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Racial/Ethnic Disparities in Pain Burden and Pain Management in the Context of Opioid Overdose Risk

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Abstract

Purpose of Review Opioid deaths have risen to unprecedented rates in the USA. Efforts to mitigate the opioid crisis include supply-side strategies that reduce opioid availability. However, Patients of Color have historically reported less access to analgesia and worse pain burden and pain management than Whites. In this narrative review, we examine the recent literature on racial/ethnic disparities in pain care, including opioid access, and provide recommendations for advancing equity in pain management.

Recent Findings Both cancer pain and non-cancer pain studies provide strong evidence of racial/ethnic disparities in pain burden and pain management. Compared with Whites, Patients of Color reported worse pain severity and less access to opioid and non-opioid analgesia. Rates of pain assessment/documentation during clinic visits were also lower among Patients of Color relative to their White counterparts.

Summary Racial/ethnic disparities continue to persist in pain burden and pain management. To prevent further exacerbation of existing racial/ethnic disparities in pain management, equity must be prioritized in the broader opioid debate.

Keywords Disparities · Race/ethnicity · Pain · Pain management · Opioids · Analgesia

Introduction

Opioid abuse is now considered the nation's most pressing public health issue, with federal, state, and local officials rapidly mobilizing resources to combat this epidemic. Since the start of 2018, Congress has approved over $4.6 billion dollars to address the widespread misuse and abuse of opioids in the USA [1]. However, as the nation works toward mitigating the opioid crisis, it is critical that policymakers and the public health community consider the potential impact of such strategies on racial/ethnic inequities in pain and pain management.

Racial/ethnic disparities in pain burden and pain management are well documented in the research literature, with People of Color (e.g., Blacks, Hispanics/Latinos) reporting worse pain severity, lower rates of analgesia receipt, and less neighborhood pharmacy access to opioids than their White counterparts [2–4]. Such disparities in pain treatment are concerning as they have implications for racial/ethnic gaps in quality of life, including mental health, employment status, and sleep quality [5–8]. Current opioid risk mitigation strategies that are supply-side focused (e.g., prescription limits, prescription drug monitoring) [9, 10] do not take into take into account these long-standing disparities in opioid prescribing. This is concerning since failure to prioritize equity considerations may result in further exacerbation of existing racial/ethnic disparities in pain management, and ultimately represents an extension of a long-standing systemic failure to address the structural inequalities that underlie our current opioid crisis.

In this narrative review, we examine the recent literature on racial/ethnic variations in pain burden and pain

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management. We then employ an equity prioritization lens in evaluating existing data on racial/ethnic differences in opioid overdose risk, as well as potential unintended consequences of current opioid overdose reduction efforts on racial/ethnic inequities in pain.

Methods

We used PubMed to conduct a search of the recent literature on racial/ethnic disparities in pain burden and pain management. Under the guidance of the research team, a graduate research assistant (GRA) performed the PubMed search in August 2018 for the time period spanning 2013 to 2018. Search teams included "race," "ethnicity," "ethnic," "ethnic groups," "black," "Asian," "African American," "Latino," "Hispanic," "Native American," "American Indian," "pain," "disparities," "inequities," "opioids," and "analgesia." The initial search resulted in 53 articles that were further examined for their relevance to the review topic. We excluded conference abstracts, non-peer-reviewed publications, non-empirical studies, non-US publications, studies that did not include a pain management or pain burden outcome, and studies that lacked stratified data by either race or ethnicity. Systematic reviews that were not inclusive of the timeframe mentioned above were also excluded. This resulted in 23 articles meeting criteria for inclusion in this review. We also included relevant articles previously known to the authors and examined the bibliographies of all included articles to identify additional relevant articles. In total, we identified and included 30 articles in this narrative review (see Fig. 1 for article disposition). Next, the first author and GRA performed a second review of the 30 included articles to abstract pertinent details on each study, including disease focus (i.e., cancer vs. non-cancer), study design (e.g., cross-sectional, longitudinal), data source (e.g., survey, administrative claims), site(s)/sampling approach (e.g., single site, multi-site, nationally representative sampling), care setting (e.g., emergency care, primary care), age group (e.g., adults, youth), racial/ethnic composition of study sample, pain-related outcomes (i.e., pain burden vs. pain management), and main findings.

Results

Characteristics of Included Studies

Of the 30 articles included in this review, 23 were cross-sectional quantitative studies and seven were longitudinal quantitative studies (Tables 1 and 2). Seven studies were limited to cancer patients and 23 studies were non-cancer focused. Data sources included survey data ($N = 17$), administrative data ($N = 12$), or a combination of the two ($N = 1$). Most studies employed a nationally representative ($N = 15$) or multi-site ($N = 10$) data collection approach; however, five studies were based on a single study site. Care settings varied and included emergency care ($N = 11$), oncology care ($N = 5$), primary care ($N = 4$), nursing homes ($N = 2$), palliative/hospice care ($N = 2$), dental care ($N = 1$), and other care settings (i.e., surgical care, any care setting, or specialty care) ($N = 5$). Six studies were focused on pain care in children and/or young adolescents, while 24 studies primarily centered on adults. In terms of pain-related outcomes, almost all studies ($N = 24$) primarily focused on pain management (e.g., pain assessment, documentation, treatment), particularly opioid prescribing/receipt, while three studies examined pain burden (e.g., frequency and/or severity or pain symptoms), and three studies included both pain burden and pain management outcomes. Twenty-five studies reported race-specific data on Blacks and Whites, but fewer captured stratified data on Hispanics/Latinos ($N = 11$), Asians ($N = 4$), or Multiracial individuals ($N = 1$). Three studies compared Whites with an aggregated group of patients labeled "non-Whites" or "minorities"; however, some racial equity advocates have argued that using such language to describe diverse populations is both racially oppressive and disempowering [41–44]. Thus, consistent with an equity prioritization lens, we employ a more empowering term, Patients (or People) of Color, when summarizing findings from studies that use "non-White" and/or "minority(ies)" to describe racially/ethnically diverse patient groups.

