Review

How is a lack of diversity in medical literature imagery affecting the quality of healthcare?

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Abstract

The purpose of this study is to investigate the importance of diverse imagery in medical textbooks in promoting representation, cultural competency, proper diagnosis of medical disorders and inclusiveness in the learning environment. It is essential for medical schools to include imagery featuring a range of skin tones. This inclusion aids future doctors in learning to practise medicine for everyone, not just those of lighter skin tones. As our communities and societies evolve and grow more diverse, it is critical that our medical curriculum evolves as well.

Introduction

As healthcare provides a variety of services for an ethnically diverse society, clinical teaching resources need to be representative to strive for an equal quality of care for all. This essay aims to highlight the overrepresentation of lighter skin tones in comparison to darker skin tones and its impact on the quality of healthcare provided to ethnic populations.

The problem, in part, stems from a lack of ethnic representation in medical literature. Alongside other factors, including socioeconomic status and varying access to care, this eventually leads to disparities in healthcare, specifically racial disparities. The term racial disparity is defined by the Institute of Medicine[1] as the "racial or ethnic differences in the quality of healthcare that are not due to access-related factors or clinical needs, preferences and appropriateness of intervention". Medical literature, comprising journals, articles, and books, primarily serves the purpose of educating on various aspects of medicine, including disease presentation and medical procedures.[2] This is utilised in the training of doctors and, subsequently, practise of medicine. If this information is then biased in terms of imagery and lacks in patient representation, it may not only be ineffective, but also have a negative impact on the health outcomes for certain demographics.

Methods

To comprehensively understand and address the issue of diversity in medical imagery and its impact on healthcare outcomes, a systematic literature search was conducted through various academic databases. This was done using PubMed, Google Scholar, relevant medical education journals, and Plymouth University's library system, which provided access to peer-reviewed journals and articles. The search strategy encompassed key terms such as "diversity in medical imagery", "racial disparities in healthcare", "representation in medical education", and "skin tone variation in clinical signs".

The goal was to search papers that explored and explained the effects of a lack of diversity in medical imagery on healthcare, rather than just identifying it. At the point of interest, there seemed to be a paucity of research on this topic, which meant I had to utilise reputable web articles that offered interesting perspectives still relevant to my topic. To ensure the reliability of these articles, I checked the authors' credentials, verified citations for accurate and relevant sources, and assessed the publication source from reputable platforms. Citation chaining was also used to find sources through other research papers.

Discussion

What is the problem with imagery in medical literature?

Images are crucial for understanding a concept in a more memorable and easily applicable way. This method is particularly useful in

medicine, where images frequently serve as tools to identify and manage patterns of illness. The lack of an array of skin tones in clinical images poses an issue. This lack of representation hinders medical practitioners from effectively applying their clinical knowledge to individuals of colour, making them less equipped to accurately diagnose medical conditions.

Louie & Wilkes (2018) investigated the occurrence of imagery showing pigmented skin tones in medical textbooks including Atlas of Human Anatomy and Gray's Anatomy to see if it approximately aligned with the racial diversity in the United States.[3] Whilst referring to the different races as white, black and other people of colour, and skin tones as light, medium and dark, they found that the books were approximate in terms of race but not in skin tones. In fact, the population of White individuals, Black individuals and other people of colour were 62.5%, 20.4% and 17%, respectively, thus accurately reflecting the population. However, 74.5% of skin tones represented were light whilst only 4.5% were dark, clearly showing an overrepresentation of light skin tones.[3] This is problematic as these books are popular in teaching and yet, fail to sufficiently demonstrate the differences in skin tones which can potentially alter the way treatment is administered. To avoid inadvertently encouraging implicit bias when using imagery as a teaching tool, it is necessary to accurately represent the racial makeup of the patient population.[4] These textbooks could enhance their content by displaying images depicting how medical conditions present on various skin tones such as the Massey-Martin skin colour guide (see **Figure 1**). However, potential challenges may arise from the limited availability of high-quality images illustrating clinical manifestations on darker skin.[5] Regardless, one must consider that not all diseases affect each race equally therefore intentional overrepresentation may be required, where appropriate.

Given that these core textbooks lay the foundation for medical students' understanding of disease identification, the insufficient representation of darker skin tones poses a potential issue. This underscores the necessity for implementing a change in this regard.[6] Implicit racism in medicine can be so subtle that it is hard to pinpoint the issue. Regardless, it is worth understanding due to its effects on the patient's experience of healthcare.

