Racial Differences in Opioid Use for Chronic Nonmalignant Pain

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BACKGROUND: Chronic pain is a frequent cause of suffering and disability that negatively affects patients' quality of life. There is growing evidence that disparities in the treatment of pain occur because of differences in race.

OBJECTIVE: To determine whether race plays a role in treatment decisions involving patients with chronic nonmalignant pain in a primary care population.

DESIGN, SETTING, AND PARTICIPANTS: A cross-sectional survey was administered to patients with chronic nonmalignant pain and their treating physicians at 12 academic medical centers. We enrolled 463 patients with nonmalignant pain persisting for more than 3 consecutive months and the primary care physicians participating in their care.

RESULTS: Analysis of the 397 black and white patients showed that blacks had significantly higher pain scores (6.7 on a scale of 0 to 10, 95% confidence interval (CI) 6.4 to 7.0) compared with whites (5.6, 95% CI 5.3 to 5.9); however, white patients were more likely to be taking opioid analgesics compared with blacks (45.7% vs 32.2%, $P<.006$). Even after controlling for potentially confounding variables, white patients were significantly more likely (odds ratio (OR) 2.67, 95% CI 1.71 to 4.15) to be taking opioid analgesics than black patients. There were no differences by race in the use of other treatment modalities such as physical therapy and nonsteroidal anti-inflammatories or in the use of specialty referral.

CONCLUSION: Equal treatment by race occurs in nonopioid-related therapies, but white patients are more likely than black patients to be treated with opioids. Further studies are needed to better explain this racial difference and define its effect on patient outcomes.

Chronic pain is a major health issue worldwide and has a profound effect on quality of life. Data from the World Health Organization estimate that 22% of primary care patients report persistent pain.[1] In the United States alone, several studies indicate that millions of adults suffer a heavy burden from this symptom.[2,3] Because of lost work and productivity, estimates for the economic loss associated with chronic pain reach as high as $61 billion per year.[4]

Although the treatment of pain and suffering should be a priority for all physicians, and the capacity to treat pain has never been greater, it is well established that pain is not optimally treated.[5–7] This fact, coupled with the 2002 Institute of Medicine report concerning unequal treatment in racial and ethnic minorities, raises the possibility that the treatment of chronic pain in primary care settings might differ, especially for blacks.[8] There is now growing evidence to suggest that disparities in the treatment of pain in racial and ethnic minorities also exist.[9–15] However, most of these studies have been conducted in an acute setting or are cancer related.

The 4P Study (Patient Physician Perception of Pain) was designed to better understand chronic nonmalignant pain patients and their treatment in the primary care setting. The specific objective for this part of the study was to determine whether race plays a role in treatment decisions concerning chronic nonmalignant pain.

METHODS

Overview

The 4P Study was conducted from July 2002 to March 2003 at 12 academic medical centers in the United States. Patients were recruited from the primary care practices of each center, including both resident and attending physician practices. The Institutional Review Boards at all centers approved the study protocol.

Patient Selection and Recruitment

Patients were eligible for enrollment if they were at least 18 years of age and reported a history of pain for at least 3 consecutive months. We excluded pregnant females, patients not fluent in English or Spanish, incarcerated individuals, patients being treated for active cancer, and patients with documented cognitive impairment such as dementia.

During the course of routine clinic check-in procedures, the research assistant, triage nurse, or treating physician identified eligible patients. The research assistant then evaluated patients for exclusion criteria, obtained informed

consent, and administered the 82-item survey verbally in a secluded location.

Survey Instrument

The initial patient survey included questions about demographic information, general health and pain perceptions, treatment choices, and attitudes toward provision of medical care. The survey also included the numeric rating scale (NRS-11),[16] a standardized pain assessment tool used to measure pain intensity, where pain scores range from 0 (no pain) to 10 (unbearable pain). Patients were shown the NRS-11 and responses to the question "How severe is your pain today?" were recorded.

Pain Medication Use

Patients were specifically asked the types of medicines that they were currently taking for their pain and whether by prescription, over the counter, or by illicit means. The research assistants were instructed to ask patients, "What medicines are you taking now for your pain?" The research assistant provided each patient with a complete list of examples from each class: (1) nonsteroidal anti-inflammatories (NSAIDS) such as Motrin, Advil, Celebrex, Goody's Powders, and Aspirin, (2) Acetaminophen or Tylenol, (3) weak opioids such as Darvocet, Tylenol III, and Vicodin, (4) strong opioids such as Demerol, Morphine, Percocet, Oxycodone, and Dilaudid, (5) long-acting opioids such as Oxycontin, MS Contin, and Duragesic patches, (6) adjuvant medications such as Elavil or Gabapentin, (7) the "atypical" analgesic Ultram, and (8) substance-abuse "medications" such as alcohol, marijuana, heroin, and cocaine. Patients could choose multiple classes, and for purposes of analysis we considered patients to be taking opioid medications if they were taking Schedule II, III, and IV drugs as defined by the Drug Enforcement Agency (classes 3, 4, and 5 above).

