



The contemporary issues related to conventional treatment of acne and the way forward

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ABSTRACT

People perceive acne as a minority disorder (not a major health concern), but it has a significant impact and burden on the victims. Although conventional drugs are available for its treatment, which are applied directly to the affected skin, such as azelaic acid, benzoyl peroxide, and salicylic acid etc. or formulations that are applied to the skin and taken by mouth such as Antibiotics and retinoids as well as birth control pills. This paper discusses the contemporary issues related to conventional treatment of acne with a view of exploring the way forward. Relevant literatures of stakeholders report and studies conducted globally and locally were searched and reviewed. Economic, environmental, emotional, social and spiritual issues are the major contemporary issues related to acne conventional treatment. The article recommend the use of scientific evidence based herbals for acne as it is a promising strategy and the real pharmacy today with no side effects.

Introduction

A common cutaneous inflammatory disorder of the pilosebaceous unit, acne vulgaris has a long-term course [1]. It develops as a result of hypersensitivity of the sebaceous glands to normal levels of circulating androgens. The existence of the bacterial species *Cutibacterium acnes* (*C. acnes*) and the ensuing inflammation worsen this process [1]. Acne appears earlier in females reflecting the earlier onset of puberty although more severe in males. The severity in males could be explained by the increased androgen levels, which is a potent stimulus for sebum production. Acne vulgaris is the eighth most common skin disease globally, with an

estimated global prevalence of 9.38% across all age groups, according to the Global Burden of Disease Study [2], the prevalence of acne varies among different countries and age groups, with estimates ranging from 35 % to close to 100 % of adolescents experiencing acne at some point. In Nigeria, the prevalence of acne vulgaris in adolescents is high and this prevalence increases with age; this increased prevalence with age is in keeping with increased androgen and sebum production in late adolescence [2].

People perceive acne as a minority disorder (not a major health concern), but it has a significant impact and burden on the victims. Although conventional drugs are available for its treatment, however there are several contemporary issues currently disturbing the society related to its usage. This paper will cover the acne conventional drugs, the contemporary issues related to its usage and suggest a way forward for its effective management.

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Acne conventional drugs

Table 1. Acne conventional drugs

S/N	Action	Drug	Adverse effects	Comment
1.	Topical antibacterial	Benzoyl peroxide 2.5%, 5% and 10% gel, lotion or wash	Dries the skin; may bleach clothing and hair; rare allergic reaction	Should be used in all patients if tolerated. Gel product usually preferred
		Benzoyl peroxide/erythromycin benzoyl peroxide/Clindamycin Clindamycin 1% gel or lotion	Diarrhea (rarely)	Must be kept refrigerated Avoid in patients with inflammatory bowel disease
		Erythromycin 1.5 to 2% (multiple vehicles)		Well tolerated
2.	Topical comedolytic and exfoliant	Tretinoin (0.025%, 0.05% and 0.1% cream; 0.05% liquid; 0.025% and 0.1% gel)	Irritates skin; increases sun sensitivity	If irritation occurs, reduce strength and/or frequency of use. Acne appears to worsen when tretinoin is started; may take 3-4 weeks to notice any improvement; protective clothing and sunscreen should be worn. Avoid in pregnancy.
		Tazarotene 0.05% or 0.1% cream or gel	Irritates skin; increases sun sensitivity	Acne appears to worsen when tazarotene is started; may take 3 to 4weeks to notice any improvement; protective clothing and sunscreen should be worn, avoid in pregnancy
		Adapalene 0.01% gel	Some redness, burning and increases sun sensitivity	As effective as tretinoin but less irritating; protective clothing and sunscreen should be worn.
		Azelaic acid 20% cream	May lighten skin	Minimally irritating; may be used by itself or with tretinoin; should be used cautiously in people with darker skin because of skin-lightening effects
		Glycolic acid 5-10% cream, lotion, or solution	Stinging, mild irritation	OTC product, which may be used as adjunct therapy
		Salicylic acid in propylene glycol 1-2% in wash, peel, mask, lotion	Stinging, mild irritation	OTC product, which may be used as adjunct therapy
3	Oral antibiotics	Tetracycline 250-500mg bid Doxycycline 50-100mg bid Minocycline 50-100mg bid Erythromycin 250-500mg bid	Sensitizes skin to sunlight, sensitizes skin to sunlight headache, dizziness, skin discoloration, stomach upset	Inexpensive and safe, but must be taken on an empty stomach; protective clothing and sunscreen should be worn protective clothing and sunscreen should be worn; most effective antibiotic but more costly Bacteria frequently become resistant to erythromycin
4.	Oral retinoid	Isotretinoin 1-2mg/kg once/day for 16-20 wk	Can harm a developing fetus; can affect blood cells, liver and fat levels; dry eyes chapped lips, drying of the mucous membranes; pain or stiffness of large joint's and lower back with high dosage; has been associated with depression, suicidal thoughts, attempted suicide, and (in rare cases) completed suicide	A sexually active woman should have a pregnancy test before she starts taking isotretinoin and at monthly intervals while she is taking it; contraception or sexual abstinence should begin 1 month before she starts taking the drug and should continue while she takes it and for 1 month after she discontinues it. Blood test are necessary to make sure the drug is not affecting blood cells, the liver, or fat (triglyceride) .

