



THE INFLUENCE OF STRESS ON THE SEVERITY OF ACNE VULGARIS IN ADOLESCENTS

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ABSTRACT

In Indonesia, acne vulgaris is a common skin disease, almost everyone has experienced acne vulgaris, especially in young people, it occurs around 85 - 100%. The highest prevalence occurs in women aged 14-17 years, 83-85%, and men aged 16-17 years. 19 years old, accounting for 95-100%. One of the factors that causes acne to appear is stress. Stress is pressure that occurs due to a mismatch between the desired situation and expectations. Teenagers who experience acne will certainly feel uncomfortable. This study aims to determine the effect of stress on the severity of acne vulgaris in adolescents. Method: Jenis penelitian ini merupakan penelitian analitik kuantitatif dengan pendekatan observasional menggunakan desain cross-sectional. Populasi dalam penelitian ini adalah remaja di Kota Tegal dengan jumlah sampel sebanyak 288 yang diambil secara acak. Uji analisis menggunakan uji Chi-square. Results: This study aims to determine the effect of stress on the severity of acne vulgaris in adolescents. Method: This type of research is quantitative analytical research with an observational approach using a cross-sectional design. The population in this study were teenagers in Tegal City with a total sample of 288 taken randomly. Test the analysis using the Chi-square test. Conclusions: Stress factors influence the severity of acne vulgaris, the more stressed a teenager is, the more severe the incidence of acne vulgaris they suffer.

Keywords: acne vulgaris; stress; teenagers

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INTRODUCTION

Acne or Acne vulgaris is a skin disease caused by a buildup of oil which causes facial skin pores to become blocked, triggering bacterial activity and inflammation on the skin. Acne vulgaris can appear with inflammatory and non-inflammatory lesions mainly on the face but can also occur on the upper arms, chest and back. The beginning of acne is due to increased sebum production and clogged hair pores causing open comedones (white heads). Furthermore, when mixed with environmental oxygen, blackheads can become black, called closed comedones (black heads). Continuous blockages can become inflamed and sometimes aggravated by bacterial infections, resulting in pus-filled eruptions and painful cysts can even form. (Kartika Ruchiati, 2022) Based on its severity, acne vulgaris is divided into three types, namely mild, moderate and severe. Types of acne vulgaris that are classified as mild include blackheads and whiteheads, while acne vulgaris that is classified as moderate includes papules and pustules, which are small red bumps filled with pus. Meanwhile, severe types of acne vulgaris include nodules and cysts. (Bella, 2022)

In Indonesia, acne vulgaris is a common skin disease, almost everyone has experienced acne vulgaris, especially in young people, it occurs around 85 - 100%. The highest prevalence occurs in women aged 14-17 years, 83-85%, and men aged 16-17 years. 19 years old, accounting for 95-100%. (Saragih et al., 2016)(Rimadhani & Rahmadewi, 2015)5] Acne

vulgaris can appear at any age, but hormonal influences cause acne vulgaris to appear during adolescence. The actual cause of acne vulgaris is not yet known with certainty, but there are four theories in the etiopathogenesis of acne vulgaris. These four things are increased sebum production, hyperproliferation of the epidermis of hair follicles, colonies of *Propionibacterium acnes* (*P. acnes*) bacteria, and inflammatory reactions.(Lynn et al., 2016) This disease can be influenced by many or multifactorial factors, including genetic factors, racial factors, food factors, climate factors, skin type factors, hygiene factors, cosmetic use factors, stress factors, infection factors and work factors. Sufferers usually complain of skin rashes in the form of blackheads, papules, pustules, nodes, or cysts and can be accompanied by itching. The predilection areas are the face, shoulders, upper part of the superior extremities, chest and back.(Saragih et al., 2016)

One of the factors that causes acne to appear is stress. Stress is pressure that occurs due to a mismatch between the desired situation and expectations, where there is a gap between environmental demands and the individual's ability to fulfill them which is considered potentially dangerous, threatening, disturbing and uncontrollable or in other words stress is exceeding the individual's ability to cope.(Barseli et al., 2017) Stress is prone to occur in teenagers due to various factors, including high pressure in the adaptation process, a feeling of wanting to be accepted by the environment, the desire to be independent and the increasing need for access to technology and other needs.(Aziz et al., 2021) This will accumulate psychological disorders and physical illnesses so that it can trigger and significantly aggravate the severity of acne vulgaris. Psychological stress will stimulate the hypothalamus to produce Corticotropin Releasing Hormone (CRH), which triggers an increase in levels of Adenocorticotropin Hormone (ACTH), an androgen hormone that plays an important role in the appearance of acne. Sebaceous glands are very sensitive to this hormone. Androgen hormones, especially testosterone, cause the sebaceous glands to increase in size and produce large amounts of sebum. This increase in sebum production is related to the pathogenesis of acne vulgaris.(Guyton and hall, 2019),(Fadilah, 2021)

