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A Systematic Review of Racial Disparities in Emergency Department Pain Evaluation and Treatment in the United States

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Abstract

Background: Providers working in emergency departments (ED) must balance the need to relieve patients' pain with the dangers of overprescribing opioids. Lack of standardization of pain evaluation and treatment may contribute to inequities in the management of pain in emergency departments. Evaluating differences in how different populations receive care in emergency departments can help to identify problems and areas where improvements need to occur.

Purpose: The purpose of this literature review is to evaluate what current research states about the prevalence and causes of racial disparities in pain evaluation and treatment in United States emergency departments and determine what gaps in knowledge are a priority for future research.

Methods: A literature review was conducted using the Augsburg University library search engine and PubMed. Exclusion criteria were any articles published prior to 2020, any articles discussing hospitals outside the United States, systematic reviews, and articles which did not discuss racial disparities in pain evaluation or treatment.

Conclusions: Many patient populations, such as Black, Hispanic and Native American patients, experience lowered rates of opioid prescription for pain in emergency departments across the United States. Racial disparities in the evaluation and treatment of chest pain are also widespread. Pediatric patients presenting with pain also experience racial disparities in rates of opioid prescription and imaging studies ordered. More research needs to be done into the efficacy of trainings and policy implementation to reduce these inequities.

Key Words: Pain, Disparities, Emergency.

Introduction

Emergency department providers managing patients with pain face many challenges. Since there is no truly objective means of quantifying pain, providers must rely on a combination of detailed patient interviews, clinical presentation and use of tests and imaging to determine the severity and best treatment of a patient's pain. Patients with subjectively intense pain may have no readily identifiable cause for their pain, and patients in mild distress may be experiencing life threatening emergencies. Evaluating how patients of different racial and ethnic backgrounds experience care for their pain is important to discover potential inequities and form a basis for understanding where progress needs to be made.

The challenge of skillfully and compassionately managing pain is one constantly encountered by emergency department providers; over half of all emergency department visits have pain as a component of their chief complaint, with abdominal pain being overall the most common chief complaint during emergency department visits in the United States.[1,2] Previous research has indicated that racial disparities in the evaluation and treatment of pain in emergency departments do exist. A meta-analysis published in 2019 found that racial minority patients were less likely to receive any pain medication during their emergency department visit.[2]

