

Ethnicity and Analgesic Practice

From the Department of Emergency Medicine,* and the Nell Hodgson Woodruff School of Nursing,† Emory University, Atlanta, GA.

Received for publication February 26, 1999. Revisions received June 24, 1999, and July 30, 1999. Accepted for publication September 7, 1999.

Presented at the Society for Academic Emergency Medicine annual meeting, Washington, DC, May 1997.

Address for reprints: Knox H Todd, MD, MPH, Department of Emergency Medicine, Emory University School of Medicine, 1518 Clifton Road, NE, Room 234, Atlanta, GA 30322; 404-727-9977, fax 404-727-8744; E-mail ktodd@sph.emory.edu.

Copyright © 2000 by the American College of Emergency Physicians.

0196-0644/2000/\$12.00 + 0
47/1/102396

Knox H. Todd, MD, MPH*
Christi Deaton, RN, PhD†
Anne P. D'Adamo, MD*
Leon Goe, MHS*

See related articles, p. 77 and p. 79.

Study objective: We previously reported that Hispanic ethnicity was an independent risk factor for inadequate analgesic administration among patients presenting to a single emergency department. We then attempted to generalize these findings to other ethnic groups and EDs. Our current study objective is to determine whether black patients with extremity fractures are less likely to receive ED analgesics than similarly injured white patients.

Methods: We conducted the following retrospective cohort study at an urban ED in Atlanta, GA. All black and white patients presenting with new, isolated long-bone fractures over a 40-month period were studied. After abstracting demographic information from the medical record and subsequently removing ethnic identifiers, we submitted the medical record to a physician who recorded characteristics of the patients' injury and treatment. We then submitted the records to a nurse, again blinded to ethnicity, who recorded analgesic administration. We used multiple logistic regression to determine the independent effect of ethnicity on analgesic use while controlling for multiple potential confounders. Our main outcome measure was the proportion of black versus white patients receiving ED analgesics.

Results: The study group consisted of 217 patients, of whom 127 were black and 90 were white. White patients were significantly more likely than black patients to receive ED analgesics (74% versus 57%, $P=.01$) despite similar records of pain complaints in the medical record. The risk of receiving no analgesic while in the ED was 66% greater for black patients than for white patients (relative risk 1.66, 95% confidence interval, 1.11 to 2.50). This effect persisted after controlling for multiple potential confounders.

Conclusion: Black patients with isolated long-bone fractures were less likely than white patients to receive analgesics in

this ED. No covariate measured in this study could account for this effect. Our findings have implications for efforts to improve analgesic practices for all patients.

[Todd KH, Deaton C, D'Adamo AP, Goe L. Ethnicity and analgesic practice. *Ann Emerg Med*. January 2000;35:11-16.]

INTRODUCTION

Oligoanalgesia, the inadequate prescribing of analgesics for patients in pain, is common among emergency department patients.¹⁻³ We previously reported that Hispanic patients with extremity fractures were less likely to receive analgesics than similar non-Hispanic white patients in the ED setting.⁴ This disparity in analgesic practice could not be explained by patient characteristics (including gender, language, and insurance status), severity of injury, physician characteristics (including ethnicity, gender, or specialty), or a disparity in physicians' ability to assess pain between Hispanic and non-Hispanic white patients.⁵

To determine whether our results are generalizable to different EDs and ethnic groups, we conducted a similar retrospective cohort study of analgesic practices comparing black and white ED patients with long-bone fractures.

MATERIALS AND METHODS

The study site was a community, university-affiliated ED serving urban Atlanta, GA. Board-certified emergency physicians staff the ED, although patients are at times seen primarily by their primary care physicians. The study protocol was approved by the Emory University School of Medicine Human Investigations Committee.

ED records were reviewed for a 40-month period (September 1, 1992, through December 31, 1995) to identify all black and white patients discharged from the ED with a diagnosis of isolated long-bone fracture. Patients with *International Classification of Diseases, Ninth Revision (ICD-9)* codes 812, 813, 821, and 823, comprising all humerus, radius, ulna, femoral shaft, tibia, and fibula fractures, were eligible for the study. Patients with fractures of the femoral neck (*ICD-9* code 820) were not included, nor were patients with additional discharge diagnoses. Patients were excluded if they presented for complications of previously treated fractures rather than for primary treatment.

