

## ADOLESCENTS KNOWLEDGE ON THE USE OF COSMETIC AND DERMATOLOGICAL PREPARATIONS IN THE TREATMENT OF ACNE VULGARIS

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### Abstract

Acne vulgaris is a common, chronic, inflammatory disorder of the pilosebaceous unit that affects most teenagers with inflammatory lesions on the face and trunk. They are mainly caused by increased sebum production, hyperkeratinization of the follicle, inflammation, hormonal changes, misuse of cosmetic and dermatological preparations. This condition is more common in adolescents, but it also occurs in patients in their twenties and thirties too. These changes in the skin affect emotional stress and quality of life. Dermocosmetics play a special role in the care and treatment of acne-prone skin. A series of complementary dermocosmetics are available, which include products with cleansing, active, soothing and moisturizing properties.

Dermocosmetics formulated with active substances can be used in acne monotherapy based on the effectiveness of specific active ingredients in alleviating acne symptoms without any adverse effects reported so far.

Effective skincare serves not only as a preventative measure by addressing the underlying causes of acne, but also helps mitigate the negative effects of pharmacological therapy and helps manage complications such as scarring and post-inflammatory hyperpigmentation.

This study aims the evaluation of the awareness of adolescents in relation to the treatment of acne and their knowledge about the use of cosmetic and dermatological preparations.

Based on our results 40% of teenagers didn't consult a dermatologist but used preparations that they see on social media and that their effectiveness was lower than 30%. 38% of the teenagers have used the therapy and the food regime that the dermatologist recommended which lead to a 75% effectiveness on treatment, 12% have used lotions recommended by their pharmacists and didn't follow the food regime from which they had an effectiveness of only 42%. We also noticed that the patients who followed the instructions of the dermatologist and the pharmacist had more efficiency, while the others had less efficiency. From this we can conclude that any change in the skin for better efficiency should be managed by a dermatologist.

*Keywords:* acne vulgaris, dermatological preparations, cosmetics, adolescents, dermocosmetics, skincare, dietary impact.

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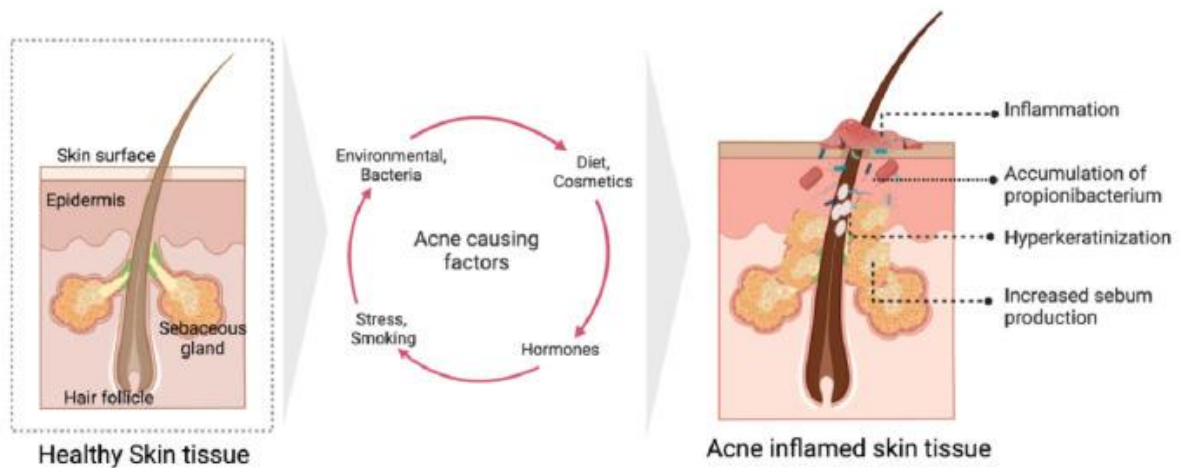
### 1. Introduction

Acne vulgaris is a common, chronic, inflammatory disorder of the pilosebaceous unit that affects most adolescents with inflammatory lesions in the face and trunk. They are mainly caused by increased sebum production, follicle hyperkeratinization, bacterial colonization and inflammation, as well as hormonal changes, misuse of cosmetic and dermatological preparations. This disease is most prevalent in adolescents, but occurs in patients in their twenties and thirties too. These changes in the skin affect emotional stress and quality of life. Dermocosmetics play a special role in the care and treatment of acne-prone skin. A series of complementary dermocosmetics are available, which include products with cleansing, active, soothing and hydrating properties.

