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ORIGINAL RESEARCH

RETROSPECTIVE STUDY: INITIAL PHARMACOTHERAPY PROFILE OF NEW ACNE VULGARIS PATIENTS

Studi Retrospektif: Profil Farmakoterapi Awal Pasien Baru Akne Vulgaris

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ABSTRACT

Background: Acne Vulgaris (AV) is one of the most common diseases in the field of dermatology and ranks as the eighth most prevalent disease worldwide. Early management of this potentially deforming skin disease may reduce the pathophysiological burden and improve the quality of life of patients. **Purpose:** This study aimed to determine the pharmacotherapy for new patients with AV. **Methods:** This cross-sectional study used new patients with AV of the Cosmetic Division of the Outpatient Skin and Venereal Health Unit, Regional Public Hospital (RSUD) Dr. Soetomo, from January to December 2013 that were descriptively presented. The variable was the pharmacotherapy given. This study used secondary data collection by looking at the patients' medical records. The variables studied were acne lesions and pharmacotherapy regimens, including the administration route and the medicine used**. Results:** The number of samples that met the inclusion criteria was 951 patients. Comedonal acne was most commonly given topical tretinoin. Papulopustular acne was most commonly given a topical combination of clindamycin and tretinoin, while acne conglobata was most commonly given a combination of topical clindamycin and tretinoin with oral doxycycline. **Conclusion:** The new patients with comedonal acne were mostly prescribed topical tretinoin pharmacotherapy. A pharmacotherapy combination of topical clindamycin and tretinoin was given to most new patients with papulopustular acne, whereas new patients with conglobata acne were given a pharmacotherapy combination of topical tretinoin and clindamycin with oral doxycycline.

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ABSTRAK

Latar belakang : *Akne Vulgaris (AV) adalah salah satu penyakit yang paling umum ditemui di bidang dermatologi dan menempati urutan ke delapan penyakit yang paling sering ditemukan di seluruh dunia. Tatalaksana awal dari penyakit yang berpotensi merusak bentuk kulit ini mungkin dapat menurunkan beban patofisiologi dan meningkatkan kualitas hidup pasien.* ***Tujuan:*** *Studi ini bertujuan unutk mengetahui profil farmakoterapi pasien baru akne vulgaris.* ***Metode:*** *Penelitian ini merupakan penelitian dengan desain studi potong lintang. Penelitian ini mengambil pasien baru akne vulgaris di Divisi Kosmetik Unit Rawat Jalan Kesehatan Kulit dan Kelamin RSUD Dr. Soetomo Surabaya pada bulan Januari-Desember 2013 yang disajikan secara deskriptif. Studi ini menggunakan pengumpulan data sekunder dengan melihat rekam medik pasien. Variabel yang diteliti dalam penelitian ini adalah lesi jerawat dan rejimen farmakoterapi, termasuk rute pemberian dan obat yang digunakan.* ***Hasil:*** *Jumlah sampel yang memenuhi kriteria inklusi adalah 951 pasien. Akne komedonal paling sering diberikan tretinoin topikal. Akne papulopustuler paling sering diberikan kombinasi topikal dari klindamisin dan tretinoin. Sedangkan akne konglobata paling sering diberikan kombinasi topikal klindamisin dan tretinoin dengan oral doksisiklin.* ***Kesimpulan:*** *Pasien baru dengan akne komedonal paling sering diberikan resep farmakoterapi tretinoin topikal. Kombinasi farmakoterapi dari klindamisin dan tretinoin topikal diberikan untuk kebanyakan pasien baru dengan akne papulopustuler, sedangkan pasien baru dengan akne konglobata diberikan kombinasi farmakoterapi topikal tretinoin dan klindamisin dengan doksisiklin oral.*

INTRODUCTION

Acne vulgaris is a dermatological disease characterized by inflammation of the pilosebaceous units, which consist of the sebaceous gland, hair shaft, and hair follicle (Saxena et al., 2018; Tan & Bhate, 2015). Globally, this skin condition is estimated to affect more than 80% of the world population, thus ranking it as the eighth most common disease in the world (Park, Kwon, Min, Yoon, & Suh, 2015; Tan & Bhate, 2015). Epidemiological studies have indicated that acne is most prevalent between adolescence and the age of 30 regardless of sex (Saxena et al., 2018; Tan & Bhate, 2015).