We performed chart abstraction in a multistaged fashion. In the first stage, demographic information was obtained from the hospital's computerized database. This included patient age, gender, ethnicity, *ICD-9* code, and treating physician. Treating physicians were characterized by gender, ethnicity, and specialty.

Next, a trained research assistant reviewed the radiology report to confirm the presence of a fracture. Charts for which the radiology report did not confirm a fracture were excluded. The research assistant then reviewed the medical record, abstracting information on insurance, marital status, and employment status. At this point, all information indicating patient ethnicity was removed from the chart, blinding subsequent reviewers to patient ethnicity.

Next, an emergency physician reviewed the medical record, abstracting information on characteristics of the patient's presentation, including mode of arrival, mechanism of injury, time of presentation, time from initial injury, total time in the ED, and whether the presence of pain was explicitly recorded in nursing or physician notes.

Finally, a nurse reviewed the record, recording whether analgesics were administered in the ED, and if so, what type of analgesic was administered (eg, narcotic versus nonnarcotic) and what route was used (eg, parenteral versus oral). We did not abstract information regarding prescriptions for analgesics given at the time of ED discharge, as this information is not reliably recorded. A second reviewer confirmed all data abstracted from the medical record for each stage of the review process.

All data were entered onto a computerized spreadsheet and analyzed using Stata statistical software (*Stata Statistical Software: Release 5.0*, Stata Corp., College Station, TX). Baseline characteristics for black and white patients were compared using means, SDs, and proportions. The primary outcome measure for the study was the proportion of black patients versus white patients receiving ED analgesics. These proportions were compared using the χ^2 test, and we calculated black patients' relative risk (RR) of receiving no analgesic compared with white patients. Multiple logistic regression was used to determine the effect of ethnicity on analgesic use while controlling for multiple potential confounders. Using this model, we calculated odds ratios and estimated RRs with 95% confidence intervals (CIs).⁶ The likelihood-ratio test and the Hosmer-Lemeshow test were used to assess strength of the model and goodness of fit.

RESULTS

During the 40-month study period, a total of 238 black and white patients were discharged from the ED with diagnoses limited to codes 812, 813, 821, or 823. Of these, 15 cases were secondary presentations of previously treated fractures. In 2 cases, the fracture diagnosis was not confirmed by the radiology report, and in 4 cases, we could not locate the medical record. The remaining 217 patients were included in the study (Figure 1).

The 127 black patients and 90 white patients were managed by 37 different physicians. Baseline characteristics of the 2 groups are presented in Table 1. The groups were generally similar, although white patients were more likely to have private insurance. The presence of pain was explicitly noted in the medical record for similar proportions of black and white patients (54% versus 59%).

Fifty-seven percent of black patients with extremity fractures received analgesics compared with 74% of white patients ($P=.01$). The risk of receiving no analgesic was 66% greater for black patients than for white patients (crude RR 1.66, 95% CI 1.11 to 2.50; Table 2).

To control for potential confounders, multiple logistic regression analysis was performed. Analgesic administra-

tion was the dichotomous outcome variable, and patient ethnicity (black versus white race), time since injury (<3 hours versus >3 hours), total time in the ED (in hours), shift of presentation (day versus night), need for fracture reduction (yes or no), and payer status (private insurance versus uninsured or public assistance) were included as potential predictor variables. Time since injury, total time in the ED, and need for fracture reduction were included in the model because they have been previously identified as predictors of analgesic use.⁴ Payer status was included as a marker for socioeconomic status, a common confounder of ethnicity. Because analgesics are commonly dispensed to patients seen at times when pharmacies are closed, the shift of presentation was included as a potential confounder. After controlling for these covariates, black ethnicity remained predictive of no

Figure 1.
Study exclusions.