Summary of Recent Literature

Overall, 21 out of 30 studies documented racial/ethnic disparities in pain burden or pain management, with less favorable outcomes more commonly reported for Patients of Color relative to Whites. In contrast, five studies reported mixed findings by race/ethnicity for pain-related care or outcomes. Additionally, findings from four studies indicated no racial/ethnic differences in pain management. Below, we summarize key findings, separately, for cancer and non-cancer pain studies.

Cancer Pain

Among the seven cancer-related pain studies, four documented worse pain burden or pain management among Patients of Color relative to Whites, while three studies reported no racial/ethnic differences or mixed findings by race/ethnicity (Table 1).

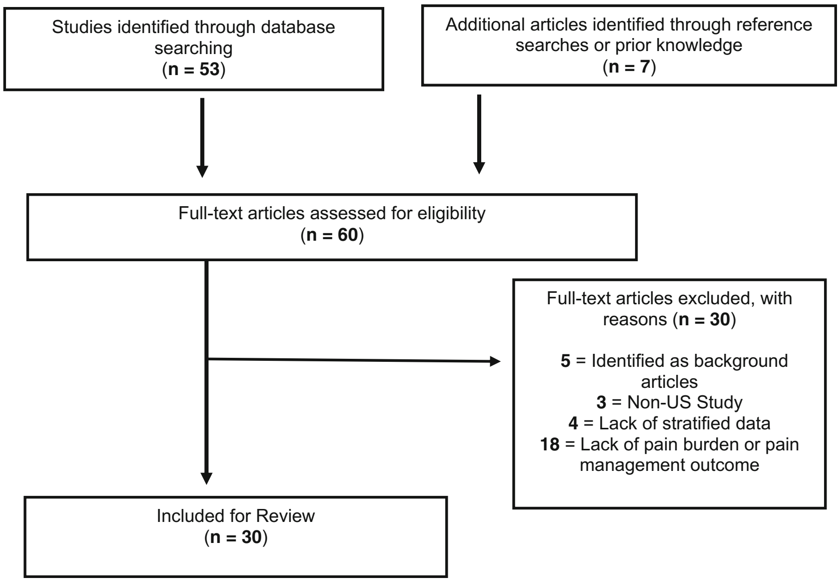

Fig. 1 Literature flow diagram

Racial/Ethnic Disparities in Cancer Pain Burden In one nationally representative study of racial/ethnic differences in pain burden in colorectal and lung cancer patients, Multiracial patients reported pain more frequently than Whites, and both Black and Multiracial patients reported worse pain severity than Whites [11]. Another study assessed racial differences in analgesia adherence in cancer patients at multiple clinics and found that compared with Whites, Blacks were more likely to report severe pain and Negative Pain Management Index scores (i.e., inadequate analgesia prescription given pain severity), and were less likely to have a prescription for long-acting opioids [12••]. Analgesia adherence rates were also lower among Blacks than Whites in this study.

Racial/Ethnic Disparities in Cancer Pain Management In terms of pain management, one nationally representative study of pain care among nursing home residents with cancer reported lower rates of pain documentation (i.e., underreporting) and pain treatment (pharmacological and non-pharmacological) in Blacks relative to Whites [15•]. Another multi-site study assessed racial differences in the type of opioid prescribed to Black and White cancer patients with and without a diagnosis of chronic kidney disease (CKD) [13]. Their findings indicated that compared with Whites, Black patients were less likely to receive oxycodone, but more likely to receive morphine with 3- and 6-glucoronide metabolite, a type of analgesia known to be associated with neurotoxicities in patients with CKD.

In contrast, two studies documented no racial disparities in pain management among patients with cancer. Specifically, one multi-site study evaluated cancer care disparities in the Veterans Affairs (VA) Healthcare System and documented similar rates of pain medication use among Black and White veterans with cancer [17]. Similarly, another study conducted among Black and White Medicare beneficiaries with stage IV breast cancer revealed similar patterns of opioid use by race [14]. Finally, mixed findings were reported in a more recent study examining gaps in supportive medication use by ethnicity and nativity status among Medicare beneficiaries with breast cancer. Compared with US-born non-Hispanics, foreign-born Hispanics and non-Hispanics were less likely to receive opioids; however, rates of opioid receipt were higher among US-born Hispanics relative to US-born non-Hispanics [16].

Non-cancer Pain

Racial disparities in pain burden or pain management were reported in 17 out of 23 non-cancer pain studies, with most studies ($N = 21$) evaluating inequities in pain management. Six studies reported no racial/ethnic difference or mixed findings by race/ethnicity for non-cancer pain management (Table 2).

Racial/Ethnic Disparities in Non-cancer Pain Burden With respect to pain burden, findings from a multi-site palliative care study revealed that pain prevalence was 10 percentage points higher among Blacks relative to Whites, though this difference was marginally statistically significant [18•]. In another multi-site study of hemophilia patients, POC were five times more likely to report severe chronic pain than Whites [19].

