Review

Pain Management

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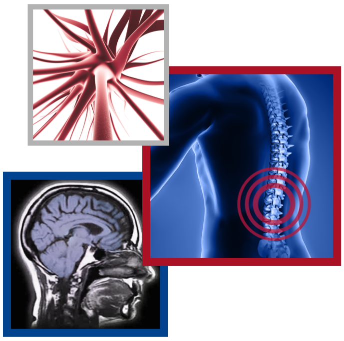

Addressing chronic pain disparities between Black and White people: a narrative review of socio-ecological determinants

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Practice points

- Within the Black community, documented socioeconomic disparities can perpetuate a positive feedback loop in which socioeconomic disparities lead to greater health disparities (e.g., more severe chronic pain, greater chronic pain-related disability and depression) that then lead to further socioeconomic disparities (e.g., missed work, lost wages).
- Provider misperceptions about pain tolerance and prescription use among Black individuals may be implicit, present during periods of increased cognitive load, and correlated with disparate pain management.
- Higher rates of obesity due to structural and systemic discrimination place Black individuals more at risk for chronic pain related symptoms.
- Personal strategies to appraising, coping with and expressing chronic pain and higher rates of comorbid anxiety, fear, helplessness and pain avoidance can lead to a downward spiral of both chronic pain and depressive symptoms.
- A longstanding history of racism, discrimination, racial stereotyping and socioeconomic oppression has led to biomedical distrust among Black individuals that weakens care-seeking behaviors and worsens pain-related outcomes.
- Put together, these interwoven factors have led to disparities in health literacy, access to treatment and general medical health; a White-centric system of educating providers, diagnosing and delivering care; patient–provider miscommunication; and downstream disparities in chronic pain outcomes between Black and White individuals.
- Behavioral interventions, culturally adapted for the chronic pain needs of Black–Americans, are particularly promising as they offer an opportunity to directly mitigate the dangers of disseminating ineffective, non-culturally appropriate interventions that risk wasting already scarce biomedical resources and widening chronic pain disparities.

A 2019 review article modified the socio-ecological model to contextualize pain disparities among different ethnoracial groups; however, the broad scope of this 2019 review necessitates deeper socio-ecological inspection of pain within each ethnoracial group. In this narrative review, we expanded upon this 2019 article by adopting inclusion criteria that would capture a more nuanced spectrum of socio-ecological findings on chronic pain within the Black community. Our search yielded a large, rich body of literature composed of 174 articles that shed further socio-ecological light on how chronic pain within the Black community is influenced by implicit bias among providers, psychological and physical comorbidities, experiences of societal and institutional racism and biomedical distrust, and the interplay among these factors. Moving forward, research and public-policy development must carefully take into account these socio-ecological factors before scaling up pre-existing solutions with questionable benefit for the chronic pain needs of Black individuals.

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Future Medicine

One-fifth of American adults suffer from chronic pain of any origin with 8% experiencing disruption in at least one major life activity [1,2]. Financially, this pain epidemic has translated to $560 billion in direct medical expenditures, lost productivity and disability programs [1]. From a sociopolitical perspective, underrepresented US groups experience worse pain management and outcomes [3–15].

Relative to the Non-Hispanic White (White) population, Non-Hispanic Black (Black) individuals often report worse pain severity [5,16–18] and duration [18]. Relative to White individuals, Black individuals also report worse pain-related disability across physical, psychological and social domains [16,17,19–22]. These disparities are more pronounced among Black individuals over the age of 50 who, relative to White individuals within the same age bracket, report higher rates of pain interference (51 vs 39%) and severity (28 vs 17%) [18].

Despite a higher risk for pain and pain-related disability within the Black community, evidence suggests this population is either undertreated or disparately treated for pain compared to White individuals [23]. Considering these disparities, the USA Department of Human and Health Services (HHS) has called for pain therapeutics that better engage the Black population [24], specifically by addressing the social determinants of pain [25]. Several well-recognized and systematic theoretical models have sought to explain pain-related health disparities between Black and White populations [26–30]. One of the most widely accepted models is the bio-psycho-social model, which posits that pain is a dynamic interaction among and within the biological, psychological and social factors unique to each individual. As a result, the treatment of chronic pain must be multifaceted [31,32].

The socio-ecological model

To our knowledge, the most recent comprehensive review of ethnoracial chronic pain disparities was conducted by Meints and colleagues using the well-recognized socio-ecological model [33]. In general, the socio-ecological model posits that each individually encountered situation is influenced by the individual, the individual's interpersonal relationships, and the individual's environment [34–51]. By modifying the socio-ecological model, Meints and colleagues found that system-, provider- and patient-factors contributed to racial and ethnic differences in the experience and treatment of chronic, non-malignant, musculoskeletal pain (Figure 1); however, further work is needed to unpack the socio-ecological nuances of chronic, non-malignant, musculoskeletal pain within the Black community, particularly in reference to implicit bias among providers, physical and psychological comorbidities that contribute to chronic pain, and the interrelationships among system-, provider- and patient-factors (e.g., societal and institutional racism and biomedical distrust). Using the narrative review format, we chose to expand upon the work of Meints and colleagues by applying their modified socio-ecological model to answer the following research question: 'What are the system-, provider- and patient-factors that influence disparities in chronic, non-malignant, musculoskeletal pain outcomes between Black and White individuals?' We chose to highlight chronic pain disparities between Black and White individuals because prior literature has largely adopted this comparison format; however, we recognize that recent advancements in pain disparities research have pushed for an antiracism framework that avoids simply comparing Black individuals with White individuals as the normative race [52–57]. According to Booker and colleagues, the history of pain disparities research can be categorized into four generations: Do pain disparities exist?; Why do pain disparities exist?; Are pain interventions accessible and effective?; and How can we transform disparities into equities through health liberation [56]? This narrative review sought to address questions from Generations 1–2 throughout the Results section. We then sought to address questions from Generation 3–4 in the Discussion section.