The contemporary issues

Conventional treatment of acne has been used for a long time. Yet, there are a lot of contemporary issues related to its usage. Contemporary issues are said to be an issues of concern, current events or problems that are facing the society today and since the beginning of civilization. The conventional acne management remained an issue of concern to the majority of the victims as competent and effective solution is not yet fully identified [4].

There are numerous issues related to the use of the conventional drugs in treating acne, listed below are:

- Economic issue
- Environmental issue
- Emotional issue
- Social issue
- Spiritual issue

Economic issue

The economic issues related to the use of conventional acne drugs for acne treatment is associated to its cost: as most of them are expensive, making them inaccessible for people with limited financial means. this is especially a concern to the female as they are beauty conscious patronizing numerous and different cosmetic pharmaceutical companies with the perception that more expensive medication are effective, imposing more financial burden to victims and their families, and also contributing to over prescribing causing more harm than good.

Environmental issue

Many conventional acne medications are chemicals that can be harmful to the environment, particularly when they are washed off from the skin and enter the water supply system thereby polluting it. Moreover, these chemicals especially with the use of isotretinoin have demonstrated various adverse effects and are teratogenic contributing to scaling and irritation of the skin, hence compelling the victims to cover their faces with mask, which get in to contact with the scaling skin causing more acne breakout, doing more harm than good.

Another issue of concern to the environment is that manufacturing of conventional drugs can produce greenhouse gas emissions and other pollutants, which contribute to climate change and air pollution.

Emotional issue

Acne can be a source of emotional distress and embarrassment, particularly for adolescents and young adults who are often self-conscious about their appearance. The extensive use of antibiotics will lead to the emergence of resistance in acne-related pathogens and when acne becomes resistant to treatment or when side effects are severe, the victims may feel frustrated and hopeless about the ability to find an effective solution contributing to feeling of low self-esteem, anxiety and subsequently depression.

Social issues

Many conventional acne medications have limited effectiveness. Instead of curing it, they cause more acne breakout. Negative side effects such as bleaching of the skin do occur sometimes, these cause the victims to experience social stigma and discrimination (people start calling them names: me shafe shafe, ai bleaching take, fanta face cocacola leg etc) which can have adverse effect on their mental health leading to the victims absenting themselves from any kind of social gathering.

Spiritual issues

The bleaching side effect of the skin caused by the use of conventional medications in treating acne, has spiritual effect on the victims, as majority of people perceive them in a negative way as sinners, ungodly, unholy. Humans that have abused what god has prohibited and are not contented, grateful with that which they were given unto them therefore cannot receive the mercy of god; as the act of bleaching is a sin against god which was revealed in both the Quran (chapter 2:128,208) and bible (chapter 1:5).