The clinical manifestation of acne is generally polymorphic eruptions ranging from the formation of open and closed comedones to erythematous pustules and papules, while, in more severe cases, it may include deep pustules, inflammatory nodules, and pseudocysts (Kucharska, Szmurło, & Sinska, 2016; Snigdha et al., 2016). Acne distribution usually correlates with the topmost density of the body's pilosebaceous units (Snigdha et al., 2016; Walsh, Efthimiou, & Dréno, 2016).

Scarring and post-inflammatory hyperpigmentation are among the most concerning sequelae of acne that portend a significantly lower quality of life and psychological well-being (Tuchayi et al., 2015; Vera, Patel, Cardwell, Saleem, & Feldman, 2017). Adults and adolescents with acne are associated with higher risks of psychological distresses like anxiety, low self-esteem, depression, embarrassment, body dissatisfaction, and suicidal thoughts compared to the general population (Bienenfeld, Nagler, & Orlow, 2017; Perera, Peiris, Pathmanathan, Mallawaarachchi, & Karunathilake, 2018). Additionally, they are also associated with higher risks of reduced career prospects and an increased unemployment rate (Saxena et al., 2018; Zaenglein et al., 2016). Successful management of this

potentially deforming skin disease may reduce the pathopsychological burden and improve the quality of life of patients (Vera, Patel, Cardwell, Saleem, & Feldman, 2017).

The four key pathogeneses that may contribute to AV development are exorbitant sebum production and alteration in its fatty acid structure, abnormal follicular hyper keratinization in pilosebaceous units, Gram-positive Propionibacterium acnes overproliferation, and peridermal glandular inflammation (Al Selaiti, 2015; Emiroğlu, Cengiz, & Kemeriz, 2015). These independent factors are synergistic and interrelated with one another, creating a complex cycle that leads to the development and progression of comedones, i.e., non-inflammatory lesions, to inflammatory lesions (Bienenfeld, Nagler, & Orlow, 2017; Vera, Patel, Cardwell, Saleem, & Feldman, 2017). An ideal AV treatment should be a rational combined prescription that targets all pathogeneses simultaneously as early as possible (Farrah & Tan, 2016; Gold, Weiss, Rueda, Liu, & Tanghetti, 2016). This research was conducted to determine the pharmacotherapy profile of new patients with AV of the Cosmetic Division of the Outpatient Skin and Venereal Health Unit, Regional Public Hospital (RSUD) Dr. Soetomo, Surabaya.

METHODS

The methods of this descriptive research used a cross-sectional design for the new patients' medical record data of the Cosmetic Division of the Outpatient Skin and Venereal Health Unit, RSUD Dr. Soetomo Surabaya from January to December 2013. The data collected from the medical records were age distribution, sex, precipitating factors, clinical symptoms or lesion types, diagnosis, and AV pharmacotherapy. The variables studied in this study were acne lesions and pharmacotherapy regimens, including the administration route and the medicine used. The acne lesion variable was the clinical diagnosis of the patients' acne type written in their medical records, while the pharmacotherapy regimen variable was the medicines given to the patients and their respective administration routes. There were 951 patient medical records that were eligible and included in this study. Excluded from this study were medical records with incomplete data.

This research obtained data on possible precipitating factors by history-taking. We asked patients whether they were using or changing cosmetic products that previously did not induce acne proliferation. The hormonal factor was defined as acne that arises in females during their menstrual cycle or in males that are using any hormonal medication. For food-related acne, we asked patients whether they were eating an increased amount of chocolates, nuts, fried foods, dairy products, or other high-fat foods in the previous two weeks before the clinical appointment that may proliferate acne. We also asked patients if they were feeling stressed by their work or life in general, which may induce acne. We also asked if they had any family members with a history of acne.

The data on the AV pharmacotherapy regimen given to newly diagnosed patients with AV was tabulated by the administration route into four different routes: topical, oral, intradermal injection, and a combination of topical and oral. These regimens matched with the patients' acne lesions, which consisted of comedonal acne, papulopustular acne, and conglobata acne. After that, this information was merged into three main tables of data with the respective pharmacotherapy given. Then, a descriptive analysis was made of these three tables of data. The study's ethicality was approved by RSUD Dr. Soetomo' Ethics Committee with ethic number 100/Panke.KKE/II/2015.

RESULTS

A total of 951 patients that met the inclusion criteria were included in this study. In Table 1, AV was mostly found in the 15–24 age group (69.40%). Compared with the male patients, female patients were more common (78.24%). Most of the patients considered cosmetics (61.72%) as the precipitating factor. Papulopustular lesions (89.90%) were the most common acne lesion type. The majority of the patients did not have a history of previous treatment (56.78%) from any other medical facility. Topical treatment (84.22%) was given most often to the new patients.

