

Interventions to increase adherence to acne treatment

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Background: Adherence to acne medication is poor and is a major reason why treatment plans are ineffective. Recognizing solutions to nonadherence is critical.

Objective: The purpose of this study is to describe the hurdles associated with acne nonadherence and to provide mechanisms on how to ameliorate them.

Methods: PubMed database was searched. Of the 419 search results, 29 articles were reviewed to identify hurdles to adherence and corresponding solutions.

Results: Hurdles to primary nonadherence where the medication is not even started, include lack of knowledge, confusion about usage, weak physician–patient relationship, fear of adverse reactions, and cost. Secondary nonadherence hurdles where the medication is started but is not taken as directed include lack of results, complex regimens, side effects, busy lifestyle, forgetfulness, inconvenience, and psychiatric comorbidity. Solutions to these hurdles include treatment simplification, technology, and dynamic education.

Limitations: Adherence is affected by numerous factors, but available literature analyzing acne adherence and interventions to improve adherence to treatment is limited.

Conclusion: There are several hurdles in adhering to acne treatment. Recognition of these hurdles and finding appropriate solutions may be as important to treatment outcomes as choosing the right medication to prescribe.

Keywords: acne vulgaris, adherence, pathogenesis, treatment, quality of life, prevalence, physician–patient relationship, lifestyle, clinic visit, disease severity

Introduction

Acne vulgaris is a common chronic inflammatory disease that affects 45 million people in the USA.¹ Acne negatively affects the quality of life – as measured by low self-esteem, increased social and emotional anxiety^{2,3} – and imposes a considerable financial toll.⁴ Annually, US consumers spend \$1.2 billion on acne medications,¹ \$233 per patient on prescribed acne treatments.⁴ The use of more than one medication due to multifactorial pathogenesis of the disease adds cost and complexity to the burden.

One of the factors negatively impacting acne treatment outcomes is poor adherence. Poor adherence is a problem in all medical disciplines, with the average adherence being only 50%–60%.^{5,6} Adherence to simple acne regimens is poor; adherence rates for complex regimens are worse. The purpose of this study is to describe the hurdles associated with adherence to acne treatment and to provide mechanisms on how to ameliorate them.

Methods

The PubMed literature database was searched with the goal of finding hurdles to acne treatment adherence. In PubMed, the search (“acne vulgaris” [all fields] OR

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“acne medication adherence” [all fields]) was performed in July 2015. Limitations consisted of the English language, humans, and publication dates of January 1, 1990 through July 1, 2015. In addition, the reference lists of these articles were searched. The titles, abstracts, and articles were analyzed and the following inclusion criteria were used:

Inclusion criteria:

1. Involvement of patients with acne
2. Studies examining acne treatments
3. Assessing adherence to acne treatments

The keyword search resulted in a total of 419 articles. Through an independent review, 29 articles were selected and used to generate a list of hurdles and interventions for acne medication nonadherence. The hurdles were identified as either primary or secondary medication nonadherence hurdles. Primary nonadherence was defined as “not obtaining or initiating a prescribed medication.”⁷ Secondary nonadherence refers to a “lack of sufficient treatment usage or early discontinuation of treatment.”⁷ Interventions identified within the articles were categorized as corresponding solutions to the aforementioned primary or secondary nonadherence hurdles.

Results

Hurdles to acne treatment adherence can be classified into primary and secondary. Primary adherence hurdles include lack of knowledge about acne condition, confusion about how to use treatment, weak physician–patient relationship, fear of side effects, and costs (Table 1). Secondary adherence hurdles include lack of efficacy, complicated regimens, adverse reactions, lifestyle factors, and psychiatric comorbidity. Solutions to address these hurdles lie in simplification, technology, and dynamic education (Table 2).^{8–10}

Findings of literature search with hurdles to acne treatment adherence and interventions are shown in Table 3.

Table 1 Hurdles to acne treatment adherence

Primary nonadherence hurdles	Secondary nonadherence hurdles*
Little knowledge about severity of acne	Lack of acne improvement
Weak physician–patient relationship	Regimen too complex
Influence from media or other physicians	Adverse reaction
Already in possession of similar treatments	Difficulty delaying satisfaction
Fear of adverse reaction	Busy lifestyle
High QOL score	Forgetfulness
Confusion about how to use treatment	Inconvenient
Cost	Psychiatric comorbidity

Notes: *Some hurdles likely apply to both primary and secondary adherence.

Abbreviation: QOL, quality of life.

Discussion

Considering the huge burden of acne and low rates of adherence associated with acne medication, more attention to increasing adherence is needed.^{11,12} A variety of hurdles to adherence exist, stemming from both inside and outside the doctor’s office. Understanding these hurdles may help dermatologists in creating effective solutions for their patients.