Solutions and way forward

Despite the recent therapies adopted in the developed countries for managing acne such as the laser therapy, light-based treatment and the chemical peel therapy. These were also reported [4] to be associated with adverse effect and potential risk such as premature aging of the skin and an increased possibility for skin cancer development later in life apart from irritation, infection, scarring, and uneven coloring of the skin among others.

Moreover, there are growing interest in the use of probiotics and nanotechnology in treating acne. The emerging therapies are still in their early stage of development and some few studies made, revealed potential risk associated with their usage [5].

However, rutonic herbs remain the ideal, modern plant medicine extract through scientific research and the real pharmacy in our society today with no side effect. Herbal medicine is a promising complementary and alternative medicine approach. Herbal medicine has been used effectively since ancient times in acne treatment. Researches shown that [6] many of these herbs with a history of use in traditional cultures have entered the growing cosmeceutical market due to their advantages of better patient tolerance, long history of use, fewer or no side effects, and relatively more cost-effective.

Many researches (systemic review and Cochrane review) have demonstrated the efficacy of these herbs; not only due to their antibacterial effect, but also due to their influence on androgenicity, sebum activity, inflammation and hyper-keratinization associated with acne [7].

The following are some of the evidence-based medicinal herbs and their constituents in the treatment of acne vulgaris.

Tea tree oil (Maleleuca alternifolia)

the tea tree oil is an essential oil extracted from the plant leaf native to Australia. It has been used for several decades for the treatment of acne. The active constituents are terpinen-4-ol, alpha-terpineol and alpha-pinene. A 2019 review study [8] looked at the existing evidence for tea tree oil and acne. The researcher found that tea tree oil products can reduce the number of acne due to its antimicrobial capacities.

Route of administration: Topically orally

Mode of action: a. Numerous studies looking into the antimicrobial activity of the essential oil on *C. acnes* have reported that the minimum inhibitory concentration (MIC) of the oil for the bacterium is between 0.3 and 0.6%, and the minimum bactericidal is between 0.25 and 0.5%. These findings suggest that the antimicrobial action of this oil involves structural and functional changes in the bacterial membrane [9]. b. Anti-inflammatory activity: TNF-a, IL-1B, IL-8, IL-9, and prostaglandin production were all decreased in vitro by the oil's primary component. Pharmaceutical preparation: creams, gel and oil

Dose: 5% concentration

Dosage: Twice a day for 8 weeks

Green tea (Camellia sinensis)

Originating from a plant native to Southeast Asia, green tea is produced by processing fresh *C. sinensis* leaves to stop the oxidation of its polyphenolic ingredient. Catechins are the main polyphenol present in green tea, representing about 30-42% of water-soluble solid of this tea. The primary polyphenol found in green tea is called catechins, which make up between 30 and 42% of the tea's water-soluble solids [10].

Mode of action: Antioxidant activity is achieved by scavenging free radicals, promoting the production of antioxidant enzymes, and preventing lipid peroxidation. b. Anti-bacterial activity results from alteration of bacteria membrane and the inhibition of fatty acid synthesis. reduced sebum production by inhibiting 5a-reductase enzymes

Route of administration: Orally and topically as a moisturizing agent

Dose and dosage: Topically, 2% lotion applied twice daily for 6 weeks duration, orally 1 tablet daily for 4 weeks or drinks as tea.

Chasteberry (Vitex agnus castus)

Chaste berry is the fruit (berries) from the chaste tree, mostly found in Mediterranean areas. The berries contain essential oils (limonene, sabinene and 1, 8-cineole [eucalyptol], iridoid glycosides (e.g. agnoside aucubin), diterpenes (e.g. vitexilactone, rotundifuran) and flavonoids (e.g. apigenin, castican, orientin, and isovitexin).