Method

Defining terms, classifications & concepts related to Black ethnoracial identity

The ethonoracial terms, classifications and concepts found within this narrative review require foregrounding, if only to acknowledge how they are inherently complex and subject to change over time. First, to address Black ethnoracial identity using less biased language, we adhere to the American Psychological Association's (APA) guidelines on style and grammar. Second, under these guidelines, we use the term 'ethnoracial' to encompass the meanings of both 'ethnicity' and 'race.' According to the APA guidelines on style and grammar, ethnicity refers to 'shared cultural characteristics such as language, ancestry, practices and beliefs' and race refers to 'physical differences that groups and cultures consider socially significant.' Second, we use the term 'underrepresented group' when referring to a 'minority,' which the APA defines as 'a population subgroup with ethnic, racial, social, religious or other characteristics different from those of the majority of the population, though the relevance of this term is changing

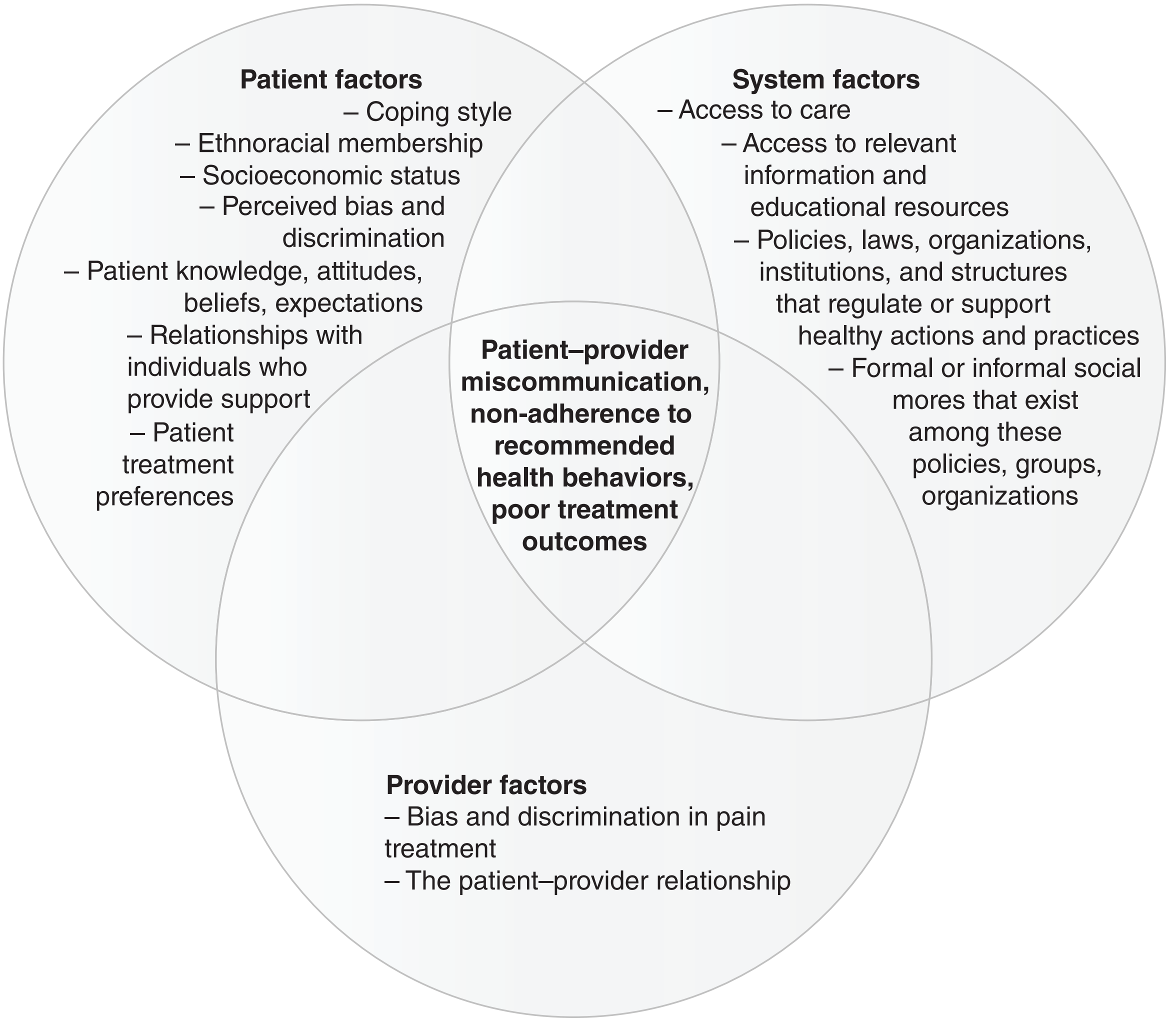

Figure 1. Modified socio-ecological model of system-, provider- and patient-factors influencing racial and ethnic disparities in pain.

as the demographics of the population change;' however, our use of the term underrepresented groups does not necessarily imply that these groups are 'underprivileged.' Third, although the term 'Black' is a self-identified social category that can refer to ethnoracial groups of both African and non-African ancestry, in this narrative review, our use of the term Black specifically refers to people of African ancestry from across the world [58]. Fourth, we use the term 'White' when referring to non-Hispanic, non-Black individuals of European ancestral origin.

Following a narrative review format

We elected to conduct a narrative review over a systematic review to gather a comprehensive overview of our research question, draw from a wide range of topics and sub-topics, and potentially identify gaps in the literature [59]. We conducted and reported this narrative review using guidelines previously outlined by Ferrari and colleagues (2015) [60]. We also ensured that our narrative review scored 'high' on each item from the Scale for the Assessment of Narrative Review Articles (SANRA) [61]. To formulate our research question, we adopted the socio-ecological model as modified by Meints and colleagues (2019). This modified socio-ecological model separates across system-, provider- and patient-level factors (Figure 1) [33]. Using this modified version of the socio-ecological model, we formulated our research question, 'What are the system-, provider- and patient-factors that influence disparities in chronic, non-malignant, musculoskeletal pain outcomes between Black and White individuals?' We defined musculoskeletal pain as any pain related to the bones, joints, ligaments, tendons or muscles. We defined 'chronic' pain as any pain lasting greater than or equal to 3 months [62]. We defined non-malignant pain as any pain unrelated to cancer [63].