Several studies have stated that there is a relationship between stress and acne vulgaris, such as research conducted by Hidayati and Riyanto showing that the level of stress and the severity of acne vulgaris have a significant relationship with $p = 0.009$. (Hidayati & Riyanto, 2017) Also, research conducted by Qorib showed that there was a significant relationship between the degree of stress and the severity of acne vulgaris in students with a value of $P = 0.005$ ($P < 0.05$). (Na'im & Meher, 2022) Likewise, research conducted by Gautama and Nadeak showed that 35% of students at the Faculty of Medicine had mild levels of stress, 60% of students had mild levels of acne vulgaris, and 72% of students who experienced stress suffered from acne vulgaris.(Gautama, 2013) Based on data from the Tegal City Central Statistics Agency, the number of adolescent population in Tegal City in 2023 is that the total number of adolescent population in Tegal City in 2023 is around 42,996 people, consisting of 22,074 men and 20,923 women. Based on this data, the incidence of acne vulgaris in teenagers In Indonesia, it is predicted that around 85 - 100%, namely around 36,546 teenagers, will experience acne, of course the incidence is quite large and this really makes teenagers feel uncomfortable, while one of the factors that causes acne to appear is stress. Based on the background above, we are interested in conducting research on how stress affects the severity of acne vulgaris in adolescents in Tegal City. This study aims to determine the effect of stress on the severity of acne vulgaris in adolescents.

METHOD

This type of research is quantitative analytical research with an observational approach using a cross-sectional design. According to the Tegal City Central Statistics Agency, the number of teenagers in Tegal City in 2023 will be around 42,996 people, consisting of 22,074 men and 20,923 women. The population is all subjects (humans, laboratory data, etc.) that will be studied and meet the specified characteristics. (Riyanto, 2011) The samples in this study were teenagers aged 10 - 21 years (Badan Pusat Statistik Kota Tegal, 2023). The minimum sample size in this study was 96 people, but in this study the author got a sample of 288 people taken randomly. The inclusion criteria for this study were adolescents aged 10 – 21 years who lived in Tegal City and had suffered from acne vulgaris in the last 1 year. This research obtained ethical permission from the Semarang Ministry of Health Polytechnic Ethics Commission No: 0660/EA/KEPK/2024 Data analysis in this study was a bivariate test which was carried out to determine the relationship between the independent variable, namely the incidence of stress in adolescents, and the dependent variable, namely the incidence of the severity of acne vulgaris in teenagers in Tegal City with the Chi-square test.

RESULTS

Know the characteristics of respondents based on age, gender, education, family history of acne. Mengetahui Karakteristik Responden berdasarkan usia, jenis kelamin, pendidikan, Riwayat keluarga menderita jerawat. The respondents in this study were 288 people consisting of teenagers in Tegal City with the characteristics of the respondents in table 1 below.

Table 1
Respondent Characteristics

Characteristics	f	%
Age (years)		
11-14 years	26	9,0
15 - 17 years	126	43,8
> 17 years	136	47,2
Total	288	100,0
Gender		
Woman	251	87,2
Man	37	12,8
Total	288	100,0
Education		
Junior high	34	11,8
Senior high	125	43,4
D3/S1	129	44,8
Total	288	100,0
Family history acne		
Yes	152	53,1
No	136	46,9
Total	288	100,0

Based on table 1, it shows the characteristics of respondents based on age, most of the respondents were > 17 years old, 136 (47.2%). Based on gender, most of the respondents were female 251 (87.2%). Based on education, the majority of respondents had a D3/S1 education, numbering 129 (44.8%). Based on a family history of suffering from acne, the majority of respondents in the family had a history of suffering from acne, 152 (53.1%).

Table 2 shows that the majority of respondents in this study experienced stress, 76.7%, while 33.3% of respondents did not experience stress. Based on the severity of the incidence of acne vulgaris, the majority of respondents who experienced stress suffered from moderate levels of acne vulgaris, 51.6%, while the majority of respondents who did not experience stress

experienced mild levels of acne vulgaris, 52%. Based on the results of the analysis of stress factors influencing the incidence of acne vulgaris severity with a sig (p value) value of 0.012.