Racial/Ethnic Disparities in Non-cancer Pain Management In terms of pain management, four studies observed no racial/ethnic differences in analgesia receipt/prescribing. Specifically, one study employing nationally representative survey data reported a narrowing racial gap in opioid use during 2000 to 2015, with rates of opioid use among Blacks closely approximating rates among Whites in 2015 [27]. The remaining

Table 1 Cancer-related pain burden and pain management studies ($n = 7$)

Reference	Study design	Data type	Sampling or sites(s)*	Care setting	Adult or youth╫	Sample	Main findings
Pain burden ($n = 3$)							
Martinez et al. [11]	Cross-sectional	Survey	Nationally representative	Oncology Care	Adult	Overall: $N = 5761$ White: $N = 3990$ Black: $N = 777$ Hispanic: $N = 392$ Asian/Pacific Islander: $N = 290$ Multiracial: $N = 167$ Other: $N = 122$	Multiracial and Black patients were worse off compared to White patients for pain burden. Among patients with any pain, pain severity was higher for Black patients ($\beta = 6.6$; $p \leq 0.001$) and multiracial patients ($\beta = 4.5$, $p = .036$) compared to White patients. In addition, multiracial patients were more likely ($\beta = 4.5$; $p = 0.036$) to report pain relative to White patients.
^Meghani et al. [12••]	Longitudinal	Administrative	Multi-site	Oncology Care	Adult	Overall: $N = 207$ Black: $N = 86$ White: $N = 121$	Blacks were worse off compared to Whites in regard to pain burden. Blacks reported greater cancer pain, including higher BPI worst pain scores ($p < .001$), higher least pain scores, ($p < .001$) and negative PMI ($p < .001$).
^Meghani et al. [13]	Longitudinal	Survey	Multi-site	Oncology Care	Adult	Overall: $N = 182$ Black: $N = 73$ White: $N = 109$	Blacks were worse off compared to Whites for pain burden. Blacks reported greater cancer pain worst score (7.6 v. 6.2, $p < .001$) and least pain score (4.1 v. 2.7, $p < .001$) compared to White patients.
Pain management ($n = 6$)							
]^Meghani et al. [12••]	Longitudinal	Administrative	Multi-site	Oncology Care	Adult	Overall: $N = 207$ Black: $N = 86$ White: $N = 121$	Blacks were worse off compared to Whites in regard pain management. Blacks were less likely to have a prescription of long-acting opioids (68 v. 41%, $p < .001$) and had a significantly lower dose adherence compared to Whites (53 v. 74%, $p < .001$).
^Meghani et al. [13]	Longitudinal	Survey	Multi-site	Oncology Care	Adult	Overall: $N = 182$ Black: $N = 73$ White: $N = 109$	Mixed findings in regard to disparities in pain management. Black patients were less likely to receive a prescription of oxycodone than White patients (53 v. 82%, $p < .001$) but were more likely to be prescribed morphine (47 v. 18%, $p < .001$).
Check et al. [14]	Longitudinal	Administrative	Multi-site	Oncology Care	Adult	Overall: $N = 883$ Black: $N = 131$ White: $N = 752$	No racial/ethnic differences in regard to pain management. In multivariate analyses examining opioid pain medication use among Medicare beneficiaries with advanced stage breast cancer, there were no statistically significant differences between Blacks and Whites.
Mack et al. [15•]	Cross-sectional	Survey	Nationally representative	Nursing Home	Adult	Overall: $N = 342{,}920$ Black: $N = 39{,}081$ White: $N = 303{,}839$	Blacks were worse off compared to Whites for pain management and pain treatment. Blacks were less likely to have staff-reported pain documentation (aPR = 0.89, 95% CI = 0.86–0.93), and less likely to receive any pharmacologic

Table 1 (continued)

Reference	Study design	Data type	Sampling or sites(s)*	Care setting	Adult or youth╫	Sample	Main findings
							pain management compared with Whites (aPR = 0.98, 95% CI = 0.97–0.99).
Pinheiro et al. [16]	Cross-sectional	Administrative	Nationally representative	Other	Adult	Overall: N = 23,091 White: *N* = 17,656 Black: *N* = 1970 Asian/Other: *N* = 747	Mixed findings of racial/ethnic differences in regard to pain management. Foreign-born non-Hispanics and foreign-born Hispanics were both worse off in regard to pain management compared to US-born non-Hispanics. In adjusted analyses, foreign-born Hispanic women were less likely to receive opioids (aOR = 0.86, 95% CI = .80–.92) compared to US-born non-Hispanic women. In addition, foreign-born non-Hispanics were also less likely to receive opioids (aOR = .91, 95% CI .087–.95) compared to US-born non-Hispanics. However, US-born Hispanics were more likely to receive opioids compared to US-born non-Hispanics (aOR = 1.05, 95% CI-1.02-1.09).
Samuel et al. [17]	Cross-sectional	Administrative	Multi-site	Oncology Care	Adult	Overall: *N* = 76,707 Black: N = 17,105 White: *N* = 59,602	No racial/ethnic differences in regard to pain management. In multivariate analyses examining the prescription of narcotic pain medication for advanced cancer patients in pain, there were no statistically significant differences between Blacks and Whites.

^ Studies included both pain burden and pain management outcomes and are displayed more than once. *Nationally representative studies involved a nationally representative sampling approach across multiple geographic areas and/or clinic sites. *Multi-site studies involved data collection from multiple geographic areas and/or clinic sites, but did not involve a nationally representative sampling approach. *Single-site studies involved data collection from a single clinic site, but did not involve a nationally representative sampling approach. ╫"Youth" studies were exclusively limited to children (0–17) and/or young adolescents (18–25). Some "Adult" studies may include some youth, but were primarily comprised of adult participants (18 and older)

Table 2 Non-cancer-related pain burden and pain management studies ($n = 23$)

