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The Interaction of Patient Race, Provider Bias, and Clinical Ambiguity on Pain Management Decisions

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Abstract: Although racial disparities in pain care are widely reported, much remains to be known about the role of provider and contextual factors. We used computer-simulated patients to examine the influence of patient race, provider racial bias, and clinical ambiguity on pain decisions. One hundred twenty-nine medical residents/fellows made assessment (pain intensity) and treatment (opioid and nonopioid analgesics) decisions for 12 virtual patients with acute pain. Race (black/white) and clinical ambiguity (high/low) were manipulated across vignettes. Participants completed the Implicit Association Test and feeling thermometers, which assess implicit and explicit racial biases, respectively. Individual- and group-level analyses indicated that race and ambiguity had an interactive effect on providers' decisions, such that decisions varied as a function of ambiguity for white but not for black patients. Individual differences across providers were observed for the effect of race and ambiguity on decisions; however, providers' implicit and explicit biases did not account for this variability. These data highlight the complexity of racial disparities and suggest that differences in care between white and black patients are, in part, attributable to the nature (ie, ambiguity) of the clinical scenario. The current study suggests that interventions to reduce disparities should differentially target patient, provider, and contextual factors.

***Perspective:** This study examined the unique and collective influence of patient race, provider racial bias, and clinical ambiguity on providers' pain management decisions. These results could inform the development of interventions aimed at reducing disparities and improving pain care.*

***Key words:** Race, bias, disparities, decision making.*

Suboptimal pain care is common, especially for black patients.[43] Several factors contribute to this disparity, including differences in pain sensitivity, patient preferences, healthcare access, and, potentially, provider biases.[2,54] Explicit biases are conscious and deliberate, whereas implicit biases are automatically activated with little conscious awareness.[16,24-26] Several theories of racial discrimination (eg,[18,20]) propose that many individuals simultaneously hold divergent racial attitudes implicitly and explicitly; that is, they consciously disavow biases yet exhibit negative evaluations of blacks on implicit measures. Contemporary discriminatory behavior is predicted more by individuals' implicit than explicit biases.[48]

Two empirical studies found that implicit racial bias was not associated with racial disparities in pain assessment[28] or treatment.[51] However, these studies were small and, more importantly, may have *reduced* the effect of implicit bias[5,57] by using straightforward, unambiguous scenarios portrayed with a written vignette[51] or simple picture.[28] Conversely, situations that increase cognitive load (eg, situations that are complex and/or ambiguous) elicit greater discrimination.[5,6,52,54] Indeed, ambiguity is a hallmark feature of pain care[7] that affects layperson and provider judgments, such that patients whose pain reports are inconsistent with objective findings are viewed

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suspiciously and considered to be in less need of treatment.[55] One of the few studies to examine cognitive load and health disparities found that under conditions of high load, providers were more likely to diagnose female patients with depression—a stereotypically female condition.[45] This retrospective study did not allow researchers to manipulate the variables of interest, assess provider stereotyping directly, or control for confounds. Stronger preliminary evidence is provided by Burgess et al,[6] who found that male physicians were less likely to prescribe opioids to black patients under high cognitive load but more likely to prescribe opioids to black patients under low load; female physicians were more likely to prescribe opioids to black patients regardless of cognitive load.

Although studies have primarily focused on opioid treatment, other important aspects of care may also be susceptible to differential practices across race. Black pain patients may be more often referred for urine drug tests and to substance abuse specialists[29] and denied early prescription renewals.[4] Additionally, black pain patients may be vulnerable to having briefer face-to-face interactions with their (primarily white) providers.[3,23,37,39,42,53] The implications of this time disparity are significant, as face-to-face time predicts patient outcomes, provider satisfaction, and reduced healthcare costs.[17,44,47]

The current study used virtual human technology and lens model methodology to examine the role of provider bias and contextual ambiguity in the care of white and black pain patients. Our primary hypotheses were that 1) providers would be less likely to use opioid medications for black than for white patients; 2) this disparity would be more pronounced for providers higher versus lower in implicit racial bias; and 3) the effect of patient race on provider opioid decisions would be greater under conditions of high versus low clinical ambiguity. We also examined the relationship between the amount of time participants spent on each patient and their decisions across race and ambiguity conditions. Portions of this investigation were presented at the 2014 conference of the American Pain Society.

Methods

Participants

Participants were recruited from medical residency/fellowship programs across the United States via posted fliers (for local sites only), email, and word of mouth. Eligible participants were at least 18 years old, currently enrolled in an accredited medical residency/fellowship program in the United States, and involved in patient care at the time of the study. Medical residents/fellows were chosen because they provided patient care currently and would be fully independent physicians in the near future; thus, they provided meaningful and consequential data about patient, provider, and contextual factors that influence pain care. Also, as a practical matter, medical residents/fellows are often easier to recruit for research studies than are independent physicians. One hundred seventy-one individuals contacted the investigators and expressed interest in the study. Of these, 21 did not provide any additional information that would have allowed us to determine their eligibility; thus, they did not complete the study. Six potential participants did not meet eligibility requirements (3 were not medical residents/fellows, and 3 did not have access to an appropriate computer). Fifteen potential participants met eligibility requirements, were provided log-in credentials to access the website, but did not complete the study. This resulted in a final sample of 129 participants (75% of the initial pool) who completed the study. Just over half of the participants were men (54%), and the mean age was 29.6 years (standard deviation [SD] = 2.7). Approximately 56% self-identified as white, 26% as Asian, 7% as Hispanic, 2% as black, and 9% as other. The most represented states of residence were Texas (35%), Indiana (30%), Michigan (12%), and Illinois (10%). More than 75% of participants were currently providing care in an inpatient hospital or emergency room setting. Participants reported a wide range of clinical specialties; the most represented were anesthesiology (17%), internal medicine (12%), pediatrics (12%), and psychiatry (12%). Participants' reported average clinical experience with pain was 43.26 (SD = 21.88, rated on a 0–100 visual analog scale anchored at "not at all experienced" and "very experienced").

Study Design and Procedure

We used a lens model design and virtual human technology for this study. The lens model is an analog method used to examine individual decision making. Inherent to this model is the assumption that individuals make decisions by attending to and weighting available information (cues).[12] Lens model studies typically present a series of profiles that contain cues that participants may use to make decisions. Each profile contains a unique combination of cues. In this study, we were interested in 1 patient cue (race: white vs black) and 1 contextual cue (clinical ambiguity: low vs high). Four unique patient profiles were needed to represent each possible cue combination once (2 levels of race $\times$ 2 levels of ambiguity = 4). To enhance the reliability of the decision-making data and maximize statistical power (see Statistical Analyses section below), we created 12 unique computer-simulated patients so that each cue combination was presented thrice.

Patient profiles consisted of a video and text vignette. We used computer-simulated patient videos created with FaceGen software (Modeller v3.1; Singular Inversions Inc, Toronto, Ontario, Canada). This virtual human software allowed us to develop high-fidelity computer-simulated patients that display standardized empirically validated facial expressions of pain. We manipulated the facial features associated with pain to create 2 prototype pain expressions—1 representing high pain and 1 representing low pain.[13,49] We then "morphed" these expressions onto different computer-simulated patients, such that equivalent pain expressions were displayed by white and black patients. This innovative feature confers