RELATIONSHIP BETWEEN BLOOD TRIGLYCERIDE LEVELS WITH ACNE VULGARIS IN YOUNG ADULTS

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ABSTRACT

Introduction: Acne vulgaris (AV) is a chronic inflammation of the pilosebaceous follicles. The four main pathologies underlying the occurrence of acne vulgaris are follicular epidermal hyperproliferation, increased sebum production, colonization of Propionibacterium acnes and inflammatory processes. Triglycerides are a component of sebum which plays an important role in the inflammatory process.

Objective: to determine the relationship between triglyceride levels in the blood and acne vulgaris in young adults.

Method: this research is analytic. The research design used was cross sectional. The population of this study were all patients who came to the clinic. The sample in this study used an accidental sampling technique.

Results: The study showed that the characteristics of the respondents based on the Chi-Square test for the relationship between triglyceride levels and the incidence of Acne vulgaris showed that there was a statistically significant relationship between triglyceride levels and the incidence of Acne vulgaris.

Conclusion: There is a relationship between triglyceride levels in the blood and the incidence of acne vulgaris in young adults.

Keywords: triglycerides, acne vulgaris

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INTRODUCTION

Acne vulgaris (AV) occurs earlier in women than in men. namely during pre-menarche or the early stages of menstruation. The first lesions of acne vulgaris can be observed at the age of 8-9 years, and more than half of acne vulgaris sufferers say that their AV started in their teens. This is because the appearance of acne is related to the etiology of the disease, which includes hormonal changes during puberty. Girls experience puberty earlier than boys. Onset occurs earlier in girls Acne vulgaris affects 85 percent of young individuals aged (17-25 years). According to the Global Burden of Disease (GBD) study. Acne vulgaris is common in Southeast Asia, with 40-80 percent of cases. Meanwhile, numbers from Indonesian cosmetic dermatology show that the incidence of acne vulgaris is increasing from year to year.[1,2] Several factors: genetics, ethnicity, diet, climate, skin type, hygiene, use of cosmetics, stress, incidence of infection and hormonal factors.[3] Four factors The main causes of acne vulgaris are abnormal proliferation of keratinocytes, increased sebum triggered by androgens, inflammation, and proliferation of Propionibacterium acnes.

Sebum contains triglycerides (40-60%), wax esters (19-26%), squalene (11-15%), cholesterol and cholesterol esters. The sebaceous glands are affected by the circulation of androgens in the blood. The sebaceous glands are also thought to express low-density lipoprotein (LDL) receptors, which act in the uptake of circulating lipoproteins in the blood. In other words, sebaceous glands are capable of independently synthesizing lipids, expressing androgen receptor enzymes and lipogenesis, and finally lead us to hypothesize about the relationship between lipid profile and sebum excretion.

Several studies have reported a correlation between acne vulgaris and lipid profiles with varying results. The relationship between total lipid levels and severity of acne vulgaris results revealed significantly higher levels of total and LDL cholesterol in acne vulgaris patients compared to the non-acne vulgaris group. Currently, the role of lipid profile in acne vulgaris is unclear. Several studies have shown a correlation between sebum levels in acne vulgaris, but no data are available on the relationship between lipid profile, sebum levels and acne vulgaris.

In this study, a significant relationship was found between blood triglyceride levels and the incidence of Acne vulgaris in the study sample. The results of the risk analysis of triglyceride levels with the incidence of Acne vulgaris also showed a higher tendency in the group with elevated triglyceride levels, namely > 150 mg/dL to experience positive Acne

vulgaris compared to the group with normal triglyceride levels, namely <150 mg/dL. Circle graph too and normal. In the circle graph the group with high triglyceride levels is dominated by positive Acne vulgaris patients, while in the circle graph the group with normal triglyceride levels is dominated by normal Acne vulgaris patients.

Lipidomics studies show a significant correlation between changes in skin lipid composition and the incidence of acne vulgaris. The main etiological mechanism that causes acne vulgaris is the hormone- dependent increase in sebum production, which can provide favorable environmental conditions for the bacterium Propionibacterium acnes (P. acnes). Propionibacterium acnes can hydrolyze triglycerides in sebum into free fatty acids and propionic acid, secrete porphyrins to stimulate squalene oxidation, increase diacylglycerol acyltransferase activity which increases the composition of triacylglycerols (TAGs) and upregulates the expression of filaggrin. The increase in these bio-products causes an increase in comedone formation and increases the proliferation and differentiation of keratinocytes and ultimately causes hyperkeratinization. The objective of this study is to determine the relationship between triglyceride levels in the blood and acne vulgaris in young adults.

