

CHAPTER 2

REVIEW OF LITERATURE

2.1 Acne Vulgaris

2.1.1 The Definition of Acne Vulgaris

Acne Vulgaris is defined as a chronic inflammatory disease of the pilosebaceous glands that are seen in predilection sites.^{1,2} This disease is characterized by the presence of comedones, papules, pustules, nodules, or cyst.¹⁻³

2.1.2 The Epidemiology of Acne Vulgaris

On a global scale, the prevalence of AV is 9.4% and the Global Burden of Disease study indicated that AV was listed among the ten diseases with the highest prevalence according to GBD.¹⁷ Acne Vulgaris was ranked as the eighth most predominant disease worldwide within the year 2010. The GBD also proposed that AV affects around 85% of adolescents aged 12-25 years old. During adolescent, the highest prevalence of acne are seen in >95% of males and >85% of females. Nearly 20% of these young individuals suffer from moderate-to-severe acne, whilst the other 50% proceed to endure from AV in their adulthood.⁴

The prevalence of AV is higher in teenage males as compared to teenage females due to the difference in hormonal levels. Teenage males produce higher levels of androgen hormones, which happens to be the hormone that controls the sebaceous

glands. Higher androgen levels predispose to excessive sebum production that leads to the formation of AV.¹⁸

2.1.3 The Pathogenesis of Acne Vulgaris

The exact mechanisms of AV formation has not been discovered. However, it is known that there are four main factors that are contributable towards the pathogenicity of AV, namely: excessive sebum production, pilosebaceous duct hypercornification, inflammation, and abnormal bacterial activity¹⁸ especially proliferation of *Propionibacterium acnes* (*P. acnes*).¹⁹ AV is a multifaceted disease.²⁰ Multiple factors may contribute to the pathogenesis, presentation, and severity of AV.¹⁴ The triggering factors of AV are inclusive of genetics, the onset of puberty, hormonal activity, race, psychological factor, dietary habits, climate, microbes, cosmetic use, side effects from medicamentosa, smoking habits, alcohol consumption, and an unhealthy BMI (overweight and obese individuals).^{1,21-23}

The role of sebaceous glands is well-known in the pathogenicity of AV. The activity of sebaceous glands are controlled by the androgen hormone. The androgen hormones control the size of the sebaceous glands, as well as the sebum produced by these sebaceous glands.¹⁸ Acne is assumed to develop mostly as a result of excessive sebum production. Hyperseborrhea is not a complication for all acne patients, though. In actuality, age and sex have an impact on the relationship between sebum production and acne severity; in males, sebum production has a greater impact on acne in men since males.⁴

The hypercornification of pilosebaceous duct is due to build-up of keratinized cells that are adhesive and produce a blockage in the canal, preventing sebum passage. Although the cause is uncertain, androgens may be influencing the process. It could also be caused by a defect in sebum lipids that causes a relative hyperproliferation of corneocytes.¹⁸ Patients with acne have lower levels of essential free fatty acids, such as linoleic acid, than those who do not have acne. Essential free fatty acids are those that the body cannot produce on its own and must be obtained through nutrition.⁴ The ductal corneocytes are effectively bathed in an inadequately low quantity of linoleic acid as linoleic acid is integrated via plasma into sebaceous gland cells, where it is diluted by excessive volume of sebum.¹⁸ Besides that, monounsaturated fatty acids (MUFAs) and lipoperoxides, which are pro-inflammatory sebum lipid components, have also been linked to the emergence of acne lesions. Follicular hyperkeratinisation is caused by the effects of both lipoperoxides and MUFAs on keratinocyte proliferation and differentiation.⁴ This results in the formation of abnormally desquamated follicular cells that block the follicular lumen, trapping sebum behind the hyperkeratotic plugs and causing the follicle to enlarge. At this point, the typical follicular architecture is gone. The development of comedones is the outcome of this hyperkeratinisation.¹⁸

The abnormal proliferation of *P. acnes* is a result from the alteration of the pilosebaceous units that were caused by the processes of excessive sebum production and hyperkeratinisation. These two conditions combined provides an optimal habitat for the multiplication of *P. acnes*,²⁴ since this bacteria species favours an environment which consists of a blocked, lipid-rich lumen with low

oxygen tension. Besides that, it's also crucial to note that different strains have variable inflammatory potential because some strains of this microorganism were strongly related with acne while other strains were abundant on healthy skin.⁴

