) is a prevalent oral disease that detrimentally impacts the quality of life for those affected. One of the several factors that can trigger the emergence of RAS is stress. Psychological stress can adversely affect health and decrease the immune system. Studies in the field of Psychoneuroimmunology have shown the relationship between human behaviour, nerve function, and psychological stress, which can potentially act as a cause of disease and reduce the immunity of the oral mucosa. Therefore, this study aimed to determine the correlation between stress and the incidence of Recurrent Aphthous Stomatitis on bank employees in Tulungagung, East Java. It is an observational analytic study with a cross-sectional approach, involving male bank employees with a marketing position, aged between 27 and 40 years. Data were analyzed and interpreted using the Chi-square test with a nominal variable data scale. The results showed that the asymp. value sig (2-sided) is 0.000, indicating a significant relationship. In conclusion, there is a relationship between stress and Recurrent Aphthous Stomatitis.

Keywords: Recurrent Aphthous Stomatitis, Stress, Psychoneuroimmunology

ABSTRAK

Recurrent Aphthous Stomatitis (RAS) merupakan salah satu penyakit mulut dengan prevalensi kejadian yang tinggi pada masyarakat yang menurunkan kualitas hidup penderitanya. Beberapa faktor yang dapat memicu munculnya RAS salah satunya adalah stres. Stres psikis dapat berpengaruh buruk terhadap kesehatan dan penurunan sistem imun. Kondisi ini sejalan dengan kajian Psikoneuroimmunologi yang menunjukkan keterkaitan antara sistem imun dan perilaku manusia melalui fungsi saraf sehingga, dapat menyebabkan munculnya penyakit dan bermanifestasi ke rongga mulut. Penelitian ini bertujuan untuk mengetahui hubungan antara stres terhadap kejadian *Recurrent Aphthous Stomatitis* pada pegawai bank di Tulungagung, Jawa Timur. Penelitian ini menggunakan desain analitik observasional dengan pendekatan *cross sectional*. Subyek penelitiannya adalah seorang karyawan Bank dengan jabatan marketing yang berjenis kelamin laki-laki serta memiliki rentang usia dewasa awal dan akhir (27-40 tahun). Data yang diperoleh dianalisis dan diinterpretasi menggunakan uji *Chi-square* dengan skala data variabel nominal. Hasil uji korelasi *Chi-square* diperoleh nilai *asymp. sig(2-sided)* yang dihasilkan sebesar 0,000 yang berarti terdapat hubungan yang bermakna. Kesimpulan sesuai dengan penelitian ini yaitu terdapat hubungan antara stres dengan kejadian *Recurrent Aphthous Stomatitis*

Kata kunci: *Recurrent Aphthous Stomatitis*, Stres, Psikoneuroimmunologi



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1. Introduction

The prevalence of dental and oral health problems, including recurrent aphthous stomatitis (RAS), is experiencing an increase (Riset Kesehatan Dasar, 2018). RAS is a recurrent ulcerated lesion that often causes disturbances, such as pain when speaking, eating, and swallowing, thereby reducing an individual self-confidence and productivity.[1] It is a multifactorial disease caused by various predispositions, such as psychological stress, hereditary factors, and hormonal balance.[2] Other predisposing factors that contribute to RAS are age, level of education, environment, and type of work.[3]

The prevalence of RAS in Indonesia is 8.0% but varies from 5% to 66% in the world population with an average of 20%.[4] Its high incidence in the community can affect the running of daily activities and the quality of individuals' life, resulting in an impact on their psychological status. The condition of psychological disorders experienced by an individual can result in stress.[1] One of the factors for the emergence of RAS is psychological stress. Many Indonesians have experienced psychological stress, from teenagers to the elderly[4], which can interfere with their health and reduce the immune system. This condition is similar to the Psychoneuroimmunology developed in previous studies, which showed the relationship between the immune system and human behavior through nerve function.[5] The stimulation of stress or stressor will activate CNS (Central Nervous System) and generate ACTH (Adrenocorticotrophic Hormone) from the HPA (Hypothalamic Pituitary Adrenal) axis. ACTH stimulates the production of cortisol, which is recognized as a stress marker.[6] These conditions can reduce the immune system and the state of the body's tissues, as well as the boundaries of the oral mucosa. Therefore, stress is one of the predisposing factors for RAS.[7] Based on the description above, this study aimed to determine the relationship between stress and Recurrent Aphthous Stomatitis.