Reference	Study design	Data type	Sampling or site(s)*	Care setting	Adult or youth╫	Sample	Main findings
					Pain burden ($n = 3$)		
Kamal et al. [18•]	Cross-sectional	Administrative	Multi-site	Palliative/Hospice Care	Adult	Overall: $N = 775$ Black: $N = 100$ White: $N = 675$	Blacks were worse off compared to Whites in regard to pain burden. More Blacks reported any pain of any severity (66.0%) compared to Whites (56.1%) ($p = .06$).
McLaughlin et al. [19]	Cross-sectional	Survey	Multi-site	N/A	Youth	Overall: $N = 80$ White: $N = 61$ Patients of Color: $N = 19$	Patients of Color were worse off compared to Whites in regard to pain burden. Patients of Color had greater likelihood (OR = 5.31, 95% CI = 1.62–17.4) to report moderate-to-severe chronic pain and had median physical quality of life scores that were 26 points lower than Whites (95% CI = 11.0–40.9, $p < .01$).
^Cea et al. [20]	Cross-sectional	Survey	Nationally representative	Palliative/Hospice Care	Adult	Overall: $N = 3918$ Black: $N = 316$ White: $N = 3433$ Hispanic: $N = 112$ Other: $N = 57$	Hispanics were worse off compared to Whites for pain burden. Hispanics were less likely to have no reported pain at discharge (aOR = 0.65, 95% CI: 0.42–0.99), compared with Whites patients.
					Pain management ($n = 21$)		
Burgess et al. [21]	Cross-sectional	Survey	Multi-site	Primary Care	Adult	Overall: $N = 245{,}504$ Black: $N = 25{,}382$ White: $N = 220{,}122$	Blacks were worse off compared to Whites in regard to pain management. Black VA patients were significantly less likely compared to Whites to be screened for pain (OR = 0.79, $p < 0.0001$).
Caperell et al. [22]	Cross-sectional	Administrative	Single Site	Emergency Care	Youth	Overall: $N = 9424$ Black: $N = 1926$ White: $N = 7065$ Other: $N = 433$	No racial/ethnic difference in regard to pain management. Rates of admission and analgesia administration were not predicted by race among subjects with appendicitis, constipation, and abdominal pain.
^ Cea et al. [20]	Cross-sectional	Survey	Nationally representative	Palliative/Hospice Care	Adult	Overall $N = 3918$ Black: $N = 316$ White: $N = 3433$ Hispanic: $N = 112$ Other: $N = 57$	Blacks and Hispanics were worse off compared to Whites in regard to pain management. Black patients were less likely to have a first pain assessment (aOR = 0.26, 95% CI = .11–.65) or a last pain assessment (aOR = 0.47, 95% CI .27–.83) in comparison to White patients. Hispanics were less likely to receive opioid analgesics (aOR = 0.62, 95% CI = 0.40–0.97) compared with Whites patients.
Craven et al. [23]	Longitudinal	Survey	Single Site	Emergency Care	Adult	Overall: $N = 15{,}060$ White: $N = 12{,}232$ Hispanic: $N = 1680$	No racial/ethnic differences in regard to pain management. Hispanic patients had a similar likelihood of receiving any pain medication while in the Emergency Department compared to White patients (OR = 1.06, 95% CI .96–1.17, $p = .62$). Hispanic patients also had a similar likelihood to receive an opioid medication compared to White patients (OR = 0.97, 95% CI = 0.88–1.08, $p = .70$).
Dickason et al. [24]	Cross-sectional	Administrative	Single Site	Emergency Care	Adult	Overall: $N = 2461$ Black: $N = 1395$ White: $N = 741$ Other: $N = 48$ Unknown: $N = 277$	Mixed findings of racial/ethnic differences in regard to pain management. Among patients with back pain and with a prescription of any analgesia, Black patients were less likely to receive an opioid (50.0%) compared to White patients (72.0%, $p < .001$). However, there was no racial/ethnic difference for receipt of any type of analgesia for back pain, migraines, or long bone fractures nor a racial/ethnic difference for receipt of opioids for patients with migraines or long bone fractures.

Table 2 (continued)

