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Factors that Influence the Onset of Acne Vulgaris : Retrospective Study

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ABSTRACT

Background: Acne vulgaris (AV) is a skin condition that mostly occurs in adolescents, although it can occur at any age. Most occur during adolescence, with a prevalence of around 85%. Acne vulgaris is a multifactorial disease triggered by many factors, namely, genetics, environment, hormonal and emotional stress, food, trauma, cosmetics, and medications. **Purpose:** This study identifies the precipitating factors of acne vulgaris. **Methods:** This study was retrospective based on medical record data at the Dermatology and Venereology Outpatient Clinic of Dr. Soetomo General Academic Hospital Surabaya in the period January 2018–December 2019. **Result:** The number of AV patients within 2 years from January 2018 to December 2019 obtained 517 cases of acne vulgaris patients with complete data. There were female AV patients (80.7%) and male AV patients (19.3%). The most common age of AV patients was 15–24 years old (60.5%), the most common occupation of AV patients was student (59.8%), and patients suffered from AV for >12 months (18.6%). The most precipitating factors for AV are hormonal (69.6%) and cosmetic (50.1%); the most common type of AV is mild AV (64.2%); and the most common AV therapy is the combination of topical tretinoin, benzoyl peroxide (BPO), and topical clindamycin. **Conclusion:** The results of this study showed that hormonal and cosmetic precipitating factors caused most AV patients in women.

Keywords: Acne vulgaris, precipitating factors, retrospective, human and disease.

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BACKGROUND

Acne vulgaris is a skin condition that occurs mostly in adolescents; acne vulgaris or acne is a chronic inflammatory disease of the pilosebaceous follicles characterized by open or closed comedones that are non-inflamed, papules, pustules, and inflamed nodules.[1] The predilection for acne vulgaris often occurs on the face, neck, chest, and back. Acne vulgaris is a common skin condition in adolescents, although it can occur at any age. Most occur during adolescence, with an impact of around 85%.[2] The prevalence of acne vulgaris based on *The Global Burden of Skin Diseases* 2010 in 187 countries is 9.4% and is the eighth of all diseases.[3]

The classification system used in the guidelines for the management of acne vulgaris in Indonesia is the classification made by Lehman in 2002, which the Indonesian Cosmetic Dermatology Study Group recommended. The classification of acne vulgaris is grouped into mild, moderate, and severe, assessed by counting the number of inflammatory and non-inflammatory lesions.[4]

Acne vulgaris is a disease triggered by many factors, namely, genetic, environmental, hormonal, emotional stress, food, trauma, cosmetics, and drugs.[5] Acne vulgaris is caused by excessive oil gland activity and is aggravated by bacterial infection. Acne

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formation occurs due to follicle blockage by dead cells, sebum, and inflammation caused by *Propionibacterium acnes* in the sebaceous follicles.[6] Although acne vulgaris is not life-threatening, it can affect quality of life as it can decrease self-confidence, especially for those who care about their appearance.[7]

Recognize the factors that trigger the onset of acne vulgaris can help in the prevention and treatment of acne. Currently, the incidence of acne vulgaris cases is still quite high, and acne vulgaris is one of the skin diseases that often occurs in adolescents and young adults. For this reason, researchers are interested in conducting this study to find the factors that cause the onset of acne vulgaris in patients in the Dermatology and Venereology Outpatient Clinic of Dr. Soetomo General Academic Hospital Surabaya.

METHODS

The design of this study was a cross-sectional retrospective study using secondary data obtained from the medical records of 517 patients at the Dermatology and Venereology Outpatient Clinic of Dr. Soetomo General Academic Hospital Surabaya in the period January 2018 - December 2019. The medical record data included basic data (number of patients, age distribution, gender, patient occupation), anamnesis (duration of suffering), precipitating factors, clinical symptoms (type of lesion), diagnosis, and management of acne vulgaris. This research has been reviewed and approved by the Ethics Committee at Dr. Soetomo General Academic Hospital Surabaya (No.1323/LOE/301.4.2/VI/2023).