2. Materials and Methods

This study is analytical observational epidemiology with a cross-sectional approach conducted at the bank in Tulungagung from April to May 2022. It involved a man with an adult and final age ranging from 27-40 years, as a marketing position operating. The inclusion criteria are those who have a history of RAS disease with a period of two events in the last six months, have no history of systemic disease associated with RAS, no history of RAS disease caused by other factors such as trauma, food allergies or drugs and have mild, moderate and severe stress level. Based on these criteria, a total of 58 study subjects were selected. The study adopted the simple random sampling technique by considering inclusion and exclusion criteria. The exclusion criteria referred are bank employees who were not willing to participate in the study activities and had a history of RAS due to trauma, food and drug allergies. Data were obtained from the results of the DASS-21 (Depression, Anxiety, Stress Scales 21) and the RASDX (Recurrent Aphthous Stomatitis Diagnose) to determine the incidence of stress and incidence of RAS in respondents. [8],[9] From the two questionnaires, the results of respondents with positive or negative RAS will be obtained with normal, mild, moderate, and severe stress levels. Individuals with stress above normal are included as positive stress respondents. The data will then be processed, analyzed, and interpreted using the SPSS application with a Chi-square test to determine the relationship between the two variables.

3. Results

This study was conducted entirely on male respondents with an adult age range of 27 to 40 years. Samples of female respondents were not selected because the study is aimed at determining the etiological factor of pressure without being influenced by hormonal factors. All respondents are bank employees in marketing positions dominated by men and are required to have a bachelor's degree in recruiting in the banking sector. The results of this study showed that the classification of early (27-35 years) and late adulthood (36-40 years) comprising 81% and 19%, respectively, have varying levels of stress dominated by mild and moderate stress (Table 1). Furthermore, the Chi-square test showed a relationship between the incidence of RAS and anxiety (Table 2). A total of 24 respondents from a sample of 58 experienced RAS events, but people were likely due to stress disorders.

Table 1. Cross-tabulation of age and stress levels based on the results of the DASS-21 questionnaire

		Stress				
		Normal	Mild	Moderate	Severe	Total
Age	Early Adult (27-35 years old)	17 (29.3%)	13 (22.4%)	13 (22.4%)	4 (6.9%)	47 (81%)
	Late Adult (36-40 years old)	4 (6.9%)	5 (8.6%)	1 (1.7%)	1 (1.7%)	11 (19%)
	Total	21 (36.2%)	18 (31%)	14 (24.1%)	5 (8.6%)	58 (100%)

Table 2. Chi-square test results based on the incidence of stress with the incidence of RAS in study subjects

RAS	Stress		Total	Value	P
	Yes	No			
Yes	14 (58.3%)	10 (41.7%)	24 (100%)	0.479	0.0001
No	16 (47.1%)	18 (52.9%)	34 (100%)		

The Pearson chi-square test showed a significant value of 0.000 ($P < 0.05$), which indicates a relationship between stress and Recurrent Aphthous Stomatitis. Furthermore, the value of the Contingency Coefficient of 0.479 with $p = 0.000$ showed that the strength of the relationship between stress and Recurrent Aphthous Stomatitis is sufficient (Table 2).

4. Discussions

Stress is an individual’s unwanted reaction to severe pressure or other types of demands that arise from either external or internal factors. The external factors can be caused by the surrounding environment, while internal factors can result from the inner perception of each individual. Stress levels increase when a person cannot deal with unpleasant situations. However, individuals respond to a stressor differently due to their varying.[10] One of the internal factors that can influence stress levels is age. According to Zulkifli (2019), an older individual is more vulnerable to experiencing stress. Age is one important factor that can affect stress levels because the physiological factors are experiencing setbacks. An individual will be susceptible to stress at the age of 21-40 and 40-60 years.[11] According to the result of this study, individuals in the age range of 27 to 40 exhibit various stress levels, as shown in Table 1.

An individual’s gender can also affect the emergence of stress. Men and women have differences in emotional, physical, and muscle work strength. Consequently, men have a lower probability of stress because women tend to experience changes in feelings and moods, which result in difficulty controlling emotions. This is often associated with hormonal factors in women.[12] However, in the context of this study, it was observed that men experienced more work stress, unaffected by hormonal factors.