The first and second authors together performed study selection, data extraction and synthesis with direct guidance and feedback from the senior author. To search for candidate articles, we combined the Boolean search modifiers 'and', 'not' and 'or' with the following search terms: chronic, pain, Black, African–American, socio-ecological, sociological, ecological, socioeconomic, psychosocial, psychological, social, determinants, factors, reasons and causes. We then inputted these search terms into the following databases: Scopus, APA PsycNET, PubMed/MEDLINE, Google Scholar, Anthrosource and Web of Science.

Several inclusion/exclusion criteria guided the screening process. We included articles if they featured an empirical or theoretical focus on the system-, provider- and patient-drivers of chronic, non-malignant, musculoskeletal pain within the US Black population. Studies were excluded if their findings focused on acute or malignant pain. For example, we excluded one review article of older Black adults because it focused on malignant pain [64]. We also excluded studies if they were not written in the English language. We did not exclude studies based on methodological rigor, publication date, specific sub-populations, interventions, controls or outcome measures. This broad inclusionary stance allowed us to expand upon the previous socio-ecological review by Meints and colleagues (2019) by capturing a more nuanced spectrum of socio-ecological findings on chronic pain within the Black community.

We then manually included other relevant publications by reviewing reference lists from the included articles. Finally, we reviewed the included articles for critical information relevant to our research question and synthesized them into the following narrative review. Given the narrative format of this review, we did not sort the included articles based upon their methodological rigor. For simplicity, we refer to all chronic, non-malignant, musculoskeletal pain as 'chronic pain.' Furthermore, all comparative statements imply comparison between Black and White individuals unless otherwise noted or specified.

Results

Our search strategy and screening yielded 174 articles published between 1984 and 2023. To conform with the modified socio-ecological model by Meints and colleagues (2019), we first organize our analysis under the following sub-headings: System Factors, Provider Factors and Patient Factors. We then outline the complex, causal network among these socio-ecological factors using under a subsequent and separate sub-heading.

System factors

Many system factors have contributed to chronic pain disparities between Black and White populations. Namely, ongoing structural and systematic discrimination against Black individuals has limited their opportunities for education, health literacy (e.g., feeling less empowered to discuss chronic pain and seek help), and socioeconomic growth (e.g., lack of insurance coverage, living in lower income neighborhoods). This is a critical issue as socioeconomic disparities can perpetuate a positive feedback loop in which socioeconomic disparities lead to greater health disparities (e.g., more severe chronic pain, greater chronic pain-related disability and depression) that then lead to further socioeconomic disparities (e.g., missed work, lost wages) [8,18,65–67].

Barriers to education leading to limited education & health literacy

Social disadvantage among Black individuals first leads to barriers in education, second, a higher prevalence of low education among Black individuals, and third, worse chronic pain outcomes [18,68–70]. For example, analysis of the 2016 National Center for Education Statistics noted that fewer Black adults earned a bachelor's degree or higher (19 vs 33%) [71]. Limited education at the higher level is associated with lower health literacy [2,17,72–74], worse chronic pain outcomes [75] and strained patient–provider relationships [76–79] (e.g., having less confidence in one's provider, asking fewer questions [80,81], seeking less help [82] and understanding less about treatment options) [83].

Socioeconomic disparities leading to less access to medical care

Income disparities contribute to disparities in chronic pain outcomes between Black and White populations. USA Census Data from 2019 suggest that 18.8% of Black individuals live below the poverty line compared to 7.3% of White individuals [84–87] and a larger percentage of the Black population (9.6%) lacks health insurance relative to the White population (5.2%) [88].

A correlation between lower socioeconomic status and worsened chronic pain outcomes has been particularly noted among older Black adults [8,65,66,89,90]. According to 1993 public release data from the Asset and Health Dynamics Among the Oldest Old, socioeconomically disadvantaged older Black adults had less access to medical care, worse overall health, and a two-times higher chance for experiencing worse pain [18]. In a 2017 study, decreased wealth among older Black–Americans with any chronic pain was associated with an increase in average pain intensity and pain-related disability [91].

Ongoing structural and systemic segregation of Black neighborhoods has also led to several negative downstream consequences including worse chronic pain outcomes. For example, Black individuals are more likely to live within poorer, more segregated and remote neighborhoods [18,67] with, relative to more affluent communities, limited access to high-strength analgesics, pharmacies, healthcare providers and pain specialists [9,16,72,92–94]. In a 2005 Michigan study, White neighborhoods had 52 times the chance of carrying opioids relative to Black neighborhoods [95]. In a 2007 study among older adults greater than 50 years of age, Black race was associated with lower neighborhood socioeconomic status, which was associated with worse affective pain (i.e., quality of the pain experience that causes pain to be unpleasant or aversive), obligatory disability (i.e., disability around activities related to life support and self-care) and mood disorders [96].

Provider factors

Provider misperceptions about black individuals with chronic pain

Providers have reported misperceptions about pain tolerance among Black individuals [97] with corresponding misperceptions in their medical judgments [98]. As part of a 2000 study, a group of 164 White and Black medical students more frequently described a Black actor as less likely to have a definite angina diagnosis, be healthy and follow-up for aftercare [99]. A 2012 university study found that White and Black undergraduate students, registered nurses, nursing students and non-university affiliated adults were more likely to perceive hardship among Black participants, to associate this hardship with toughness, and to assume that Black people felt less pain than White people [100].

Providers have also reported misperceptions about prescription use among Black individuals. For example, providers have reported more fear that Black patients would overdose on pain prescriptions [16,17], with providers from a 2011 study more frequently scrutinizing Black patients for potential drug abuse [101].

What perpetuates provider misperceptions about black individuals with chronic pain?

