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Author

Linehan, Alyssa

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Racial disparities in pain management: Exploring the causes and potential solutions

Alyssa Linehan

University of California, Davis

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Dr. Lisa Sperber

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Abstract

Racial disparities in pain management are a widely recognized issue in U.S. healthcare. Black patients presenting with pain in U.S. hospitals are more likely to have their pain underestimated and undertreated in comparison to White patients. These disparities are perpetuated by a variety of factors rooted in both implicit and explicit racial biases, such as false beliefs about biological racial differences in pain sensitivity, provider insensitivity in the detection of pained expressions on Black patients' faces, and stereotypes regarding the presumed criminality and drug use of Black patients. These factors result in Black patients' pain often being viewed through a lens of skepticism or even being overlooked entirely. This literature review aims to explore these causal factors and connect them to potential interventions to alleviate the racial disparities in pain management. The current body of research reflects that provider awareness of the implicit and explicit racial biases these factors stem from is not enough to effectively address these disparities. More structured interventions focused on individualized feedback, mindfulness skills, and reducing the intergroup anxiety of non-Black healthcare providers are needed to effectively tackle these disparities.

Introduction

Racial disparities in pain management are a well-documented issue in U.S. healthcare.[9,14,15,19,20,23] Black patients' pain is often underestimated and undertreated in comparison to White patients presenting with the same level of pain.[9,14,15,19,20,23] Black patients are less likely to receive an opioid prescription and more likely to receive no analgesia at all in comparison to their White counterparts.[1,2,7,11,18,21,26] When Black patients do receive a prescription for opioids, they are often given a lower dosage than White patients.[1,2,18] Heightened concern surrounding opioid misuse due to the opioid epidemic combined with biases regarding the presumed criminality and drug use of Black people add another layer of complexity to consider when tackling these pain management disparities.[5,9,13,22] Clinician training focused on reducing opioid prescriptions has been shown to be largely effective in reducing overall opioid prescriptions, but the racial disparities in opioid prescribing still remains significantly consistent.[5] These racial disparities in opioid prescribing remain significant even after adjusting for possible confounding factors such as patient pain severity, history of substance abuse, age, payment source, and location.[22,26]

The general body of research on this topic suggests that these disparities are largely due to the implicit and explicit racial biases of healthcare providers influencing their medical decision-making.[4,8,9,12,13,14,19,20] Implicit racial biases are unconscious subjective preferences regarding race that are shaped by one's life experiences and environment.[4] Explicit racial biases are an individual's conscious thoughts and beliefs about specific races.[4] With subjective conditions such as pain, adequate assessment and treatment is often decided at the provider's discretion, which relies on the provider's understanding and interpretation of the patient's presentation.[9] Therefore, pain treatment is especially vulnerable to the influence of both implicit

and explicit biases. For instance, one study conducted a survey of registered nurses and revealed differences in pain assessment, pain management, and stigma/therapeutic relations among racially discordant nurse-patient pairs.[4] These findings indicate that racial biases play a role in the pain care that patients receive.

The physical and psychological toll of insufficient pain management greatly contributes to patients' suffering and can interfere with their ability to function in their daily lives.[3] Some patients even report suicidal ideation as a result of their unmanaged chronic pain.[3] When patients are unable to receive adequate pain management through their medical provider, many seek out risky methods of self-medication through the use of alcohol and marijuanna.[3] Some patients even turn to using illicit drugs, such as non-prescription opioids.[3,21] The consequences of inadequate pain management are clear, and the severity of these consequences must inform our sense of urgency in approaching disparities in pain management.

In this literature review, I aim to synthesize the current research on the causal factors contributing to these racial disparities in pain management and opioid prescribing in order to analyze the best targets for interventions. First, I will analyze the specific racial biases that perpetuate the racial disparities in pain management and opioid prescribing. Then, I will explain how contradictory findings in the research on interventions inform us that awareness of racial bias, alone, is not enough to comprehensively and effectively address these issues. Finally, I will evaluate the effectiveness of different interventions in reducing these racial disparities in order to highlight both the direction of the current body of research as well as the gaps that require further study.