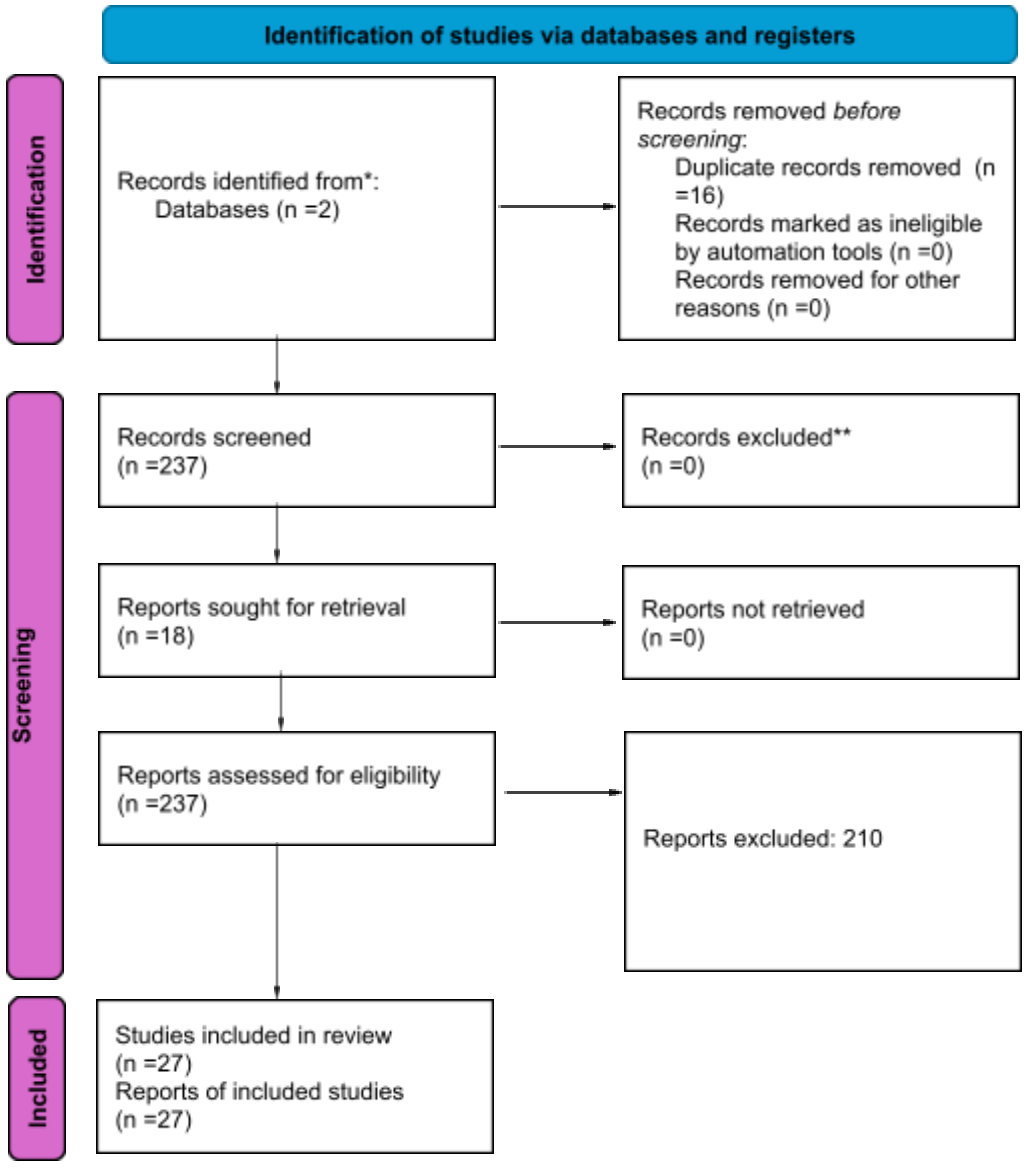
The purpose of this systematic review is to discover what the most current research states about racial disparities in pain evaluation and treatment in U.S. emergency departments. Patients with chief complaints of pain represent a large fraction of all emergency department visits, and the skillful and equitable evaluation and treatment of their pain is a crucial part of the provider's responsibility. This review will begin by evaluating the studies discussing rates of opioid

prescription in different patient populations. Several studies found that Black patients and Hispanic patients experience lowered rates of opioid prescription when presenting with pain to U.S. emergency departments.[1-3] The consistencies and differences in the findings of these studies will be discussed. Several studies evaluating rates of opioid prescription among different patient populations in the pre-hospital EMS setting are also included.[4-5] Next the review evaluates studies which discuss disparities in the assessment and workup of chest pain. These sources suggest that Black patients experience disparities in rates of lab tests and imaging studies ordered when presenting with chest pain. Finally several studies evaluating racial disparities in pain evaluation and treatment in pediatric patients are also included.

Methods

To find the studies evaluated in this review two databases were used: PubMed and the Augsburg University Lindell Library academic database. To search the Lindell Library, the advanced search feature was utilized using the keywords “pain disparities” and searching titles containing “pain emergency.” To search PubMed the keywords “racial pain disparity emergency” were used. Exclusion criteria were any articles published prior to the year 2020, any articles describing research on hospitals outside of the United States, other systematic reviews, articles which did not discuss emergency departments or prehospital care, and articles which did not discuss racial differences in pain management. The initial search yielded 253 study results. Of these sources 16 were duplicates which were eliminated. The remaining sources were evaluated for exclusion criteria, and 210 of them were excluded for a total of 27 articles included in the

review. This search feature was last accessed on 7/6/2024. I independently performed the review of articles to determine whether they met inclusion or exclusion criteria.



Literature Review

Part 1: Opioids and Analgesic Administration

The administration of opioids for pain relief in the emergency department is a controversial subject requiring nuance and care on the part of the provider. Many patients have their first exposure to opioids at an emergency department, and being prescribed opioids at discharge from an ED is linked to higher rates of opioid addiction.[1] Providers must consider that some patients may present to emergency departments seeking opioids. However, there are many situations where timely administration of opioids is indicated and necessary for relief of severe pain and reducing the suffering of the patient. Providers must carefully weigh the pros and cons when prescribing opioids. This segment of the review will discuss several topics related to opioid administration and prescription in emergency departments. Firstly, several studies will be examined which evaluate overall rates of ED opioid administration and prescription in different racial populations. Next, several studies are reviewed which examine racial opioid administration disparities in the context of specific chief complaints. Finally, several studies will be evaluated which examine racial disparities in opioid administration in the prehospital EMS context.