Reference	Study design	Data type	Sampling or site(s)*	Care setting	Adult or youth╫	Sample	Main findings
Fain et al. [25•]	Cross-sectional	Survey; Administrative	Nationally representative	Nursing Home	Adult	Overall: $N = 18{,}526$ White: $N = 13{,}415$ Black: $N = 1367$ Hispanic: $N = 493$ Asian: $N = 76$ Other: $N = 81$	Blacks and Asians are worse off compared to Whites. Nursing home residents who were Black (OR = 1.20, 95% CI = 1.03–1.39) or Asian (OR = 1.97, 95% CI = 1.22–3.20) were less likely to receive a prescription analgesic compared to White residents.
Goyal et al. [26•]	Cross-sectional	Survey	Nationally representative	Emergency Care	Youth	Overall: $N = 0.94$ million[1] Black: 86.6% White: 8.8% Asian: 3.1% Other: 1.5%	Blacks were worse off compared to Whites in regard to pain management. Black patients with moderate pain were less likely to receive any analgesia than White patients (OR = 0.1, 95% CI = 0.02–0.8) and among patients with severe pain, Black patients were less likely to receive opioids relative to White patients (OR = 0.2, 95% CI = 0.06–0.9).
Harrison et al. [27]	Cross-sectional	Survey	Nationally representative	Any	Adult	–	No racial/ethnic difference in regard to pain management. Black adults receiving opioid prescriptions were similar to that of White adults in 2015 (~ 23%, $p = 0.87$).
Hausmann et al. [28]	Longitudinal	Administrative	Single site	Primary Care	Adult	Overall: $N = 1899$ White: $N = 1646$ Black: $N = 253$	Blacks were worse off compared to Whites in regard to pain management. Compared to Whites, pain was documented in a lower percentage of primary care appointments for Black patients than for White patients ($\beta = -0.12$, 95% CI = 0.16 to 0.08, $p < .001$). Black patients were significantly less likely than White patients to be referred to a pain specialist (OR = 0.62, 95% CI = 0.43–0.90, $p = .01$).
Janakiram et al. [29]	Cross-sectional	Administrative	Multi-site	Dental Care	Adult	Overall: $N = 891{,}720$ White: $N = 480{,}208$ Black: $N = 218{,}453$ Hispanic: $N = 76{,}809$ Other: $N = 116{,}250$	Hispanic patients were worse off compared to White and Black patients. White and Black patients were approximately twice more likely to receive opioids than were Hispanics (OR = 2.11; 95% CI = 2.05–2.17 and OR = 1.88; 95% CI = 1.83–1.93), and opioid use was higher among Black female patients (OR = 3.29; 95% CI = 3.18–3.40) and White female patients (OR = 3.24; 95% CI = 3.14–3.35) than among Hispanic female patients.
Johnson et al. [30]	Cross-sectional	Survey	Nationally representative	Emergency Care	Youth	Overall: $N = 8{,}137{,}774$[1] White: $N = 4{,}283{,}045$[1] Black: $N = 1{,}908{,}755$[1] Hispanic: $N = 1{,}676{,}632$[1] Other: $N = 269{,}342$[1]	Black patients and patients from other racial/ethnic groups were worse off compared to Whites in regard to pain management. Black patients were less likely than White patients to receive any analgesic (OR = 0.61; 95% CI = 0.43–0.87) or a narcotic analgesic (OR, 0.38; 95% CI, 0.18–0.81). Among patients with severe pain, Black patients (OR = 0.43, 95% CI = 0.22–0.87) and patients from other racial/ethnic groups (OR = 0.02, 95% CI = 0.00–0.19) were less likely to receive analgesia compared to White patients.
Joynt et al. [31]	Cross-sectional	Survey	Nationally representative	Emergency Care	Adult	Overall: $N = 183{,}784{,}463$[1] White: 72.6% Black: 24.3% Other: 3.1%	Blacks were worse off compared to Whites in regard to pain management. Black patients were prescribed opioids less often (aOR = 0.73; 95% CI = 0.66–0.81) than White patients across all measures of SES after controlling for pain-level, age, injury-status, and other covariates.

Table 2 (continued)

Reference	Study design	Data type	Sampling or site(s)*	Care setting	Adult or youth╫	Sample	Main findings
Lee et al. [32]	Cross-sectional	Survey	Nationally representative	Emergency Care	Adult	Overall: $N = 389{,}676{,}926^1$---	Blacks were worse off compared to Whites in regard to pain management. Black patients had greater odds (OR = 1.99, 95% CI = 1.25–3.17) relative to White patients of receiving only a non-opioid pain medicine rather than an opioid.
Ly et al. [33•]	Cross-sectional	Survey	Nationally representative	Primary Care	Adult	Overall: $N = 6183$ Black: $N = 692$ White: $N = 4764$ Hispanic: $N = 682$	Blacks and Hispanics were worse off compared to Whites in regard to pain management. Black patients were less likely to receive opioids for abdominal pain (β = − .060, SE: .030) and back pain (β = − 0.71, SE: .035) compared to White patients. Similarly, Hispanic patients were less likely than White patients to receive opioids for abdominal pain (β = − .063, SE: .021) and back pain (β = − 0.148, SE: .035) compared to White patients.
Nafiu et al. [34]	Cross-sectional	Administrative	Single site	Other	Youth	Overall: $N = 771$ White: $N = 619$ Patients of Color: $N = 152$	White children are worse off compared to child Patients of Color in regard to pain management. Child Patients of Color were more likely to receive i.v. opioid analgesia than their White children (24.5% vs minority children 34.2%, OR = 1.5; 95% CI = 1.04–2.2; $p = .03$). In multivariate analysis, child Patients of Color had a 63% higher adjusted odds of receiving i.v. opioids in the recovery room (OR = 1.63; 95% CI = 1.05–2.62; $p = .03$).
Rasooly et al. [35]	Cross-sectional	Survey	Nationally representative	Emergency Care	Youth	Overall: $N = 27{,}183^2$ ---	Mixed findings of racial/ethnic differences in regard to pain management. Black children (OR = 0.69, 95% CI = 0.53–0.89) were less likely to receive opioids compared to White children. In addition, children treated in hospitals with a high proportion of Black race patients were less likely to receive opioids (OR = 0.73, 95% CI = 0.60–0.89). However, no racial/ethnic differences were found in receipt of any analgesia to treat pain.
Rasu et al. [36]	Cross-sectional	Survey	Nationally representative	Primary Care	Adult	Overall: $N = 690{,}205{,}290^1$ Black: $N = 63{,}982{,}030$ White: $N = 602{,}273{,}136$ Hispanic: $N = 52{,}622{,}664$ Other: $N = 238{,}120{,}823$	Hispanics were worse off in regard to pain management compared to non-Hispanics. Hispanics reporting chronic pain were less likely (aOR = 0.67, 95% CI = 0.47–0.96) to be prescribed an opioid compared to non-Hispanics, after accounting for other covariates such as insurance, age, and physician type.
Ringwalt et al. [37•]	Cross-sectional	Administrative	Multi-site	Other	Adult	Overall: $N = 75{,}458$ White: $N = 49{,}197$ Black: $N = 75{,}458$	Blacks were worse off compared to Whites in regard to pain management. Black Medicaid beneficiaries in NC were less likely to fill an opioid prescription compared to White beneficiaries (OR = 0.91, 95% CI = 0.88–0.94). These race differences were greater among patients of specialists in obstetrics and gynecology, internal medicine, and general practitioners/family medicine physicians.
Rosenbloom et al. [38]	Longitudinal	Survey	Nationally representative	Emergency Care	Adult	Overall: $N = 2{,}622{,}926^1$ White: $N = 1{,}535{,}794$ Black visits: $N = 356{,}582$ Hispanic: $N = 665{,}173$ Other: $N = 65{,}377$	Patients of Color were worse off in regard to pain management compared to White males. Patients of Color were less likely to receive opioids (OR = 0.72, 95% CI = 0.72–0.73; $p < .001$) compared to White males.