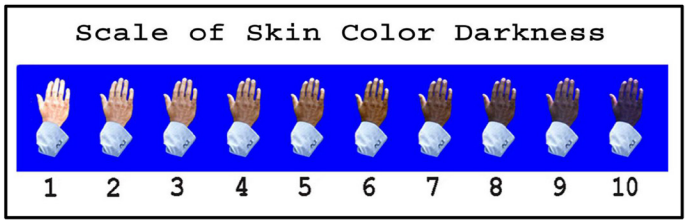

Figure 1. Massey-Martin skin colour guide. Reprinted from Louie P & Wilkes R (2018)[3]

Which areas of medicine suffer as a result of inconsistency in imagery?

This issue of underrepresentation is commonly seen in dermatology. Dermatology is a branch of medicine that deals with the study of the skin and its diseases. Visual presentations on the skin can be an indication of underlying problems like iron deficiency, which clinically presents as pallor but in itself is not a skin condition.[7] Hence, the skin is referred to as a 'window to health'.[8] Despite the primary focus on the skin in dermatology, the problem of underrepresented darker skin tones in medical literature is highlighted in conditions where redness, paleness and rashes are valuable for diagnosis. For example, rashes may manifest on a Black person as a white, purple or a grey colour whereas most textbooks classify rashes as red.[9] Neglecting these visible differences in literature can be harmful, increasing the risk of a delayed diagnosis for those who need immediate care, due to a lack of awareness. Moreover, racially biased literature depicts light skin as the 'norm' and limits the quality and accuracy of differential diagnoses and treatments offered to those with darker skin tones.[10]

Additionally, a study by Massie et al (2019) found that after analysing over 24,000 images in six plastic surgery textbooks, different skin tones were not equally represented in accordance with the US population[4] and another showed that darker skin tones were linked with worse health outcomes.[11] As an example, consider the five-year survival rate for melanoma, which is 67% for Black patients compared to 92% for White patients, primarily due to delayed diagnosis.[11] These statistics vividly demonstrate the possible repercussions of insufficient awareness concerning clinical manifestations in different skin tones, resulting in medical care that may favour White patients while disregarding black and brown-skinned patients.

Besides this, clinical images serve another important purpose – they help convey an individual's diagnosis in a manner that words alone cannot achieve. However, when images inaccurately represent the patient or their condition, confusion can arise – eroding the individual's trust in the doctor's judgment. Such instances might lead patients to assume that the doctor lacks expertise in treating individuals with their specific skin tone. This breakdown of trust can subsequently influence their behaviour, health-related decisions, and most crucially, the dynamic of the doctor–patient relationship.[13]

Problems like these are precisely why representation is crucial in medical education as the limitations highlight the hidden curriculum in medicine. The hidden curriculum consists of the 'uncritical aspects of medical training that impact medical practice'.[3] Decolonisation of the medicine curriculum is crucial to bringing about change. The main focus of this is conquering structural inequalities rather than exclusion based on race.[14] This will mean lecturers and those put in charge constantly question their methods to encompass all students and their future patients. Although the medicine curriculum emphasises the importance of equal care in terms of race, the inconsistent portrayal of races and skin tones in clinical resources contradicts this. Whether or not this is deliberate, the outcomes lead to racial minority patients being pushed aside in medical education, meaning future doctors are not as familiar with complications in minorities. Lipoff, a dermatologist,[15] stated that it is a result of the 'White patient being treated as the default and the Black patient as the asterisk'. As a result, this gives a false idea of the patients that doctors are likely to encounter, creating a sense of unpreparedness in the healthcare setting, contributing to poorer health outcomes in racial minorities.

What factors could contribute to the lack of diversity in medical imagery?

Delving deeper, we can explore the influence of cognitive biases in the authors and teachers of clinical education, as they conclude what is added and discussed in the clinical teaching resources. This is not helped by the lack of racial diversity that are present in the authors. Cognitive biases (sometimes referred to as implicit bias), present in the authors and producers of these resources can affect how they view the importance of inclusive information about different races in their literature. Ryn et al (2015) explains that these biases are likely to develop from their life experiences, some of these maybe occurring at medical school which may ultimately affect how they view other races.6 An example of this implicit bias is in the research findings by Lester et al[15,17] who found that out of 5026 images in common medical teaching resources, coloured skin tones were represented significantly more in sexually transmitted infections (STIs) than in non-STI infections such as acne, 47–58% in comparison with 28%. This literature reflects the reinforced stereotypes of hypersexuality commonly associated with Black people. We need to challenge these statistics in order for subconscious stereotypes to be addressed. Implicit elements like these affect the way healthcare is objectively provided. This is where decolonisation of the curriculum comes into play.