Several factors may influence these provider misperceptions. First, misperceptions about pain perception among Black individuals have been observed as early as childhood. Three studies demonstrated how individuals ranging from children to undergraduate students, both Black and White, rated the typical Black person as less sensitive to pain and less willing to report pain [102–104]. Second, providers have exhibited less empathy towards Black facial expressions of pain. Across three experiments in 2011, university students and nursing professionals exhibited a significant level of pro-White pain treatment bias unless asked to imagine how pain would affect their patients [105]. Third, these biases may arise unconsciously and implicitly rather than consciously and explicitly. This claim has been supported by studies in which providers took implicit association tests in the context of both pain [106–108] and non-pain care delivery [109–116], subliminal priming around general medical decision making [117] and physiological response to visual stimuli related to pain [118]; however, conflicting results have also emerged. In a 2020 study, 436 physician residents/fellows completed measures assessing implicit and explicit attitudes about race and participated in the care of computer-simulated patients with chronic back pain who varied by race (Black/White). While almost all providers attributed more distress to Black patients and were more likely to recommend workplace accommodations to Black patients, implicit association test scores did not significantly moderate pain-related ratings [119].

Misperceptions produce disparities in pain management

Under experimentally controlled situations, provider misperceptions about Black individuals with chronic pain produced disparate prescribing patterns relative to standard of care at the time (e.g., when legislation and guidelines had yet to reduce opioid prescriptions for pain) [120].

As part of a 2016 medical school study, nearly half of the White first- and second-year students and a quarter of the residents reported incorrect beliefs about the biological differences between Black and White populations (e.g., ‘Black people’s skin is thicker than whites,’) and these same medical students and residents were significantly more likely to underestimate the pain of Black individuals while offering substandard medication recommendations [121]. In a 2008 study, providers tended to escalate their management of pain only among verbally 'challenging' Black patient actors (i.e., actors who demanded a specific narcotic and exhibited anger) and verbally 'non-challenging' White patient actors [122]. A 2019 study recruited lay individuals to prescribe in hypothetical scenarios. The participants who required more stringent thresholds to perceive pain on Black faces also tended to prescribe Black patients less non-narcotic analgesic cream [108].

Other research on misperceptions of chronic pain among Black individuals has suggested that these misperceptions principally manifest when providers experience increased stress/cognitive load. In one 2014 study, male providers less often prescribed opioids for Black patients under high cognitive load (13 vs 30%) and more often prescribed opioids for Black patients under low cognitive load (31 vs 11%). On the other hand, female providers more often prescribed opioids for Black patients under both high (39 vs 16%) and low (29 vs 22%) cognitive loads [123]. These findings suggest that providers may regulate racial biases through explicit awareness unless they are burdened by a high cognitive load; however, other studies have again provided conflicting results. In the aforementioned 2019 study, racial bias during pain perception persisted whether the cognitive load was low or high [108]. In a 2015 study, bias during pain judgments increased with ambiguity as opposed to cognitive load [124].

Disparities in pain management within the clinical setting

In the clinical setting, providers have delivered disparate pain management to Black individuals (e.g., disparate wait times, surgical recommendations, assistance with compensation claims and prescribed medication frequency, amount and potency) [4,5,16,121,125–144]. For example, Black individuals have received chronic pain treatments of lower quality/potency. A 20-year meta-analysis on analgesic prescribing patterns across the USA revealed that Black individuals were 22% less likely to receive any pain medication, especially opioid prescriptions, regardless of the pain type, setting, study quality and data collection period [23]. With respect to non-opioid pain management, a 2004 retrospective cohort study among a national sample of 6038 veterans with osteoarthritis found that providers prescribed NSAIDs with less COX-2 selectivity and a lower days' supply for Black individuals (38 vs 43 days) [135]. Similarly, an analysis of medical and prescription claims for Medicaid Managed Care Organization enrollees between January 2000 and June 2002 found that Black individuals were a third less likely to receive a COX-2 pain prescription [134]. These findings highlight a complex reality in which stereotypes about drug abuse cannot fully explain biases in non-opioid pain management.

Patient factors

Physical comorbidities & coping/appraisal strategies

Physical comorbidities may negatively influence chronic pain outcomes. Within Black communities, residents have long been segregated from healthy food options and safe exercise spaces. This socio-environmental racism contributes to higher rates of obesity [145–148], poor diet, osteoarthritis [149], join strain [150], other health complications as a result of obesity stigma [151] and higher osteoarthritis-related pain severity and disability [152]. However, despite higher osteoarthritic-related pain severity and disability, Black–Americans have reported lower rates of arthritis-related hip/knee surgeries [153–155], perhaps due to a greater belief in over-the-counter and herbal medications, physical therapy, massage and prayer over surgery [156].

Psychological comorbidities & coping/appraisal strategies

Black adults with chronic pain more frequently suffer from anxiety, fear, helplessness [13,157–159] and disability [160]. Chronic stress (e.g., worse sleep), has been associated with adverse health behaviors that can worsen pain symptoms (e.g., insufficient physical activity, low medication adherence and chronic health conditions) [161]. Higher rates of comorbid depression and post-traumatic stress disorder have been particularly spotlighted among Black adults over the age of 50 with chronic pain [8]. In a 2011 to 2015 epidemiological study, the rate of comorbid depression and chronic pain increased by 1.6% among older Black individuals but decreased by 2% among older White individuals [162]. Despite higher rates of comorbid depression, Black adults are more likely to dismiss their depressive symptoms [8,163–167].

As a result, Black individuals may generally approach chronic pain using different appraisal and coping strategies [17,168]. For example, Black individuals are more at risk for catastrophizing [70,82,86,169–171] and ruminating over pain symptoms [172], attributing their pain to personal inadequacies [173], describing their pain as a less important issue when compared to other health issues [174], feeling powerless over their pain symptoms [172], having lower expectations for pain relief [14,167,174–182], and fearing and avoiding chronic pain [183,184], even when pain severity is statistically controlled for [184]. In particular, older Black individuals have reported more aversion and displeasure towards pain [96] (e.g., jaw pain, toothache) [13], disability [8,96] and limitations in functional/physical/daily living activities [153,185]. Further, older Black adults are prone to minimizing their pain [186] and hesitation with regards to reporting or openly talking about their pain [187,188]. For example, older Black adults in a 2014 study had trouble communicating their osteoarthritic pain to a medical provider using explicit or medical syntax [189].