Table 2 (continued)

Reference	Study design	Data type	Sampling or site(s)*	Care setting	Adult or youth╫	Sample	Main findings
Singhal et al. [39]	Cross-sectional	Survey	Nationally representative	Emergency Care	Adult	Overall: $N = 63{,}300{,}200^{1}$--	Mixed findings in regard to disparities in pain management**.** Blacks were less likely relative to Whites to receive opioid prescription at discharge during ED visits for back pain (OR = .57, CI = .47–.70) and abdominal pain (OR = .67, CI = .52–.88). However, no racial/ethnic disparity existed for opioid prescription at discharge for toothaches, fractures or kidney stones.
Young et al. [40]	Longitudinal	Administrative	Multi-site	Emergency Care	Adult	Overall: $N = 6398$ White: $N = 3699$ Black: $N = 991$ Asian: $N = 244$ Hispanic: $N = 800$ Other: $N = 246$	Blacks and Hispanics were worse off compared to Whites in regard to pain management. Black patients with a pain score recorded (OR = 0.55, 95% CI = 0.33–0.91) and without a pain score recorded (OR = 0.15, 95% CI = .05–.52) were less likely than White patients to receive analgesia. Similarly, Hispanic patients with a pain score recorded (OR = 0.57, 95% CI = (0.33–1.00) and without a pain score recorded (OR = 0.29, 95% CI = 0.10–0.80) were less likely than White patients to receive analgesia.

[1] Estimated weighted visits and racial/ethnic breakdown

[2] Unweighted visits

^ Studies included both pain burden and pain management outcomes and are displayed more than once

—Did not specify either sample size or racial breakdown of sample

*Nationally representative studies involved a nationally representative sampling approach across multiple geographic areas and/or clinic sites

*Multi-site studies involved data collection from multiple geographic areas and/or clinic sites, but did not involve a nationally representative sampling approach

*Single-site studies involved data collection from a single clinic site, but did not involve a nationally representative sampling approach

╫"Youth" studies were exclusively limited to children (0–17) and/or young adolescents (18–25). Some "Adult" studies may include some youth, but were primarily comprised of adult participants (18 and older) three studies were all single-site studies of emergency care patients, including one study that described no racial differences in the evaluation (e.g., abdominal X-ray) and therapeutic treatment (e.g., pain medications) of pediatric emergency care patients presenting with abdominal pain [22]. Another study documented no racial disparity in receipt of analgesia for post-operative pain among emergency care pediatric patients, but higher rates of intravenous opioid use among POC relative to Whites [34]. In a third study of adult emergency care patients, rates of morphine and opioid prescribing and dosing were similar for Hispanics and non-Hispanics [23].

However, the vast majority of studies with non-cancer patients revealed racial disparities in pain management that favored Whites over their POC counterparts. Most of these studies were conducted using nationally representative data for emergency care patients. For example, in a nationally representative study of emergency care patients reporting moderate-to-severe pain, Blacks were less likely to be prescribed opioids than Whites [31]. In a similar study of pain treatment for emergency department toothache visits, Whites were prescribed opioid pain medications at higher rates than Blacks [32]. Additionally, another study reported racial disparities in analgesia administration for pre-hospital emergency patients with blunt trauma, with non-Hispanic Blacks and Hispanics less likely to receive analgesia than non-Hispanic Whites [40]. A longitudinal study of racial/ethnic and sex differences in opioid administration among emergency care patients with appendicitis and gallbladder disease observed that male Patients of Color were less likely to receive opioids than female Patients of Color, White males, and White females [38]. Additionally, two nationally representative studies of pediatric emergency care patients reported that Blacks were less likely to receive opioid analgesia than their White counterparts [26•, 35]. One of these studies also found that rates of opioid receipt were lower among hospitals with higher concentrations of Black patients [35].

Findings from three emergency care studies were mixed. One study reported no racial differences in opioid prescribing among a nationally representative sample of patients with toothaches, fractures, and kidney stones; yet, among patients with back pain and abdominal pain, Blacks were less likely to receive an opioid prescription at discharge than Whites [39]. Additionally, one single-site study of emergency care for back pain, migraines, and long bone fractures revealed that Blacks with back pain were less likely to receive opioids than their White counterparts [24]. However, no racial differences were observed in regard to receipt of opioids for migraines or long bone fractures, or receipt of “any analgesia” for all three conditions. Findings from another nationally representative study of children in emergency care for abdominal pain indicated similar levels of analgesic administration and pain score documentation among non-Hispanic Whites, Hispanics, and patients of other races/ethnicities; however, non-Hispanic Blacks exhibited lower rates of analgesia receipt than non-Hispanic Whites [30].

