

Mobile App Rankings in Dermatology

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PRACTICE POINTS

- As mobile application (app) usage increases among dermatology providers, whose demographic is shifting younger and younger, apps may become more incorporated in dermatology education. As such, it will become more critical to develop formal scientific standards.
- The most desired dermatology apps for patients were apps that allowed them to be proactive with their health.
- There seems to be a disconnect between the apps that are popular among patients and the scientific validity of the apps.

As technology continues to advance, so too does its accessibility to the general population. Mobile applications (apps) have become a part of the medical field, with dermatology being no exception. There are various types of dermatology apps, including teledermatology, self-surveillance, disease guide, reference, dermoscopy, conference, education, photograph storage and sharing, and journal apps, and others. In this study, we examined the types of dermatology apps targeting patients and physicians that are most popular by analyzing their rankings in the Apple App Store. We also delved deeper into the perceived benefits of the ranked apps targeting patients and the impact of physician-targeted apps on the field of dermatology.

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As technology continues to advance, so too does its accessibility to the general population. In 2013, 56% of Americans owned a smartphone versus 77% in 2017.¹ With the increase in mobile applications (apps) available, it is no surprise that the market has extended into the medical field, with dermatology being no exception.² The majority of dermatology apps

can be classified as teledermatology apps, followed by self-surveillance, disease guide, and reference apps. Additional types of dermatology apps include dermoscopy, conference, education, photograph storage and sharing, and journal apps, and others.² In this study, we examined Apple App Store rankings to determine the types of dermatology apps that are most popular among patients and physicians.

METHODS

A popular app rankings analyzer (App Annie) was used to search for dermatology apps along with their App Store rankings.³ Although iOS is not the most popular mobile device operating system, we chose to evaluate app rankings via the App Store because iPhones are the top-selling individual phones of any kind in the United States.⁴

We performed our analysis on a single day (July 14, 2018) given that app rankings can change daily. We incorporated the following keywords, which were commonly used in other dermatology app studies: *dermatology, psoriasis, rosacea, acne, skin cancer, melanoma, eczema, and teledermatology*. The category ranking was defined as the rank of a free or paid app in the App Store's top charts for the selected country (United States), market (Apple), and device (iPhone) within their app category (Medical). Inclusion criteria required a ranking in the top 1500 Medical apps and being categorized in the App Store as a Medical app. Exclusion criteria included apps that focused on cosmetics, private practice, direct advertisements, photograph editing, or claims to cure skin disease, as well as non-English-language apps. The App Store descriptions were assessed to determine the type of each app (eg, teledermatology, disease guide) and target audience (patient, physician, or both).

Another search was performed using the same keywords but within the Health and Fitness category to capture potentially more highly ranked apps among

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patients. We also conducted separate searches within the Medical category using the keywords *billing*, *coding*, and *ICD (International Classification of Diseases)* to evaluate rankings for billing/coding apps, as well as *EMR* and *electronic medical records* for electronic medical record (EMR) apps.

RESULTS

The initial search yielded 851 results, which was narrowed down to 29 apps after applying the exclusion criteria. Of note, prior to application of the exclusion criteria, one dermatology app that was considered to be a direct advertisement app claiming to cure acne was ranked fourth of 1500 apps in the Medical category. However, the majority of the search results were excluded because they were not popular enough to be ranked among the top 1500 apps. There were more ranked dermatology apps in the Medical category targeting patients than physicians; 18 of 29 (62%) qualifying apps targeted patients and 11 (38%) targeted physicians (Tables 1 and 2). No apps targeted both groups. The most common type

of ranked app targeting patients was self-surveillance (11/18), and the most common type targeting physicians was reference (8/11). The highest ranked app targeting patients was a teledermatology app with a ranking of 184, and the highest ranked app targeting physicians was educational, ranked 353. The least common type of ranked apps targeting patients were “other” (2/18 [11%]; 1 prescription and 1 UV monitor app) and conference (1/18 [6%]). The least common type of ranked apps targeting physicians were education (2/11 [18%]) and dermoscopy (1/11 [9%]).

Our search of the Health and Fitness category yielded 6 apps, all targeting patients; 3 (50%) were self-surveillance apps, and 3 (50%) were classified as other (2 UV monitors and a conferencing app for cancer emotional support)(Table 3).