Dermocosmetics formulated with active substances can be used in acne monotherapy based on the effectiveness of specific active ingredients in improving acne symptoms with no adverse effects reported so far.

Effective skin care not only serves as a preventive measure by addressing the underlying causes of acne, but also helps to mitigate the negative effects of pharmacological therapy and helps manage complications such as scarring and post-inflammatory hyperpigmentation.

Acne pathogenesis is multifactorial, which includes excessive sebum production, colonization hyperproliferation of bacteria known as cutibacterium acnes (formerly known as propionibacterium acnes), abnormal hyperkeratinization of inflammatory pilosebace mechanisms, and are the four main causes of acne [12]. (Fig. 1).



**Figure 1** Schematic illustration of healthy/normal skin tissue vs acne inflamed skin tissue, various factors (environmental, bacterial, diet, stress, smoking and relevant hormonal imbalance among others) contributing to the formation and development of acne

**a) Increase in Sebum production:** An increase in sebum production in the hair follicles is one of the most significant causes of acne formation. According to Gollnick et al. androgen hormones, specifically testosterone and Insulin Growth hormone (IGH-1), increase sebum synthesis and secretion [13]. There is a clear correlation between increased sebum production and the severity and frequency of acne lesions; as a result, it is a significant element that should be considered in patients suffering from acne vulgaris [[14], [15], [16]].

**b)Hyperkeratinization abnormalities of the pilosebaceous follicles:** Generally, the healthy follicles often shed single-cell keratinocytes into the lumen, which are then ultimately eliminated. However, in acne patients, keratinocytes hyper proliferate and are not shed into the lumen, which leads to the accumulation of irregular desquamated corneocytes in the pilosebaceous follicles coupled with lipids and monofilaments [[17], [18], [19]].

**c)Hyper proliferation of propionibacterium acnes (P. acnes):** Propionibacterium, which plays a substantial part in the pathophysiology of inflammatory acne, is an additional acne-causing agent. Cutibacterium acnes, formerly known as propionibacterium acnes, is an anaerobic, lipophilic, gram-positive pathogen that prefers to colonise in sebaceous follicles because they produce large amounts of sebum and provide excellent anaerobic habitat for bacterial growth [20]. P. acnes secretes a lipase enzyme that metabolizes the triglycerides of sebum into glycerol and fatty acids, which can lead to the formation of comedones and inflammation on the skin [21].

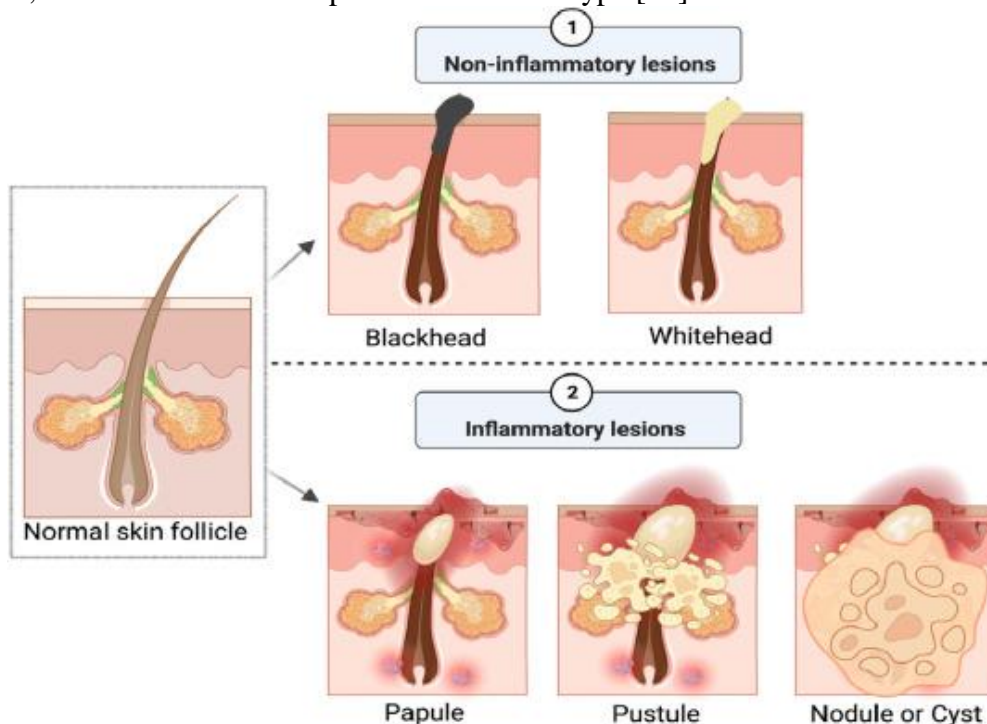
**d)Inflammation acne:** On continuation to the above P. acnes process, when the immune system detects P. acnes, the inflammatory process begins. P. acnes has a strong