Methods

Peer-reviewed studies that primarily focused on racial disparities in pain management, racial disparities in opioid prescribing, and/or interventions to alleviate racial disparities in healthcare were identified. The databases searched were PubMed and Scopus, using keywords "Black American," "pain management," "analgesia," "opioids," "racial bias," "intergroup anxiety," and "disparity." Criteria for source selection included: 1. The source focused on at least one specific pain management disparity faced by Black patients in the U.S. 2. The source mentioned interventions that included either provider implicit bias training, clinical decision support tools, or both. 3. The source was published within the last 10 years (2015-2025). Two additional studies, Carrillo et al. (2025) and Tajeu et al. (2022), were included that did not meet all of the inclusion criteria. Carrillo et al. (2025) did not meet the first two criteria, but this cross-sectional survey study was deemed necessary to include in order to provide sufficient context regarding the specific health consequences of insufficient pain management. Tajeu et al. (2022) did not meet the first inclusion criterion, as it primarily focused on implicit racial biases impacting the quality of patient care as a whole, but this study was deemed relevant to include due to its findings on utilizing an e-course intervention to reduce racial bias among healthcare staff, which could serve to improve racial disparities in pain care. A total of twenty-seven sources were chosen for analysis including literature reviews, exploratory studies, randomized controlled trials, retrospective cohort studies, and cross-sectional surveys. The findings from these sources were synthesized according to their specific topic in order to indicate the significance of each source to the focuses of this review.

What Biases Perpetuate Racial Disparities in Pain Management and Opioid Prescribing?

False Beliefs About Biological Racial Differences in Pain Sensitivity

Many people hold false beliefs about biological racial differences between Black and White people.[14] These false beliefs include ideas such as Black people having less sensitive nerve endings, thicker skin, weaker lungs, quicker blood coagulation, and smaller brains than White people.[14] These beliefs come from pseudoscientific claims previously used to justify slavery, yet a concerning proportion of both laypeople and medical students still believe in some of these falsehoods.[14] Hoffman et al. (2016) found that 73% of White laypeople and 50% of White medical students endorsed at least one false belief about biological racial differences.[14] Data from surveys conducted in other studies further illustrate the prevalence of false beliefs regarding racial differences in pain sensitivity.[13,15] Hollingshead et al. (2016) found that, on average, both Black and White laypeople perceived the average White person to be more sensitive to pain and more willing to report pain in comparison to the average Black person.[15] Hirsh et al. (2020) found this same belief trend among physician residents and fellows.[13]

Endorsement of these misconceptions have concerning clinical implications, as the management of pain relies not only on the clinician's ordered prescription, but also the discretion of nurses who are often instructed to administer pain medication "as needed".[9] If healthcare providers believe Black patients are inherently less sensitive to pain, this can skew their evaluation and treatment of their pain, contributing to the racial disparity in pain management. This concern is validated by the findings of Hoffman et al. (2016), as the endorsement of more false beliefs was found to be associated with greater inaccuracy in pain assessment and treatment recommendations for Black patients in comparison to White patients.[14]

Insensitivity to Negative Facial Expressions of Black Patients

The inability to accurately recognize and interpret the facial expressions of Black patients also contributes to the undertreatment of Black patients' pain.[19,20] Studies have found that non-Black participants, which included White people as well as non-Black people of color, had greater difficulty recognizing pain in the facial expressions of Black patients in comparison to White patients.[19,20] This bias in pain recognition carries significant consequences for the treatment of Black patients' pain. Mende-Siedlecki et al. (2019) found that, even when virtual patient models presented with the exact same facial expression, Black patients were still given one less gram of non-opioid pain medication, on average, in comparison to White patients.[19] Racial bias in pain recognition still remains a significant predictor of racial bias in treatment recommendations, even after adjusting for other possible confounding factors such as objective differences in facial structure and participants' explicit racial biases regarding status and strength judgements.[19]