The topical route of pharmacotherapy administration was given to all patients with comedonal acne (100%) and to most of the patients with papulopustular acne (86.32%). Meanwhile, a combination of the topical and oral pharmacotherapy administration routes was mostly given to patients with conglobata acne (Table 2).

Patients with comedonal acne were mostly given topical tretinoin (Table 3). Patients with conglobata acne were mostly given a combination of topical tretinoin and topical clindamycin with

oral doxycycline (Table 4). Patients with papulopustular acne were mostly given a combination of topical tretinoin and topical clindamycin (Table 5).

Table 1
Baseline Characteristics

Characteristics	n	%
Age (years old)		
0-4	0	0.00
4-14	68	7.15
15-24	660	69.40
25-44	214	22.50
45-64	9	0.95
≥65	0	0.00
Sex		
Male	207	21.77
Female	744	78.23
Precipitating factor		
Cosmetic	587	61.72
Hormonal	597	62.77
Food	456	47.95
Stress	424	44.58
Genetics	274	28.81
Acne lesion type		
Comedonal	58	6.10
Papulopustular	855	89.90
Conglobata	38	4.00
Total	951	100.00

DISCUSSION

This study indicated that people from the age group of 15–24 years dominate new patients with AV, with a higher number of female patients. An observational study reported that female patients outnumber male patients in a 1.44:1 ratio and are mostly in the age range of 16–25 years (Saxena et al., 2018). Literature in Korea has also shown that females more commonly suffer from acne (Snigdha et al., 2016). Another community-based study in Iran reported that acne has an overall prevalence rate of 93.20% and is more common in females with a ratio of 1:0.4 to males (Al-Hammadi et al., 2016). The Global Burden of Disease 2010 indicated that acne ranks as the eighth most common illness worldwide (Tuchayi et al., 2015) and that almost every individual between the ages of 15 and 17 years old is affected (Bienenfeld, Nagler, & Orlow, 2017).

The most common recorded precipitating trigger of AV in new patients is the hormonal factor. A cross-sectional study demonstrated that systemic and local hormone imbalances have a crucial role in promoting AV, with a high level of androgen associated with more severe acne, mostly because of induced sebum production (Juhl et al., 2018; Tuchayi et al., 2015). Another study showed that acne may occur in premenstrual flares due to alteration of progesterone and estrogen causing hydration in the pilosebaceous follicles (Snigdha et al., 2016). This factor has been found to have a vital role in the stimulation and differentiation of sebaceous glands that produce sebum as well as take part in follicular hyperkeratinization (Zaenglein et al., 2016).

Patients consider that genetics are a factor that increases, precipitates, and predisposes the risk of having AV (Saxena et al., 2018; Zaenglein, 2018). Genetic studies of twins and family studies have produced evidence of a hereditary factor in the development of acne, with 81% of the population variance attributed to genetic factors (Tuchayi et al., 2015; Zaenglein et al., 2016). Accumulating evidence from many epidemiologic and controlled dietary studies has demonstrated a relationship between nutritional factors and acne; recent studies, even after age, body mass index, and gender ratio adjustment, suggest that a high-glycemic-index (GI) diet, saturated fat consumption, and dairy consumption may promote the exacerbation of acne (Çerman et al., 2016; Park, Kwon, Min, Yoon, & Suh, 2015).

Table 2
Pharmacotherapy Administration Route According to Acne Type

Pharmacotherapy Administration Route	Acne Type					
	Comedonal		Papulo-Pustular		Conglobata	
	n	%	n	%	n	%
Topical	58	100.00	738	86.32	2	5.26
Oral	0	0.00	1	0.12	0	0.00
Combination of topical and oral	0	0.00	116	13.57	36	94.74
Intradermal injection	0	0.00	0	0.00	0	0.00
Total	58	100.00	855	100.00	38	100.00

Table 3
Pharmacotherapy Regimen of Patients with Comedonal Acne

Pharmacotherapy regimen	n	%
Topical administration route		
Tretinoin	25	43.10
Tretinoin+Clindamycin	19	32.75
Tretinoin+BPO[1]	9	15.51
Tretinoin+LKF[2]	1	1.72
Tretinoin+LKF+BPO	1	1.72
Tretinoin + BPO + Clindamycin	1	1.72
Clindamycin	1	1.72
LKF	1	1.72
Oral administration route		
Combination of topical and oral administration route	0	0.00
Intradermal injection administration route	0	0.00
Total	58	100.00