inflammatory effect, which may produce chemostatic agents like lymphocytes, neutrophils, and macrophages. In addition, these conditions cause follicular damage, rupture, and the release of germs, fatty acids, and lipids into the dermis layer. These mechanistic processes will produce inflammatory lesions such as ulcers (pustules, nodules, cysts and papules). Non-inflammatory lesions are smaller and less pus-filled than inflammatory lesions [22,23]. In addition, it was discovered that neutrophils produce reactive oxygen species (ROS), which damage the follicular epithelium and contribute to acne inflammation. This causes the follicular substances to be expelled into the dermis, resulting in a variety of inflammatory acne lesions [24].

**e)DNA Methylation:** Under environmental stress, epigenetic modification, which represents the intersection of genetics and the environment, can alter the expression of genes. DNA methylation, one of the well-studied forms of epigenetic modification, is gaining increasing attention in the field of dermatology for its function in the mechanisms of inflammatory, autoimmune, and cancerous skin diseases. DNA methylation has been shown to play a role in the pathogenesis and progression of inflammatory skin diseases such as hidradenitis suppurativa, atopic dermatitis, psoriasis, and other inflammatory skin disorders. Epigenetics plays a significant role in the development of acne vulgaris and may offer insights into its molecular mechanisms and potential therapeutic approaches [25].

## 2. Types of acne lesions

Acne is classified into several forms, including acne conglobate, acne rosacea, acne fulminans, acne cosmetica, acne excoriee (picker's acne), acne medicamentosa, acne chloracne, and acne mechanica [26,27]. Nonetheless, acne vulgaris is the most prevalent form of acne, accounting for 99% of all acne cases. It is differentiated by two types of lesions: non-inflammatory, open and closed comedones, as well as inflammatory papules, pustules, nodules, and cysts (see Fig. 2). The comedones are of two types: a comedo that is closed is a whitehead, while another that is open is a blackhead type [28].



**Figure 2.** Schematic illustration of major distinguishing of the two types of lesions (non-inflammatory, inflammatory) and their pathogenies.

**Blackheads:** Blackheads are non-inflammatory acne lesions that develop on the skin due to excess oil and dead skin cells obstructing hair shafts. A blackhead is referred to as an open comedo because the skin surface remains exposed and has a dark look, such as black or brown. Blackheads are mild acne that usually appears on the face, arms, chest, neck, back and shoulders.

**Whiteheads:** Whiteheads are small bumps and non-inflammatory acne lesion that develops on the skin when oil, bacteria and skin cells block the opening of hair follicle pores. Whiteheads are referred to as closed comedones since the bumps are closed and white. Whiteheads can develop anywhere on the body, but they are most frequent in the T-zone, which includes the nose, chin, and forehead.

**Papules:** Inflammation is the response of healthy skin tissue to bacteria, excess oil production, and excess androgen activity, and its symptoms include swelling, heat, redness, and pain. These inflamed lesions are known as papules and are considered an intermediary step between non-inflammatory and inflammatory lesions (see Fig. 2). Papules show on the skin as a little pink lump typically less than 5 mm in diameter and not pus-filled.

**Pustules:** Pustules are small bumps and an inflammatory lesion that occurs on the skin by clogging the pores with excess oil and dead skin cells. Pustules are inflammatory lesions that contain fluid or pus in their centre. Often, they manifest as white pimples surrounded by red, irritated skin. Pustules can form on any part of the body, although they are most prevalent on the shoulders, chest, back, face, neck, underarms, pubic region, and hairline.

