Mobile Medical Apps for Patient Education: A Graded Review of Available Dermatology Apps

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PRACTICE **POINTS**

- Mobile dermatology apps for educational purposes should be objectively reviewed before being used by patients.
- In our study, only 9 (20.5%) of the 44 dermatology apps evaluated were considered adequate for patient information based on our grading criteria.

The utilization of mobile applications (apps) as educational resources for patients highlights the need for an objective method of evaluating the quality of health care–related mobile apps. In this study, a quantified rubric was developed to objectively grade publicly available dermatology mobile apps with the primary focus of patient education. The rubric included 5 criteria thought to be most important in evaluating the adequacy of these apps in relaying health information to patients: educational objectives, content, accuracy, design, and conflict of interest. A 4-point scale was applied to each criterion. The use of this objective rubric could have implications in the evaluation and recommendation of mobile health care apps as a vital educational resource for patients.

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According to industry estimates, roughly 64% of US adults were smartphone users in 2015.[1] Smartphones enable users to utilize mobile applications (apps) that can perform a variety of functions in many categories, including business, music, photography, entertainment, education, social networking, travel, and lifestyle. The widespread adoption and use of mobile apps has implications for medical practice. Mobile apps have the capability to serve as information sources for patients, educational tools for students, and diagnostic aids for physicians.[2] Consequently, a number of medical and health care–oriented apps have already been developed[3] and are increasingly utilized by patients and providers.[4]

Given its visual nature, dermatology is particularly amenable to the integration of mobile medical apps. A study by Brewer et al[5] identified more than 229 dermatology-related apps in categories ranging from general dermatology reference, self-surveillance and diagnosis, disease guides, educational aids, sunscreen and UV recommendations, and teledermatology. Patients served as the target audience and principal consumers of more than half of these dermatology apps.[5]

Mobile medical and health care apps demonstrate great potential for serving as valuable information sources for patients with dermatologic conditions; however, the content, functions, accuracy, and educational value of dermatology mobile apps are not well characterized, making it difficult for patients and health care providers to select and recommend appropriate apps.[6] In this study, we created a rubric to objectively grade 44 publicly available mobile dermatology apps with the primary focus of patient education.

Methods

We conducted a search of dermatology-related educational mobile apps that were publicly available via the App Store (Apple Inc) from January 2016 to November 2016. (The pricing, availability, and other features of these apps

AUDIO **ONLINE**

Dr. Babar K. Rao discusses mobile dermatology apps with *Cutis* Editor-in-Chief Vincent A. DeLeo, MD, in a "Peer to Peer" audiocast

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may have changed since the study period.) The following search terms were used: *dermatology*, *dermoscopy*, *melanoma*, *skin cancer*, *psoriasis*, *rosacea*, *acne*, *eczema*, *dermal fillers*, and *Mohs surgery*. We excluded apps that were not in English; had a solely commercial focus; were mobile textbooks or scientific journals; were used to provide teledermatology services with no educational purpose; were solely focused on homeopathic, alternative, and/or complementary medicine; or were intended primarily as a reference for students or health care professionals. Our search yielded 44 apps with patient education as a primary objective. The apps were divided into 6 categories based on their focus: general dermatology, cosmetic dermatology, acne, eczema, psoriasis, and skin cancer.

Each app was reviewed using a quantified grading rubric developed by the researchers. In a prior evaluation, Handel[7] reviewed 35 health and wellness mobile apps utilizing the categories of ease of use, reliability, quality, scope of information, and aesthetics.[4] These criteria were modified and adapted for the purposes of this study, and a 4-point scale was applied to each criterion. The final criteria were (1) educational objectives, (2) content, (3) accuracy, (4) design, and (5) conflict of interest. The quantified grading rubric is described in Table 1.

Results

The possible range of scores based on the grading rubric was 5 to 20. The actual range of scores was 8 to 19 (Table 2). The 44 reviewed apps were categorized by topic as acne, cosmetic dermatology, eczema, general dermatology, psoriasis, or skin cancer. A sample of 15 apps selected to represent the distribution of scores and their grading on the rubric are presented in Table 3.