METHOD

This research is analytic because the researcher wants to find the relationship between variables. The research design used was cross sectional to determine the relationship between triglyceride levels in the blood and acne vulgaris in young adults. The population in this study were all patients who came to the clinic who met the inclusion and exclusion criteria, while the criteria were divided into two, namely inclusion and exclusion criteria.

Inclusion criteria are respondents who are doing Acne treatment at the clinic and are willing to be research respondents. Exclusion criteria are respondents who are sick and respondents who do not experience acne vulgaris. The subjects of this study were patients who came to the clinic. The number of samples in this study was determined by the approach the proportion of Vincent Gasper's sample to determine the minimum sample size. A minimum sample of 85 was obtained. The sample in this study used an accidental sampling technique. The SPSS (Statistical Product and Service Solution) application is used to process research data using version 26 with nominal categories. The data correlation technique will be carried out with the chi-Square correlation test. In this study, researchers used two variables, namely the dependent and independent variables. Independent variable in this study is

triglyceride levels. while the dependent variable in this study was the incidence of acne vulgaris. The data collection procedure is based on a questionnaire given to the research sample. Collecting data with the method of preliminary questionnaires and observation of the patient's face. then the researcher gave a brief explanation such as the benefits and objectives and then gave informed consent as a sign of demonstration of their willingness to participate in this study, after which the questionnaire was distributed to be filled in directly guided by the researcher. When finished, the questionnaires were collected accompanied by the identity of the respondent and anamnesis and physical examination will be carried out one by one. The tools and materials used in this study were capillary lipid profile checkers consisting of lipidocare, check strips, lancets, lancing devices, alcohol wipes and fresh capillary whole blood used to check triglycerides.

RESULTS

Characteristics of the Research Population

This study involved 85 patients, consisting of 34 (40.0%) males and 51 (60.0%) females. The population of this study were all patients who came to the clinic and met the inclusion and exclusion criteria. The sample in this study has an age limit that is 17 to 25 years old. Of the total 85 patients included in the study, 39 patients (45.9%) had normal acne vulgaris and 46 patients (54.1%) had acne vulgaris which was positive for increased. Based on their triglyceride levels, the study sample could be divided into a group with normal triglyceride levels, totaling 26 patients (30.6%) and a group with increased triglyceride levels, totaling 59 patients (69.4%).

Relationship between Triglyceride Levels and Acne Vulgaris

Table 1. Chi-square test result of triglyceride levels with *Acne vulgaris* incidence

		Acne Vulgaris		Total	Pearson Chi-Square	p value
		Normal	Positive			
Triglyceride Level	Normal <150	19	8	27		
	High >150	20	38	58	9.556	0.02
	Total	39	46	85		

Table 1 describes that based on their triglyceride levels, there were 27 patients (31.8%) with normal triglyceride levels, namely <150 mg/dL, while there were 58 patients (68.2%) with high triglyceride levels, namely > 150 mg/dL. From these

data it was found that in the group with normal blood triglyceride levels, there were 19 people (22.4%) without Acne vulgaris, and 8 people (9.4%) were positive for Acne Vulgaris. Furthermore, in the group with high triglyceride levels, there were 20 patients (23.5%) patients without Acne vulgaris, and 38 patients (44.7%) with Acne vulgaris. The results of the Chi-Square test

for the relationship between triglyceride levels and the incidence of Acne vulgaris obtained a score of 9.556 with a p value of 0.02 which is smaller than 0.05 and means that the null hypothesis is rejected, and there is a statistically significant relationship between triglyceride levels and the incidence of Acne vulgaris.

The results of the Chi-Square test for triglyceride levels with the severity of Acne Vulgaris

Table 2. Chi-square test result of triglyceride levels with the severity of *Acne vulgaris* incidence

		Acne Vulgaris			Total	Pearson Chi-Square	p-value
		Mild	Moderate	Severe			
Triglyceride Level	**Normal <150**	18	4	4	26		
	High >150	24	20	15	59	9.127	0.10
Total		42	24	19	85		

Further analysis regarding the relationship between triglyceride levels and the severity of Acne vulgaris is presented in the table. The table describes that in the group with normal triglyceride levels, i.e. <150 mg/dL, there were 18 patients (17.6%) with mild acne vulgaris, 4 patients (7.1%) with moderate acne vulgaris, and 4 patients

(7.1%) with severe acne vulgaris. Meanwhile, in the group with high triglyceride levels, namely > 150 mg/dL, there were 24 patients (27.1%) with mild acne vulgaris, 20 patients (21.2%) with moderate acne vulgaris, and 15 patients (20.0%) with acne vulgaris.