**Nodules:** Acne nodules are a severe form of inflammatory acne that develops when the pores become clogged by bacteria, excess oil and dead skin cells. This type of combination usually causes whitehead or blackhead comedones, but if the infection penetrates underneath the surface of the skin and affects the pores as well as the surrounding area to become red and swollen and appear as a small bump. Acne nodules are not treatable with over-the-counter medications alone and might remain for weeks or months. Nodular acne is similar to papule acne, but its diameter is bigger than 5–10 mm, and it often develops on the face's jawline or chin.

**Cysts:** Cystic acne is a severe kind of inflammatory acne that appears beneath the skin due to blocked pores caused by the accumulation of bacteria, dry skin cells, and oil (see Fig. 2). People with the oily skin of all ages are most affected. Cyst typically appears as large white/red painful lesions filled with pus, sometimes leading to scars. Cystic acne can appear anywhere on the body, although it most frequently affects the face, arms, shoulders, back, chest, and neck. Most people with cystic acne experience both inflammatory and non-inflammatory acne symptoms.

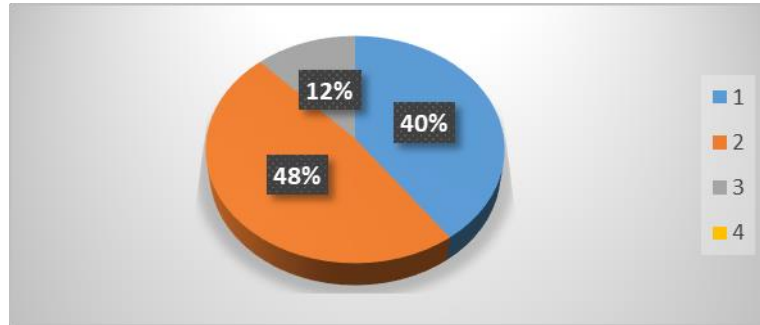
### **3. The purpose of the study**

Noticing the number of teenagers who come and ask for cosmetic and dermatological preparations, we had the idea to do this study to observe the evaluation of the awareness of teenagers regarding their knowledge and treatment for the use of cosmetic and dermatological preparations.

### **4. Material and methods**

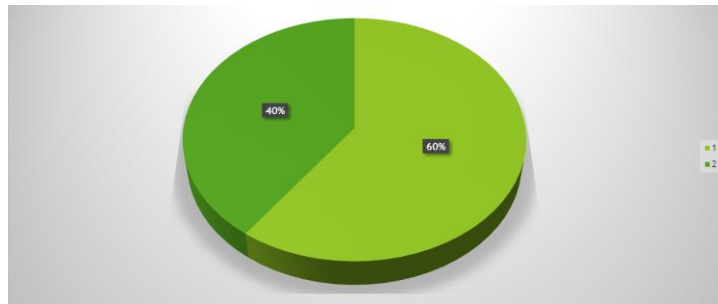
In this study, a total of 256 adolescents were surveyed. The questionnaires were filled out in pharmacies “Herba pharm 2” and “Malton Farm”. The results are presented in the graphs below.

## 5. Results

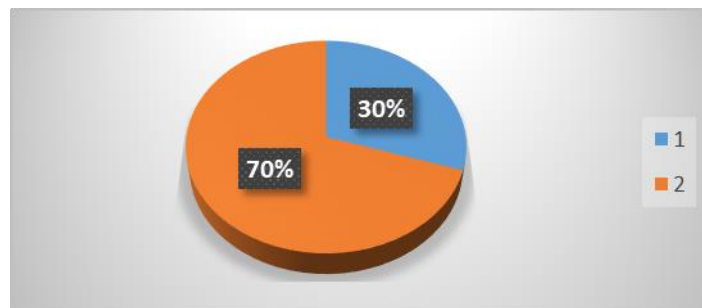


**Graph.1.** Distribution of respondents on the use of preparations with or without instruction of dermatology specialist:

48% of teens have used the therapy and diet regimen recommended by the dermatologist  
40% of teens have not consulted a dermatologist, but have used social media-based preparations.  
12% have used creams recommended by their pharmacists and have not followed the food regime