Fear and avoidance of chronic pain can lead to a downward spiral of both chronic pain and depressive symptoms. For example, Black adults with chronic pain less frequently seek mental healthcare from formal medical services while reporting substantially more depressive symptoms due to chronic pain [190,191]. Untreated depression then negatively alters chronic pain related experiences, which then worsens depression [192–195]. For instance, a 2005 study found that physical impairment and depressive symptoms were more prevalent among Black individuals, significant indicators of pain intensity and accountable for 27% of the variability in pain intensity [160]. Similarly, a 2005 study found that loss of control over pain was a modifying factor for worsened pain intensity, pain-related distress and pain-related interference with function [14].

Inter-relationships among system-, provider- & patient-level factors

Societal & institutional racism

The older Black population has endured periods of involuntary medical experimentation [196], unethically withheld treatment (e.g., as with the Tuskegee Experiment), misused biological sampling materials [197] and intense racial tension and healthcare disparities. For example, mainstream health institutions excluded Black–Americans up until the Medicare Act in 1965. Older Black individuals who have reported experience with racism and discrimination have also reported higher levels of bodily pain, suffering and depressive symptoms [198–202]. Since this period of social upheaval, Black–Americans have continued to face stigmatization, racial stereotyping and socioeconomic oppression [203] while receiving poorer quality of care through Medicare, Medicaid and the Veterans Administration fund [204].

Biomedical distrust

In light of this history, some Black individuals have described their clinicians as racist, interpersonally and technically lacking, greedy for profit (e.g., refusing to treat patients who lack insurance) and prone to experiment during routine provision of healthcare [205–208]. In a 2005 study, low-income Black individuals who sought pain management were three times more likely than low-income White individuals to feel discriminated against [94]. In a 2009 study, Black veterans more frequently sought chronic pain treatment than White veterans and yet were also less likely to describe their treatment as highly effective [206]. Across larger-sample studies, Black–Americans reported feeling unfairly judged, disrespected and disparately treated because of their race [209] (e.g., receiving inequitable pain care and pain specialist referrals) [210].

A distrust in one's provider can hinder care-seeking behaviors (e.g., seeking, staying in and adhering to care/important surgeries, communicating pain symptoms openly and honestly, enrolling in clinical trials) [33,179,207,211,212]. In a 2013 descriptive, cross-sectional study among 892 primary care patients with chronic pain, Black individuals reported higher levels of discrimination, higher rates of hopelessness and worse pain self-management [213].

A distrust in biomedicine can also negatively influence chronic pain outcomes. For instance, a 2020 study utilized functional magnetic imaging during thermal pain and found that discrimination mediated higher pain reports among Black individuals [214]. Similarly, studies utilizing data from the National Survey of Midlife Development in the USA have found significant dose-response relationships among perceived discrimination, psychological distress and chronic pain [215] and a relationship between discrimination and back pain in which the experience of discrimination most predicted back pain among Black men [201]. Further, findings that correlate distrust in biomedicine with worse pain-related outcomes among Black individuals [216–218] persist even when controlling for socioeconomic status, gender and other mental and physical health variables [7,184].

In light of biomedical distrust, studies have examined the positive impact of trust and patient–provider concordance on pain experiences [219–221] and communication within healthcare settings [222,223]. For instance, a 2020 study using simulated clinical interactions among medical trainees and community members/undergraduates found that Black patients reported a significant reduction in pain and pain-induced physiological arousal when clinician–

Table 1. Summary of system-, provider- and patient-level factors that influence disparities in chronic, non-malignant, musculoskeletal pain outcomes between Black and White individuals.

System factors	• The ongoing structural and systemic segregation of Black neighborhoods has led to several negative downstream consequences including worse chronic pain outcomes • Black communities face barriers to education, health literacy and socioeconomic growth that can perpetuate a positive feedback loop in which socioeconomic disparities lead to greater health disparities that then lead to further socioeconomic disparities • A correlation between lower socioeconomic status and worsened chronic pain outcomes has been particularly noted among older Black adults
Provider factors	• Providers have reported misperceptions about pain tolerance and prescription use among Black individuals with corresponding misperceptions in their medical judgments and pain management • Provider misperceptions may stem from (1) longstanding socio-cultural norms, (2) less empathy towards Black facial expressions of pain and (3) implicit processes • While findings have suggested that cognitive load may play a role in racial biases during pain assessment and treatment, these findings are not uniform through the literature
Patient factors	• Within Black communities, residents have long been segregated from healthy food options and safe exercise spaces • This socio-environmental racism contributes to higher rates of obesity, poor diet, osteoarthritis, join strain, other health complications as a result of obesity stigma, and higher osteoarthritis-related pain severity and disability • Despite higher rates of comorbid depression, Black adults are more likely to dismiss their depressive symptoms • Fear and avoidance of chronic pain can lead to a downward spiral of both chronic pain and depressive symptoms
Inter-relationships among system-, provider- and patient-factors	• Black–Americans have continued to face stigmatization, racial stereotyping and socioeconomic oppression while receiving poorer quality of care for their chronic pain • Black–Americans with chronic pain are more likely than White Americans to feel discriminated against within the biomedical context • A distrust in one's provider can negatively influence care-seeking behaviors and chronic pain outcomes • In light of biomedical distrust, studies have examined the positive impact of trust and patient–provider concordance on pain experiences and communication within healthcare settings

patient racial/ethnic was concordant [224]. Consistent with these findings, a 2011 meta-analysis found that Black individuals express a moderately strong preference for therapists who share the same ethnoracial background [225].