An analysis of 2018 NHAMCS survey results of over 15,00 patients who visited emergency departments across the United States found that after adjusting for other variables Black patients were 45% less likely to receive opioid medication when visiting an emergency department than White patients.[1] This study pulls data from NHAMCS survey results to obtain representative nationwide samples of patient experiences. Of note, approximately 30% of the patients included in the sample did not have a pain scale recorded.[1] The study primarily examines ED visits in which the chief complaint was pain related and examines the relationship of the pain treatment and other variables. Black patients, patients with Medicaid and uninsured patients were significantly less likely to be prescribed opioids.[1] Factors which increased the likelihood of a patient being prescribed opioids included increased age, higher reported level of

pain, and visiting the emergency department during a night shift. Measured patient behavioral factors such as history of substance abuse and multiple ED visits within a 72 hour period were not found to have a statistically significant impact on rates of opioid prescription.[1] Another cohort study included in the review confirmed the finding that Black patients are significantly less likely to be prescribed opioids when visiting emergency departments and found similar rates of disparities in Hispanic patients.[3]

The NHAMCS survey analysis also examined rates of opioid prescription by pain type and found that the degree of variation between different populations varies with different pain types. Black patients were prescribed significantly less opioids than White patients when presenting with back pain, chest pain, musculoskeletal pain or neck pain.[1] There were no statistically significant differences noted in rates of opioid prescription for patients of different races who presented with abdominal pain, head pain or facial pain in the NHAMCS survey, although as will be seen several other sources had differing conclusions.

Several other sources evaluated disparities in rates of opioid prescription within the context of specific chief complaints. A retrospective cohort study of patients with headache presenting to an ED in New York found that Black patients were more likely to be treated with acetaminophen or ibuprofen and less likely to receive opioids despite reporting higher average pain levels.[6] A cohort study of over 26,000 patients presenting with kidney stones found that White patients were more likely than Black or Hispanic patients to receive opioids.[7] Two reviews of emergency departments in California and Minnesota found that Black and Hispanic patients presenting to emergency departments with undifferentiated abdominal pain were less likely to receive opioids during their stay or be prescribed opioids after discharge.[2,8]

In contrast to the previously mentioned sources, a retrospective analysis of NHAMCS data on over 2.3 million patients treated for long bone fractures in emergency departments between 2016-2019 found no statistically significant associations between race and rates of opioid administration or prescription.[9] Furthermore, this analysis found a positive association between being Black and receiving analgesia during the ED stay.[9] One potential explanation for the difference in these findings is that with long bone fractures there is an obvious traumatic cause of the patient's pain. With complaints such as headache or abdominal pain which have less clear causality there may be a greater tendency on the part of providers to interpret the patient's behavior as drug seeking or the pain as being non-severe.

Disparities in rates of opioid prescription also may occur in the prehospital setting. Several sources found that minority patients were less likely to receive analgesic medication during emergency medical services (EMS) transport.[4,10-13] The majority of sources focused on prehospital management of traumatic pain, which is more likely to result in analgesic administration. A cohort study of over 4.7 million patient encounters in the U.S. between 2019-2021 found that all racial and ethnic minority groups studied were less likely to have a pain scale recorded by EMS than White patients.[10] The study also found that black, American Indian and Alaska Native patients were approximately half as likely to receive analgesic medications (defined in this study as opioids or ketamine) from EMS even after adjusting for severity of recorded pain score.[10] Similarly, smaller scale study of over 2,000 adult patients transported to a level 1 trauma center between 2014-2020 found that racial and ethnic minority patients on average reported higher subjective ratings of pain but were less likely to receive analgesic pain medications.[11] A large observational study found similar results: reviewing the data of over 35,000 adult patients with long bone fractures transported by 400 different EMS agencies in

2019-2020 found that Black patients with severe pain were approximately 12% less likely to receive analgesic medications during transport than White patients, showing consistency with the previously mentioned studies.[4] This study found that Hispanic patients were slightly more likely to receive analgesic medications than White patients, but after adjusting for severity of reported pain there was no statistically significant difference in rates of analgesic administration between White and Hispanic patients.[4] In the setting of long bone fractures fentanyl was the medication used for analgesia in 86% of cases.[4] All of these studies found that Black patients experienced a significantly lower rate of analgesia administration in the prehospital EMS setting.

