ISSN: 2574-1241
DOI: 10.26717/BJSTR.2018.06.001422
Yoram Harth. Biomed J Sci & Tech Res

BIOMEDICAL Journal of Scientific & Technical Research

Opinion Open Access

Deep Learning-Based Acne Apps Can Solve the Problem of Ineffective Office Consultations

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Received: June 09, 2018; **Published:** July 17, 2018

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Abstract

90% of acne patients never see a Dermatologist. Acne treatment products bought online or in local drugstores are not personalized to the skin type and acne severity of the user and are frequently irritating the skin or simply ineffective. A new mobile app uses computer vision and deep learning to assess the user's skin and to provide personalized acne treatment medications, monitor the skin with simple selfies and to enhance commitment to the treatment.

Keywords: Dermatology; Physician; Dermatologist.

Introduction

Acne affects approximately 7% of the population at any given moment. If untreated, acne frequently causes psychosocial stress, with the risk of life-long physical and mental scars. Ninety percent of acne patients never see a dermatologist. For those that do visit a dermatologist in-person, the experience is frequently frustrating. Acne patients interviewed for a recent British Journal of Dermatology study [1] complained about the frequent use of "high" language by their dermatologists, the lack of empathy to their psychosocial stress, the lack of understandable practical information for preventing acne and the lack of affordable follow-ups. Virtual dermatologists, or telehealth services, are unfortunately not a commercially viable option. The low monetary compensation offered to these dermatologists results in extra-short "visits" estimated to be 2 minutes per patient. In addition, these "virtual" visits are the same as in-person dermatology visits in the sense that they do not provide guidance on how to prevent acne and are not able to track or enhance the commitment to treatment. Additionally, follow-ups require additional payments. As office and telehealth visits are short and expensive, most acne patients look for anti-acne products on the web or in local drugstores. These "one size fits all" treatments are frequently irritating or simply ineffective.

A new type of acne app may provide a physician-free solution to the majority of people with acne. This app (MDacne, IOS) uses computer vision and deep learning to analyse the skin of the user and provides a personalized set of anti-acne medications. This personalized combination of FDA-cleared medicated acne cleansers, acne treatment creams and moisturizers are customized to the user's skin type and acne severity. Furthermore, this app provides acne information and tips, automatic "selfie"-based improvement monitoring and unlimited chat support with a dermatologist. The treatment suggestions adhere to the recent acne treatment guidelines of the American Academy of Dermatology [2]. Users with severe acne or moderate acne who do not respond to 3 months of topical treatment are referred to their local dermatologist for oral treatment.

How do Acne Analysis Apps Compare to a Human Doctor?

The use of Simple Language: The app: easy. The doctor: "I studied for so many years. I must use these complicated terms…"

Listener to the Patient and Paying Attention to his or her Body Language, Expressed Emotions, and Word Choice: The app collects the patient's subjective input and uses image analysis to objectively assess her/his skin. The doctor is instructed to pay attention to body language and expressed emotions. In practice, this is hard to implement in 5 minutes.

Monitoring Acne Quality of Life Questionnaire: The app: easy. Do you know any doctors that do that?

Patient education: Tell the patient what acne is. Tell the patient how the treatment works. Let the patient know that no treatments work instantly and indicate when the patient may expect to see an improvement. Provide a detailed explanation of how to use the recommended treatment regimen. The app: wins. It provides dozens of video tutorials, guides and tips to educate the acne patient. The doctor: it is hard to educate the patient in a 5-minute visit.

Monitoring the improvement: The app: wins again. The user can monitor his/her skin improvement by a simple selfie, charted on a graph. The doctor: "I need to charge a fee for each office visit".

Conclusion

Our acne patients do not get the treatment they deserve. However, much can be done and improved through smart mobile health apps. Recommending these apps to our patients can help control most patients with mild to moderate acne with topical anti-acne treatment. This will allow us as dermatologists to focus on the more severe cases that require prescription oral treatments.

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