Evaluating Medical Student Assessment of Common Dermatologic Conditions Across Fitzpatrick Phototypes

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INTRODUCTION

Skin of Color (SoC) is underrepresented in dermatology texts and clinical images. In one analysis of medical textbooks, only 4.5% of images showed darker skin types[1]. Additionally, 47% of United States dermatologists and dermatology residents surveyed felt that their training was inadequate in preparing them to identify and treat skin conditions in dark skin[2]. SoC patients are often misdiagnosed or diagnosed later in disease progression, and have poorer outcomes compounded by other health disparities[2]. We sought to assess potential SoC differences in diagnostic accuracy among medical trainees.

METHODS

A 22-question clinical pictures diagnosis quiz including the top 11 Global Burden of Disease[3] dermatologic conditions in non-SoC (Fitzpatrick Skin (FS) Phototype I-III) and SoC (FS Phototype IV-VI) was distributed to University of Colorado medical students via email. Students were instructed to take the quiz only once and without outside resources. They also provided their current year in medical school, prior dermatology experience, and self-reported their Fitzpatrick skin type to determine whether students' own experiences could play a role in accurate diagnoses. No students were excluded from this study.

References

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DATA

Table 1: Dermatologic conditions with the greatest disparities in correct visual diagnosis based on Fitzpatrick Skin (FS) Phototype.

Condition	FS Phototype I-III % Correct	FS Phototype IV-VI % Correct	X^2	P-value
Atopic Dermatitis	96/121 = 79.3%	71/121 = 58.7%	12.0758	0.0000511
Psoriasis	106/121 = 87.6%	20/121 = 16.5%	122.457	< 0.00001
Malignant Melanoma	112/121 = 92.6%	87/121 = 71.9%	17.6757	0.000026
Impetigo	87/121 = 71.9%	61/121 = 50.4%	11.7591	0.000605
Basal Cell Carcinoma	115/121 = 95.0%	58/121 = 47.9%	65.8673	< 0.00001

Table 2: Disparities in correct visual diagnosis of dermatologic conditions based on Fitzpatrick Skin (FS) Phototype and students' self-reported FS type.

	Student FS Type I-III # Correct/Total	Student FS Type IV-VI # Correct/Total	X^2	P-value
Psoriasis on FS I-III Photos	77/92 = 83.7%	17/29 = 58.6%	7.9976	0.004684
Psoriasis on FS IV-VI Photos	16/92 = 17.4%	6/29 = 20.7%	0.1613	0.68806
Basal Cell Carcinoma on FS I-III Photos	83/92 = 90.2%	22/29 = 75.9%	3.9599	0.046596
Basal Cell Carcinoma on FS IV-VI Photos	43/92 = 46.7%	14/29 = 48.3%	0.0209	0.885065
Malignant Melanoma on FS I-III Photos	86/92 = 93.4%	26/29 = 89.7%	0.4681	0.493862
Malignant Melanoma on FS IV-VI Photos	71/92 = 77.2%	16/29 = 55.2%	5.283	0.021535

RESULTS

A total of 144 students enrolled and 121 completed the study (n=121/144, 84.0% completion). All students had participated in didactic dermatology lectures and had the option of participating in elective dermatology rotations. Preclinical students (years 1+2) scored an average of 68.5% correct, while clinical students (years 3+4), scored an average of 77.6%. Conditions with the greatest disparities in accurate visual diagnosis were atopic dermatitis (79.3% correct in non-SoC vs. 58.7% in SoC), psoriasis (87.6% vs. 16.5%), malignant melanoma (92.6% vs. 71.9%), impetigo (71.9% vs. 50.4%), and basal cell carcinoma (95.0% vs. 47.9%) (statistics in Table 1). Even after considering students' self-reported FS phototype, both non-SoC and SoC students correctly diagnosed psoriasis, basal cell carcinoma, and malignant melanoma more frequently in non-SoC patient photos relative to SoC (Table 2). No single condition was diagnosed more accurately in SoC than non-SoC.

DISCUSSION & ACKNOWLEDGMENTS

These findings emphasize the need for a more diverse representation of patients to be included in comprehensive dermatology curricula. Similar work conducted at Tulane and the University of Oklahoma revealed that medical students diagnosed squamous cell carcinoma and atopic dermatitis less accurately in SoC[4]. We improved on the previous study by accounting for potential confounding variables, including the measurement of prior dermatology experience, as well as within-subject analysis, as each student was required to identify all skin conditions in both light skin tones and SoC. Future work could survey a greater number of trainees, especially those who identify as SoC, and examine a wider variety of conditions to further elucidate diagnostic disparities. Residents training in less diverse areas also emphasized insufficient SoC exposure[5]. SoC-focused problem-based learning, didactics, and resources (VisualDx featuring SoC photographs, and textbooks e.g. Malone Mukwende's Mind the Gap, describing clinical signs and presentations in darker skin types) could potentially improve dermatology training and care[5].

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