Our search of the Medical category for billing/coding and EMR apps yielded 232 and 164 apps, respectively; of them, 49 (21%) and 54 (33%) apps were ranked. These apps did not overlap with the dermatology-related search criteria; thus, we were not able to ascertain how many of these apps were used specifically by health care providers in dermatology.

TABLE 1. Patient-Targeted Dermatology App Rankings in the Medical Category^a

Rank	Type of App
184	Teledermatology
242	Self-surveillance
327	Self-surveillance
384	Self-surveillance
485	Teledermatology
711	Self-surveillance
817	Self-surveillance
1070	Other
1128	Other
1135	Self-surveillance
1194	Self-surveillance
1202	Self-surveillance
1283	Self-surveillance
1292	Self-surveillance
1353	Teledermatology
1380	Self-surveillance
1398	Teledermatology
1484	Conference

^aData based on Apple App Store results from July 14, 2018.

COMMENT Patient Apps

The most common apps used by patients are fitness and nutrition tracker apps categorized as Health and Fitness^{5,6}; however, the majority of ranked dermatology apps are categorized as Medical per our findings. In a study of

TABLE 2. Physician-Targeted Dermatology App Rankings in the Medical Category^a

Rank	Type of App
353	Education
505	Reference
520	Reference
720	Reference
1048	Reference
1053	Reference
1100	Dermoscopy
1140	Education
1144	Reference
1240	Reference
1310	Reference

^aData based on Apple App Store results from July 14, 2018.

TABLE 3. Dermatology App Rankings in the Health and Fitness Category^a

Rank	Type of App	Intended Audience
29	Self-surveillance	Patients
539	Conferencing	Patients
1242	UV	Patients
1325	Self-surveillance	Patients
1381	UV	Patients
1442	Self-surveillance	Patients

^aData based on Apple App Store results from July 14, 2018.

557 dermatology patients, it was found that among the health-related apps they used, the most common apps after fitness/nutrition were references, followed by patient portals, self-surveillance, and emotional assistance apps.⁶ Our search was consistent with these findings, suggesting that the most desired dermatology apps by patients are those that allow them to be proactive with their health. It is no surprise that the top-ranked app targeting patients was a teledermatology app, followed by multiple self-surveillance apps. The highest ranked self-surveillance app in the Health and Fitness category focused on monitoring the effects of nutrition on symptoms of diseases including skin disorders, while the highest ranked (as well as the majority of) self-surveillance apps in the Medical category encompassed mole monitoring and cancer risk calculators.

Benefits of the ranked dermatology apps in the Medical and Health and Fitness categories targeting patients include more immediate access to health care and education. Despite this popularity among patients, Masud et al⁷ demonstrated that only 20.5% (9/44) of dermatology apps targeting patients may be reliable resources based on a rubric created by the investigators. Overall, there remains a research gap for a standardized scientific approach to evaluating app validity and reliability.

Teledermatology—Teledermatology apps are the most common dermatology apps,² allowing for remote evaluation of patients through either live consultations or transmittance of medical information for later review by board-certified physicians.⁸ Features common to many teledermatology apps include accessibility on Android (Google Inc) and iOS as well as a web version. Security and Health Insurance Portability and Accountability Act compliance is especially important and is enforced through user authentications, data encryption, and automatic logout features. Data is not stored locally and is secured on a private server with backup. Referring

providers and consultants often can communicate within the app. Insurance providers also may cover teledermatology services, and if not, the out-of-pocket costs often are affordable.

The highest-ranked patient app (ranked 184 in the Medical category) was a teledermatology app that did not meet the American Telemedicine Association standards for teledermatology apps.⁹ The popularity of this app among patients may have been attributable to multiple ease-of-use and turnaround time features. The user interface was simplistic, and the design was appealing to the eye. The entry field options were minimal to avoid confusion. The turnaround time to receive a diagnosis depended on 1 of 3 options, including a more rapid response for an increased cost. Ease of use was the highlight of this app at the cost of accuracy, as the limited amount of information that users were required to provide physicians compromised diagnostic accuracy in this app.

For comparison, we chose a nonranked (and thus less frequently used) teledermatology app that had previously undergone scientific evaluation using 13 evaluation criteria specific to teledermatology.¹⁰ The app also met the American Telemedicine Association standard for teledermatology apps.⁹ The app was originally a broader telemedicine app but featured a section specific to teledermatology. The user interface was simple but professional, almost resembling an EMR. The input fields included a comprehensive history that permitted a better evaluation of a lesion but might be tedious for users. This app boasted professionalism and accuracy, but from a user standpoint, it may have been too time-consuming.