BPO[1] : Benzoyl peroxide
LKF[2] : *Kumerfeldi* lotion

Table 4
Pharmacotherapy Regimen of Patients with Conglobata Acne

Pharmacotherapy regimen		n	%
Topical administration route			
Tretinoin+BPO		1	2.63
Tretinoin+BPO+Clindamycin		1	2.63
Oral administration route		0	0.00
Combination of topical and oral administration route			
Topical drug	Oral drug		
Tretinoin+BPO+Clindamycin	Doxycycline	2	5.26
Tretinoin+LKF	Doxycycline	1	2.63
Tretinoin+Clindamycin	Doxycycline	16	42.11
Tretinoin	Doxycycline	6	15.79
Tretinoin+BPO	Doxycycline	2	5.26
Tretinoin+LKF+Clindamycin	Doxycycline	1	2.63
Tretinoin+Clindamycin	Clindamycin	1	2.63
Tretinoin+BPO	Clindamycin	0	0.00
Tretinoin+BPO+LKF+Clindamycin	Doxycycline	1	2.63
BPO+Clindamycin	Doxycycline	1	2.63
LKF	Doxycycline	3	7.89
LKF+Clindamycin	Doxycycline	1	2.63
Clindamycin	Doxycycline	1	2.63
Intradermal injection administration route		0	0.00
Total		38	100.00

A cross-sectional study with 1,871 patients and a community-based study of Iranian high schoolers recorded that frequent consumption of fatty and sugar-rich foods, like chocolates, nuts, sweets, and oily foods, is linked to an increased risk of a more severe AV case (Zaenglein, 2018). A high-GI diet increases the blood glucose, which subsequently the increases insulin level and insulin growth factor 1 (IGF-1) activity. These are known to be involved in acne pathogenesis by stimulating keratinocyte, lipogenesis, and sebocyte proliferation while also decreasing IGF binding protein 3 (IGFBP-3); this causes a compounding IGF-1 effect (Al Selaiti, 2015; Çerman et al., 2016; Kucharska, Szmurło, & Sinska, 2016; Park, Kwon, Min, Yoon, & Suh, 2015)

According to numerous studies, a low-GI diet is linked to a profound reduction in the total number of acne lesions, a decreased free androgen index, weight reduction, increased IGFBP-3 levels, and improved insulin sensitivity that results in a lower sebum production level and improvement in

acne severity (Al Selaiti, 2015; Çerman et al., 2016; Juhl et al., 2018; Tan & Bhate, 2015; Zaenglein, 2018). There is also another study that positively correlated insulin resistance and polycystic ovary syndrome with acne initiation (Emiroğlu, Cengiz, & Kemeriz, 2015).

Dairy-derived amino acids from whole milk, low-fat/skim milk, full-fat dairy, and yoghurt induce hepatic IGF-1 synthesis and promote insulin secretion, which are associated with an increased odds ratio for acne proliferation (Juhl et al., 2018). Androgen precursors, 5α-reductase steroids, dihydrotestosterone, and progesterone in dairy products might influence comedogenesis through hormonal alteration pathways, which can stimulate sebum production, sebaceous gland growth, and hyperkeratinization (Emiroğlu, Cengiz, & Kemeriz, 2015; Kucharska, Szmurło, & Sinska, 2016). A case–control study of dairy consumption in people with and without acne showed an elevated risk of acne proliferation due to increased milk consumption, especially low-fat/skim milk because of its lower estrogen content, which is postulated to be a protective factor in acne (Kucharska, Szmurło, & Sinska, 2016; Zaenglein, 2018).