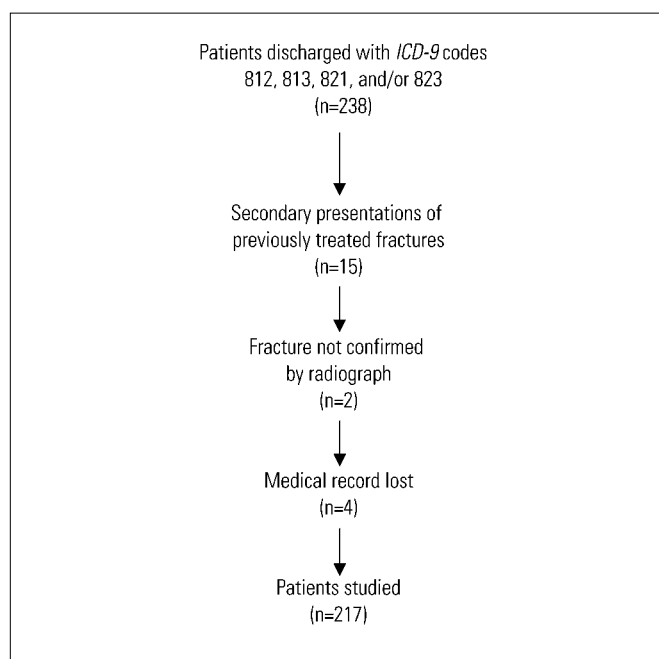


Table 1.
Baseline characteristics.

Characteristics	White Patients (N=90) (%)	Black Patients (N=127) (%)
Age, y (interquartile range)	35 (25–47)	33 (24–42)
Male	58	59
Married	36	32
Employed	77	67
Private insurance	88	74
Arrived by ambulance	12	14
Occupational injury	8	7
Mechanism of injury		
Fall	84	75
Assault	5	11
Motor vehicle crash	7	5
Other	5	10
Principal ICD-9 code		
812 (humerus)	21	17
813 (radius/ulna)	70	69
821 (femoral shaft)	2	0
823 (tibia/fibula)	7	14
Time of presentation		
7 AM–3 PM	37	33
3 PM–11 PM	43	54
11 PM–7 AM	20	13
Time from fracture to presentation (h)		
<3	61	51
3–6	8	8
6–12	11	5
12–24	9	15
>24	10	21
Total time in ED (h) (SD)	3.6 (1.9)	3.6 (2.0)
Pain noted in medical record	59	54
Fracture reduction performed	9	10
White physician	83	89
Male physician	56	62
Emergency physician	95	90

analgesic administration in the ED (estimated RR, 1.7; 95% CI 1.1 to 2.3; likelihood ratio $\chi^2=5.99$; $df=1$; $P=.01$). The Hosmer-Lemeshow goodness-of-fit test indicated that the logistic model suitably fit the data ($\chi^2=5.15$, $P=.74$; Table 3).

Of the 140 patients receiving some form of analgesic, 114 (81%) received narcotics and 48 (34%) received some form of parenteral therapy. White and black patients received parenteral therapy in similar proportions. Black patients who were given analgesics were somewhat less likely to receive narcotics, although this difference was not statistically significant (87% versus 77%, $P=.13$; Table 4).

DISCUSSION

In this study, approximately two thirds of our patients received analgesics in the ED. This proportion is similar to that of our previous study, which reported ED analgesic administration to 68% of a group of Hispanic and white patients with extremity fractures. Our finding that black patients received analgesics less frequently than white

patients is also similar to our previous finding that Hispanic patients received analgesics less often than white patients. Our findings are also consistent with those of 2 recent studies of cancer patients finding disparities in analgesic use between majority and minority ethnic groups.^{7,8} The apparent disparity in analgesic administration to minority ethnic groups is of concern and requires further elucidation.

Our finding that time since injury predicted analgesic use was expected. The need for fracture reduction was associated with analgesic use; however, this association was not statistically significant, perhaps because of the small number of patients requiring reduction.

In interpreting our results, it is useful to consider the sequence of events that leads to treatment of pain and how each of these might be influenced by ethnicity (Figure 2). First, to ensure comparability of the source of each patients' pain experience, we included only subjects with specific, well-identified bone injuries. This increased the likelihood that our groups, on average, experienced similar trauma. Given similar injuries, there is no evidence from the literature that ethnicity differentially influences patients' experience of pain.^{9,10}

Second, given a source of pain, the patient must express discomfort to gain the attention of health care workers. Ethnicity may indeed influence the patient's expression of pain.¹¹ We cannot be certain that some aspect of ethnicity, or an unmeasured confounder such as the presence of friends or family, might influence black patients' expression of pain to physicians and nurses. However, if present, this unmeasured confounder could only have biased the study against our findings, as explained in the following text.

Importantly, the medical records contained explicit notations of pain in nearly identical proportions of black and white patients. If some unmeasured confounder served to inhibit expressions of pain for black patients, it would follow that their pain experience could only have been more severe than that of white patients to result in

Table 2.
Analgesic use for white versus black patients.