Primary nonadherence is when a patient never even begins taking the medication. The existence of primary nonadherence highlights the need for a strong patient–physician relationship. In a weak relationship, a patient may be more likely to disagree with the dermatologist’s recommendations due to information obtained from nonmedical professionals, websites, television advertisements, commercials, and magazine articles.¹³ Other reasons also exist for primary nonadherence. Patients may be indifferent to filling their prescribed medication or begin using it due to a lack of motivation. They may already possess similar treatments or acne may not be bothersome enough for its treatment to be high on their list of priorities. There is also the possibility that the skin condition may improve before even obtaining their prescriptions, negating a need for primary adherence.^{13,14}

Secondary nonadherence is when the medication is not taken as prescribed. This type of nonadherence tends to be more prevalent in patients with chronic acne than in those with acute conditions.¹³ One common reason for secondary nonadherence in acne treatment would be side effects. Topical retinoids, which are a first-line therapy, can cause burning, irritation, and dryness.^{13,15} Topical and oral antibiotics used as monotherapy can lead to antibiotic resistance.¹⁵ Isotretinoin, which is used to treat moderate-to-severe acne has been known to be teratogenic and can contribute to cheilitis, dermatitis, arthralgia, increased liver enzymes, cholesterol levels, depression, and even attempted suicide.^{3,16–18} These large numbers of potential adverse events can scare patients from even starting the medication. They may also reduce patients’ use and if they occur, may cause patients to discontinue treatment altogether. Another reason for secondary nonadherence is poor efficacy. Many acne medication regimens take many weeks or months for improvement, leading patients into believing that the medication is not working, which leads to lower adherence.¹⁹ This may be especially true of the patient population suffering from acne, as difficulty “delaying satisfaction” is commonly seen in adolescents.²⁰ Complex regimens may also lead to less adherence. One study has shown that going from a single treatment to multiple treatments leads to less adherence.⁷ Other patients may have confusion about treatment usage and

Table 2 Interventions to acne treatment hurdles

Intervention type	Interventions to primary nonadherence hurdles	Interventions to secondary nonadherence hurdles
Simplification	Consider postponing therapy if patient is content and has little psychological distress and nonscarring acne	Simplify regimen by using combination therapies and allowing patients to choose their vehicle Ask patients to incorporate use of their medication into their daily activities
Technology	Electronic transmission of prescription to pharmacy	Ask patients to place their medications within daily eyesight Automated text messaging Follow-up phone calls Follow-up with internet-based surveys Recommend phone applications
Dynamic education	Verbally and visually educate the patient about their condition Discuss treatment options with the other physicians Debunk myths by proactively educating the patients about side effects Instruct the patient by giving a demonstration Use open-ended questions and avoid nonjudgmental and accusatory remarks Understanding the pervasive nature of the media and its influence on patients. Debunk myths and educate patients about their condition and any anticipated side effects Ask about previously prescribed treatments and satisfaction with them Demonstrate medication use Know which insurance covers what medications	Determine if the patient is using medication correctly. If not, educate the patient again. If therapy is truly ineffective and there is no improvement, abandon treatment and consider alternatives Proactively deal with anticipated side effects Use adjunctive medications, consider comedone extraction and drainage of cysts Simplify the regimen by using combination medication, allow patients to choose their vehicle, and ask patients to incorporate use of medication into their daily activities Consider psychiatric consultancy, psychotherapy, or setting up acne vulgaris support groups

be discouraged to use the medication.²¹ Lifestyle must also be considered when thinking about reasons for poor adherence. A patient with a busy lifestyle may simply forget to apply it, especially if other reasons for nonadherence exist.⁷ Additionally, tumultuous lifestyles or depressive emotional states may contribute to lower psychiatric comorbidities and decreased adherence.²²

Simplification serves as one solution to nonadherence, as it allows treatment to better fit into a patient's lifestyle. Among patients who were prescribed one, two, or three acne treatments, primary adherence was significantly higher in the patients who were prescribed one medication.⁷ Simplifying the medication vehicle may increase adherence as well. Acne subjects preferred the pump over a tube for dispensing fixed-dose combination of adapalene 0.1%-benzoyl peroxide 2.5% gel because the pump made it easy to follow their doctor's instructions and apply a consistent amount each time.²¹ Fixed-dose combinations such as a combination of retinoids and antimicrobials simplify the acne therapeutic regimen and increase adherence; this combination simultaneously combats the proliferation of follicular keratinization, *Propionibacterium acnes* colonization, and release of inflammatory mediators.¹⁵ However, combination treatments have overcome all adherence obstacles, especially in maintaining good adherence over time. A pilot randomized controlled trial found that even after product demonstration and sampling of

the fixed combination treatment of adapalene/benzoyl peroxide gel, medication adherence rates decreased from 86% after 1 week of treatment, to 36% in week 6 of treatment.²³

The use of technology has the potential to play a major role in increased adherence. In an experiment where two different groups of adolescent acne patients were given a topical agent for acne treatment, the group given an automated weekly emailed survey was seen to have higher adherence than the group given no survey.²⁴ This type of technological intervention may be more useful than other types of technologies such as automated text messaging reminders, which have been shown not to significantly increase adherence.²⁵ The email survey technique encourages patients to act as active participants in their own treatment as opposed to automated text messaging reminders, where they play a more passive role. Surveys rather than reminders may also simulate a doctor's visit and enhance the "white coat compliance" effect, the phenomena where patients are more likely to listen when given direct instructions by a doctor.²⁴ Survey-based technology also takes advantage of the long amounts of time adolescents spend on the computer and can be a cost-effective alternative to frequent follow-up visits in an attempt to increase adherence.

