

Diversity of Skin Images in Medical Texts: Recommendations for Student Advocacy in Medical Education

Trisha Kaundinya^{ID} and Roopal V Kundu

Northwestern University Feinberg School of Medicine, Chicago, IL, USA.

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ABSTRACT: Foundational academic medical texts facilitate foundational understanding of disease recognition in medical students. Significant underrepresentation of darker skin tones and overrepresentation of lighter skin tones in dermatologic texts, general medical texts, and scientific literature is observed. This compromises the clinical tools of trainees when it comes to darker skin tones. Text publishers and editors are steadily beginning to address these disparities, but bottom-up change from trainees is necessary to comprehensively address this issue. In this article the authors propose institutional review panels as a framework for building awareness of underrepresentation of darker skin tones and ensuring that faculty intentionally share diverse presentations in didactics. They also propose trainee engagement in building diverse medical image libraries and including texts on skin of color in institutional libraries. Empowering trainees to be advocates and call out any implicit or explicit biases in image selection can engender change in this area of medical education.

KEYWORDS: Medical education, skin of color, medical training, diagnostics, equity, skin

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CORRESPONDING AUTHOR: Trisha Kaundinya, Northwestern University Feinberg School of Medicine, 420 E. Superior St, Chicago, IL 60611, USA. Email: Trisha.Kaundinya@northwestern.edu

In the wake of powerful anti-racism advocacy, we must more carefully consider representation of different races, ethnicities, and skin tones in our academic spaces. In medicine, much of our academic teaching and foundational grasp of concepts occurs with textbooks, particularly their visual aids. These images provide building blocks for pattern recognition in the nuanced presentations of patients.

Our foundational texts have been and continue to be inequitable in their distribution of images of skin tones. This inequity has serious longitudinal consequences that must be addressed by all stakeholders in the medical system, including medical students. In this commentary, we highlight trends in distributions of skin tones in medical images, discuss their effects throughout medical training, and make recommendations for medical students to combat this issue.

Differential Representation in Medical Texts

Overrepresentation of light skin tones and underrepresentation of dark skin tones—brown and black skin tones—has been significantly observed in dermatologic texts. A 2006 study found that the coverage of dark skin in images in major dermatology resources ranged from 4% to 18%.¹ Following this study, the difficulty in photography technique to capture the nuances in cutaneous presentations for darker skin tones was presented as a contributing factor to the dearth of images, although texts with illustrative images of brown and black skin have been in circulation for several decades.²

The disparities persist, however, even as technology improvements have minimized the challenges in photographing dark skin tones—a 2020 study found that the percentages of image representation in dermatology textbooks mirror 2006,

with up to 18% of images containing dark skin tones. At the core of this underrepresentation of brown and black skin is white centering and defining white as normal when characterizing skin conditions. The stratification of representation of skin tones based on condition is more concerning, as dark skin tones are more frequently used to show sexually transmitted infections than common diagnoses such as acne.³

A pronounced disparity of representation in medical images is arguably most concerning in dermatology, but recognizing differences in normal and abnormal for a condition on any skin tone is paramount to the diagnostic process in every specialty. A 2018 study of general medicine texts found that under 5% of images included dark skin tones.⁴ This has been seen in primary medical literature as well, with only 18% of images in the *New England Journal of Medicine* including non-white skin tones from 1992 to 2017.⁵

Current barriers to increasing visual representation of darker skin tones in medical texts are three fold: First, there is a lack of awareness of the underrepresentation of darker skin tones in medical images. Second, there is a shortage of darker skin tones in medical image repositories. Third, there are implicit biases in the image selections of publications.