The tendency to see pain less readily on the faces of Black patients is also associated with a general insensitivity in recognizing other negative expressions on Black people's faces such as fear and sadness.[20] However, this insensitivity in recognizing fear and sadness was not found to have any statistically significant correlation with any racial bias in pain treatment.[20] Despite the lack of a significant correlation to treatment recommendations in this specific study context, where the participants viewed still images of virtual patient models, these findings still carry significant implications for how Black patients may be treated differently in actual clinical settings. In actual clinician-patient interactions, patients are likely to present with an array of negative emotions, and the inability of a clinician to detect negative emotions such as fear or sadness could potentially influence the level of empathy and sensitivity that Black patients are

treated with. This can contribute to a lack of effective communication and compassion in patient interactions, which can have negative impacts on pain assessment and treatment decisions.[9]

Presumed Criminality and Drug Use of Black Patients

Misconceptions about racial differences in pain experience in conjunction with the reduced sensitivity of clinicians' detection of pain on Black patients' faces both contribute to the underprescription of non-opioid and opioid analgesia for Black patients. However, to fully understand the factors that perpetuate the racial disparity in opioid prescribing, specifically, it is important to consider how stereotypes regarding the presumed criminality and drug use of Black patients also impact clinicians' treatment decisions.[6,9,13] Black patients with a history of opioid misuse are perceived to have a much higher risk of diversion (distributing their opioid prescription to others) than White patients who also had a history of opioid misuse.[13] When no history of opioid misuse is present, clinicians still rate Black patients as having a higher risk of adverse effects from opioids, such as an accidental overdose, than White patients who also had no history of opioid misuse.[13] Personal accounts of Black patients further illustrate the consequences of racial stereotyping regarding drug use, with many Black patients reporting that they were unfairly treated and felt their clinicians did not provide them with pain medication because of the false perception that they were drug addicts.[6]

Interestingly, when patients had a prior history of opioid misuse, there was no evidence of significant racial bias in the perceived risk of adverse effects.[13] This finding suggests that prior history of opioid misuse may reduce clinical ambiguity in evaluating opioid-related risks.[13] When that relevant evidence for increased risk of opioid misuse is not indicated, racial stereotypes appear to seep into the provider's risk assessment for Black patients.

Despite these findings, Hirsh et al. (2020) found no significant association between clinicians' implicit and explicit biases and their perceptions of patients' opioid-associated risks.[13] However, this seemingly contradictory finding can be explained by evaluating the methods by which implicit and explicit biases were measured. Implicit bias was measured using the Implicit Association Test, which assesses general implicit racial preferences based on the speed of the participants' association of Black or White people with good or bad terms (e.g. delight, fantastic, gross, hate). The Implicit Association Test does not measure the specific stereotypes that may influence these preferences, (e.g. assumed predisposition to drug-abuse and criminal behaviors), so the absence of an association between this implicit bias measure and risk assessment does not mean that racial stereotyping did not influence risk assessment.[13] Explicit bias was measured in the form of the Race/Ethnicity Expectations of Pain Questionnaire (REPQ) in which participants stated their beliefs regarding the pain sensitivity and willingness to report pain of a typical Black person and a typical White person.[13] Although the questions from the REPQ can be useful metrics for evaluating racial bias in pain management, in the context of opioid risk assessment, these questions do not adequately capture other explicit racial biases such as the drug-related stereotypes previously described in this section.

An alternative explanation for the disparity in opioid prescribing has also been offered outside of these racial biases. It is possible that there are patient-level biases that reflect a racial preference for different types of analgesia and that preference is what contributes to the racial difference in opioid prescriptions. However, the findings of a randomized prospective clinical trial by Engel-Rebitzer et al. (2021) indicate that, regardless of whether or not clinicians were provided additional patient information regarding opioid-associated risks and pain management preferences, Black patients were still consistently less likely to receive an opioid prescription in

comparison to White patients.[8] This indicates that the racial disparity in opioid prescribing likely stems from clinician bias rather than patient preference.