Education, specifically dynamic education, which consists of a more informative physician-patient interaction can also increase adherence. Acne patients with higher adherence

Table 3 Summary of findings of literature search with hurdles to acne treatment adherence and interventions

Study	Study type	Sample size	Hurdles to adherence	Intervention to increase adherence
Anderson et al ⁷ (2015)	Cross-sectional, observational	143	Patients with busy lifestyles may forget to apply medication or pick up prescription	Simplification of the therapeutic regimen and considering patient preference
Rueda ²¹ (2014)	Randomized controlled trial	300	Patients may be confused about treatment usage and stop using the medication	
Tan et al ¹³ (2012)	Review Article		Disagreement with the dermatologist's recommendations due to information obtained from nonmedical professionals, websites, television advertisements, commercials, and magazine articles	
Gorelick et al ¹⁴ (2015)	Cross-sectional, observational	312	Skin condition may improve before obtaining a prescription	Education via a physical demonstration of use had 15% overall higher adherence rates Technology interventions, specifically, automated email surveys encouraging active participation in treatment increase adherence. Simulates "white coat compliance" Text messaging reminders are ineffective at increasing adherence Education and positive interaction with the dermatologist increased adherence Scheduling follow-up visits increases adherence Scheduling follow-up visits increases adherence
Gollnick ¹⁵ (2015)	Review Article		Topical retinoids have side effects such as burning, irritation, and dryness	
Charakida et al ¹⁷ (2004)	Review Article		Isotretinoin has been known to be teratogenic, and causes cheilitis, dermatitis, arthralgia, increased liver enzymes, cholesterol levels, depression, and attempted suicide	
Renzi et al ²² (2002)	Cross-sectional, observational	396	Psychiatric comorbidities like depression cause low adherence	
Sandoval et al ²³ (2014)	Randomized controlled trial	17	Adherence rates drop markedly over time even after simplification of regimen	
Yentzer et al ²⁴ (2011)	Randomized controlled trial	15		
Boker et al ²⁵ (2012)	Randomized controlled trial	40		
Miyachi et al ²⁶ (2011)	Cross-sectional observational	428		
Feldman et al ²⁷ (2007)	Randomized controlled trial	29		
Yentzer et al ²⁸ (2011)	Randomized controlled trial	46		

reported that education and interaction with the dermatologist positively affected their behavior, while patients who were dissatisfied with their dermatologist interaction reported feeling unsure as to why they needed continuous treatment, what the expected results were, or how to prevent acne.²⁶ Education could also involve using a more direct manner to teach the patient how to use the medication. Electronic adherence monitors revealed that mean adherence rates over a 6-week period were 15% higher in the group given a physical demonstration of how to apply the medication versus the group given no demonstration.²³ As the long length of some acne regimens directly play a role in nonadherence, physicians should highlight the fact that it takes some time for these regimens to show their effects. Reinforcement of

this idea as part of the education process may lead to higher adherence. Acne medication adherence decreases over time; however, around the time of follow-up visits, medication adherence increases.^{23,24,27} Scheduling follow-up visits is a potent intervention to increase adherence.²⁸ Several of the hurdles that prevent adherence to medication stem from patients' concerns about things like adverse reactions to the medication, which can be further reinforced by media influences and their lack of knowledge about acne as a whole.^{9,17} Hurdles such as these can be addressed through dynamic education in combination with scheduling more follow-up visits. At follow-up visits, physicians can address concerns about side effects or usage and reassure patients on the importance of adherence if the patient feels as if there is

a lack of progress. When frequent follow-up visits are not feasible, using substitutive technology methods that mimic the effects of visits should be considered.

Research on pathophysiologic pathways in acne may lead to new treatment modalities, but numerous acne treatments and various guidelines will be ineffective if they are not used by patients.²⁹ A variety of interventions have been introduced that may help to improve acne treatment adherence, especially with recent technology achievements; however, establishment of novel solutions to increasing adherence is still needed.

Conclusion

- Acne medication adherence is poor and a major reason for treatment failure.
- This article examines the hurdles to adherence and solutions to these hurdles.
- Understanding hurdles to adherence and identifying the most effective solutions may help physicians to achieve better treatment outcomes.

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