Discussion

We conducted a narrative review to focus the modified socio-ecological model by Meints and colleagues (2019) on the Black population, specifically by investigating the following question: "*What are the system-, provider-, and patient-factors that influence disparities in chronic, non-malignant, musculoskeletal pain outcomes between Black and White individuals?*" Our relatively broad inclusionary stance allowed us to review a large and rich body of literature on chronic pain within the Black community. In keeping with findings by Meints and colleagues (2019), we found that chronic pain among Black individuals was a complex interplay across system-, provider- and patient-factors. Building off these findings, we also found that chronic pain within the Black community was influenced by implicit bias among providers, physical and psychological comorbidities that contribute to chronic pain, and the interrelationships among system-, provider- and patient-factors (e.g., biomedical distrust, societal and institutional racism).

Starting at the system level, societal racism, limited access to education and health insurance, higher rates of poverty and life within socio-economically challenging neighborhoods can perpetuate a positive feedback loop in which socio-economic disparities lead to health disparities that then lead to further socio-economic disparities. These system-level relationships have been especially noted among socially disadvantaged older Black individuals. At the provider level, misperceptions about Black individuals with chronic pain (e.g., stereotypical representations of Black individuals, counter-productive beliefs about pain tolerance and rates of overdose among Black individuals) and interpersonal discrimination and racism (e.g., disparate empathy) can negatively impact chronic pain outcomes. At the patient level, socio-environmental racism has resulted in higher rates of obesity among Black individuals that place them more at risk for chronic pain related symptoms; personal strategies to appraising, coping with, and expressing chronic pain (e.g., a propensity towards stoicism) and higher rates of co-morbid anxiety, fear, helplessness and pain avoidance can lead to a downward spiral of both chronic pain and depressive symptoms; and a longstanding history of racism, discrimination, racial stereotyping and socioeconomic oppression has led to biomedical distrust among Black individuals that hinders care-seeking behaviors and worsens chronic pain-related outcomes (Table 1). Put together, these interwoven factors can lead to disparities in health literacy, access to treatment and general medical health; a White-centric system of provider education, diagnoses and care delivery; patient–provider miscommunication; and downstream disparities in chronic pain outcomes between Black and White individuals (Figure 2).

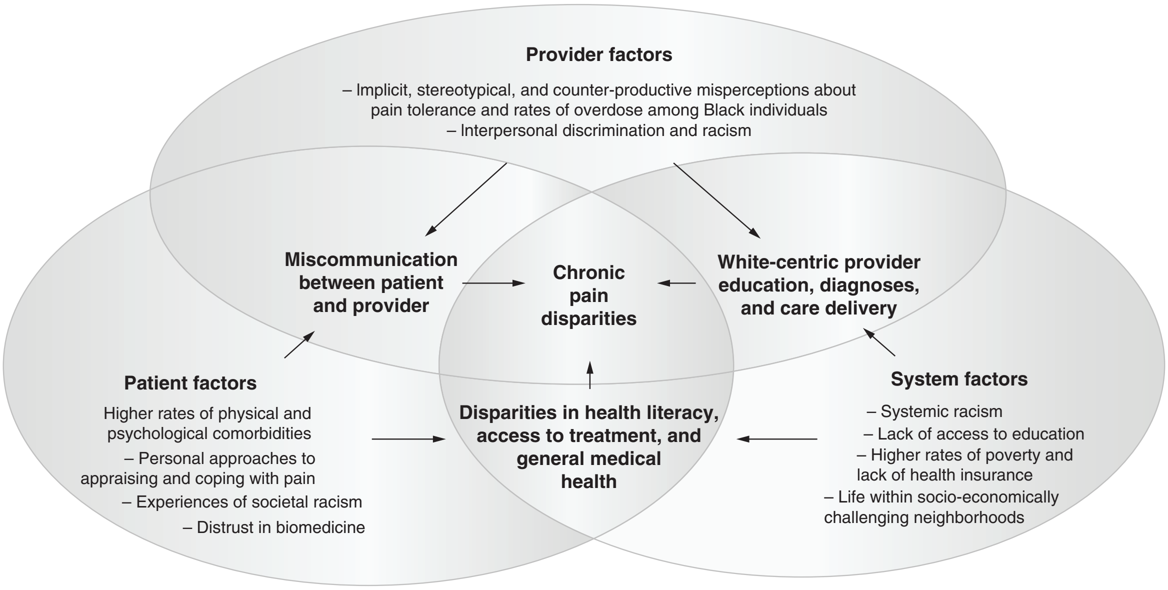

Figure 2. Modified socio-ecological model of system-, provider- and patient-level factors that influence disparities in chronic, non-malignant and musculoskeletal pain outcomes between Black and White individuals.

To address the socio-ecological roots of these and similar health disparities, the Department of HHS has called for a multi-modal pain management toolbox that prioritizes individualized patient-centered care, psychosocial factors, therapeutic alliance and shared decision-making [24]. However, the precise approach to achieving the Department of HHS' recommendations remains open to interpretation. To guide further research and public-policy development on chronic pain disparities between Black and White individuals, we now highlight ongoing innovations at the system-, provider- and patient-levels.

System-level improvements

To lower the structural and systemic access barriers to chronic pain treatment, researchers and public policy developers have worked to expand low-cost, low-risk postal banking services; federal research and development funding for Black innovators, inventors and entrepreneurs; early childhood care and education [226,227]; and Medicaid [228,229]. To close the socio-geographic gap between Black communities and biomedical care, broader movements have sought to empower residents from historically Black and low-income neighborhoods to resist 'gentrification', zoning laws that lead to high housing prices and the lack of taxes on vacant properties [230]. To improve healthcare access within at-risk neighborhoods (e.g., neighborhoods that demand greater than 30–40 min of travel time to primary medical or mental healthcare respectively [231], lack accessibility via public transit and possess a low number of healthcare facilities or practitioners per capita), urban planners have utilized geographic information systems (GIS) to determine the best location, capacity and cost for new healthcare facilities and transit services [232]. Given a major push for telehealth since the COVID-19 pandemic, healthcare reform has also employed mobile-health technologies to improve healthcare service delivery to low-income patients who are more likely to own a smartphone than a computer or cable internet services [233].

