

The Representation of Skin Tones in Google Images of Skin Cancers

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ABSTRACT

Skin self-examinations play a vital role in skin cancer detection and are often aided by online resources. Available reference photos must display the full spectrum of skin tones so patients may visualize how skin lesions can appear. This study investigated the portrayal of skin tones in skin cancer-related Google Images, discovering a significant underrepresentation of darker skin tones.

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INTRODUCTION

Skin self-examinations (SSE) are an integral part of skin cancer surveillance, with the potential to reduce mortality from melanoma by 63%.¹ Many patients rely on information found online, e.g. Google, during SSE prior to seeking medical care.² Previous studies searching Google Images for various dermatologic conditions found only 5.7% of total search results displaying darker skin tones.³ This study complements previous findings by doubling the images analyzed and focusing on skin cancers. Additionally, this study incorporated the 5-tone Pantone swatch⁴ instead of the Fitzpatrick scale, allowing for a more targeted categorization of darker skin tones rather than misuse of a grading system intended to measure skin response to UV light.

MATERIALS AND METHODS

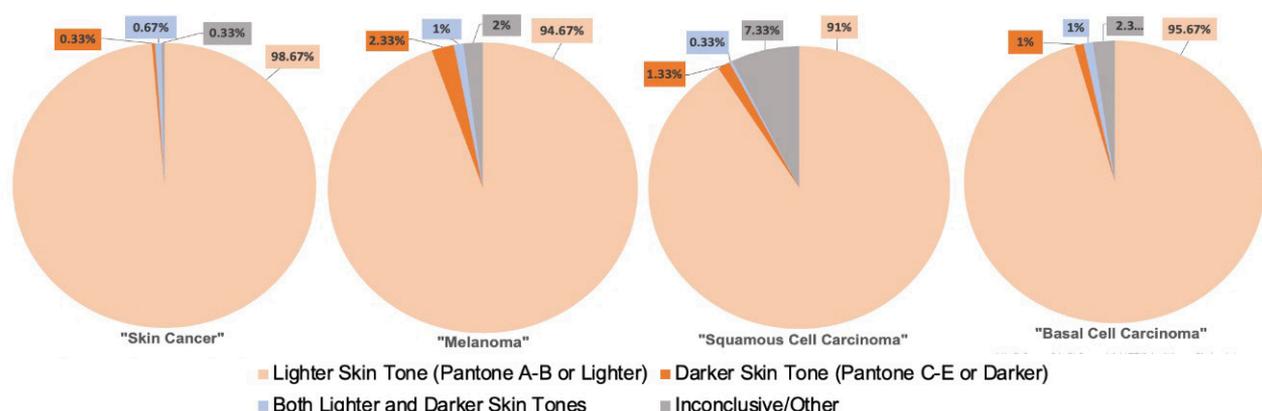
A Google Image search was conducted by 3 independent reviewers on Incognito browsers to minimize personal

algorithm bias. Each reviewer assessed the first 100 images for the following searches: "Skin Cancer" (SC), "Melanoma", "Squamous Cell Carcinoma" (SCC), and "Basal Cell Carcinoma" (BCC). Each image was designated as "Lighter Skin Tone", "Darker Skin Tone", "Light and Dark Skin Tone", or "Inconclusive/Other" based on the published 5-tone Pantone swatch.⁴ "Lighter Skin Tones" included Pantones A-B or lighter while "Darker Skin Tones" included Pantones C-E or darker. Images where skin tone could not be differentiated were deemed inconclusive. Pantone shade for each image of darker skin tone was documented, along with the image number in the search; final results were compiled and averaged.

RESULTS

Darker skin tones were infrequently encountered in the first 100 Google Image results for each search term. 1200 pictures were evaluated, of which 95% (n=1140) depicted only lighter skin tones, 1.25% (n=15) displayed only darker skin tones, and

FIGURE 1. Skin-tone representation in first 100 Google Images.



0.75% (n=9) showed both darker and lighter skin tones. 3% of images were inconclusive (n=36). For images categorized under "Darker Skin Tone," per each Google search, SC revealed 0.33%, Melanoma had 2.33%, SCC had 1.33%, and BCC had 1%. In the "Light and Dark SkinTones" category, SC had 0.67%, Melanoma had 1%, SCC had 0.33%, and BCC had 1% (Figure 1). Of darker skin tones represented, 37% (10/27) were Pantone C, 25.9% (7/27) were Pantone D, and 37% (10/27) were Pantone E. On average, the first image depicting darker skin tone was not until image 56 of 100. Depictions of Pantone E or darker were not observed until after reviewing 85+ pictures.

DISCUSSION

This analysis highlights the underrepresentation of darker skin tones in Google Images of skin cancers. Even when present, darker skin tones were not seen for over 56 images, and Pantone E or darker was not depicted until after the 85th search result. Altogether, these findings suggest that patients have a significantly reduced likelihood of finding skin cancer through Google Images of darker skin tones.

The underrepresentation of darker skin tones in a prominent search engine such as Google is especially alarming given patients with darker skin tones have delayed times for treatments of skin cancer and overall poorer outcomes.⁵ Google should be socially accountable for presenting inclusive search results for skin cancer images to improve health access and outcomes for marginalized groups.

DISCLOSURES

The authors have no conflicts of interest to disclose.

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