Despite the strong influence of racial disparities in medical education upon patient outcomes, some may argue that the lack of trust present in the doctor–patient relationship with Black patients

also plays a significant role in their absence in medical research and literature. The deep-rooted distrust present in the majority of the Black community may stem from individual experiences of racism and discrimination from healthcare professionals along with the history of harmful clinical practises like the Tuskegee syphilis study.[18,19] Consequently, this results in a reluctance to adhere to clinical treatment and participate in drug trials meaning there is less information about certain diseases for Black people in comparison to their White counterparts.

Even though the majority of this research is based on the American population and American healthcare, the same implicit biases which lead to racial disparities are present in the UK healthcare system tool.[20] This has been highlighted in the current pandemic climate of the UK where ethnic minorities have been affected most by the virus, with the highest number of deaths.[20] In such cases, it would be unfair to attribute the outcomes solely to genetic differences.[21] Instead of placing blame on genetics, it is crucial to address the healthcare disparities arising from biased literature and implicit racism, which contribute to these unfortunate deaths. A lack of diversity in medical education is an example of racial inequality which is reflected in care provided to people of colour.

What is the way forward?

Barriers to a good quality of healthcare need to be dissolved or else they can have negative consequences on those affected. Efforts have been made by medical professionals to tackle these inequalities and create more awareness. One such initiative comes from a third year medical student, Malone Mukwende, who published a clinical handbook called 'Mind the Gap' which aims to bring attention to the clinical signs that do not present the same in a darker skin tone and to educate healthcare professionals on how to identify these differences.[22] For example, consider Kawasaki disease, an acute inflammatory disease of the blood vessels which presents as a red rash in lighter skin tones but as a barely visible heat rash on black skin tones.[22] Please see **Figure 2** for another example. Resources like this will be beneficial in educating of these significant differences that affect health outcomes and is a great example of student advocacy.[6] Despite the impressive response to this book, it is disappointing that a separate book needs to be created in order for there to be an inclusive solution. Just as Lipoff says, 'You can't make skin of colour a lecture that students get once a year. It can't be 'otherized' or put in a separate textbook.'[15] This is a powerful statement that emphasises the pattern of teachings regarding skin colour.

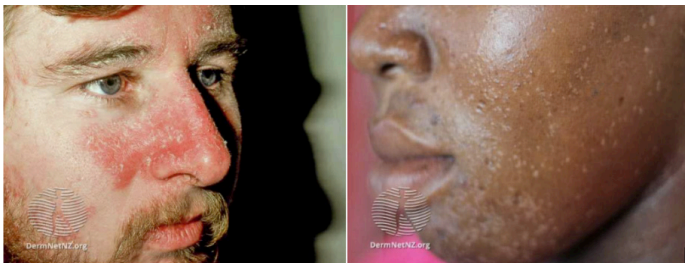

Figure 2. Presentation of Seborrheic Dermatitis on lighter skin and darker skin. Images reprinted from DermNet[23]

Recently, the General Medical Council (GMC) issued a statement acknowledging the need for ethnic representations in patient case studies to diversify the curriculum and the resources used to educate medical students, so that they have the 'opportunity to gain knowledge and understanding of the needs of patients from diverse social, cultural and ethnic backgrounds'.[24] As this new change in the curriculum is relatively a new thing, it is not certain if the change will be the determining factor in better patient health outcomes, but with the GMC speaking out and the NHS incorporating images of darker skin tones in their patient information websites, it is a good place to start.[14,25]

Conclusion

The studies presented highlight a critical issue concerning the underrepresentation of darker skin tones. This issue carries a dual impact, influencing both the competence of doctors in treating patients of colour and the satisfaction of these patients with the quality of healthcare received. As a medical student and person of colour, who has received a dermatology handbook devoid of skin tones similar to my own, I feel passionately about the need for change to provide medicine that is created for all.

To enhance doctor–patient relationships and optimise patient wellbeing, the need to eradicate barriers present in healthcare such as racially biased literature is crucial. As medical institutions prioritise inclusivity in training and educational materials, we have an opportunity to promote improved healthcare outcomes for diverse patients and foster culturally competent doctors. In doing so, we can work towards eradicating inequalities that have marginalised and isolated Black and Brown patient populations.

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Hello, I'm a fourth-year medical student at Plymouth Medical School. My fascination with the intricacies of the brain has led to a strong interest in neurology and psychiatry. The inspiration for this essay stems from my first-hand experiences as a student and those of my loved ones in healthcare. These encounters have ignited my passion for advocating and raising awareness about the importance of this topic.