In contrast, a cohort study of over 1 million patients transported by EMS in 2018 and 2019 found that in patients with chief complaints of non-traumatic pain, Black patients were less likely to receive analgesic medication during transport than White patients, but Hispanic patients were more likely to receive analgesic medications including opioids.[12] This study examined rates of administration of both opioid and non-opioid analgesics such as NSAIDs or acetaminophen and found that for both opioids and non-opioids Black patients were the least likely to receive medications and Hispanic patients were the most likely to receive them.[12] Another outlying source was a study of over 27,000 patients with a chief complaint of pain or injury transported by EMS in the state of Wyoming between 2016-2019, which found that Hispanic patients were less likely to receive opioids during transport than White patients but that there was no statistically significant difference in rates of opioid administration between Black and White patients.[13] This study focused on EMS transport within the state of Wyoming whereas the majority of the other studies evaluated nationwide samples, suggesting that regional variation may play a role in rates of observed disparities.

A wide variety of sources point to the fact that members of several minority groups experience disparities in rates of opioid administration and prescription, both in emergency departments and in EMS settings. However, relatively few studies exist which attempt to discern the underlying causes of these disparities. A clinical trial of over 1000 patients in 4 different EDs examined whether racial disparities in opioid prescriptions were associated with patient preference, and whether provider education influenced rates of disparities.[14] The sample population was adult patients presenting to an emergency department with a chief complaint of pain. The patients evaluated were divided into a treatment group and a control group. There were 671 patients in the treatment group and 341 patients in the control group. In the treatment group, patients completed a questionnaire about their preference for opioid vs non-opioid pain medication and completed a screening interview intended to assess their risk of opioid misuse. The providers working with these patients were given the collected information about patient preference and risk of opioid misuse.

The intent of this study was to determine if patient preference or lack of provider knowledge about a patient's preferences and risk factors were influencing racial disparities in opioid prescriptions.[14] Black patients were found to be less likely to be prescribed opioids than White patients in both the treatment and control groups.[14] When patients who did prefer opioids and those who did not prefer opioids were considered separately, Black patients were less likely to receive opioids at similar rates, indicating that patient preference did not explain the racial disparities observed in this study.[14] Also, the racial differences in rates of opioid prescription were not significantly different in the treatment arm of this study, indicating that the information the providers received about patient preferences and risk factors did not significantly change rates of disparities.[14]

The majority of the sources which examined rates of opioid prescription in emergency departments found that Black patients are less likely to receive opioid pain medication than White patients, even after adjusting for severity of pain and differentiating by chief complaint.[1-3,6-8,10-12] These findings were consistent across a wide variety of etiologies of pain including headache, abdominal pain, kidney stones, chest pain, back pain and neck pain.[1-2,6-8] However, the study analyzing NHAMCS data on long bone fractures found no significant racial disparities in rates of opioid administration for that complaint.[9] Several sources also found that Black patients experienced lowered rates of opioid administration in the prehospital EMS setting.[4,10-12] Some sources also found disparities in EMS rates of opioid administration for Hispanic patients.[10-11,13] However, other studies either failed to find statistically significant disparities in rates of EMS opioid administration for Hispanic patients or found that they were more likely to receive analgesia than white patients.[4,12] The underlying causes of these disparities and the extent to which they are regionally variable is unclear and requires further research to determine.

Part 2: Chest Pain

The assessment and treatment of chest pain in the emergency department is of crucial importance, since chest pain can be the manifestation of life-threatening conditions such as a myocardial infarction or pulmonary embolism. An evaluation of the treatment of chest pain is especially important in Black patients, since CDC data suggests that African-American patients die of heart disease at rates approximately twice that of other minority groups.[15] Several of the sources reviewed suggest that widespread racial disparities in emergency department evaluation and treatment of chest pain do exist.

A retrospective analysis of over 28,000 patients in 17 different emergency departments in 2019 who presented with chest pain found that Black patients with chest pain were more likely to be assigned a lower acuity level when being triaged compared to White patients.[16] Black patients on average also had a significantly longer wait time before being evaluated for chest pain and had a longer wait time before their disposition was determined. A retrospective study examining the EMRs of over 10,000 emergency department patients taken from a nation-wide geographic sample found that Black patients presenting with chest pain were less likely to have ECGs and cardiac enzymes ordered compared to other ethnic groups, despite current AHA recommendations that all patients presenting with chest pain receive an ECG within 10 minutes of presenting at an emergency department.[17] This study did not examine whether the disparity in rates of ECG assessment were linked to increased rates of adverse patient outcomes. Patients with Medicaid and uninsured patients were also found to have lower rates of ECG and cardiac enzymes ordered when evaluating their chest pain.[17] This study is consistent with the previously discussed studies on rates of opioid prescription in suggesting that significant inequities exist in the management of pain in Black patients in emergency departments.