RESULT

The objective of this study was to determine the factors that influence the onset of Acne vulgaris in patients in the Dermatology and Venereology Outpatient Clinic of Dr. Soetomo General Academic Hospital Surabaya in the period January 2018 - December 2019. The results of this study indicate that within 2 years, from January 2018 to December 2019, there were 517 cases of acne vulgaris patients with complete data. The most cases were obtained in 2018, namely 320 acne vulgaris patients, and in 2019 acne vulgaris cases amounted to 197 patients.

AV patients in the Dermatology and Venereology Outpatient Clinic of Dr. Soetomo General Academic Hospital Surabaya in the period January 2018 - December 2019 were dominated by female as many as 417 (80.7%) while male patients were 100 (19.3%). It was found that most AV patients were in the age group of 15-24 years, totaling 313 (60.5%) patients (Table 1). The occupational distribution of AV patients was students, totaling 309(59.8%), as shown in Table 1.

Table 1. General characteristics of the study subjects

Category	Group	Frequency (n)	Percentage (%)
Sex	Male	100	19.3
	Female	417	80.7
Age (years)	5-14	65	12.6
	15-24	313	60.5
	25-34	98	19.0
	35-44	32	6.2
	45-54	9	1.7
Occupation	Student	309	59.8
	Government employee	21	4.1
	Private employee	115	22.2
	Not working/ not data	72	13.9

The triggering factors for the onset of acne vulgaris in patients in the Outpatient Clinic Dermatology and Venereology of Dr. Soetomo General Academic Hospital Surabaya in the period January 2018 - December 2019 were mostly due to hormonal factors, namely 360 (69.6%) and cosmetics 259 (50.1%) as shown in Figure 1.

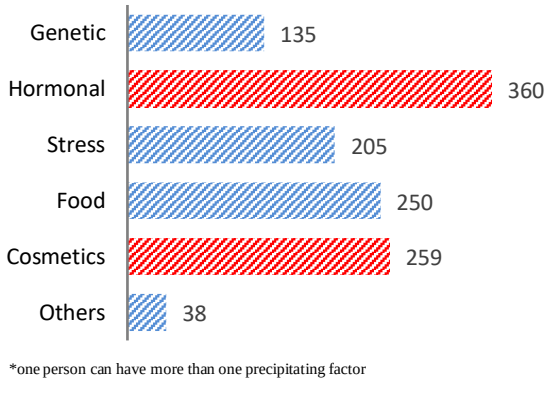


Figure 1 Distribution of precipitating factors for the onset of AV in Of acne vulgaris.

Based on the results of the distribution of complaints of acne vulgaris patients, there were 202 (39.1%) who did not have data on the length of complaints. From the data of acne vulgaris patients who have the most complaints for > 12 months, there are 96 (18.6%) in Figure 2.

The distribution of acne vulgaris type the severity of the study, it was found that most acne vulgaris patients had a mild degree of 332 (64.2%) with the number of closed and open comedo lesions <20 pieces/face, inflammatory lesions (papules, nodules, pustules) <15 pieces/face, and total lesions (number of comedones, and inflammatory lesions) <30 pieces/face as shown in table 2.

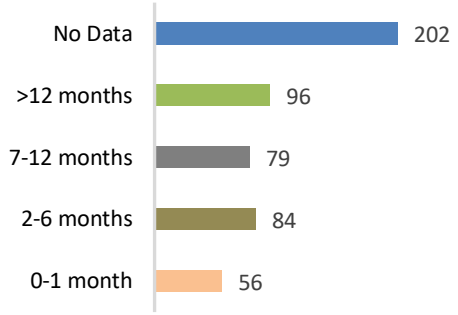
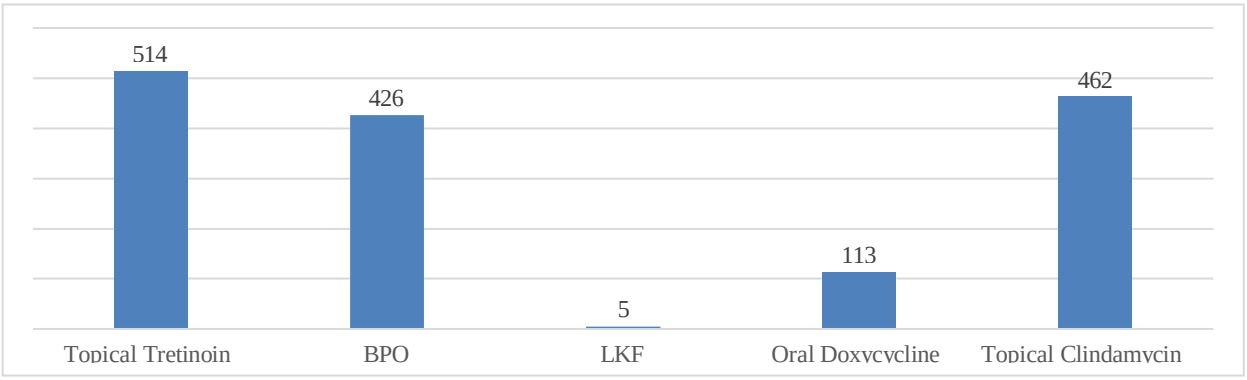