Mode of action: Anti-androgen effect as its bind to dopamine D2 receptors in the pituitary gland leading to an increase in progesterone and a decrease in estrogen, and subsequently regulating the level of androgen hormones, and then decrease in the production of sebum and hair follicle activity

Dose and dosage: German commission E has recommended daily intake of 40mg for 3 month in the form of tablet or capsule, first thing in the morning when the pituitary gland are more active enough to regulate the hormones [11].

Black seed (Nigella sativa)

Black seed is a medicinal plant, widely found in the Mediterranean countries, Middle East, and western Asia. The oil and seed constituent have shown medicinal properties since olden day's history. The active constituents are terpenes, phenols and flavoids. The seed and oil has been used for over 2000 years in Asian and Arabian culture for it

medicinal purpose pure and black seed oil as a golden brown color.

Mode of action: 1) Antibacterial- blackseed oil contains an active oil thymoquinone, which inhibit the bacteria cell wall responsible for causing acne. The linoleic acid, oleic acid and stearic acid present in the oil helps to unclog pores and regulated sebum production. A 2010 clinical study [12] on 62 patients suffering from acne revealed that 20% black seed oil lotion was more effective in reducing the appearance of acne lesions and scar compared to a 5% benzoyl peroxide lotion. 2) Anti-oxidant- the phenolic compound in black seed helps prevent acne by reducing the oxidative stress and neutralizing free radicals present on the skin. It's also aid in treating hypo pigmentation and cleared off acne scars.

Spikeweed (Guiera senegalensis)

G. senegalensis locally known as sabara' in the Hausa language of northern Nigeria belongs to the family Combretaceae. It is one of the most important West African medicinal plants, mostly found in tropical Africa in dry areas from Senegal to Sudan. The leaf of *G. senegalensis* contains active ingredients of such as retinoic acids, resins, alkaloids, tannins, saponins, glycosides, and terpenes [1].

Mode of action: Studies reveal that its act by increasing the turnover of skin cells, removing dead cells from the surface of the skin, preventing proliferation (acne breakout) and spot formation.

Aloevera (Aloe barbadensis miller)

One of the most well-known species in the genus Aloe is aloe vera; it is native to Arabian Peninsula. The long, green leaves of *A. vera*, a xerophytic plant, has thorny edges and is packed with a mucilaginous pulp. In that *A. vera* gel, more than 75 distinct components were found including polysaccharides, anthraquinones, flavonoids, terpenes, saponins, amino acids, flavonoids, minerals, and vitamins[9]. The important secondary metabolites found in *A. vera* are anthraquinones they are responsible for the astringent, anti-inflammatory, antioxidant, and healing properties. Its gel minimizes the adverse effects associated with the administration of tretinoin [13].

Mode of action: Anti-microbial, anti-inflammatory, antioxidant, anti-acne in vivo.

Although the discovery/concepts and pre-clinical research were made to all the aforementioned herbs. However, it is essential that clinical

researches should be done and then the food and drug administration (FDA) scientists should review the drug research and labeling information on how to use the herbs. If findings show the herbs benefits and that they can be manufactured in a way that ensures quality product, then the herbs should be approved by the FDA to be integrated in to conventional treatment of acne and continued monitoring of the drugs post-approval should be carried out.

Conclusion

In conclusion, scientific evidence based herbals for acne remains the permanent and effective solution for treatment of acne as it is the ideal pharmacy today with no side effect. This statement is backed up by AVICENNA quote, which says; "There is no incurable disease except the lack of will-there is no worthless herb except the lack of knowledge". This speaks on the idea that with right mindset of seeking for knowledge, right treatment can be found. Therefore, it is important to search and seek treatment from those with the knowledge if really you do not know.

Contribution of authors

Author 1 contributed to writing the abstract, the contemporary issues and the way forward. Author 2 contributed to writing the background information on acne and the table for the conventional treatment.

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