Stress can also be associated with other external factors, such as education and occupation levels. Education is not the only factor that supports a person's mindset, but individuals with a high level of education are more receptive to good changes that can significantly affect their coping mechanism in dealing with stress.[12] This level of education affects the respondent's position. According to Kumar and Sundaram (2014) and Masyitha et al. (2021), male bank employees often experience “severe” and “very severe” stress levels.[13],[14] This is consistent with the results of this study because it produces stress levels above average, but majorly dominated by moderate and mild. In addition to inquiring about the cases of work-related stress experienced by respondents, the study analyst also sought information on various contributing factors. Respondents admitted that workloads, such as targets and deadlines, were among the primary stressors. Moreover, factors such as overloaded working hours and increased overtime, as well as problems with

customers or their co-workers were also reported. Several bank employees admitted that issues outside the workplace, such as the family environment and friendships, often exacerbated their stressful conditions.

Continuous psychological stress can adversely affect health by reducing the immune system and the condition of body tissues due to an increase in the hormone cortisol in the blood. This condition causes a reduction in the resistance of the oral mucosa, which is susceptibility to Recurrent Aphthous Stomatitis (RAS) and has a predisposition to disease due to psychological stress.[7] The opinion above is consistent with this study because it was found that 14 people experienced RAS triggered by a stress disorder, as shown in Table 2. This study is also consistent with the result of Tedi et al. (2021) that 63.9% of stressed respondents also experience RAS.[2]

The emergence of a stress-induced disease in an individual aligns with psychoneuroimmunology studies, which have been developed to investigate the effect on the immune system. Furthermore, the emergence of RAS in an individual experiencing stress may be due to stress stimuli that can affect the sympathetic nervous system in the brain and negatively impact the body's health, one of which manifests in the oral cavity. According to the psychoneuroimmunology paradigm, the brain's response to stress is influenced by the perceptual ability and acceptance of an individual, eventually leading to stress and triggering physiological, psychological, and behavioral changes.[5] The stressor received by an individual will activate the CNS in the brain through the HPA axis (Hypothalamic Pituitary Adrenal), which then produces CRH (Corticotropin Releasing Hormone). The CRH stimulates the pituitary gland to produce ACTH (Adrenocorticotropic Hormone). ACTH stimulates the production of cortisol and catecholamines, with cortisol levels increasing in the bloodstream, leading to decreased response of the immune system.[6] Under stress conditions, cortisol levels in the blood will increase because all leukocytes, including lymphocytes, have receptors, thereby modulating the immune system. High cortisol levels are immunosuppressors that interfere with the phagocytic system and immune response.[7] The phagocytic and inflammatory systems play a role in the disease mechanism. RAS usually manifest in acute and chronic inflammation, which will cause damage to the oral mucosa. On the other hand, acute inflammation will cause pain in RAS lesions and discomfort.[15] This situation also causes an increase in stress levels or becomes a stressor.

The immunosuppressor effect of cortisol will also damage the cellular and humoral immune systems, dominated by cellular immunity. A high-stress level can decrease mucosal immunity related to amylase levels as a biomarker of stress in the oral cavity. Furthermore, salivary amylase levels are known to increase when an individual experiences stress because cortisol levels also increase.[16] Besides amylase levels in saliva, the immunosuppressor effect on the humoral immune system is played by B lymphocytes, which reduce the function and production of immunoglobulins, as well as their ability to eliminate microorganisms. Furthermore, various changes and imbalances in the immune system can lead to pathological conditions in the oral mucosal epithelial cells. This increases the sensitivity of epithelial cells to the attachment of microorganisms and makes the invasion of the mucosa easier but difficult to phagocytize.[15]

In conclusion, there was a relationship between stress and Recurrent Aphthous Stomatitis (RAS) among bank employees in Tulungagung. For future studies, it was recommended to explore the relationship between Recurrent Aphthous Stomatitis and other predisposing factors, such as allergy, infection, and genetics. This could be achieved by using more accurate measuring instruments to determine the factors causing RAS with certainty and focusing on sample homogenization. Furthermore, it is important to consider systematic health conditions in order to ensure the validity of the study results. Furthermore, to obtain more reliable data on all elements of stress variables, including ethnicity and socioeconomic status, careful consideration and inclusion of these factors is essential.

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