Vol. 35 / No. 2 / August 2023
Sinta 2 (Decree No: 200/M/KPT/2020)
Online ISSN : 2549-4082 ; Print ISSN : 1978-4279
Available online at https://e-journal.unair.ac.id/BIKK

Berkala Ilmu Kesehatan Kulit dan Kelamin

Original Article
Periodical of Dermatology and Venereology

The Effects of Hormonal Factor on the Degree of Acne Vulgaris Severity

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ABSTRACT

Background: Acne vulgaris is a disease in the form of chronic inflammation of the pilosebaceous follicles with multifactorial causes. Acne vulgaris is a very common skin disease with a prevalence of 85% in the age range of 18-25 years. There are aggravating factors that can exacerbate acne vulgaris, including hormonal factors. However, the study about how strong the effects of hormonal factors and on acne severity is really limited. **Purpose:** The objective of this research is to determine how strong hormonal factors contribute on the severity of acne vulgaris. **Methods:** This was a cross-sectional retrospective study using secondary data obtained from 199 patients at the Dermatology and Venereology Outpatient Unit of RSUD Dr. Soetomo from January- December 2019. The data were analyzed using SPSS with regression analysis.
Result: Hormonal factors significantly influenced the degree of acne vulgaris severity (P-value=0.030). Based on the logistic regression model, it can be found that hormonal factors influence the degree of acne vulgaris by 70% **Conclusion:** The effect of hormonal factors on the severity of acne vulgaris is 70%.

Keywords*:* acne vulgaris, hormonal factors, degree of severity, human and health.

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| Article info |
Submited: 21-12-2022, Accepted: 30-02-2023, Published: 31-07-2023

BACKGROUND

Acne vulgaris is a disease in the form of chronic inflammation of the pilosebaceous follicles with multifactorial causes and clinical manifestations in the form of comedones, papules, pustules, nodules, and cysts. Acne vulgaris has an 85% prevalence in the age range of 18-25 years. The causes of acne vulgaris are multifactorial, including intrinsic and extrinsic factors. Intrinsic factors include genetics, race, and hormones. Then, for extrinsic factors that influence them, there are stress, humidity, cosmetics, diet and drug use.[1]

There are at least four factors that have been found to be the main patophysiology responsible for causing acne vulgaris, including hyperproliferation of epidermal follicles, sebum production, colonization of Cutibacterium acnes (formerly known as Propionibacterium acnes) and inflamatory response.[2,3] Apart from those pathogenesis factors, there are also several factors that can trigger and exacerbate acne vulgaris, including high-glicemic foods, diary foods, and hormonal factors.[4,5] Untreated acne vulgaris can cause post-acne scarring in 95% of the patients.[6] Acne vulgaris and its sequelae can have a negative impact on a patient's physical, mental, and interpersonal relationship with others.[7–9] One of the studies that had been done in Indonesia also stated that patients with moderate-degree acne vulgaris experienced a decrease in their quality of life.[10]

However, the study about how strong the effects of hormonal factors are on acne severity is really limited. Therefore, the researcher is trying to determine how strong hormonal factors contribute to the severity of acne vulgaris.

Knowing the effect of hormonal factors on the degree of acne vulgaris is expected to increase the knowledge of other researchers about hormonal factors

DOI : 10.20473/bikk.V35.2.2023.126-129

as one of the aggravating factors of the disease. It can also benefit clinicians who work with patients with acne vulgaris patient, especially women and adolescents who are prone to hormonal effects.

METHODS

This was a cross-sectional retrospective study using secondary data obtained from the medical records of 199 patients at the Dermatology and Venereology Outpatient Unit of RSUD Dr. Soetomo from January- December 2019. This study used total population sampling of patients that are diagnosed with acne vulgaris at the Department of Dermatology and Venereology in RSUD Dr. Soetomo.

In determining the hormonal factors experienced by the patient, the doctor on duty asks whether acne vulgaris appears near or when menstruation occurs. In addition, the factor that indicates the role of hormones in this study is the age factor associated with puberty. Both of these provide the basis for doctors to determine hormonal factors in acne vulgaris patients. Researchers did not carry out any lab tests related to hormone levels in this study.

The statistical analysis used to determine how strong the effect of hormonal factors is on the severity of acne vulgaris is logstic regression analysis. This research has been approved by the Ethical Committee at the Dr. Soetomo General Hospital with the reference number of 0690/LOE/301.4.2/IX/2021.