To allay concerns about and improve participant recruitment in scientific studies, researchers should follow community-engaged research (CER) methods [234,235]. Under the CER model, researchers use culture, history and the community to inform each step of participant recruitment, research design, intervention development, intervention assessment and intervention implementation. Researchers have applied various CER methods to work with Black communities (e.g., field-based approaches, snowball sampling, newspaper advertisements that circulate within Black communities) [236]. Research centers have also sought to improve representation in clinical trials. For example, The Community Access, Recruitment and Engagement (CARE) Research Program at Massachusetts General Hospital has worked to improve recruitment, engagement and retention among individuals from the Black community and other underrepresented groups by leveraging a community-led collective impact model to develop and engage in sustained local partnerships in underserved areas; improving health, medical, research and insurance literacy; ensuring that studies provide a strong return of value for underserved groups; streamlining the clinical trial recruitment process through staff training and consultancy; and facilitating collaboration across the USA via robust clinical and research networks. For intervention development, assessment and implementation along the CER approach, researchers have utilized the Community Engagement Studio, a structured program that facilitates project-specific input from community and patient stakeholders [237].

Provider-level improvements

Schim and Doorenbos (2010) have recommended a four-step approach to overcome provider-patient differences in values, beliefs, perceptions and expectations: appreciation (e.g., acknowledging the values of others), accommodation (e.g., adjusting aspects of care to align with values), negotiation (e.g., maintaining professional standards and integrating cultural values into care) and explanation (e.g., statement to justify why cultural values cannot be integrated into care) [238]. For older Black adults, Robinson-Lane and colleagues (2017) took inspiration from the Screen, Intervene and Reconvene (SIR) pain card and recommended a set of culturally sensitive pain assessment principles and questions, pain communication tools, treatment considerations and re-assessment and evaluation tools [239]. For older Black adults in need of perianesthesia, Booker & Herr (2015) developed a culturally-compatible framework that instructs nurses on how to knowledgeably and capably integrate cultural practices and evidence-based recommendations [198].

If we assume implicit bias negatively impacts chronic pain management, then reducing implicit bias is a public health imperative. In the past, hospital and clinic systems have developed committees on cultural humility, diversity and antiracism [240] that promote ways for providers to pause and reflect on implicit bias, consider how reflexive actions can lead to poor healthcare, evaluate patients based on the individual's personal characteristics, take implicit association tests, engage in implicit bias training, practice ways to reduce stress and increase mindfulness, and engage with information that pertains to the Black experience of biomedical care [241]. However, as previously noted, literature on the relationship between implicit bias and pain care delivery has been mixed. Research on implicit bias within general healthcare contexts further substantiates this uncertainty. A 2021 study found that implicit bias trainings provided minimal utility [242]. Further, a 2020 study summarized findings from 11 studies that investigated the association between implicit bias and patient–provider communication and found that, while implicit bias predicted worse patient–provider communication, implicit bias did not predict inappropriate treatment decision making between providers and patients from underrepresented ethnoracial groups [243]. Further research may be required to elucidate which implicit bias measures are valid for predicting inappropriate decision making [243].

Patient-level improvements

Culturally sensitive behavioral interventions are particularly promising as they offer an opportunity to directly mitigate the dangers of disseminating ineffective, non-culturally appropriate interventions that risk wasting already scarce biomedical resources and widening chronic pain disparities. As a result, the Department of HHS has called for behavioral pain interventions that better engage members from underrepresented groups; however, the current standard of care (e.g., cognitive behavioral therapy, mindfulness-based stress reduction, mindfulness-based cognitive therapy) [244], is in need of socio-cultural repackaging [240] at both the surface structural level (e.g., by incorporating people, places, language, practices and locations relevant to Black individuals) and the deep structural level (e.g., taking into account cultural, social, historical, environmental and psychological forces that influence chronic pain and treatment access within Black communities) [245]. Although known behavioral interventions like cognitive behavioral therapy (CBT) and mindfulness-based stress reduction (MBSR) have been culturally adapted for Black individuals (e.g., CBT for depression [246–248], panic episodes [247] and internalized racism [249]; and MBSR for depression [250], PTSD, intimate partner violence; [251] human immunodeficiency virus (HIV) risk [252], prediabetes [253], pregnancy related stress [254] and addiction) [255], to date, no behavioral treatment has been culturally adapted for Black individuals with chronic pain. To guide future cultural adaptations, we now discuss potential modifications.

Overlapping identities

Deep structural changes to known behavioral interventions as noted above can engender 'structural competency' and potentially acceptance among Black individuals living with chronic pain [256]. For example, behavioral interventions for the chronic pain concerns among Black individuals could focus on the impact of stigmatization;

racial stereotyping; socioeconomic oppression; biomedical distrust; physical comorbidities such as obesity stigma; negative coping strategies such as catastrophizing, fear and avoidance of chronic pain; and coping strategies already accepted by the Black community (e.g., physical therapy, massage).

One well known coping strategy within the Black community involves spirituality and religion. Four out of five Black–Americans identify as Christian, with the older Black population being more likely than younger Black adults to associate with historically Black Protestant churches [257]. As a result, Black individuals more frequently endorse coping with medical health issues using Christian-based practices [258–271] such as prayer, faith healing, church attendance [169,171,180,198,257,272,273], group healing services (e.g., the laying of hands) and believing in the divine power of the Holy Spirit [274,275]. For example, Black individuals have expressed a preference for alternative practices over prescribed analgesics [260,265], unless the pain was very severe [176,276,277], more frequently rated complementary care therapies (e.g., prayer) as more efficacious than joint replacements for lower extremity osteoarthritic pain [156], and reported a significantly higher level of pain severity, interference and disability while reporting a significantly higher frequency of coping with these issues by diverting attention, praying and expressing hope [262].