Striking a balance between ensuring proper care versus appealing to patients is a difficult but important task. Based on this study, it appears that popular patient apps may in fact have less scientific rationale and therefore potentially less accuracy.

Self-surveillance—Although self-surveillance apps did not account for the highest-ranked app, they were the most frequently ranked app type in our study. Most of the ranked self-surveillance apps in the Medical category were for monitoring lesions over time to assess for changes. These apps help users take photographs that are well organized in a single, easy-to-find location. Some apps were risk calculators that assessed the risk for malignancies using a questionnaire. The majority of these self-surveillance apps were specific to skin cancer detection. Of note, one of the ranked self-surveillance apps assessed drug effectiveness by monitoring clinical appearance and symptoms. The lowest ranked self-surveillance app in the top 1500 ranked Medical apps in our search monitored cancer symptoms not specific to dermatology. Although this app had a low ranking (1380/1500), it received a high number of reviews and was well rated at 4.8 out of 5 stars; therefore, it seemed more helpful than the other higher-ranked apps targeting patients, which had higher rankings but minimal to no reviews or ratings. A comparison of the ease-of-use

features of all the ranked patient-targeted self-surveillance apps in the Medical category is provided in Table 4.

Physician Apps

After examining the results of apps targeting physicians, we realized that the data may be accurate but may not be as representative of all currently practicing dermatology providers. Given the increased usage of apps among younger age groups,¹¹ our data may be skewed toward medical students and residents, supported by the fact that the top-ranked physician app in our study was an education app and the majority were reference apps. Future studies are needed to reexamine app ranking as this age group transitions from entry-level health care providers in the next 5 to 10 years. These findings also suggest less frequent app use among more veteran health care providers within our specific search parameters. Therefore, we decided to do subsequent searches for available billing/coding and EMR apps, which were many, but as mentioned above, none were specific to dermatology.

General Dermatology References—Most of the dermatology reference apps were formatted as e-books; however, other apps such as the Amazon Kindle app (categorized under Books) providing access to multiple e-books within one app were not included. Some apps included study aid features (eg, flash cards, quizzes), and topics spanned both dermatology and dermatopathology. Apps provide a unique way for on-the-go studying for

dermatologists in training, and if the usage continues to grow, there may be a need for increased formal integration in dermatology education in the future.

Journals—Journal apps were not among those listed in the top-ranked apps we evaluated, which we suspect may be because journals were categorized differently from one journal to the next; for example, the *Journal of the American Academy of Dermatology* was ranked 1168 in the Magazines and Newspapers category. On the other hand, *Dermatology World* was ranked 1363 in the Reference category. An article's citation affects the publishing journal's impact factor, which is one of the most important variables in measuring a journal's influence. In the future, there may be other variables that could aid in understanding journal impact as it relates to the journal's accessibility.

Limitations

Our study did not look at Android apps. The top chart apps in the Android and Apple App Stores use undisclosed algorithms likely involving different characteristics such as number of downloads, frequency of updates, number of reviews, ratings, and more. Thus, the rankings across these different markets would not be comparable. Although our choice of keywords stemmed from the majority of prior studies looking at dermatology apps, our search was limited due to the use of these specific keywords. To avoid skewing data by cross-comparison of noncomparable categories, we could not compare apps in the Medical category versus those in other categories.

TABLE 4. Comparison of Ranked Patient-Targeted Self-surveillance Apps in the Medical Category^a

Rank	Ease-of-Use Features						
	Photographs	Risk Calculator	Photograph Comparison	Reminders ^b	Education	Symptom Monitor	Telemedicine
242	X			X			X
327	X						
384	X		X		X		
711	X			X		X	
817	X		X				
1135	X	X			X		
1194	X		X				X
1202		X					
1283	X						
1292				X	X		
1380					X	X	

^aData based on Apple App Store results from July 14, 2018.

^bReminders to take medications, take photographs every month, etc.

CONCLUSION

There seems to be a disconnect between the apps that are popular among patients and the scientific validity of the apps. As app usage increases among dermatology providers, whose demographic is shifting younger and younger, apps may become more incorporated in our education, and as such, it will become more critical to develop formal scientific standards. Given these future trends, we may need to increase our current literature and understanding of apps in dermatology with regard to their impact on both patients and health care providers.

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