Although Black patients were found to be less likely to be screened with an ECG,[17] one retrospective analysis found that Black patients were more likely to have urine drug screening (UDS) ordered when presenting to an emergency department for chest pain.[18] This study found that Black patients and male patients were both more likely to have UDS ordered as part of a chest pain workup than White patients or female patients. Black male patients with chest pain were roughly twice as likely to have UDS ordered as the general population.[18]

Although the previous studies demonstrated that Black patients do experience disparities in the evaluation of chest pain in the emergency department setting, they did not attempt to

determine to what extent these disparities resulted in differing outcomes for Black patients. One study funded by the Statewide Campus System examined over 1,400 adult patients presenting with chest pain to an ED in Michigan to evaluate their rates of admission, stress testing, and 30 days readmission or death.[15] At this hospital patients evaluated for chest pain were given a HEART score, a risk stratification tool intended to predict risk of cardiac events. Patients with a HEART score of 3 or less were considered low risk and could be safely discharged, whereas patients with a HEART score of 7 or higher were considered high risk. Of the patients evaluated in the study, White patients on average had higher recorded HEART scores than Black patients (3.9 for White patients vs 3.3 for Black patients[15]). However, even after adjusting for different HEART scores White patients were found to more likely to be admitted or to receive stress tests than Black patients with equivalent HEART scores.[15] The rates of 30 day readmission or death were significantly higher in Black patients; 7 of 193 African-American patients experienced one of these outcomes while 5 of 458 White patients did.[15] During this study only 3 patients died within the 30 day time frame that was measured, a sample size too small to accurately assess whether there was a racial association with increased mortality in this patient population.[15]

The studies examined in this review suggest that there are widespread racial disparities in evaluation and treatment of chest pain in emergency departments in the United States. Black patients with chest pain were found to be less likely to have an EKG ordered, which is the AHA guideline for standard of care.[17] They were also less likely to have cardiac enzymes ordered and more likely to be screened for drug use, suggesting potential provider bias influencing the evaluation of the patients.[17-18] Black patients were also found to be less likely to be admitted to the hospital or have a stress test performed when presenting with chest pain but were more likely to be readmitted within 30 days of their initial visit.[15]

Part 3: Pediatric Disparities

Several studies were included in this review which evaluate racial disparities in emergency department pain evaluation and treatment in pediatric populations. The studies examined in this review found pediatric racial disparities in rates of opioid administration in emergency departments. These disparities were noted in studies generally examining pain as a chief complaint, as well as in studies examining treatment of pediatric patients with headaches and long bone fractures. Studies will also be reviewed examining racial disparities in evaluation of abdominal pain in female pediatric patients. A study is also included evaluating rates of pediatric analgesia administration in the EMS setting.

Much like adult patients, racial disparities in rates of opioid administration in the treatment of pain in emergency departments were found to occur in pediatric populations. A large cross-sectional study of NHAMCS data on over 189 million pediatric patients seen in emergency departments across the U.S. between 2006-2016 found that Black patients and Hispanic patients were less likely to receive opioid medications during ED visits than white patients.[19] This was true once pain levels were adjusted for and was true in all regions of the United States.[19] However, when the sample of patients in the second half of the time frame of the study (years 2011-2016) was examined, there was no longer found to be a statistically significant difference in rates of opioid administration between Hispanic and White pediatric patients.[19] In addition, in the patients sampled from the Western United States there also was no significant difference in rates of opioid prescriptions between Hispanic and White patients. For Black patients disparities were consistently observed through all years and geographic regions included in the study.[19] Another study found that Black, Asian and Hispanic pediatric patients presenting

to an emergency department with headaches were less likely to receive IV pain medication and reported lower overall levels of pain relief.[20]

Several sources discussed the management of long bone fractures in pediatric patients, with varying findings. One study found that non-White pediatric patients were less likely to receive imaging when presenting with traumatic wrist or arm pain.[21] Similarly, a retrospective study of over 21,000 pediatric patients treated for long bone fractures at 7 different emergency departments found that Hispanic and Black children were more likely to receive analgesics than White patients and more likely to report a reduction of their pain by at least 2 points on a numerical scale.[22] However, Hispanic and Black patients were less likely to be administered opioids, and less likely to experience optimal pain reduction (defined as feeling either no pain or mild pain).[22] This means that although Black and Hispanic children were more likely to receive some type of pain medication, they were more frequently given acetaminophen or NSAIDs and less frequently given opioids compared to White children.

