

SKIN HEALTH APPLICATIONS: BLESSING OR MISDIAGNOSIS?

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There has been a global rise in skin cancer over the last few years with the rising diagnosis of 2–3 million non-melanoma and 132,000 melanoma skin cancer cases each year¹. This growing prevalence is not only attributed to the increasing ultraviolet radiation by ozone depletion but also by other major predisposing factors centred to an individual's own responsibility controls like recreational sun exposure and sunburn¹. However despite the escalating figures, low skin screening rates and awareness levels among the general population are highly disconcerting².

An estimated five billion worldwide mobile phone subscribers have permitted the creation of custom built skin health applications on personal mobile phones for self-diagnosis and screening of different skin health conditions^{3,4}. The easily accessible self-diagnostic/screening skin health applications such as Skin Scan, SpotCheck and Skin of Mine has allowed self-care dermatology to remote regions⁵.

In an eHealth review by Tyagi et al, skin 46 skin health applications were identified. These applications deploy one or all of the five basic principles, namely mobile teledermoscopy, algorithm analysis, video demonstration, teaching and education⁶. Telemedicine based skin health applications sanction utilization of a dermoscope attached to a smartphone camera to capture high resolution images of skin lesions to be sent to a team of dermatologists analysing and diagnosing the sent images within 24 hours⁶. However unlike telemedicine applications, algorithm based applications involves complete self-evaluation without a clinician⁷. While algorithms vary from program to program, the majority of algorithms use a list of low, medium, and high-risk skin lesions being diagnosed to date, along with a world map of where each case happened to help these applications define any advancement of the lesion to an uncharacteristic growth⁸.

Other skin health applications focus on providing informational material to the user to perform self-skin exams (SSE) in distinguishing the asymmetry, border irregularity, colour, diameter, and evolution of the skin lesions (ABCDE criteria)⁶. Providing diagrams and instructional text, teaching modules with quizzes to progress through tutorials or inclusion of videos about skin safety advice and interventions for regular performance of SSE are the techniques of these applications⁹. An archive log of each lesion's growth along with a complete list of doctors tailored to personal locations for future appointments are some additional features of majority skin health applications⁸.

The first major study to highlight the efficacy of these applications by Wolf et al, analysed four skin health applications which are being utilized for melanoma tracking and risk assessment¹⁰. Three of the aforementioned applications which employed automated algorithms to assess melanoma were exposed as inaccurate in misdiagnosing more than 30% of melanomas as benign. The fourth and most sensitive application, was based on the principle of store and forward teledermatology wherein images of the lesion were sent to a board certified dermatologist for evaluation within a time frame of 24 hours¹⁰. While the physician based method proved to be superior in sensitivity, it was also the most expensive, costing \$5 per use. The algorithm based applications had a price ranging from free to \$4.99 for unlimited use¹⁰. Due to financial reasons, some people may use the cheaper applications, though the use of these potentially inaccurate applications may delay appropriate healthcare⁶.

While these skin health applications are accessible to the general public, further research and improvement is required to address inaccuracies. Physicians should also be educated on the different applications that are available to their patients, allowing

them to counsel their patients on appropriate usage of these technologies. Whilst there are significant issues with the current generation of skin health applications, through further research and development, these applications may play a valuable role in the screening of suspicious skin lesions in the future.

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Conflict of Interest

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