Keratin, sebum, and the bacteria *P. acnes* in particular cause the release of proinflammatory mediators and the build-up of T-helper lymphocytes, neutrophils, and foreign body giant cells are what causes the appearance of inflammatory papules, pustules, and nodulocystic lesions.¹⁸ It is believed that proinflammatory cytokines, such as Tumour necrosis factor- α (TNF α) and Interleukin-1 α (IL-1 α) also contribute to the formation of inflammatory lesions that characterise acne and subsequent follicular hyperkeratinisation.²⁴

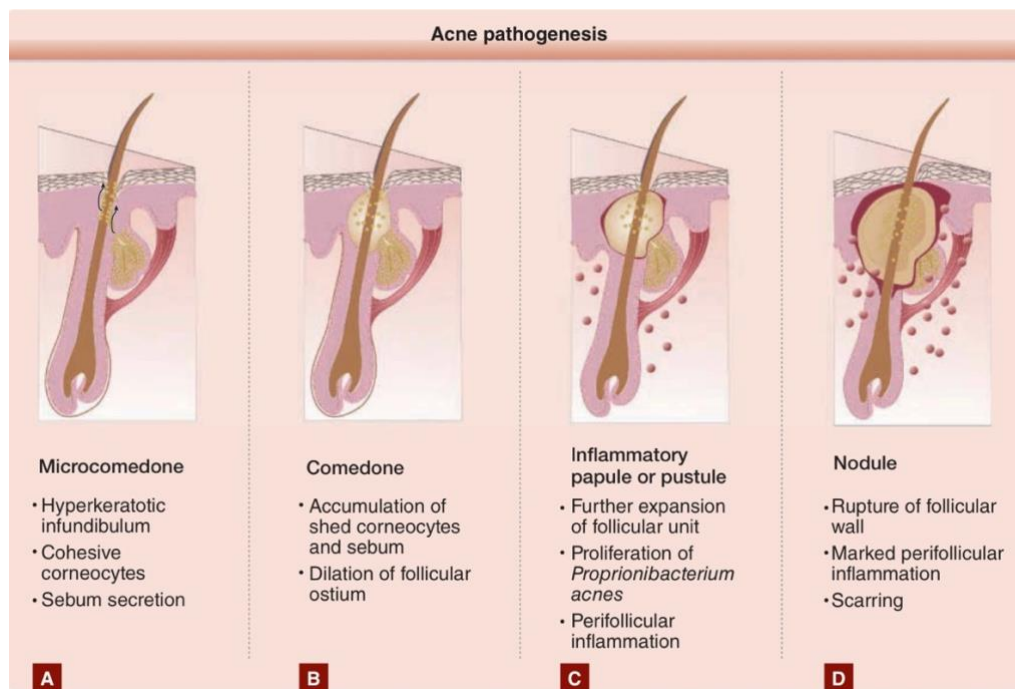


Figure 2.1 The Pathogenesis of Acne.²⁵

2.1.4 Clinical Manifestations in Acne Vulgaris

The presentation of acne vulgaris is characterized by the occurrence of skin eruptions such as comedones, papules, pustules, nodules, and cyst in sebaceous distribution site such as the face, neck, upper chest, upper arms, shoulders and back.^{1,2} Comedones are further classified into whitehead and blackhead. Whiteheads are known as closed comedones, where the lesion is located beneath the skin layer. Whereas, blackheads are known as open comedones, this lesion is present above the skin layer.²⁰ All of the presentation of acne lesions are primarily caused by the blockage of the sebaceous glands.²⁰ In cases of delayed management and inappropriate treatment, the severity of AV formation may progress, and finally lead to scarring.²⁶ The types of scars that may result from severe AV are atrophic scars, hypertrophic scars and keloid scars.²⁷