Figure 2. Distribution of the duration of AV in the Acne vugaris

Table 2. The degree of severity of AV in Acne vugaris.

AV Degree	Frequency (n)	Percentage (%)
Mild acne vulgaris	332	64.2
Moderate acne vulgaris	167	32.3
Severe acne vulgaris	18	3.5
Total	517	100



*BPO : *Benzoyl Peroxide*, LKF : *Lotion Kummerfeldi*

Figure 3. Distribution of AV therapy in patients in the Dermatology and Venereology Outpatient Clinic of Dr. Soetomo General Academic Hospital Surabaya in the period January 2018 - December 2019

Table 3. Combination therapy of oral and topical of AV in the Acne vulgaris.

Therapy	Frequency (n)	Percentage (%)
Tretinoin cream + BPO + Clindamycin gel	307	59.4
Tretinoin cream + Clindamycin gel	45	8.7
BPO	2	.4
Tretinoin cream + BPO + Doxycycline oral + Clindamycin gel	83	16.1
Tretinoin cream + LKF	3	.6
Tretinoin cream + BPO	32	6.2
Tretinoin cream + Doxycycline oral + Clindamycin gel	25	4.8
Tretinoin cream	11	2.1
Tretinoin cream + LKF + Clindamycin gel	2	0.4
Tretinoin cream + Doxycycline oral	3	0.6
Tretinoin cream + BPO + Doxycycline oral	2	0.4
Clindamycin gel	2	0.4
Total	517	100.0

*BPO : *Benzoyl Peroxide*, LKF : *Lotion Kummerfeldi*

The most common therapy for AV patients was topical tretinoin, with 514 (99.4%) patients out of 517 patients (Figure 3). AV patients who received the most combination therapy were 307 (59.4%) patients using tretinoin + BPO + clindamycin therapy (Table 3).

DISCUSSION

Within 2 years, from January 2018 to December 2019, 517 cases of acne vulgaris patients with complete data were obtained. The most cases were received in 2018, namely 320 acne vulgaris patients, and in 2019, acne vulgaris cases amounted to 197 patients in the Dermatology and Venereology Outpatient Clinic of Dr. Soetomo General Academic Hospital Surabaya in the period January 2018 - December 2019.

The majority of AV patients in this study were female. AV patients generally often occur in women and are most common in late adolescence and decrease with age, influenced by an increase in androgen hormones, which can increase sebum production and activate the sebaceous glands. This is in accordance with a 2019 study by Sibero et al who found that acne vulgaris is more common in women aged 16-25 years.[8]

The most common age group of AV patients was 15-24 years old. The age group of 15-24 years is classified as late adolescence, where around 80% of adolescents suffer from acne vulgaris. Based on the *Global Burden of Disease* (GBD) study, acne vulgaris affects 85% of young adults between the ages of 12-25 years.[5]

Most AV patients are students. AV often occurs during the student and college student period, which is a group of late adolescents.[8] AV patients are mostly among students or college students; this is due to the high level of stress in schoolchildren or college students. Stress affects the onset of acne vulgaris, which can lead to increased sebaceous gland secretion.[5,9]

Precipitating factors in patients with AV are many factors, and more than one precipitating factor can cause AV.[10] The most common precipitating factors for AV are hormonal (69.6%) and cosmetic (50.1%) factors. Hormonal factors play an important role in the pathogenesis of acne vulgaris. The percentage of hormonal influence according to gender is 89.0% in women and 11.0% in men. Hormonal factors generally occur in female patients due to their association with the menstrual cycle. Hormones affect women more during menstruation, and an increase in hormones before menstruation affects the exacerbation and aggravation of acne vulgaris.[5]