RESULT

This was an analytic study based on secondary data from acne vulgaris patients' medical records at the Department of Dermatology and Venereology in RSUD Dr. Soetomo during the period of January-December 2019.

Table 1. Characteristics of Subjects in RSUD Dr. Soetomo during the period of January-December 2019

Characteristic of Subject	n	%
Age (years)		
<16 (early adolescent)	35	17,6
17-25 (late adolescent)	122	61,3
26-35 (early adult)	29	14,6
36-45 (late adult)	9	4,5
46-55 (elderly)	4	2
Sex		
Female	157	78,9
Male	42	21,1
Total	199	100

There were 199 subjects that were recorded. From the total data obtained, there were 157 female patients (78.9%) and 42 male patients (21.%). The majority of the patients age is in the range of 17-25 years old (61%).

Table 2. Distribution of the Degrees of Acne Vulgari in RSUD Dr. Soetomo during the period of January December 2019

Degrees of Acne Vulgaris	n	%
Mild	140	70.4
Moderate	54	27.1
Severe	5	2.5
Total	199	100

Based on the Lehmann grading system, acne vulgaris can be divided into 3 categories based on the number of comedones, the degree of inflammation and total number of lessions. In this research, we found that the majority of the subject has mild degree of acne vulgaris.

Using SPSS, researchers used logistic regression analysis to figure out how strong the effect of hormonal factors is on the severity of acne vulgaris.

Table 3. Wald test on Acne Vulgaris

Variable	P-value
Hormonal Factor	0,030

Based on the table above, the result of the analysis for testing the hormonal factor on acne vulgaris severity using the Wald test obtained a P-value of 0.30 which means it was smaller than alpha ($p<0.05$). So it can be concluded that hormonal factors significantly influenced the degree of acne vulgaris severity.

Table 4. Logistic Regression Model in RSUD Dr. Soetomo during the period of January-December 2019

Variable	Estimated
Hormonal Factor	0,703

Based on the table above, the result of Logistic regression model estimated that the effect of the hormonal factor on the degree of acne vulgaris severity is 70%.

DISCUSSION

In this study, researchers found that hormonal factors play a big role in influencing the severity of acne vulgaris. There are two main factors discussed in this research : menstruation in women and puberty in adolescents. Even though the researchers did not check any hormonal markers, menstruation and puberty can be signs of hormonal influences on the subject. By

asking about the menstrual cycle and age, it can be an effective way to assess hormonal changes in the subject.

It is known that the effects of menstruation exacerbate the severity of acne vulgaris, but the pathophysiological mechanisms are still debated. One study showed a decrease in sex hormone binding globulin (SHBG) and higher levels of free androgen and dihydroepiandrosterone sulfate in patients with perimenstrual flares.[11]

The finding of this study is linear with the findings Geller et al. (2014), which show that 65% of women who are menstruating will suffer from acne vulgaris.[12] The findings of Lucky et al. (2004) have found that the acne will be more severe in the luteal phase or before menstruation.[13]

In addition to menstrual factors, puberty experienced by adolescents also plays a big role in the hormonal factors that influence acne vulgaris. The prevalence of acne vulgaris in adolescents is 95%. During puberty, DHEAS will increase due to maturation in the reticular zone of the adrenal cortex.[14] Based on the article that was published by Sutaria et al. (2022), it was stated that the pathophysiology of acne that occurs during puberty is caused mainly by the increase of 5-alpha reductase, which converts testosterone to the more potent dihydrotestosterone (DHT).[5] These phenomena will increase sebum production and finally lead to an increase in follicular hyperproliferation. Sebum production and follicular hyperproliferation are two of the main pathophysiologies of acne vulgaris. Through this explanation, it can be explained why puberty can affect the severity of acne vulgaris.[15]

Furthermore, one of the studies shows that the testosterone level of patient with severe acne is higher than that of patients with moderate or mild acne.[16] This phenomenon occurs not only in men but also in women. Women with severe acne tend to have higher dihydroepiandrosterone sulfate levels.[17]

Based on the discussion above, researchers can summarize that androgen hormones, including dihydroepiandrosterone (DHEAS), play a major role in influencing the severity of acne vulgaris. DHEAS levels increase during puberty and peak at 25 years.[18,19]

In this study, hormonal factors influenced the severity of acne vulgarisby 70%. This figure is quite high and can be caused by several factors, including the fact that majority of subjects are female and the majority age is 17-25 years old, or adolescent.

Based on the research that has been done about the effects of hormonal factors and the degree of acne severity, it can be concluded that hormonal factors significantly influenced the severity of acne vulgaris by 70%.

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