Consequences of Bias: Black Patients' Pain Is Not Taken at Face Value

The compounding effect of the biases described above is that Black patients' pain is often not taken at face value in comparison to White patients. If Black patients are believed to have a higher pain tolerance and a predisposition to drug abuse behaviors, then it is likely that their pain is perceived through a lens of skepticism, resulting in worse pain management and decreased likelihood of opioid prescription. A retrospective cohort study of three U.S. emergency departments conducted by Boley et al. (2024) presents a specific example of this potential difference in the perceived legitimacy of Black patients' pain.[2] Boley et al. (2024) explain that obtaining advanced imaging on a patient provides clinicians with additional information on patient condition that may "legitimize" the self-reported pain score, thus increasing the likelihood of opioid prescription .[2] Among patients that had imaging ordered, significantly fewer Black patients were administered opioids prior to the availability of their imaging results in comparison to White patients.[2] This indicates that White patients' pain was more likely to be perceived as legitimate, resulting in an opioid prescription even before the clinician received imaging results, whereas Black patients' pain may not have been perceived as legitimate.

Why Awareness of These Disparities Is Not Enough to Alleviate Them

The Possibility of Overcompensating for Known Disparities

After learning about the different false beliefs and racial biases that contribute to racial disparities in pain management, it may seem intuitive that we can eliminate these disparities by

simply raising awareness about these issues. While this is an important step to take, some studies present conflicting findings that indicate the solution to this disparity is far more nuanced.[10,14] As topics of racial disparities have become a more mainstream focus in our culture, many physicians try to balance their consciousness of racial disparities in pain management with their awareness of the opioid epidemic. With no standardized training on how to mitigate implicit racial biases in their decision making, some studies indicate providers may overcompensate for disparities in pain management and actually overestimate Black patients' pain, leading to overprescription of opioids to Black patients.[10,14]

Hoffman et al. (2016) found that White medical students and residents who endorsed fewer or no false beliefs on biological racial differences actually underestimated the pain of White patients in comparison to Black patients.[14] Interestingly, unlike with the underestimation of pain levels of Black patients in comparison to White patients, this underestimation in the pain levels of White patients in comparison to Black patients did not result in any racial bias in treatment recommendations.[14]

However, one study did find racial bias in treatment recommendations that conflicted with the general trend of the undertreatment of Black patients' pain. Grant et al. (2020) found that White physicians with higher levels of intergroup anxiety had increased situational discomfort when treating Black patients which resulted in higher opioid treatment recommendations and pain specialist referrals for Black patients in comparison to White patients.[10] Grant et al. (2020) noted that a potential cause for this behavior could be a desire to avoid any social conflict or backlash that may result from accidentally de-legitimizing the severity of Black patients' pain by recommending non-opioid medication or not providing a referral to a pain specialist.[10]

Although the results of these studies do not reflect the general trend within this body of research, contextualizing these findings within the changing social climate surrounding racial inequality highlights the need for more structured interventions targeting the clinical accuracy of pain assessment and treatment in order to eliminate racial bias in both directions. It is important to find the "sweet spot" of accurate assessment and treatment decisions for Black patients because, just as the undertreatment of pain has serious health consequences, overprescribing opioids also carries its own health risks. Healthcare providers must be able to make accurate judgements regarding patient pain and opioid risks without having the patient's race skew their assessment.

What Interventions Could Alleviate This Disparity?