A retrospective chart review of over 700 pediatric patients presenting to a rural ED with long bone fractures provides an interesting contrast to the previously mentioned study. In the patients presenting to the rural ED Black and Hispanic patients were also more likely to receive some form of analgesic medication than White patients, and Black patients were less likely to receive opioids.[23] However, this study found that Hispanic patients were 92% more likely to receive opioid medications than White patients.[23] This study was consistent with the previously discussed retrospective study in finding that Black and Hispanic pediatric patients were more likely to receive non-opioid analgesic medications than White pediatric patients.[22-23] However, a limitation of this study is that the measured variable was the first medication administered during ED stay, meaning that many of the pediatric patients who initially received non-opioid

medications may later have received opioids without this fact being recorded in the study.[23] This may cause misleading interpretations of the data in this study and makes direct comparisons with other studies difficult.

A cross sectional study of 2017 NHAMSC data found that 55% of all pediatric ED visits in the U.S. were pain related.[24] The most common body system associated with the pain with musculoskeletal at 39%, followed by abdominal at 16% and ENT complaints at 15%.[24] Slightly less than half of the pain related visits were associated with a clear injury. This study also found that over half of the pediatric ED visits did not have pain severity assessment documented, pointing to a lack of adequate standardization of pediatric pain assessment.[24] The study notes that for very young children it may not be possible to utilize a numerical pain rating system, and accurately assessing their level of pain may be challenging for the provider.

Pediatric racial disparities were also found within the context of the chief complaint of abdominal pain. A retrospective review of female patients between the ages of 12-21 presenting to an urgent care or emergency department in 2016 with abdominal pain found inconsistencies in patient assessment and in the nature of the work-up for the patients' chief complaint.[25] This study found that while 88% of the female patients in the sample were asked about their menstrual status, only 52% of patients were asked if they were sexually active, and only 28% were questioned about contraceptive use.[25] Some racial differences in workup of abdominal pain were noted: Black female patients with abdominal pain were more likely to be tested for STIs and receive pelvic exams, and less likely to receive abdominal imaging.[25] White patients included in the study had a 64% chance of having an imaging study ordered (X-ray, CT or ultrasound), while Black patients only had a 36% chance of receiving imaging.[25] Black female patients were also more likely to be asked about their sexual history and use of contraceptives, pointing to possible

bias and assumptions influencing provider workup of abdominal pain.[25] Several sources noted that Black female patients presenting with abdominal pain or abnormal uterine bleeding were more likely to be asked about their sexual history, receive pregnancy tests, and be tested for STIs.[25-27] However, Black female patients with abdominal pain or abnormal uterine bleeding were less likely to receive imaging or be evaluated for bleeding disorders.[25-26]

Like adult patients, racial disparities were also noted in pediatric pain management in the pre-hospital setting. One of the included studies surveyed EMS providers who transported pediatric patients to emergency departments.[5] The researchers had the EMS personnel fill out a brief survey at the time of transfer of care of the patient. The sample size of the survey was 465 pediatric patients transported to 10 different emergency departments between 2019 and 2020. The study sought to determine if there is a correlation between ethnicity of the pediatric patient and the likelihood of receiving pain medication while being transported to the emergency department. This study did find that Black and Hispanic pediatric patients were less likely to receive opioid pain medications from EMS personnel than White patients, but due to the sample size and wide confidence interval the findings were not statistically significant.[5] Factors that were positively correlated with receiving pain medication in all demographics were being transported for a fracture, being transported by ALS rather than BLS, and being transported by more experienced EMS personnel.[5]

Several sources found that racial disparities in emergency department pain evaluation and treatment exist for pediatric as well as adult patients. Both Black and Hispanic pediatric patients were administered opioids less frequently than White patients, although in Hispanic populations regional variability in rates of disparities were noted and the overall rate of disparities for Hispanic pediatric patients appears to have diminished since 2011.[19] Multiple sources found that