Effects on Medical Education

Although it has been asserted that interactive educational content is more worthy of consideration in today's learning environment than content employing passive learning strategies like textbooks, foundational textbooks in every medical specialty still represent the core values of our profession. Any inequities in these texts' preferences may lead to clinicians having less exposure to presentations in darker skin tones. The



resultant hesitation in diagnosing darker-skinned patients can compromise the quality of care for these patients. It can also affect the mental health of residents, as learning to provide care within a racially inequitable educational framework can be discouraging.⁶

The effect of underrepresentation of dark skin tones in medical images seeps deeper into the medical education pipeline than current providers. For medical students, images of mostly white patients pulled from preeminent texts into lectures are often their first encounter with disease presentation. The Covid-19 pandemic and the semi-permanent transition to virtual didactics have also required medical students to be more autonomous in supplementing what they learn in lectures, and ancillary textbooks and primary literature on the web perpetuate the skew toward presentation in lighter skin tones.

When most presentations of conditions that students see are in one skin tone, we automatically connect the diagnosis with a one-dimensional presentation, limiting our ability to recognize the condition in other skin tones or include it on our differential diagnosis. This narrow-minded diagnostic eye will carry forward with us in the wards, throughout residency, and in clinical practice unless it is meaningfully corrected with culturally competent in-person education, a challenging process that is not currently achieved by all residency training programs.^{7,8}

The biases that underrepresentation of dark skin tone images creates ultimately exacerbates disparities in dermatologic outcomes between patient populations with light and dark skin tones.^{9,10}

Opportunities for Medical Students

Addressing the scarcity of images of skin of color in medical education must be a priority—the temporal immediacy of this has been seen with Covid-19, as there is already a shortage of reference images showing how it presents in darker skin tones.

This disparity is being steadily addressed at the publisher, author, and clinician levels to improve racial equity in curation of medical images, but there is room for bottom-up change too. Medical students witnessing these disparities in their education can build awareness of the importance of adding images of darker skin tones to medical texts. Student curriculum review panels at medical schools can facilitate this discussion, as having equitable education on different skin tones directly impacts the experiences of future cohorts. Panels may find that seasoned educators have an existing awareness of this issue, but they can develop a “checkbox” system to quantitatively assess if all faculty include diverse images in lectures.

Medical students can also engage their schools in building and bolstering image libraries. They may have an incomplete background in skin presentations, but their first-hand exposure to how image disparities affect their medical decision making is invaluable when communicating with darker-skinned patients and seeking informed consent to take their photos in clinic. In addition to producing images, students can request

medical texts that exclusively cover skin of color in their physical and online institutional libraries.

Students whose institutions do not have review panels or image library initiatives can also assist in international efforts—Malone Mukwende, a medical student at St. George’s, University of London recently worked with his institution to create a guide *Mind the Gap*, which compares images of cutaneous and systemic diseases side-by-side on dark and light skin tones. It also contains a guide that elucidates ways to describe phenotypes in different skin tones in an anti-racist way. Malone’s team is now looking to build their medical image web library of dark skin tones and they have been approached by the British Association of Dermatology and National Health Service (NHS), who also struggle to find images of darker skin.

When trying to combat the implicit biases of publications, medical students may feel like a quiet voice in the hierarchy of influence, but social media has shown to be a powerful amplifier of their advocacy efforts and can engender change.¹¹ Throughout these student-led efforts to improve image distributions, faculty can help provide a voice of awareness, support, and advocacy, and facilitate connectivity to ongoing work at the publisher level.

These changes can together improve the diagnostic toolkits of all future physicians when it comes to darker skin tones. The act of learning about more patients with diverse backgrounds and seeing their clinical presentations in lecture will also build a more inclusive learning environment that indirectly reminds us of our responsibility as physicians to take care of all patients.

Conclusion

In a turbulent time when our health systems revisit the principle of justice, we must critically address the areas in which the foundational texts in medicine fall short. The deep-seated underrepresentation of darker-skinned individuals in medical images is concerning for the future of medical education, culturally competent patient care, and research. Structural changes instituted by medical student trainees are necessary to complement higher level initiatives to improve equity in skin tone image representation.

Author Contributions

TK: conceptualizing and writing. RK: conceptualizing and writing.

ORCID iD

Trisha Kaundinya  <https://orcid.org/0000-0002-0680-0522>

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