Table 5
Pharmacotherapy Regimen of Patients with Papulopustular Acne

Pharmacotherapy Regimen		n	%
Topical administration route			
Tretinoin		20	2.34
Tretinoin+Clindamycin		544	63.63
Tretinoin+LKF		10	1.17
Tretinoin+BPO		23	2.69
Tretinoin+BPO+Clindamycin		116	13.57
Tretinoin+BPO+LKF		1	0.12
Tretinoin+BPO+AHA[1]		1	0.12
Tretinoin+BPO+AHA+LKF		1	0.12
Tretinoin+AHA+Clindamycin		2	0.23
Tretinoin+LKF+Clindamycin		7	0.82
Tretinoin+BPO+LKF+Clindamycin		3	0.35
AHA		1	0.12
AHA+Clindamycin		1	0.12
BPO		1	0.12
Clindamycin		7	0.82
Azeiaiac Acid		1	0.12
Oral administration route			
Doxycycline		1	0.12
Combination of topical and oral administration route			
Topical drug	Oral drug		
Tretinoin	Doxycycline	7	0.82
Tretinoin+BPO	Doxycycline	11	1.29
Tretinoin+LKF	Doxycycline	4	0.47
Tretinoin+Clindamycin	Doxycycline	50	5.85
Tretinoin+BPO+Clindamycin	Doxycycline	29	3.39
Tretinoin+AHA+LKF	Doxycycline	3	0.35
Tretinoin+LKF+Clindamycin	Doxycycline	3	0.35
Tretinoin+BPO+LKF+Clindamycin	Doxycycline	3	0.35
Tretinoin+BPO+AHA+LKF	Doxycycline	0	0.00
Tretinoin+BPO+Clindamycin	Erithyromycin	1	0.12
Tretinoin+Clindamycin	Erithyromycin	2	0.23
BPO+Clindamycin	Doxycycline	1	0.12
Clindamycin	Doxycycline	2	0.23
Intradermal injection administration route		0	0.00
Total		855	100.00

AHA[1] : Alpha hydroxy acid

Psychological stress and cosmetic usage are also regarded as aggravating factors that proliferate acne (Saboo & Agarwal, 2019; Snigdha et al., 2016). Chronic emotional distress activates hypothalamic-pituitary-adrenal (HPA) and peripheral nerve neuropeptides that can also alter the immune physiology of the skin and cutaneous barrier function. Meanwhile, corticotropin-releasing hormone, as the coordination center for behavioral and neuroendocrine responses to stress, stimulates sebaceous gland lipid production and steroidogenesis and releases proinflammatory cytokines that contribute to acne pathogenesis (Saboo & Agarwal, 2019). A cross-sectional analytical study demonstrated a statistically significant correlation of frequent application of cosmetics that contain comedogenic ingredients like ethyl alcohol, polyethene glycol, and stearyl alcohol with the severity of acne in females (Perera, Peiris, Pathmanathan, Mallawaarachchi, & Karunathilake, 2018; Snigdha et al., 2016).

Acne vulgaris is a clinical diagnosis, and, currently, there is no universal acne classifying and grading system that is endorsed globally (Thomas, 2017; Zaenglein et al., 2016). There are more than 20 different scales in global acne grading, and this lack of a standardized consensus regarding the grading system is a significant shortcoming that slows efforts to compare the efficacies of pharmacotherapies while also hindering the complete understanding of acne (Tan & Bhate, 2015; Tuchayi et al., 2015). Lesion counting and lesion description generally may help guide treatment (Thomas, 2017). A profound challenge in dealing with AV is developing treatment guidelines within a demographic and regional context (Al-Hammadi et al., 2016).

Antibiotic overuse that subsequently leads to resistance is a burgeoning worldwide concern for acne pharmacotherapy effectiveness (Barbieri, Hoffstad, & Margolis, 2016; Walsh, Efthimiou, & Dréno, 2016). For instance, *P. acnes* resistance increased from 20% in 1978 to 62% in 1996 and is postulated to be still growing in many places today (Walsh, Efthimiou, & Dréno, 2016). A more recent study showed that P. acnes strains from over 90% of people with acne are antibiotic-resistant (Ochsendorf, 2015). There is a possible correlation of P. acnes resistance to unsatisfactory acne pharmacotherapy treatment results with topical antibiotics, which are a key agent in acne treatment (Kosmadaki & Katsambas, 2017). Topical retinoid or benzoyl peroxide should always be combined with a regimen that contains topical antibiotics to reduce antibiotic resistance (Farrah & Tan, 2016; Walsh, Efthimiou, & Dréno, 2016).

Commencing proper pharmacotherapy as soon as the acne is in its early stage while still localized only in some body parts may prevent its progression into a more widely distributed and severe stage (Park, Kwon, Min, Yoon, & Suh, 2015). Multiple guidelines favor initial combination therapy with agents that affect different mechanisms of acne (Tuchayi et al., 2015; Vera, Patel, Cardwell, Saleem, & Feldman, 2017; Zaenglein et al., 2016). In most cases, topical acne treatment may be associated with some adverse skin irritation effects that can manifest as erythema, skin dryness, scaling, burning or stinging, and itching (Goh et al., 2016). Oral pharmacotherapies should be reserved for more severe acne that is unresponsive to topical pharmacotherapy to achieve faster, more complete acne resolution and combat antibiotic resistance (Bienenfeld, Nagler, & Orlow, 2017; Roman, Cifu, & Stein, 2016; Thomas, 2017; Tuchayi et al., 2015).