E-Courses on Racial Disparities

Although awareness of these disparities, alone, is not sufficient to alleviate them, awareness is still a necessary part of the solution. The success of novel e-courses in increasing provider awareness of racial biases in pain management, and patient care in general, indicates that e-courses focused on the racial biases in pain management could prove to be a potentially fruitful intervention.[24,25]

Stensland et al. (2025) evaluated the effectiveness of a 90-minute self-paced online e-course focused on educating medical students about racial disparities in pain assessment and management in order to enhance empathy and reduce implicit bias.[24] Student feedback on this course highly rated its effectiveness in improving their knowledge of disparities in pain care, ability to challenge implicit biases, and empathy for the pain experienced by racial minorities.[24] A unique component of this intervention, which likely contributed to its success, was the

inclusion of real patient testimonial videos, one of which focused on the story of a Black patient who recounted his own challenges in accessing adequate pain management.[24]

Similarly, an online intervention evaluated by Hirsh et al. (2019) also found success in mitigating bias by increasing clinicians' compassion for Black patients through virtual perspective-taking interactions.[12] In these perspective-taking interactions, physicians interact with virtual simulations of Black patients in order to gain a better understanding of how the patient's pain impacts different personal aspects of their life.[12] Providers who received this intervention had 85% lower odds of demonstrating treatment bias against Black patients.[12] The success of both the patient testimonial videos and perspective-taking intervention methods indicate that humanizing Black patients to increase provider empathy is a key component in tackling this disparity.

Importantly, results from Ruben et al. (2024) indicate that a passive learning approach of solely raising awareness about racial biases in pain assessment did not yield any significant changes in pain assessment bias.[23] However, the awareness intervention evaluated by Ruben et al. (2024) only involved reading an article about racial biases in pain assessment and did not include any other multimodal components or specific aspects targeting provider empathy.[23] Inclusion of those empathy-increasing elements could have enhanced the effectiveness of this intervention.

A different e-course evaluated by Tajeu et al. (2022) that focused more broadly on racial bias in healthcare was found to reduce the average implicit bias scores among the participants from an initial slight pro-White bias to a neutral unbiased score.[25] It is important to note that this course in particular was targeted specifically towards non-physician and non-RN staff in primary care clinics.[25] Despite these healthcare staff not having the ability to make treatment decisions,

the use of e-courses to reach a broader audience of healthcare workers could still contribute to solving disparities in pain management, as the management of patient pain can be influenced by the attitude of the entire healthcare team.[9,25]

Further research is needed on this intervention method to explore its effectiveness in raising provider awareness of the specific racial stereotypes and false beliefs that hinder equitable pain care, specifically targeting clinicians who are directly involved in the assessment and administration of pain care. Additionally, further research is needed to assess the impact these courses may have on reducing racial bias in actual patient interactions and pain treatment decisions.

Individualized Feedback and Bias Training

The effectiveness of interventions focused on increasing awareness of racial biases described in the prior section can be significantly strengthened by implementing individualized feedback on the racial biases personally exhibited by providers.[12,17,23] Providing individual feedback to participants regarding the degree to which racial biases were prevalent in their overall trend of pain assessment accuracy has been shown to significantly decrease pain assessment bias.[23] Additionally, combining this individualized feedback with interventions that target provider compassion through dynamic perspective-taking interactions were found to be very effective.[12]

However, individualized feedback and bias training focused on increasing compassion may still not be enough to effectively tackle this disparity. Although combining individualized feedback with perspective-taking bias training was successful in increasing clinician compassion for Black patients and reducing treatment bias against Black patients, this intervention had no

significant impact on clinicians' level of discomfort with treating Black patients.[12] As discussed earlier in this review, increased situational discomfort stemming from intergroup anxiety can also lead to the opposite trend in pain assessment and opioid prescribing, with Black patients being overprescribed opioids, which carries its own health risks.[10]

Additionally, when study participants were provided with immediate feedback on their pain assessment accuracy, allowing them to practice self-correcting their own exhibited biases in each pain assessment trial, participants' self-correction skewed their overall pain assessment accuracy.[23] While participants' pain assessment accuracy for Black patients increased, they began to overestimate the pain of White patients.[23] It appeared as if participants shifted their overall pain assessment rating scale up to account for their underestimation of Black patients' pain, but they still exhibited the bias that Black patients were less sensitive to pain than White patients.[23]