DISCUSSION

Basic characteristics of the research sampleThis study involved a total of 85 patients with a male to female ratio of 2:3 with more female than male samples. The population of this study is similar to that reported by Sobhan, Rabiei & Amerifar in 2020 where in that study, the ratio of males to females was found to be around 1:2. Adult

women are reported to have a higher prevalence of Acne vulgaris compared to adult men. 23 Similar results were also reported in a study by Jiang et al in 2015 where out of 181 patients included in the study, there were more female samples than with men (101 vs. 80). 9 Of the 85 patients involved in this study, there were more

Acne vulgaris patients with elevated triglyceride levels than normal, namely as many as 69.4% compared to 30.6%. More patients with elevated triglyceride levels are in line with information regarding the prevalence of dyslipidemia patients in Indonesia.

A total of 39 patients (45.9%) in this study had normal Acne vulgaris and 46 patients (54.1%) had positive Acne vulgaris. The population of patients with Acne vulgaris which is higher than normal is in accordance with previous studies. The prevalence of acne vulgaris is reported to be 85% in adults aged 12 to 25 years, and estimates of the lifetime prevalence of acne vulgaris in the general population in the literature range from 0.1% to 85.1% and depend on age range, region, and sampling method.

Serum triglyceride concentrations also experience variability based on the time of sampling. Triglyceride levels were reported to increase during the day, and decrease during the night in human subjects. Fasting triglyceride levels in the male sex population were reported to be higher than the female population. The increase in triglyceride levels in the male population was reported to be around 75% during the day, while in the female population it was reported to be around 25%. The recommendation for sampling triglyceride levels is after 8 to 12 hours of fasting to reduce day to day variability, but even in fasting conditions, blood triglyceride levels vary significantly.

Relationship Between Triglyceride Levels and Acne Vulgaris

In this study, a significant relationship was found between blood triglyceride levels and the incidence of Acne vulgaris in the study sample. The results of the risk analysis of triglyceride levels with the incidence of Acne vulgaris also showed a higher tendency in the group with elevated triglyceride levels, namely > 150 mg/dL to experience positive Acne vulgaris compared to the group with normal triglyceride levels, namely <150 mg/dL. Circle graph too and normal.

Lipidomics studies show a significant correlation between changes in skin lipid composition and the incidence of acne vulgaris. The main etiological mechanism that causes acne vulgaris is the hormone- dependent increase in sebum production, which can provide favorable environmental conditions for the bacterium P.acnes. Propionibacterium acnes can hydrolyze triglycerides in sebum into free fatty acids and propionic acid, secrete porphyrins to stimulate squalene oxidation, increase diacylglycerol acyltransferase activity which increases the composition of triacylglycerols (TAGs) and upregulates the expression of filaggrin. The increase in

these bio-products causes an increase in comedone formation and increases the proliferation and differentiation of keratinocytes and ultimately causes hyperkeratinization.

The Relationship Between Triglyceride Levels and the Severity of Acne Vulgaris

The results of the analysis of the relationship between triglyceride levels and the severity of Acne vulgaris in this study showed statistically significant results. Visualization with a circle graph shows that the group with normal triglyceride levels is dominated by the group with mild acne vulgaris, whereas in the group with increased triglyceride levels, namely > 150 mg/dL, the distribution of severity of acne vulgaris tends to be the same between mild severity, medium, and heavy.

Research conducted by Utami et al. in 2019 analyzed the correlation between the serum lipid profile and the severity of Acne vulgaris. In this study, it was found that there was a significant correlation between lipid profiles, in the form of total cholesterol levels, LDL-C and HDL-C levels, and the severity of acne vulgaris. However, there was no correlation between triglyceride levels and the severity of acne vulgaris. Other factors that are known to affect the severity of acne include skin type, where oily and seborrheic skin is reported to be associated with the severity of acne

vulgaris. At the time of late adolescence, it was also reported to be associated with the severity of acne vulgaris compared to early adolescents or pre-adolescents. Late adolescents are reported to tend to have higher sebum production than early adolescents. Severe acne vulgaris is also found more often in patients with male sex compared to women.

CONCLUSION

In this study, a relationship was found between triglyceride levels in the blood and the incidence of Acne vulgaris, where elevated triglyceride levels (> 150 mg/dL) were associated with an increased incidence of Acne vulgaris compared to normal triglyceride levels.

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