Variable	Ethnicity	
	White No. (%)	Black No. (%)
Analgesic given?		
Yes	67 (74)	73 (57)
No	23 (26)	54 (43)
Total	90	127

Table 3.
Results of multiple logistic regression analysis.

Independent Variables	Odds Ratio	Estimated RR	95% CI
Black race	2.1	1.7	1.1–2.3
Time since injury	2.4	1.8	1.2–2.4
Total time in ED	0.9	0.9	0.8–1.04
Time of presentation	0.7	0.8	0.5–1.2
Need for fracture reduction	0.4	0.5	0.1–1.2
Payer status	0.9	1.0	0.6–1.4

Likelihood ratio $\chi^2=25.1$, $df=6$, $P=.0003$.

Note: In this model, a large odds or risk ratio denotes a lesser likelihood of analgesic administration.

Table 4.
Route and class of analgesic by ethnicity for 140 patients receiving analgesics.

Variable	White Patients (n=67) (%)	Black Patients (n=73) (%)
Parenteral	23 (34)	25 (34)
Narcotic	58 (87)	56 (77)

this near identical assessment of pain by physicians and nurses.

We have previously examined health professionals' ability to assess pain in different ethnic groups, by testing physicians' skill in estimating pain severity among Hispanic and white patients with extremity trauma.⁵ Although disparities between patient and physician pain scores were noted, they were identical for the 2 ethnic groups. This implies that any ethnic disparity in analgesic prescribing could not be attributed to differences in pain assessment.

We are left then, with the final step, the physician's decision to administer analgesics. Our findings suggest that patient ethnicity affects decisionmaking, independent of objective clinical criteria. Beyond this, we have no specific data to shed light on the reasons physicians order analgesics less frequently for minority patients than for white patients.

Our study is limited in several respects. Given its retrospective design, our study allows for potential misclassification of predictor or outcome variables, as well as potential confounders. Patient ethnicity was generally recorded by clerical personnel and is a potential source of error. It seems unlikely, however, that their perception of ethnicity differed from that of the physicians or nurses. Analgesic administration, particularly that of narcotics, tends to be well recorded in the medical record. However, it is possible that the administration of nonnarcotic medications were recorded with less fidelity. If this did occur, we can see no reason that it should occur more commonly among black patients than white patients.

It is possible that our results are confounded by other factors, particularly alcohol or other drug use. Nursing staff often record information regarding mental status and

intoxication on the medical record. In only 2 cases patients were noted to be less than "alert and oriented." In 4 additional cases, patients were judged "intoxicated." These 6 patients included 2 white patients and 4 black patients.

Although the infrequent notation of altered mental status and intoxication is somewhat reassuring, this information is inconsistently recorded by nursing personnel. However, time of day and occupational injury were 2 variables that were reliably recorded. These also correlate with alcohol and drug use, and may serve as partial proxies for intoxication. Black and white patients had similar proportions of occupational injuries, and their times of presentation, as well as distribution of injury mechanisms, are similar; thus, we believe that unrecorded alcohol and drug use are unlikely to explain our findings.

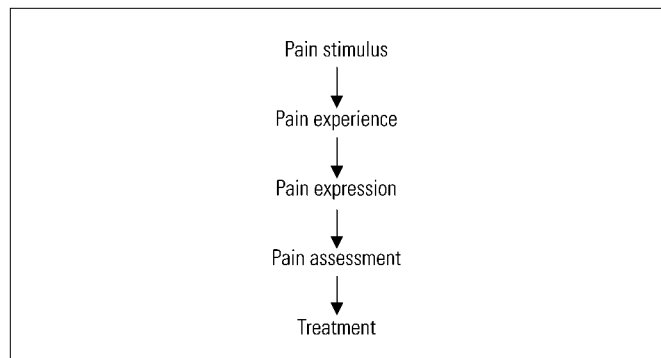
Finally, although we found no association between physician ethnicity and analgesic prescribing patterns, the small numbers of minority physicians in this and our previous study preclude making definitive statements on this point. Future studies involving larger numbers of minority physicians will be required to assess the importance of physician/patient concordance in analgesic practice.