These results indicate that more structured bias training is needed to supplement these individualized feedback and compassion-focused interventions. A randomized control trial conducted by Kanter et al. (2020) explored this approach through an in-person workshop intervention that involved standardized patient interactions with real people.[17] This training intervention targeted bias through structured lessons on mindfulness skills regarding racial stereotypes, microaggressions, and emotional rapport building.[17] Clinicians randomized to participate in the intervention group practiced these skills in mixed-race groups and then received feedback on their skills in standardized patient interactions with Black patient actors.[17] Combining individualized feedback with structured bias training and standardized behavior correction was extremely effective in reducing racial bias and improving emotional rapport in provider-patient interactions.[17] The non-intervention control group exhibited no significant

change across any of these measures in their standardized patient interactions.[17]

Although this study did not specifically evaluate pain assessment and pain treatment recommendations in all of its patient scenarios, its effectiveness in targeting bias in the perceived legitimacy of the concerns Black patients presented provides valuable insights into how this intervention could influence the treatment of Black patients' pain. Building a foundation of trust and understanding in provider-patient interactions is a crucial component of effective pain care.[9] Additionally, focusing on building skills on mindfulness and acceptance of bias rather than suppressing race-related intergroup anxiety allows providers to maintain critical awareness of their biases without letting them have any functional impact on their decision-making and patient care.[17]

Due to the in-person interactive design of this intervention, we can also draw stronger conclusions about how this intervention could translate to improvements in real clinical settings. However, it is important to note that this was a relatively small pilot study, only including 25 participants.[17] Despite this, the overall strength of the study remains high due to the extensive evaluation methods used, which included results obtained from the participants themselves as well as two sets of blind, independent behavioral coders.[17] The fact that significant post-intervention improvement was consistent across so many distinct measures (e.g. emotional rapport building, response to racial challenges, attitudes towards racial minorities, microaggressive responding, working alliance, interaction closeness) also provides compelling evidence supporting the effectiveness of this intervention.[17] Additionally, when Kanter et al. (2020) isolated the results of only the White participants, the resulting statistical analysis still reflected statistically significant improvements for the intervention group across all of the observer-related outcome measures and nearly all of the self-reported outcome measures.[17]

The small sample size of this study does indicate potential issues regarding the practicality of such an involved in-person intervention, as Kanter et al. (2020) note that their sample size was restricted by the availability of participants, with 15 out of 40 of their initial participants being unable to commit to the study dates.[17] In-person training is less flexible and accessible than the virtual training interventions discussed throughout all of the proposed interventions thus far. This presents us with the conflict of a trade-off between efficacy and practicality. Further research is needed to explore a potential blend of e-courses and virtual training with the training targets of this workshop intervention and to explore approaches to make in-person workshop interventions more accessible and practical. Additionally, further research is needed to explore how these interventions affect actual clinical outcomes in pain management as well as how long the effects of these interventions last.

AI as a Clinical Decision Support Tool

Considering the complexities involved in addressing individual biases, incorporating large language models (LLMs) into the pain management decision-making process could also serve as a potentially effective intervention to alleviate racial disparities in pain management.[16,27] Although LLMs can reproduce biases, some studies indicate that after significant improvements, LLMs such as GPT-4 and Gemini could potentially provide a more objective standardized assessment of pain and development of treatment plans.[27] After further development, AI could be a potentially useful tool in analyzing pain cues in patients' facial expressions, body language, and vocal signs.[16] Automating the pain assessment process in this manner could serve as a potential solution to the issues described earlier regarding provider insensitivity to pained and negative facial expressions on Black patients' faces.

However, AI is a rudimentary intervention that will require significant improvements before it can be utilized in a clinical setting, as this technology has been shown to exhibit similar racial biases in pain treatment recommendations as well.[16] This makes sense, given that these AI models are trained on clinical research datasets, which come with their own sources of bias.[16] Systemic healthcare issues that result in the overrepresentation of White patients in clinical trials as well as the fact that statistical datasets often exclude underrepresented demographics both contribute to the development of treatment biases in AI algorithms and reduce the generalizability of these models to a more diverse patient population.[16] Additionally, publication bias plays a role in the development of algorithmic bias as well.[16] Publication bias is the tendency to publish data with positive or statistically significant results. Favoring these results over negative or null findings reduces the comprehensive accuracy of AI models in the assessment and treatment of pain.[16] While promising as a future clinical decision support tool, bias in AI models holds the potential to actually worsen disparities in pain management, so it is incredibly important that we cautiously approach this intervention with critical awareness of this risk.