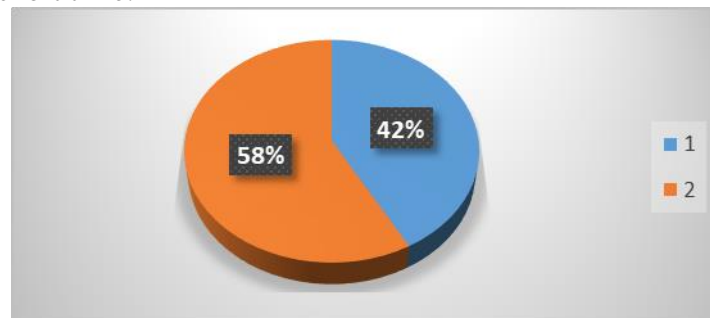


**Graph.2.** The distribution of the respondents based on knowledge about the use of dermatological and cosmetic preparations: 60% have knowledge about the use of preparations while 40% have no knowledge of its use



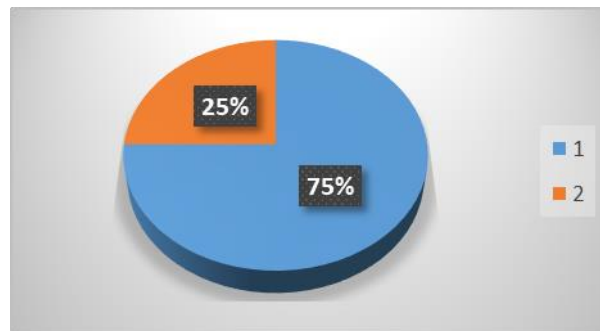
**Graph.5.** The results of respondents who have used popular preparations from the Internet

70% have not been effective after using the preparations from social networks 30% were effective but for a short time.



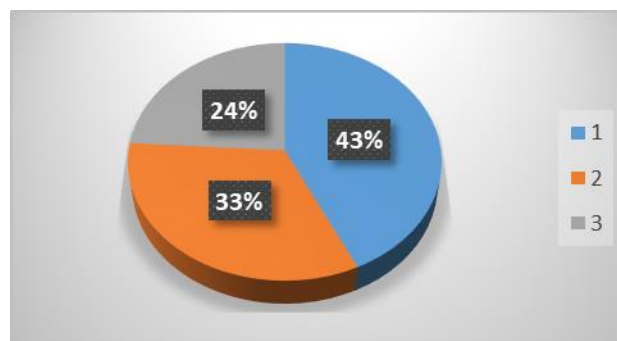
**Graph.6.** The division of respondents who are directed to the pharmacist:

42% have had good results because they have had the right preparations and have followed the advice 58% didn't have good results because they didn't follow the rules of use or diet.

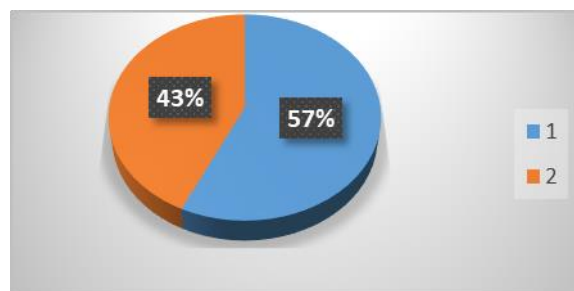


**Graph.7.** The results of the respondents who are directed to dermatologists:

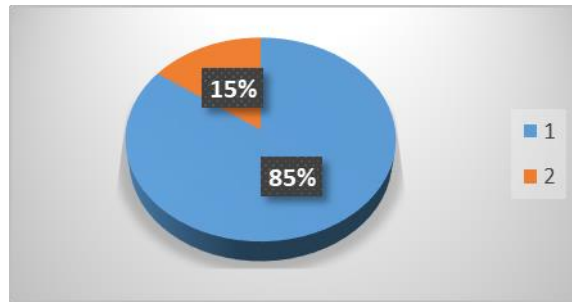
25% didn't have good results because they didn't follow the dermatologist's instructions 75% have had good results because they followed the dermatologist's instructions



**Graph.8.** The results of the respondents regarding the use of carbohydrate foods of which we observe that 33% use carbohydrate and fat foods and therapies recommended by the dermatologist, 43% use healthy foods and therapies recommended by the dermatologist and 24% use foods with carbohydrates and fats and cosmetic preparations.