Topical retinoids, such as adapalene and tretinoin, are vitamin A derivatives that have demonstrated anti-inflammatory properties in many clinical studies and research works, can normalize follicular hyperkeratinization, and are comedolytic to acne precursor lesions (Al-Hammadi et al., 2016; Santer, Francis, Platt, Eady, & Layton, 2018). Topical antibiotics, like erythromycin and clindamycin, are generally recommended in the pharmacotherapy of mild to moderate acne by inhibiting *P. acnes* proliferation and reducing inflammation (Al-Hammadi et al., 2016; Walsh, Efthimiou, & Dréno, 2016). Benzoyl peroxide (BPO) is a powerful over-the-counter, non-specific anti-bacterial agent that can enter pilosebaceous ducts and penetrate the stratum corneum due to its lipophilic nature (Farrah & Tan, 2016; Kosmadaki & Katsambas, 2017).

The Global Alliance to Improve Outcomes in Acne has reached a consensus that the pharmacotherapy combination of topical retinoid and antimicrobial agents, such as topical antibiotics and BPO, is recommended as the first-line therapy for most mild to moderate acne patients (Walsh, Efthimiou, & Dréno, 2016). Combination topical therapy has a greater efficacy and faster response in comparison to either product alone (Al-Hammadi et al., 2016; Kosmadaki & Katsambas, 2017; Tuchayi et al., 2015; Zaenglein, 2018). Patients with refractory acne to topical pharmacotherapy are then treated with oral antibiotics (Thomas, 2017). The prevailing

evidence-based acne pharmacotherapy guidelines recommend the usage of systemic antibiotics for people with moderate to severe inflammatory acne that is unresponsive to topical treatments and for people with a positive history of scarring (Farrah & Tan, 2016; Santer, Francis, Platt, Eady, & Layton, 2018; Tan & Bhate, 2015; Vera, Patel, Cardwell, Saleem, & Feldman, 2017; Walsh, Efthimiou, & Dréno, 2016). Oral antibiotics should always be combined with topical retinoids or BPO and be limited to a maximum three- to six-month period to lessen the risk of antimicrobial resistance (Barbieri, Hoffstad, & Margolis 2016; Farrah & Tan, 2016; Walsh, Efthimiou, & Dréno 2016; Zaenglein, 2018) The treatment response assessment should be evaluated 4–6 weeks after initiation, and the result should be maintained with topical retinoids or BPO to prevent relapse (Bienenfeld, Nagler, & Orlow, 2017; Farrah & Tan, 2016; Tuchayi et al., 2015).

Guidelines for patients with severe recalcitrant nodulocystic acne and with a positive risk of permanent scarring recommend the usage of systemic isotretinoin (Roman et al., 2016; Thomas, 2017; Zaenglein, 2018). Isotretinoin is a retinoic acid isomer that is highly effective at targeting all four pathogeneses of AV and is the only agent that can decrease sebum production by inducing sebocyte apoptosis (Farrah & Tan, 2016; Tuchayi et al., 2015). Although this agent has been approved by the Food and Drug Administration (FDA) of the United States (Vera, Patel, Cardwell, Saleem, & Feldman, 2017), it has not yet been officially authorized by Indonesia's *Badan Pengawas Obat dan Makanan*, which has a similar function as the FDA, due to its side effects.

CONCLUSION

New patients with comedonal acne were mostly prescribed topical tretinoin pharmacotherapy. A combination of topical tretinoin and clindamycin was given to most new patients with papulopustular acne, whereas new patients with conglobata acne were given a combination of topical tretinoin and clindamycin with oral doxycycline pharmacotherapy.

CONFLICT OF INTEREST

The authors declare that no conflict of interest in this study.

AUTHOR CONTRIBUTION

EAW: Conceptualization, Methodology, Data curation, Writing- Original draft preparation. DMI: Conceptualization, Methodology, Supervision, Writing- Reviewing and Editing. MR: Supervision, Writing- Reviewing and Editing. All authors provided critical feedback, discussed the results, and contributed to the final manuscript.

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