Group-based effects

Mobilizing social support is an established, multi-faceted coping strategy for Black adults, particularly older [278] or financially destitute Black adults [279]. To incorporate this known coping strategy, chronic pain interventions could center around local group settings such as Black community centers [280], culture centers [281], beauty salons [282–287] and health fairs.

Given the aforementioned role of spirituality and religion in Black culture [198,288–299], Black churches have received considerable attention as cultural hotspots for social- and health-reform delivery [300] (e.g., assisting vulnerable Black populations, implementing anti-racism campaigns and disseminating health education) [301–312]. In addition, many Black Church members are of low education, and over half make less than $30,000 annually. Thus, Black Churches present an opportunity for researchers to connect with a particularly indigent sub-population of the Black community [313] who may lack the health literacy, finances and insurance coverage required for biomedical pain management.

Patient–provider concordance

Findings from this narrative review highlighted the potential for patient–provider concordance to improve chronic pain outcomes among Black individuals; however, Black individuals, despite representing 13.6% of the 'working age' population [41], represent only 4% of psychologists, 5% of physicians [314], 10% of nurses and advanced practice registered nurses, 8% of physician assistants, 5% of pharmacists and 4% of occupational therapists and speech therapists [40]. This workforce disparity is further compounded within rural America where healthcare professionals are relatively scarce [315,316]. Thus, increasing diversity within the healthcare workforce is imperative for improving pain outcomes among Black individuals, not only to increase patient–provider concordance but to facilitate other downstream benefits via enhanced interracial contact [242].

'Task shifting' is one strategy to improve diversity within the healthcare workforce. Under the task shifting model, programs enlist not only professional but lay health workers from the Black community. Across the world, lay health workers have proven themselves capable of delivering low-intensity, evidence-based health interventions [317] with 'novice' health workers having already demonstrated potential as instructors for MBSR [318].

Beyond the potential for ethnoracial concordance, lay healthworkers are naturally more sensitive to the community's cultural, spiritual and sociological needs relative to outside community healthcare professionals. In this manner, a lay community healthworker can pivot their therapeutic focus to match the client's needs without expending much additional effort [319]. Lay healthworkers are also better situated to offer their services both within the community and for a less expensive stipend or incentive. Making behavioral chronic pain interventions more accessible and affordable is critical given how insurance policies do not typically cover these interventions and practitioners work in fragmented locations across the USA [244]. For example, a group of veterans with chronic pain cited higher costs, challenges in scheduling, a lack of transportation and a lack of motivation as barriers to pursuing behavioral interventions for chronic pain [320]. If lay community healthworkers can further integrate their services within either a self-sustaining community or biomedical infrastructure, then they could also address the lack of long-term benefits from interventions such as MBSR by regularly offering their services within the community [321–323].

Limitations

We sought to deliver a comprehensive overview of a topic-related research area by turning to the narrative review format over the systematic review format. To ensure methodological quality, we structured our search protocol, inclusion/exclusion criteria, and data quality interpretation, extraction and synthesis around the SANRA guidelines; however, this protocol is relatively less stringent when compared to systematic review protocols (e.g., PRISMA) [59]. Thus, our narrative review lacks elements typical of scoping or systematic reviews (e.g., a table that aggregates individual study characteristics). Further, we adopted a broad inclusionary stance to broaden the scope of our narrative review; however, the inclusion of dated and methodologically lax studies raises the possibility that our findings are no longer applicable at this current time. For example, when synthesizing our findings, we attempted to map disparities in chronic pain management onto disparities in prescription patterns; however, this proved challenging in light of ongoing changes to legislation and healthcare that regulate opioid prescription practices.

Despite a push within pain disparities research towards an antiracism framework, we elected to focus our narrative review on chronic pain disparities between Black and White individuals. This approach prevented us from making critical comparisons between the Black community and other ethnoracial groups (e.g., Asian and Pacific Islander, American–Indian, Latine/x). More importantly, this approach (1) limited this narrative review to simple comparison statements between Black and White individuals and (2) prevented us from fully addressing concerns relevant to Generations 2–4 in pain disparities research. Future research should adopt a broad inclusionary stance as with this narrative review but expand to include comparisons with other ethnoracial populations besides simply the White population.

Conclusion

Based on findings from this narrative review, chronic pain within the Black community is a complex product of system-, provider- and patient-factors that has led to disparities in health literacy, access to treatment, and general medical health; a White-centric system of provider education, diagnoses and care delivery; patient–provider miscommunication; and downstream disparities in chronic pain outcomes between Black and White individuals, especially among older Black individuals. These findings suggest that changes at the system-, provider- and patient-levels are required to close the existing treatment gap in chronic pain. Culturally sensitive behavioral interventions are particularly promising as they offer an opportunity to directly mitigate the dangers of disseminating ineffective, non-culturally appropriate interventions that risk wasting already limited biomedical resources and further widening chronic pain disparities. Researchers can culturally adapt known behavioral interventions for the chronic pain needs of the Black community by utilizing community-engaged research methods. We have outlined a number of recommendations for cultural adaptation that tap into the benefits of overlapping identities, group-based effects and patient–provider concordance.

Future perspective

Ongoing movements in social justice and health equity have sought to understand and address the socio-ecological determinants of chronic pain within the Black community. Lowering the systems-level barriers to chronic pain treatments within the Black community is critical but requires intensive resources and time. Provider- and patient-level changes present an opportunity for less resource intensive and more immediate change. For example, we have already witnessed dramatic shifts in medical education and intervention delivery to match the needs of underserved communities. Given this pace, the increase in research funding for social justice and health equity matters, and the push by the Department of HHS for a multi-modal pain management toolbox that prioritizes individualized patient-centered care, psychosocial factors, therapeutic alliance and shared decision making, we expect to see an expansion in medical curricula and behavioral interventions that reflects the cultural nuances of chronic pain within the Black community and other underserved groups.

Author contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by TV Pham. The original draft of the manuscript was written by TV Pham, and all authors reviewed and edited previous versions of the manuscript. All authors read and approved the final manuscript.

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