Racial/ethnic disparities in pain management were also documented outside of the emergency care setting. In a multi-site study of North Carolina Medicaid beneficiaries with chronic non-cancer pain, Whites exhibited higher rates of opioid utilization than Blacks [37•]. In another multi-site study of opioid prescriptions among Medicaid patients needing dental care, Hispanic patients were less likely to receive opioids than non-Hispanic Whites or Blacks [29]. Similarly, in a nationally representative study of outpatients with chronic pain, Hispanics were less likely to receive opioids than non-Hispanics [36]. Another nationally representative study conducted in the VA setting reported that compared with Whites, Black veterans were less likely to be screened for pain during outpatient visits [21]. Moreover, another VA study reported lower rates of pain documentation and fewer referrals to pain specialists among Black veterans relative to Whites [28]. In the nursing home setting, one nationally representative study found that compared with Whites, Blacks and Asians were less likely to receive a prescription analgesic for chronic pain [20]. Furthermore, in a nationally representative study of pain-related care in hospice patients, rates of pain assessment were lower among non-Hispanic Blacks relative to non-Hispanic Whites. Additionally, compared with non-Hispanic Whites, Hispanics were less likely to receive opioids or report no pain at discharge [25•]. Finally, in another nationally representative study of opioid prescribing patterns among outpatients with back and abdominal pain during 2006–2015, both non-Hispanic Blacks and Hispanics were less likely to receive opioids than their White counterparts [33•], and in contrast to findings from one recent study of trends in opioid prescribing during 2000–2015 [27], this study documented no change in racial/ethnic gaps in opioid prescribing.

Discussion

This study examines evidence from the recent research literature and suggests that little progress has been made in achieving racial/ethnic equity in the burden and management of pain. Compared with Whites, Patients of Color report worse pain, yet are less likely to receive opioids and other forms of analgesia to manage pain. Moreover, on average, pain screening/documentation is less common among Patients of Color relative to Whites. These findings were consistent among individuals with and without cancer, and across various clinical settings (e.g., emergency care, dental care, hospice).

Some limitations of the recent literature on pain disparities include the large number of studies that focused on comparing Blacks and Whites. Fewer recent studies assessed and reported on pain burden/management among Hispanics/Latinos, Native Americans, and Asians. Such data are needed to determine the distinct and common pain-related care needs among Patients of Color. Additionally, the vast majority of studies evaluated racial/ethnic variations in receipt of pain medications, particularly opioids; however, no recent studies examined other outcomes of pain management such as adequacy of pain medication dosing. More longitudinal and intervention studies are also needed in order to monitor pain-related disparities and identify evidence-based solutions to improve equity in pain care and outcomes.

Moreover, there was wide variation in regard to use of socioeconomic status (SES; e.g., insurance, income, education) adjustment across studies, with about half of studies (14 out of 30 studies) reporting race/ethnicity-specific estimates of pain burden/management that reflected adjustment for socioeconomic status, and the other half of studies (16 out of 30 studies) not accounting for socioeconomic status in their analysis (not presented in Table 1). As described in prior studies, presenting together both, SES and non-SES adjusted estimates of racial/ethnic health care disparities is preferable, as this approach allows assessment of both the independent effect of race on care (non-SES adjusted disparity estimates) as well as the residual direct effect of race on care (i.e., SES adjusted disparity estimates) that accounts for potential mediating factors [14, 17, 45]. It is worth noting, however, that SES adjustment was similarly common among studies reporting racial/ethnic disparities (9 out of 21 studies) and those that did not or reported mixed findings (5 out of 9 studies), suggesting that disparities in pain exist and persist despite SES adjustment. Finally, none of the studies from the recent literature attempted to evaluate modifiable drivers of pain inequities; however, findings from earlier studies suggest that provider behavior (e.g., implicit bias) and supply-side factors such as racial/ethnic differences in community-level access to pain medications and specialists may contribute to these disparities [46].

Implications of Federal/State Opioid Risk Mitigation Strategies on Pain Disparities

Rates of opioid overdose deaths in the USA continue to grow at an alarming rate. While historical data indicate that Whites account for a disproportionately larger share of opioid-related deaths in the USA, recent data suggest that opioid abuse death rates are growing more rapidly among People of Color relative to Whites [47]. For example, data from the Centers for Disease Control revealed that between 2015 and 2016, the percent change in opioid deaths ranged from 56.1% for non-Hispanic Blacks to 36.4% among Asians/Pacific Islanders, 32.6% among Hispanics, 25.9% among non-Hispanic Whites, and 14.9% among American Indians/Alaskan Natives. Clearly, the impact of the opioid epidemic is far-reaching across population subgroups and warrants further attention by policymakers and stakeholders.

Federal and state efforts to combat opioid deaths include prescribing policies to reduce the widespread availability of opioids, public awareness campaigns around the harms of opioid misuse, increased access to substance abuse treatment, improvements in overdose response (e.g., naloxone access and use), criminal penalties for traffickers, and legal and disciplinary action against companies and medical providers [48]. While these efforts may be effective in curtailing opioid use, there is emerging evidence suggesting that the current environment of heightened opioid surveillance (i.e., "opioid pharmacovigilance") may negatively impact patient access to adequate pain management [49], including access for patient groups thought to be excluded from new restrictions on opioid prescribing (e.g., cancer patients in active treatment). Moreover, given existing inequities in pain care, some opioid risk mitigation strategies may widen disparities where opioid prescribing is indicated and have overall unintended consequences for racial/ethnic equity in pain management. In particular, strategies that emphasize reducing opioid availability across the USA are likely to have a greater impact on communities of color, where pharmacies are less likely to carry a sufficient stock of opioid medications [50].

At the provider level, clinician concerns around possible litigation and disciplinary action may cause some providers to alter their opioid prescribing and dispensing practices in ways that harm patients with significant pain management needs. This adverse effect on provider behavior may exacerbate existing clinician biases in pain management practices, as prior studies indicate that providers are more likely to underestimate pain severity in Patients of Color and less likely to refer these patients to a pain specialist than their White counterparts [21, 28, 51, 52]. Thus, additional research is needed to evaluate the effects of opioid risk mitigation efforts on both, racial/ethnic differences in opioid death rates and inequities in community- and individual-level access to adequate pain management, including opioids, non-opioid analgesics, and non-pharmacological treatments (e.g., acupuncture).