Oligoanalgesia is common in both outpatient and inpatient settings. Many authorities have implicated the lack of an adequate pain assessment as the primary barrier to the optimal treatment of pain. The primacy of pain assessment has been highlighted in a number of guides to improve analgesic practice, including the 1992 Agency for Health Care Policy and Research Acute Pain Management Clinical Practice Guideline, the 1994 Canadian Association of Emergency Physicians Consensus Document on emergency pain management, and the American Pain Society quality improvement guideline for the treatment of acute pain and cancer pain.¹²⁻¹⁴

A number of investigators have evaluated pain management interventions that include attempts to standardize pain assessment.¹⁵⁻¹⁹ Unfortunately, none of these interventions have successfully altered physician practice or improved patients' pain experience.

Our findings suggest that it is not the failure of physicians to assess pain, but the failure to administer analgesics, which principally contributes to oligoanalgesia among Hispanic and black patients. Efforts to alter pain management practices may find better success with interventions targeting analgesic administration as well as standardized pain assessment, including

Figure 2.
Steps involved in patient-physician pain-analgesic process.



clinical guidelines that couple pain ratings with specific recommendations for analgesic use.

REFERENCES

1. Wilson J, Pendleton J. Oligoanalgesia in the emergency department. *Am J Emerg Med.* 1989;7:620-623.
2. Selbst SM, Clark M. Analgesic use in the emergency department. *Ann Emerg Med.* 1990;19:1010-1013.
3. Ducharme J, Barber C. A prospective blinded study on emergency pain assessment and therapy. *J Emerg Med.* 1995;13:571-575.
4. Todd KH, Samaroo N, Hoffman JR. Ethnicity as a risk factor for inadequate emergency department analgesia. *JAMA.* 1993;269:1537-1539.
5. Todd KH, Lee T, Hoffman JR. The effect of ethnicity on physician estimates of pain severity in patients with isolated extremity trauma. *JAMA.* 1994;271:925-928.
6. Zhang J, Yu KF. What's the relative risk? A method of correcting the odds ratio in cohort studies of common outcomes. *JAMA.* 1998;280:1690-1691.
7. Cleeland CS, Gonin R, Baez L, et al. Pain and treatment of pain in minority patients with cancer. *Ann Intern Med.* 1997;127:813-816.
8. Bernabei R, Gambassi G, Lapane K, et al. Management of pain in elderly patients with cancer. *JAMA.* 1998;279:1877-1882.
9. Zatzick DF, Dimsdale JE. Cultural variations in response to painful stimuli. *Psychosom Med.* 1990;52:544-557.
10. Pfefferbaum B, Adams J, Aceves J. The influence of culture on pain in Anglo and Hispanic children with cancer. *J Am Acad Child Adolesc Psychiatry.* 1990;29:642-647.
11. Greenwald HP. Interethnic differences in pain perception. *Pain.* 1991;44:157-163.
12. US Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research. *Clinical Practice Guideline. Acute Pain Management: Operative or Medical Procedures and Trauma* [AHCPR publication No. 92-0032]. Silver Spring, MD: Center for Research Dissemination and Liaison, AHCPR Clearinghouse, 1992.
13. Ducharme J. Emergency pain management: a Canadian Association of Emergency Physicians (CAEP) Consensus Document. *J Emerg Med.* 1994;12:855-866.
14. American Pain Society Quality of Care Committee. Quality improvement guidelines for the treatment of acute pain and cancer pain. *JAMA.* 1995;274:1874-1880.
15. Ward SE, Gordon DB. Patient satisfaction and pain severity as outcomes in pain management: a longitudinal view of one setting's experience. *J Pain Symptom Manage.* 1996;11:242-251.
16. Bookbinder M, Coyle N, Kiss M, et al. Implementing national standards for cancer pain management: program model and evaluation. *J Pain Symptom Manage.* 1996;12:334-347.
17. Rhodes DJ, Koshy RC, Waterfield W, et al. The feasibility and effectiveness of quantitative pain assessment in outpatient oncology practice [abstract]. The Robert Wood Johnson Clinical Scholars Program, 1997 National Meeting, November 12-15, Lago Mar Club, Fort Lauderdale, FL.
18. Kravitz RL, Delafield JP, Hays RD, et al. Bedside charting of pain levels in hospitalized patients with cancer: a randomized controlled trial. *J Pain Symptom Manage.* 1996;11:81-87.
19. Leapley M, Watson WA, Todd KH, et al. Pain documentation and ED analgesic practice [abstract]. *Acad Emerg Med.* 1996;3:475.