Table 2.
The Effect of Stress on the Severity of Acne Vulgaris

Stress	The severity of acne vulgaris			Total	P value
	Mild	Moderate	Severe		
Not stressed	35 (52,2%)	21(31,3%)	11(16,4%)	67(100,0%)	0,012
Stressed	77(34,8%)	114(51,6%)	30(13,6%)	221(100,0%)	
Total	112 (38,9%)	135 (46,9%)	41(14,2%)	288 (100,0%)	

DISCUSSION

The research results showed that the majority of respondents who experienced stress had a moderate level of severity, 51.6%, while the majority of respondents who did not experience stress experienced mild levels of acne vulgaris, 52%. Based on the results of stress analysis on the influence of the severity of acne vulgaris in adolescents with a sig (p value) value of 0.012, this condition is in accordance with the theory that stress is a condition that can influence a person's emotions, thought processes and condition and express itself in the form of rejection, tension, or frustration, disrupting balance, physiology when stressed will result in the activation of the HPA (Hypothalamus Pituitary Axis), this condition can increase the concentration of ACTH and glucocorticoids for a long time. Increasing ACTH can stimulate an increase in androgen hormones which function in triggering the formation of sebum and keratinocytes. Increased sebum and hyperkeratinocytes will result in acne vulgaris. The results of this study are supported by research conducted by Angie which shows there is a relationship between the stress scale and the severity of acne vulgaris. The stress scale and the severity of acne vulgaris had a positive correlation of moderate strength and a statistically significant value ($r = 0.456$; $p = 0.001$). (Sutrisno et al., 2020), (Flordeliz Abad-Casintahan, Steven Kim Weng Chow, Chee Leok Goh, Raj Kubba, Nobukazu Hayashi, Nopadon Noppakun, JoAnn See, Dae Hun Suh, 2016)

According to Guyton Andrea Acne is a primary inflammatory disorder involving the pilosebaceous unit. The pathogenesis is multifactorial, involving four key factors with interrelated mechanisms: increased sebum production, hyperkeratinization of the follicular infundibulum, inflammation, and Cutibacterium acnes (formerly Propionibacterium acnes). (Andrea L. Zaenglein, 2019) According to Guyton The pathogenesis of acne vulgaris is very complex and multifactorial. One of the four main factors that play a role in the pathogenesis of acne vulgaris is increased sebum production. An increase in sebum production can be triggered by an increase in CRH stimulated during stress. In addition, stress also stimulates other neuropeptides that cause neurogenic inflammation. The binding of neuropeptides to their receptors will cause increased production of pro-inflammatory cytokines resulting in proliferation, differentiation and lipogenesis of pilosebaceous glands. (Guyton and hall, 2019), (Nada Elbuluk, Pearl Grimes, 2021), (Rizwan A Bhaijama, 2023). Research result Yosipovich found that stress can cause acne vulgaris. Neuropeptides and hormones released in response to stress activate cells that contribute to the pathogenesis of acne vulgaris. (Misery et al., 2015) Research has shown that this mechanism involves the neuroimmune-cutaneous system as well as the hypothalamic-pituitary axis. Acne vulgaris is triggered by excessive growth of the sebaceous glands caused by increased production of androgens by the adrenal glands in response to chronic stress. (Saloko & Mantu, 2023) Research conducted by Resati stated that there is a relationship between stress and the occurrence of acne vulgaris and stressed respondents have a 26.414 times greater chance of

developing acne vulgaris than respondents who do not experience stress.(Panonsih et al., 2021).

Stress can increase the production of the hormone adenocorticotropin hormone. Increasing levels of adenocorticotropin hormone in the blood will cause increased adrenal cortex activity. One of the hormones produced by the adrenal cortex is the androgen hormone, so increased cortex activity will result in increased levels of the androgen hormone. In addition, the production of androgen hormones from the adrenal glands will increase fatty acids in sebum, resulting in damage to the follicular walls and new lesions appearing.(Hafianty et al., 2021) According to Arifah, stress can affect a person's physiological condition. The body will respond to stress through the hormonal system which plays a role in the etiopathogenesis of acne vulgaris. However, this disease can cause a decrease in self-confidence and mental disorders, so the risk factors that trigger acne vulgaris must be reduced or even eliminated.(Fadilah, 2021) The majority of teenagers who experience high levels of stress are susceptible to acne vulgaris. This shows that in the adolescent age group, pressure or feelings of pressure which are often referred to as stress can result in the accumulation of psychological disorders and physical conditions that cause the emergence and worsening of acne vulgaris in these individuals (Rosita et al., 2021),(Topang et al., 2024)

CONCLUSION

Based on the research results, it shows that stress has an influence on the incidence of acne vulgaris severity in teenagers in Tegal City with a sig (p velocity) value of 0.012. This shows that the more stressed a teenager is, the more severe the acne vulgaris they suffer. Therefore, the risk factors that trigger acne vulgaris must be reduced or even eliminated.

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