Cosmetic factors can cause AV among adolescents, resulting in an increase in the incidence of acne up to 90%. There is a relationship between the use of cosmetics and acne vulgaris, which is influenced by the length of use, the amount of use, and the type of cosmetics.[11] Cosmetics that can cause acne vulgaris, such as foundation, moisturizer, sunscreen, and night cream, if they contain ingredients that cause acne vulgaris. Acne-causing ingredients such as lanolin, petrolatum, essential oils, and pure chemicals (oleic acid, butyl stearate, lauryl alcohol, Drug and Cosmetic (D&C) cosmetic dyes) are commonly found in face

creams.[12]

Most AV patients have had complaints for >12 months, totaling 96 (18.6%). This is in accordance with Ayudianti's research (2014) at Dr. Soetomo General Academic Hospital in Surabaya, the majority of patients who suffered from acne vulgaris for 1-5 years were 1605 (46.5%) patients.

In AV patients, based on the degree of severity of the AV type, the most are mild AV as many as 332 people (64.2%) of patients; this is in line with research conducted by Sinaga (2020) showing that the highest degree of acne is mild acne as many as 54 people (58.1%) and the least is severe acne as many as 11 people (11.8%).[13]

Topical tretinoin was used more often than clindamycin gel, 514 (99.4%) compared to 462 (89.4%). Topical AV therapy is the first-line treatment for mild to moderate acne vulgaris and systemic treatment for moderate and severe acne vulgaris. Topical therapies include topical retinoids, benzoyl peroxide (BPO), and topical antibiotics. Topical retinoids can be used as a first-line option for mild acne vulgaris and in combination for moderate acne vulgaris. The use of BPO was 426 (82.4%). BPO has the ability to kill P. acnes; BPO can be used alone or can be used in combination with topical retinoids or other antibiotics and formulations in facial washes, creams, and gels with low concentration doses of 2.5% to 10%. Common topical antibiotics used in the treatment of acne vulgaris include erythromycin, lincomycin, and their derivatives clindamycin, chloramphenicol, clindamycin, and fusidic acid. Topical antibiotics can promote *P. acnes* resistance, so long-term therapy is not recommended. Combination of roofing antibiotics / topical antibiotics / BPO and retinoids are recommended.[14] The most common oral antibiotic use was doxycycline as many as 113 patients (21.9%) with doses of 2x100mg in accordance with the literature, namely: The first line of antibiotic selection for acne is doxycycline; the second is other cyclin groups such as minocycline, tetracycline; and the third line is the macrolide group, for example, erythromycin.[15]

The highest proportion of AV combination therapy was tretinoin + BPO + clindamycin in 307 patients (59.4%). The choice of topical combination therapy should be considered to prevent resistance. The recommended combination therapy is BPO, zinc, or isotretinoin.[16] Topical corticosteroid therapy is often used as an anti-inflammatory, and it is believed that if used as a combination therapy with tretinoin, it can reduce the irritating side effects of tretinoin without exacerbating acne vulgaris.[17]

The use of sunscreen in acne vulgaris patients is an important factor that can influence the need for skin conditions. Some acne vulgaris therapies predispose patients to photosensitize (i.e., tetracycline) when exposed to ultraviolet (UV) light. Acne therapies using BPOs and topical retinoids are recommended to use sunscreen and avoid sun exposure. Drug-induced photosensitivity is the skin's response to the interaction between a chemical (drug) and a physical substance (light). Chemicals that can cause photosensitivity reactions can be systemic or topical agents; for example is tetracycline compound.[18]

Based on the research that has been done on the factors that influence the onset of acne vulgaris, it can be concluded that hormonal dan cosmetic have a significant effect on acne vulgaris. This study concludes that as doctors, we need to provide good education to patients regarding prevention and influencing factors in order to avoid acne vulgaris. AV treatment is a long-term treatment, it takes time to achieve satisfactory results that patients expect. In future research, it is necessary to carry out more detailed research using data analysis tests to identify factors that significantly contribute to acne vulgaris.

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