**Graph.9.** The results of the respondents based on the foods they used, where we notice that 57% regularly use chocolates, chips, sweets and 43% fruit, antioxidant vitamins



**Graph.9.** The results of the respondents who have used healthy foods and antioxidants, vitamins and therapy from the dermatologist. Of which 85% have had efficacy following the dermatologist's instructions and 15% have not had efficacy because they did not adhere to the instructions of the dermatologist. the dermatologist.

## 6. Discussion

Dermocosmetics are used to reduce the negative effects of treatment, either as maintenance or adjunctive therapy. Various formulations can be used for this purpose, including creams, gels or serums. The active ingredients used in some dermocosmetics are designed to target different acne-related pathways, making them a viable option for maintenance therapy. This approach helps to maintain the achieved level of improvement and prevent the appearance of new lesions [30, 36]. Dermocosmetics are also used to reduce acne lesions, especially post-inflammatory hyperpigmentation [36].

They can exhibit keratolytic, sebostatic, anti-inflammatory, antibacterial and skin whitening effects and improve the epidermal barrier and microbiome. Some of these substances target multiple mechanisms involved in the development of acne vulgaris simultaneously [30, 37, 38]. In our study, teenagers who used carbohydrate foods did not have efficacy in the treatment of acne, which corresponds to the studies of some researchers such as Heng AHS, Taha S, Shakshir M, Zyovud and Kwon HH, Yoom et al have done some studies in the USA, Korea and Australia regarding the use of carbohydrate foods, where they came to the conclusion that all those who used carbohydrate foods had more worsening of acne and when they followed a diet with carbohydrate foods, their skin improved from acne.[39]

In this study, teenagers who consume foods with carbohydrates and fat have a worsening in the treatment of acne, which corresponds to the data of some researchers Taha S, Shakhshir M, Meixiong J, Ricco C, Vasavda C, Ismail NH, Manaf ZA, et al. (2012) others have done research on the use of cow's milk and have found that clients who have used milk have more changes in acne compared to those who have not used it.[40]

And another group of researchers Morze J, Przybylowicz KE, Danielewicz A, Obara-Golebiowska M. (2017) have done studies with fast food from which it was found that those who use fast food have more acne compared to those who eat healthy foods.[41]

In our study, teenagers who used healthy foods did not have worsening acne, which corresponds to the studies of another group of researchers such as Aksu AE, Metintas S, Saracoglu ZN, Gurel G, Sabuncu I, Arikani I, et al. Khan A, Chang MW. (2022) Di Landro A, Cazzaniga S, Cusano F, Bonci A, Carla C, Musumeci ML, et al. (2016) conducted several studies on the use of healthy foods, vitamins and fruits and concluded that clients who consumed healthy foods, fruits, vegetables, and antioxidant vitamins had less worsening of acne.[42]

More efforts are therefore needed to educate adolescents about the aggravating and ameliorating factors of acne, its health consequences and treatment options.

## 7. Conclusions and recommendations

According to our results, patients who followed the instructions of the dermatologist and pharmacist were more efficient, while others had less efficacy.

From this we can conclude that any changes to the skin for better efficacy should be managed by a dermatologist.

To avoid complications such as hyperpigmentation, emotional stress and infections we recommend a healthy diet with lots of whole foods, including fruits, vegetables, fat-free protein and healthy fats.

Reducing the intake of processed foods and lots of sugar can help control acne. Treatment of acne patients should include education about proper daily skin hygiene, including protection from environmental damage.

Cleansing with gentle cleansers should be done and cleansing with harsh cleansers should be avoided, non-comedic products that do not close pores should be used and the face skin should be touched as less as possible. The correct selection and use of topical dermocosmetics are essential in managing patients with acne. Daily use of moisturisers, cleansers and sunscreens can reduce the number of inflammatory and non-inflammatory acne-like inflammations and may be beneficial for treating acne if combined with specific medications

It is also very important to raise the awareness of cosmetics or makeup use in acne prone skins because it can be a potential factor of acne worsening, so adolescent should be more aware of the use of these products.

One of the major ways that will help promote the right attitude towards the treatment of acne vulgaris includes health education on treatment behaviours for acne vulgaris to reduce the frequency and severity of the lesions as well as promote better healing of the lesion sites without scarring. Also, health education on the negative impact of using over-the-counter medications, unprocessed organic mixtures and picking or squeezing of acne lesions should be given to discourage such practices and prevent further inflammation.

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