Figure 2.2 Mild acne vulgaris. ²⁵



Figure 2.3 Moderate acne vulgaris.²⁵

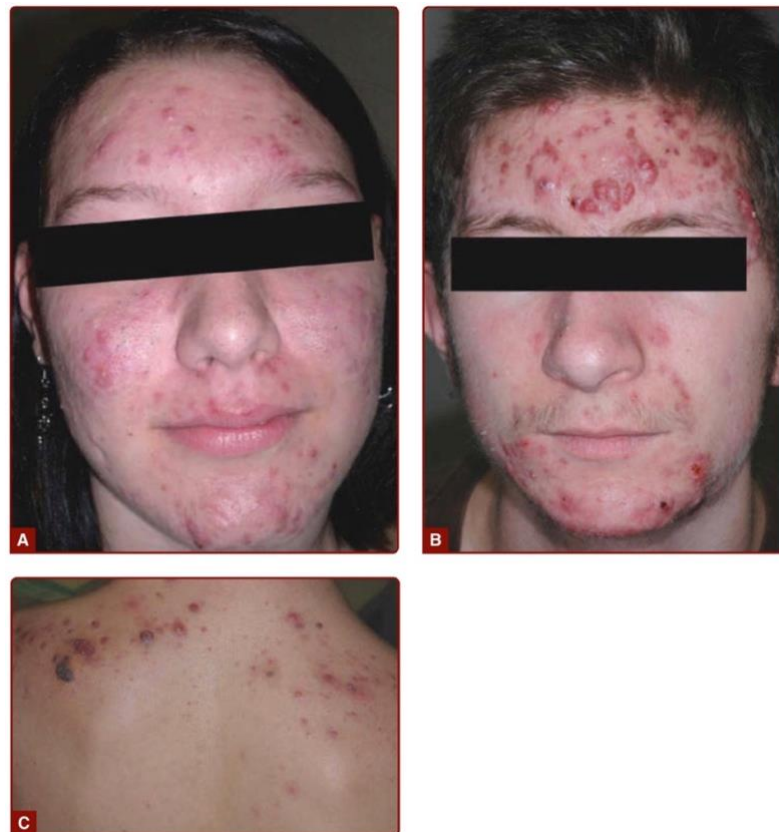


Figure 2.4 Severe acne vulgaris.²⁵

2.1.5 The Classification of Acne Vulgaris

To date, there is no global standard for grading systems or assessment tools in diagnosing, and determining the severity of AV.^{28,29} The classification of AV is helpful in appropriately administering therapy for AV patients, and facilitating the patients' response throughout the treatment course.²⁹ However, in Indonesia the standardised classification scheme used is the acne severity classification of Lehmann et al, as recommended by the Indonesian Acne Expert Meeting (IAEM).³⁰

Table 2.1 Classification of acne severity on lesion counting per half face^{23,28}

Grade	Comedonal count	Papulopustular count
1	<10	<10
2	10-25	10-20
3	25-50	20-30
4	>50	>30

Table 2.2 Severity index based on types of lesions^{23,28}

Severity index	Types of lesions
0.5	Comedones
1.0	Papules
2.0	Pustules
3.0	Infiltrates
4.0	Cysts

Table 2.3 Indonesian Acne Expert Meeting (IAEM) recommendation³⁰

Grade	Criteria			
	Comedones	Pustules	Cysts	Total
Mild	<20	<15	0	<30
Moderate	20-100	15-50	<5	30-125
Severe	>100	>50	>5	>125

2.1.6 The Management of Acne Vulgaris

Acne is no longer acknowledged as an inevitable part of life, so prompt and thorough treatment is vital to prevent its psychological as well as physical consequences.⁴ In order to treat AV successfully, presenting the appropriate treatment alternatives in a therapy algorithm, taking into account the kind of acne and the severity of the condition of an individual is crucial in making the ideal therapy choice.³¹ The available treatment options for AV are inclusive of topical and systemic treatments.^{30,31} Besides that, the latest techniques for managing AV involve using lasers, lights, and vaccinations.³²

Table 2.4 Treatment algorithm for acne vulgaris based on the severity.²⁵

Acne Vulgaris			
	Mild	Moderate	Severe
First line	Topical retinoid or combination*	Topical retinoid + topical antimicrobial or combination*	Oral antibiotic + topical retinoid ± BPO or combination*
Second line	Topical dapsone or azelaic acid or salicylic acid	Topical dapsone or azelaic acid or salicylic acid	Oral antibiotic + topical retinoid ± BPO or combination*
Additional options	Comedone extraction	Comedone extraction, laser or light therapy, photodynamic therapy	Comedone extraction, laser or light therapy, photodynamic therapy
Maintenance	Topical retinoid ± BPO, or combination*	Topical retinoid ± BPO, or combination*	Topical retinoid ± BPO, or combination*