Recommendations for Advancing Equity in Pain Management

Cancer Pain

According to the American Society of Clinical Oncology (ASCO), "cancer patients represent a special population that should be largely exempt from regulations intended to restrict [opioid] access or limit doses, [due to] the unique nature of the disease, its treatment, and potentially life-long sequelae [53]." As such, many new opioid prescribing regulations and guidelines, including the Centers for Disease Control and Prevention (CDC) guidelines for opioid prescribing among patients with chronic pain, exclude patients in active cancer treatment, palliative care, or end-of-life care [54]. However, recent data from the American Cancer Society (ACS) suggest that since

Table 3 Recommendations for advancing equity in pain management

Cancer pain	(1a) Maintain and improve access to opioids for all cancer patients. (1b) Address racial/ethnic inequities in pain assessment, use of opioid prescribing as first-line pain therapy, and patient access to other forms of pain management.
Non-cancer pain	(2a) Address racial/ethnic inequities in pain assessment, encourage non-opioid prescribing as first-line therapy for all patients, and increase patient access to non-opioids. (2b) Increase racial/ethnic diversity of participants in non-opioid pain research.

2016, when the CDC guidelines were published, a growing number of cancer patients and survivors have been less able to fill opioid prescriptions due to problems at the pharmacy (e.g., insufficient stock of opioid drugs; 16% in 2016 vs. 41% in 2018) and challenges with insurance (e.g., insurance company did not cover drug; 11% in 2016 vs. 30%) [55]. Furthermore, 48% of ACS participants reported that their provider informed them that options for treating their pain were limited due to current laws, guidelines, or insurance companies.

Such unintended changes in care for oncology patients raise serious concerns around potential exacerbation of inequities in the management of cancer-related pain, as Patients of Color with cancer are already at greater risk for worse pain burden due to provider bias in pain management [56–59]. Thus, advancing equity in cancer-related pain management will require both (1a) maintaining and improving access to opioids for all cancer patients; and (1b) addressing racial/ethnic inequities in pain assessment, use of opioid prescribing as first-line pain therapy, and access to other forms of pain management (see Table 3). Given the unique pain management needs of cancer patients, providers and pharmacies should be prepared to use aggressive opioid regimens in this special patient group without fear of possible litigation. To that end, policymakers, the CDC, and other public health and health care stakeholders will need to take a firmer stance in reinforcing messages related to the appropriateness of opioid prescribing for managing cancer-related pain, so that clinicians feel supported in making pain management decisions that prioritize the functional status and well-being of cancer patients. Raising provider awareness regarding systematic racial/ethnic differences in opioid prescribing and pain burden should also be an integral component of provider education efforts. Relatedly, provider-level strategies that interrupt bias and provide evidence-based guidance in pain management should also be explored in future research, along with implementation of routine monitoring of race/ethnicity-specific rates of opioid prescribing and pain severity within oncology clinical practice. Similar strategies have already been successfully implemented and evaluated to address gender biases in the administration of blood clot prevention treatment in trauma care [60, 61], and hold much promise for future dissemination and use in pain care.

Non-cancer Pain

Guidelines for managing non-cancer pain have shifted in recent years toward a preference for non-opioids over opioids as first-line therapy [62–64]. This shift in guidelines was partly motivated by efforts to curb the opioid epidemic as well emerging evidence regarding the comparative safety and efficacy of non-opioid analgesia for managing non-cancer pain. For example, data from a recent clinical trial demonstrated that compared with opioid regimens, non-opioid regimens were more effective in managing chronic non-cancer pain and resulted in fewer side effects [65]. It is worth noting, however, the vast majority of participants in this trial were White (87%), which raises questions regarding the generalizability of these findings to Patients of Color.

Thus, we couch our recommendations for addressing inequities in non-cancer pain management in the broader current context of growing support and research investigation of non-opioid treatments for pain. Specifically, we recommend (2a) addressing racial/ethnic inequities in pain assessment, encouraging non-opioid prescribing as first-line therapy, and increasing patient access to non-opioids. As described earlier, increasing provider awareness of inequities in pain burden, interrupting implicit bias in analgesia prescribing, and implementing routine race/ethnicity-specific monitoring of analgesia prescribing and pain burden are all critical to achieving goal (2a). Moreover, for the subset of non-cancer pain patients requiring opioid therapy, the focus should be to not only equalize rates of opioid prescribing by race/ethnicity, but also to ensure safe prescribing across all patients (e.g., informed consent process prior to prescribing opioids, prescribe lowest effective dose, ongoing evaluation of harms/risks for chronic pain, limit the duration of use for acute pain) [64]. We also recommend (2b) increasing racial/ethnic diversity of participants in non-opioid pain research. As more studies of non-opioid analgesia and non-pharmacological approaches are conducted, it will be important to prioritize enrollment of Patients of Color into these studies in order to ensure equitable uptake and benefit from non-opioid regimens.

Conclusion

The recent evidence overwhelmingly suggests that the quality of pain care varies by race/ethnicity in the USA. Future research should continue to monitor racial differences in pain burden and pain management, particularly in the present environment of opioid pharmacovigilance. While the nation's opioid crisis is unprecedented, our national response needs to address current injustice and inequities in pain management. Addressing one national crisis should not come at the cost of inflicting further pain and suffering among groups already marginalized in pain care delivery.

Compliance with Ethical Standards

Conflict of Interest Cleo A. Samuel reports grants from Pfizer/NCCN. This funding supports her effort on a research study that is unrelated to this manuscript. Giselle Corbie-Smith and Samuel Cykert each declare no potential conflicts of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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