Interestingly, Young et al. (2025) observed no racial biases in pain assessment nor treatment when presenting mock patient cases to the AI models GPT-4 and Gemini.[27] However, although the researchers did not observe differences in pain assessment and treatment based on race across either model, they did observe general differences in pain assessment and treatment between the two models.[27] One example of this was the overall tendency of GPT-4 to rate patient's pain as "severe" whereas Gemini had the tendency to rate patient's pain as "moderate."[27] This indicates that AI tools as a whole are not yet capable of providing standardized patient assessments nor treatment plans. It is also important to note the fact that the

cases were presented to these AI models in text form, so we cannot draw any conclusions to address the concerns of biases in pain assessment based on AI recognition of pain cues in patients' facial expressions, voices, or body language.

Overall, the general body of research on AI as a clinical decision support tool indicates that there is still much work needed to refine these models before they can reach the level of accuracy required to trust their application with real patients. Further work needs to be done to eliminate bias in the training of these AI tools and to ensure that its assessments and treatment recommendations are up to par with clinical standards.

Conclusion

The observed racial disparities in pain management among Black patients presenting with pain in U.S. hospitals can be largely attributed to both the implicit and explicit racial biases of healthcare providers influencing pain assessment and treatment decisions.[4,8,9,12,13,14,19,20] These biases are often informed by false beliefs regarding biological differences in pain sensitivity as well as racial stereotyping regarding the presumed criminality and drug use of Black people.[6,13,14,15] Because of these biases, the pain of Black patients is often viewed through a lens of skepticism and not taken at face value.[2]

It is critical that healthcare providers are cognizant of the consequences of their implicit and explicit biases in order to avoid contributing to these disparities in pain management. Providers must also recognize that awareness of racial biases is a necessary, but not entirely sufficient, component in effectively addressing these disparities. The desire to be equitable, alone, does not directly translate to equitable care. This issue is much more nuanced than just "choosing to not be racist." The current body of research reflects that compassion does not

cancel out discomfort and self-correction does not translate to overall assessment accuracy. Awareness of biases without structured approaches to resolve them can result in well-meaning providers overcompensating for known disparities which, especially in the context of opioid prescribing, carries its own set of health risks.

Humans are all inherently biased and that bias is shaped by a variety of factors discussed in this review, such as misinformation, stereotypes, societal attitudes, and social pressures. Although eliminating bias itself may appear to be the ideal solution to this issue, because of the complex nature of issues rooted in bias, research indicates that this may not be the most effective approach. Interventions providing mindfulness training centered around not letting these biases or intergroup anxiety interfere with behaviors appear to yield more accurate and reliable improvements in equitable patient care.[17] The consequences of the discomfort of non-Black providers in treating Black patients can also be mitigated by increasing the diversity of the medical workforce to improve rates of provider-patient racial concordance.

This review also explored topics regarding the development of AI tools to aid in standardizing pain assessment and treatment. Despite the potential that AI holds as a clinical decision support tool, it is critical to recognize that even if a completely unbiased and accurate AI model was developed, AI as a clinical decision support tool, alone, cannot eradicate racial biases that influence the overall treatment experience of Black patients by their providers. It will always be necessary to address racial biases held by providers in order to ensure that the aspect of human connection in healthcare is not lost. Empathetic patient-centered care and accurate patient assessment must always remain the top priorities in any healthcare interaction, and it is especially important in subjective treatment areas such as pain.[9] These goals can be accomplished through a combination of structured interventions centered around awareness,

compassion, and mindfulness. Every patient deserves equitable, competent, and compassionate care and addressing these racial disparities in pain management can help the healthcare community get one step closer to that goal.

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