*BPO-erythromycin, BPO-clindamycin, adapalene-BPO, tretinoin-clindamycin

2.1.7 The Quality of Life among Patients with Acne Vulgaris

According to the WHO, a person's perspective of their situation in life in relation to their objectives, expectations, standards, and worries is what determines their quality of life. Acne lesions alter a person's perception and result in a detrimental effect on numerous aspects of an individual's personal, social, professional, and academic lives.⁴

Acne has a noteworthy psychological influence on the patient, causing consciousness of oneself, poor self-worth, and feelings of unworthiness. Physical symptoms of acne, such as pain and itching, can also be bothersome, and everyday discomfort from treatment can make one quite unsettling.^{4,13}

Depression, anxiety, and body dissatisfaction are all more likely to occur among individuals suffering from acne.³³ Patients with acne are 2-3 times more inclined to suffer from depression than the overall population, and women with acne experience depression at a higher incidence than men.⁴

2.2 Knowledge

2.2.1 The Definition of Knowledge

Knowledge is the result of "knowing", which occurs after a person senses a particular object. This sensing occurs through human senses. Knowledge or cognition is a very important domain for the formation of a person's actions. Behaviours based on knowledge will be more sustainable than behaviours that are not based on knowledge.³⁴

2.2.2 The Assessment and Criteria of Knowledge

Knowledge measurement can be done through questionnaire or interview about the material to be measured on research subjects or commonly called respondents.

Knowledge is categorised into three levels: good, sufficient, and poor as stated by author Rachmawati Windi Chusniah in her book entitled '*Promosi Kesehatan Dan Ilmu Perilaku.*'

Table 2.5 The classification of knowledge ³⁴

Criteria	Percentage of correct answers
Good	75-100%
Sufficient	56-74%
Poor	<56%

2.2.3 Factors Affecting Knowledge

An individual's knowledge level is affected by multiple factors. Some of the factors are as listed below:³⁵

1. Education Level
2. Experience
3. Age
4. Information Resources

2.3 Behaviour

2.3.1 The Definition of Behaviour

Behaviour is said to be a response that arises only when an individual is confronted with a stimulus. A person's behaviour towards an object is influenced by

a feeling of support or favourability, or a feeling of non-support or unfavorability towards a particular object.³⁴

2.3.2 The Classification of Behaviour

Behaviour can be categorised into covert and overt behaviour. Covert behaviour occurs when a person's response to a stimulus is not clearly observable by others. The response to the stimulus is limited to attention, feelings, perceptions, knowledge, and attitude toward the stimulus. Whereas on the other hand, overt behaviour is referring to behaviour where the response to a stimulus can be observed by others. Based on the Skinner's Theory of Behaviourism, it was stated that behaviour is the response to the stimulus, that is repeated, then forms one's behaviour.³⁴

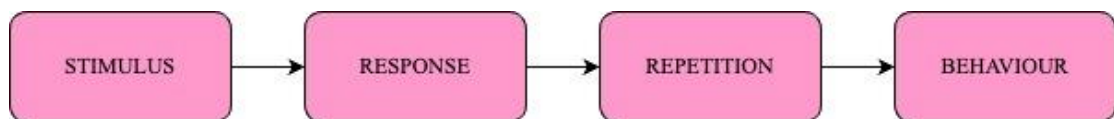


Figure 2.5 Skinner's Theory³⁴

Table 2.6 The classification of behaviour³⁴

Criteria	Percentage of correct answers
Positive	≥ 50%
Negative	≤ 50%

2.3.3 Factors Affecting Behaviour

Human behaviours are mainly affected by two dominant factors, which are genetic factors and external factors.

For instance, genetic factors include receiving similar physical, and psychological characteristics as parents. This is known as physical and psychical

heredity. Besides that, behaviour formation is also manifested through the presence of motivation. Motivation encompasses a variety of internal stimuli or objectives, including needs, desires, interests, beliefs, aspirations, intentions, visions, and goals, that drive individuals towards actions, behaviors, or attitudes.

The most important external factor affecting the behaviour of an individual are environmental factors such as the natural environment that encompasses the habitat of the individual. Besides that family is also considered to have a direct influence on the individual's behaviour. Besides family members, other individuals that contribute to the attitude of an individual are group of friends and acquaintances. The developing child may take up certain beliefs and pick up certain patterns of attitudes from these groups.³⁶

2.4 Conceptual Framework

