Underrepresentation of Skin of Color in Google Images Search of Common Skin, Hair, and Nail Conditions

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To the Editor,

There is a significant lack of diversity in skin tones when depicting dermatological conditions in educational and online materials. Google Images is a reference tool often used by both physicians and patients to diagnose skin, hair, and nail conditions.[1,2] A 2020 study on the representation of skin of color (SOC) in Google Images of common skin conditions found that 90.5% of searches underrepresented SOC patients concerning the racial demographics of the United States.[3] This study highlighted the overall dearth of melanin-rich skin representation in dermatology education and reference materials, potentially causing substandard quality of care, treatment delay, and misdiagnosis for patients with darker skin tones.[4] Recently, websites such as the American Academy of Dermatology (AAD), DermNet NZ, and VisualDx have made efforts to be more inclusive with their photos.[4] The purpose of our study was to analyze the representation of melanin-rich skin tone photos in Google Images relative to the US epidemiological data for dermatological conditions. Additionally, we assessed whether there has been an increase in the inclusion of photos of melanin-rich skin since the previous 2020 study.

Forty-two common dermatological conditions compiled based on similar research articles were searched on Google Images using "Incognito Mode" (ie, private browsing), blocking location data, and clearing browsing data and cookies. Three independent reviewers analyzed screenshots of the first 100 photos for each search and categorized them as either light-medium skin tone (Fitzpatrick I-IV) or melanin-rich skin tone (Fitzpatrick V-VI).

A total of 4,182 photos were analyzed; only 11.7% of these photos were classified as melanin-rich. In 52% of the searches, there were no photos of melanin-rich skin within the first 10 images. Of the first 100 photos in each search, it was found that conditions with classically equal racial distribution such as contact dermatitis, diaper dermatitis, cherry angioma, urticaria, and tinea versicolor showed drastic underrepresentation of melanin-rich skin tones. Furthermore, conditions with a higher incidence in people of African descent, such as central centrifugal cicatricial alopecia which occurs almost exclusively in Black women, only 64% of photos depicted melanin-rich skin. Similarly, traction alopecia, discoid lupus, hidradenitis suppurativa, dermatomyositis, acne, HSV, and subungual melanoma, still heavily feature photos of light-medium skin tones despite having predominance in people of African descent. The only disease in which melanin-rich skin was overrepresented was vitiligo (Table 1).

Representation of all skin colors within dermatology educational and reference materials is paramount to providing quality care to every patient. Although our search revealed that there was an increase in melanin-rich skin representation since 2020 (from 5.7% to 11.4%) there is still work to be done towards creating more inclusive search results on Google Images, especially for conditions in which there is no racial/ethnic predominance.[3] Notably, images featuring melanin-rich skin tones with those conditions were represented on the first page only after adding the search term "dark skin" to the query, indicating that these photos do exist but the algorithm still places a preference on lighter skin tones.

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TABLE 1.

Google Image Search Results. Prevalence of melanin-rich skin tones in Google Image searches compared to the epidemiological data of that disease in the US population. Red = Large Discrepancy (30%+); Yellow= Moderate Discrepancy (5-30%); Green = Little to No Discrepancy (0-5%); White= No clear epidemiological data could be found. The second column lists the number of the first photo depicting melanin-rich skin out of the 100 photos evaluated for the condition, indicating how far the reviewers had to scroll before coming across this photo.

Condition	Position of the 1st Melanin-Rich Skin Tone Image Out of 100	% of Melanin-Rich Skin Tone Images in Search	Prevalence of Condition in Individuals of African Descent in US	Epidemiological Data Source PMID
Acne	39	2%	Higher Prevalence in African Descent, #1 reason for Dermatology visits in African Americans	35143915 35720053
Acne Rosacea	51	2%	2-10%	30240779
Actinic Keratosis	--	0%	Uncommon	24485530
Alopecia Areata	10	9%	26%	32280257
Androgenetic Alopecia	1	4%	4x more likely in Caucasian men	17543725
Basal Cell Carcinoma	15	2%	1-2% annually	17052479
CCCA	1	64%	Strong African American Predominance	32609323
Cherry Angioma	--	0%	Equal Racial Distribution	33085354
Contact Dermatitis	49	1%	Equal Racial Distribution	11807469
Dermatomyositis	8	6%	Strong African American Predominance	25641317
Dermatofibroma	11	4%	--	--
Dermatosis Papulosa Nigra	1	81%	Strong African American Predominance	28916031
Diaper Dermatitis	29* *Only 82 photos	5%	Equal Racial Distribution	23603652
Discoid Lupus	15	2%	54%	24504809
Eczema	49	3%	10-12%	30389491
Herpes Simplex	14	6%	Higher prevalence in African Americans vs Caucasians 30-50% (HSV-1 and HSV-2)	21176214 29442994
Hidradenitis Suppurativa	13	5%	33%	28492923
Kaposi Sarcoma	4	31%	Correlates with HIV/AIDS prevalence, higher in African Americans	7804993
Keloids	1	14%	23.7%	23463963
Melanoma	--	0%	3% (mostly acral melanoma)	11807469
Melanonychia	3	20%	Strong African American Predominance	32055501
Melasma	13	2%	Strong African American Predominance	25184917
Molluscum Contagiosum	14	3%	6%	15575844
Phytophotodermatitis	2	3%	Uncommon	32104953
Pityriasis Rosea	37	4%	Uncommon	35620324
Psoriasis	10	2%	2%	24388724
Squamous Cell Carcinoma	52	1%	1-2%	19691228 32845319
Seborrheic Dermatitis	12	5%	6.5%	30681789
Seborrheic Keratosis	–	0%	Uncommon	31424869
Syphilis	1	30%	33%	CDC.gov
Shingles	18	1%	4.5%	7876622
Stevens-Johnson Syndrome	5	16%	2X as likely in African Descent vs Caucasian	27039263
Subungual Melanoma	61	3%	Equal Racial Distribution (of African Americans with melanoma, 75% are subungual)	29494087
Sunburn	87	1%	13.2%	29541756
Syringoma	9	11%	--	--
Tinea Capitis	1	20%	0-19%	36983534
Tinea Corporis	78	2%	--	--
Tinea Versicolor	29	9%	Equal Racial Distribution	29494106
Traction Alopecia	9	42%	Strong African American Predominance	29670386
Chronic Urticaria	63	1%	12%	30872154
Vitiligo	1	56%	17%	34787670
Warts	17	1%	Half as likely in African Descent vs Caucasian	28613701

DISCLOSURES

Dr. Kindred is on the Lilly advisory board and speaker's bureau, a board member at Aerolase, in the speaker's bureau for Nutrafol, a speaker for Novartis, a member of the Sun Pharmaceuticals advisory board and speaker's bureau, an AAD Web content reviewer, a JNMA editor, a Cutis journal editor, part of the Janssen steering committee and SOC Advisory Board a consultant for Abbvie and Pfizer, a speaker and advisor for Regeneron, and a member of the medical board for Selphyl. No other authors have anything to disclose or conflicts of interest.

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