Comment

The number of dermatology-related apps available to mobile users continues to grow at an increasing rate.[8] The apps vary in many aspects, including their purpose, scope,

TABLE 1. Quantified Grading Rubric Used for Review of Apps

Category	1	2	3	4
Educational objectives	App does not fulfill the focus and educational objectives of its description	App minimally fulfills the focus and educational objectives of its description	App mostly fulfills the focus and educational objectives of its description	App completely fulfills the focus and educational objectives of its description
Content	App has major gaps in information; it is disorganized and confusing	App has gaps in information and the content is disorganized	App has minor gaps in information relayed or is disorganized	Information provided in the app is complete, comprehensive, and logical
Accuracy	App presents factually incorrect information that detracts from the educational objectives	App has minor errors that do not detract from the educational objectives	App has no factual errors; however, it does not provide resources	App provides evidence-based, factually correct information
Design	Design of the app is difficult to use and obtrusive to the relaying of information to the user	App has some issues with design that may have minor interference with relaying of information to the user	App has a design, interface, and mode of navigation that are understandable and do not hinder the relaying of information to the user	App is easy to use and well designed with an interface and mode of navigation that are understandable and enhance the user experience
Conflict of interest[a]	App has obvious conflict of interest resulting in selective, biased, or misleading information	App was made with some conflict of interest; however, it presents information in a mostly unbiased and objective way	App is created with some sort of monetary incentive; however, it relays unbiased, factually correct information	App was created with no conflict of interest or monetary incentive and has the sole purpose of relaying educational information

[a]Advertisements, particularly targeted advertisements with products or services related to dermatology, constituted a conflict of interest, as the educational information provided may show a propensity toward those advertisers and thus prevent app users from getting completely unbiased information.

TABLE 2. Distribution of Scores by App Category[a]

Category	No. of Apps			Total No. of Apps
	Total Score of 5–10	Total Score of 11–15	Total Score of 16–20	
Acne	6	4	0	10
Cosmetic dermatology	2	2	1	5
Eczema	0	3	1	4
General dermatology	1	6	3	10
Psoriasis	0	3	0	3
Skin cancer	2	6	4	12
Total	11	24	9	44

[a]Apps with scores in the range of 5–10 were not thought to be useful and may even be detrimental to patients. Apps with scores in the range of 11–15 may be used for patient education with some reservations based on shortcomings for certain criteria. Apps with scores in the range of 16–20 were thought to be valuable and adequate for patient education.

TABLE 3. Sample of App Scores[a]

App (Category)	Cost, $	Educational Objectives	Accuracy	Conflict of Interest	Content	Design	Total Score
Doctor Derm (general dermatology)	Free	4	3	4	4	4	19
Eczema Doc (eczema)	Free	4	4	3	4	4	19
Dermomedia (general dermatology)	7.99	4	3	3	4	4	18
Dermatology Conditions (general dermatology)	0.99	3	3	3	4	3	16
Mollie's Fund (skin cancer)	Free	4	3	4	2	3	16
Psoriasis Treatment Decision Aid (psoriasis)	Free	4	3	4	2	2	15
Acne – Causes (acne)	Free	4	3	2	3	2	14
Atopedia (eczema)	Free	3	3	1	3	4	14
Most Skin Disorders (general dermatology)	1.99	3	2	3	2	3	13
uDerm (skin cancer)	Free	2	2	4	1	2	11
Intelligent Skin MD (skin cancer)	1.99	2	2	2	2	2	10
Mole Checker (skin cancer)	2.99	2	2	3	2	1	10
MDacne (acne)	Free	2	3	1	2	1	9
Melanoma Watch (skin cancer)	Free	2	2	3	1	1	9
How to Treat Acne (acne)	2.99	2	1	3	1	1	8

[a]Pricing based on availability via the App Store (Apple Inc) from January 2016 to November 2016. At the time of publication, some of the apps may have been updated or removed from the App Store.

intended audience, and goals of the app publisher. In turn, more individuals are turning to mobile apps for medical information,[4] especially in dermatology, thus it is necessary to create a systematic way to evaluate the quality and utility of each app to assist users in making informed decisions about which apps will best meet their needs in the midst of a wide array of choices.

For the purpose of this study, an objective rubric was created that can be used to evaluate the quality of medical apps for patient education in dermatology. An app's adequacy and usefulness for patient education was thought to depend on 3 possible score ranges into which the app could fall based on the grading rubric. An app with a total score in the range of 5 to 10 was not thought to be useful and may even be detrimental to patients. An app with a total score in the range of 11 to 15 may be used for patient education with some reservations based on shortcomings for certain criteria. An app with a score in the range of 16 to 20 was thought to be valuable and adequate for patient education. For example, the How to Treat Acne app received a total score of 8 and therefore would not be recommended to patients based on the grading rubric used in this study. This particular app provided sparse and sometimes inaccurate information, had a confusing user interface, and contained many obstructive advertisements. In contrast, the Eczema Doc app received a total score of 19, which indicates a quality app deemed to be useful for patient information based on the established rubric. This app met all the objectives that it advertised, contained accurate information with verified citation of sources, and was very easy for users to navigate.

Of the 44 graded apps, only 9 (20.5%) received scores in the highest range of 16 to 20, which indicates a need for improvements in mobile dermatology apps intended for patient education. Adopting the grading rubric developed in this study as a standard in the creation of medical apps could have beneficial implications in disseminating accurate, safe, unbiased, and easy-to-understand information to patients.

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