Black pediatric patients were less likely to receive opioid treatment for long bone fractures.[22-23] However, the 2 sources evaluating opioid treatment of pediatric patients with long bone fractures had differing findings with Hispanic populations. One of the sources found Hispanic pediatric patients less likely to receive opioid pain medication than White patients, while the other found that Hispanic patients were more likely to receive opioids.[22-23] In addition to the previously noted disparities, Black female pediatric patients with abdominal pain were found to be less likely to receive diagnostic imaging.[25] Finally, the study evaluating rates of pediatric analgesia administration by EMS found that Black and Hispanic patients were less likely to receive opioid pain medications, although the results of this study were not statistically significant.[5]

Discussion

The purpose of this review is to determine what current research reveals about racial disparities in the evaluation and treatment of pain in emergency department patients in the United States, and what unanswered questions need to be addressed by future research. The studies analyzed in this review do reveal widespread racial disparities. Several studies found significant differences in rates of opioid prescription in different populations. Multiple studies also found disparities in the workup and treatment of chest pain in black patients. Additionally, several sources indicate that racial disparities in pain evaluation and treatment are experienced by pediatric as well as adult populations.

The evidence presented in the studies this review examined strongly suggests that pain management disparities in U.S. emergency departments are both significant and widespread. The

findings in these studies are not isolated to a single hospital system or region of the U.S. Several of the studies involve thousands of patients within many different hospitals. The findings are statistically significant and cannot be explained by small or unrepresentative samples. While some details varied from study to study, they were widely consistent with showing statistically significant, widespread disparities. For example, although the 2018 NHAMCS survey showed no significant differences between black and white patients in rates of opioid prescription when presenting for abdominal pain[1] and a 2019-2020 survey of hospitals in California did find that black patients presenting for abdominal pain were prescribed opioids at lower rates,[3] both studies found that overall black patients presenting to emergency departments for pain were prescribed less opioids among the populations being studied.

This review included 7 studies examining rates of opioid administration to adult patients in emergency departments. Of these studies, 6 found that Black patients were less likely to receive opioid analgesia than White patients.[1-3,6-8] These studies included a large scale review of NHAMCS data on patients with a generalized complaint of pain, as well as several studies focusing on opioid administration within the context of specific pain related chief complaints. The only study which found no significant differences in rates of opioid administration between Black and White patients was the retrospective analysis of NHAMCS data on emergency department treatment of patients with long bone fractures.[9] Of note, 4 of these studies also found that Hispanic patients were less likely to receive opioid pain medication.[2-3,7-8] Like with Black patients, the only study which found no statistical difference in rates of opioid administration between Hispanic and White patients was the retrospective analysis of patients with long bone fractures.[9] The large degree of consistency within these studies suggests that Black and Hispanic

patients do experience widespread disparities in rates of opioid administration within emergency departments when presenting with a wide variety of pain-related chief complaints.

Five studies evaluated opioid/analgesia administration in the prehospital EMS setting. Of these studies, 4 found that Black patients were less likely to receive pain medication from EMS than White patients,[4,10-12] while 1 study found no significant difference.[13] Three of these studies found that Hispanic patients were less likely to receive analgesia from EMS than White patients,[10-11,13] 1 study found no significant difference,[4] and 1 study found that Hispanic patients were more likely to receive opioid pain medication than White patients (this study was specifically examining patients with non-traumatic pain).[12] The majority of the studies did find that Black and Hispanic patients are less likely to receive pain medication from EMS personnel compared to White patients.

The studies evaluating disparities in evaluation and treatment of chest pain focused on disparities within the Black population; the sources did not evaluate whether other patient populations may also experience disparities. Of note, the nationwide retrospective study found that Black patients were less likely to have EKGs ordered with chest pain but did not evaluate to what extent this impacted patient outcomes.[17] The study which found that Black patients with chest pain were more likely to be readmitted after 30 days was conducted in a hospital in Michigan, so it is unknown to what extent there may be regional variability in this measure of health equity.[15] Further research needs to be done on the nationwide impact of inequities in chest pain evaluation and treatment on Black patients and members of other racial and ethnic groups.

The studies evaluating disparities in pediatric pain in emergency departments largely mirrored the findings in adult patients. Like with adults, Black and Hispanic pediatric patients with pain were found to have lowered rates of opioid administration, although in Hispanic

populations the sources varied in their findings.[5,19-20,22-23] No studies evaluated rates of EKG ordering in Black pediatric patients, likely because pediatric patients are relatively unlikely to have cardiogenic chest pain. However, non-White pediatric patients were found to be less likely to have imaging ordered for traumatic arm pain,[21] and Black female pediatric patients with abdominal pain were less likely to receive imaging.[25] Although in some cases direct comparisons of study findings were not possible, the pediatric studies reviewed are consistent with the studies evaluating adult patients in suggesting that racial disparities in emergency department pain evaluation and treatment are widespread and significantly impact patients' experiences of care.

One topic which the studies largely did not evaluate was the extent to which provider characteristics influence disparities in pain management. It is possible that variables such as provider age, number of years spent working, level of intercultural training or training on pain management, and the ethnic or cultural identity of the provider may all influence the manner in which providers provide care to patients of different demographics. Future research should attempt to analyze demographic traits of providers in addition to the patients they serve, in an effort to identify possible causes of disparities and inform possible solutions.

Conclusion

The purpose of this systematic literature review is to determine what existing literature states on racial disparities in emergency department pain evaluation and treatment, and what gaps in knowledge exist which need to be answered by future research. The studies examined in this systematic review indicate that currently in the U.S. there are widespread disparities in the type of treatment patients of different populations receive in emergency departments. Black,

Hispanic, and Native American patients all experienced lowered rates of opioid prescriptions when presenting with pain, with the largest number of studies demonstrating lowered opioid prescription rates in Black populations.[1-3,6-8] The conclusions on rates of racial disparities in Hispanic patients displayed a greater amount of variance between studies. Although the majority of the studies examining racial disparities in Hispanic patients found that they experienced lowered rates of analgesia administration compared to White patients, some studies either found no significant difference in rates of analgesia administration or found that Hispanic patients were more likely to receive pain medication than White patients.[2-3,7-8,10-13] Further research on pain evaluation and treatment in Hispanic populations is needed to clarify the disparities these patients may be experiencing. Disparities in rates of opioid prescriptions in adult and pediatric minority populations were also found in the prehospital EMS setting.[4-5,10-13]

Black patients were found to experience significant disparities in the emergency department evaluation and treatment of chest pain. The studies examined in this review suggest that Black patients are less likely to have their chest pain evaluated with an EKG, cardiac enzyme labs or stress tests.[15,17-18] Black patients were also found to be more likely to be readmitted to the hospital within 30 days of presenting with chest pain.[15] These findings are consistent with the previously discussed studies on rates of opioid administration in pointing out that Black patients experience significant disparities in the evaluation and treatment of their pain.

The racial disparities noted in adult populations were mirrored in studies examining emergency department pain evaluation and treatment in pediatric populations. Several sources found that Black and Hispanic pediatric patients were less likely to receive opioid pain medications in emergency departments than White patients.[19-20,22-23] Racial minority pediatric patients were found to be less likely to receive imaging for traumatic arm pain,[21] and Black

female pediatric patients were less likely to receive abdominal imaging when presenting with abdominal pain.[25]

Although the majority of the studies were consistent in pointing out that racial disparities in pain management do exist, almost none of the studies examined the effectiveness of measures intended to reduce disparities. Further research is needed to gain more insight into the underlying causes of these disparities and to what extent provider trainings and hospital policy changes can lead to more equitable evaluation and treatment of pain in emergency departments. Providers need to take individual responsibility for educating themselves about pain management disparities and striving to provide equitable care. But there is also a responsibility on the part of hospitals and medical researchers to evaluate policies and trainings related to emergency department pain evaluation and treatment to determine areas for improvement. There is a need for further research evaluating the effectiveness of different strategies which attempt to reduce racial disparities in pain management.

Many questions remain to be answered. It is crucial for future research to be undertaken regarding the effectiveness of training and education for providers. More studies comparing the before and after effects of provider training will help to determine effective protocols to reduce disparities. Additional research into the causes of racial disparities in emergency department pain evaluation and treatment is also important. It is not known to what extent hospital or system wide policies on standardization of pain evaluation and treatment may be effective in reducing racial disparities. Current research provides strong evidence for the existence of widespread disparities in emergency department pain evaluation and treatment. Further research should focus on evaluating potential methods of reducing these disparities, while continuing to evaluate the extent to which different populations are uniquely affected by variations in pain management.

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