Race

Patients were asked to self-report their racial status from a list of 16 groups. The 3 major groups were classified as (1) white, (2) black, African American or Negro, or (3) Spanish, Hispanic, or Latino. Because of insufficient numbers, Hispanic patients and other races such as Indian, Chinese, Filipino, Japanese, or Korean were excluded from this analysis.

Treatment Choices

As a measure of other treatment choices, patients were asked whether they had previously seen different types of specialists or nonprimary care providers for their pain such as a rheumatologist, orthopedist, pain specialist, chiropractor, podiatrist, reflexologist, acupuncturist, or herbalist. Patients were also asked whether they had undergone physical therapy as a modality to improve their pain.

Other Covariates

Other medical conditions reported by patients included any of 15 common chronic diseases including diabetes, hypertension, arthritis, stroke, or emphysema. The type of health insurance, the current number of hours per week the patient worked, whether the patient received a disability check, annual income, and the years of schooling completed were also documented as elements of socioeconomic status. The research assistant also documented whether a resident or attending physician was the primary care provider for the patient on the study day.

Statistical Analyses

Statistical analyses were performed using Stata 7.0 (Stata Corp., College Station, Tex). Descriptive statistics for the demographic variables, the use of opioids, the different treatment modalities, and other covariates as described above were performed. Race was analyzed as black versus white, physician level as resident versus attending, and the presence of comorbidities, insurance status, and disability check status were dichotomized as yes or no. Age, duration of pain, educational level, and number of current hours worked were analyzed as continuous variables.

The primary outcome variable was any opioid use by the patient. We also performed additional analysis considering the 3 classes of opioids (weak, strong, and long acting). In these analyses, persons reporting the use of more than one class of opioid were classified hierarchically as follows: long acting, strong, weak, and none. Thus, a person reporting both long-acting and weak opioid use would be classified in the long-acting group. Four additional outcome variables included patients' use of other treatment modalities, including (1) NSAIDS, (2) physical therapy, (3) pain specialists, and (4) other specialists. The use of orthopedists, rheumatologists, chiropractors, podiatrists, reflexologists, acupuncturists, and herbalists were all grouped into the category of other specialists because of the low overall percentage of referrals for the last five groups.

We performed bivariate analyses of race versus other demographic data, level and duration of pain, comorbidities, and other socioeconomic-related covariates. We then compared race with the prevalence of opioid use and the other 4 treatment choices. We applied 2-sample t tests, χ^2, and Wilcoxon rank sum tests as appropriate. Variables that were significant ($P<.05$) in bivariate analysis and variables of particular interest that might predict opioid use or treatment decisions were included in the final regression models. We used multiple logistic regression to assess the relationship between race and each outcome while adjusting for potential confounding by age, sex, pain severity and duration, comorbidities, disability status, and elements of socioeconomic status. Additionally, in order to examine any effect of physician experience on race and opioid utilization, we ran separate models stratified by physician level of training. We used 2-sided P values of less than .05 to indicate statistical significance. In the logistic regression analysis, robust variance estimates were used to account for clustering by site.

RESULTS

We enrolled 463 patients of the 601 patients approached (77%). Twenty-three patients were excluded because of pregnancy, dementia, and incarceration, and 115 patients declined to participate. Fifty-eight patients were classified as Hispanic or "Other" race, and no race data were available on eight patients, leaving a total of 397 patients available for analysis. Demographic data are reported in Table 1.

Of the 397 patients, 219 (55%) were white and 178 (45%) were black. Overall, more women participated than men, and this gender predominance was more significantly reflected among black participants. Significantly more blacks than whites were uninsured (34% vs 16%, $P<.001$), but there were no other socioeconomic differences such as disability status or income.

Depression was reported more commonly in whites than blacks (45.6% vs 32.0%, $P=.006$), but there were no significant differences in other reported comorbidities or body mass index. There were no significant differences in the proportion of patients seen by resident versus attending physicians, and 75% of patients stated that they saw their regular primary care provider often or always. Forty percent of all patients reported 2 or more body sites affected by chronic pain, with the lower back being the most commonly mentioned site.

The majority of patients (81%) experienced pain for at least a year, but whites reported suffering longer (median months 60 vs 39, $P=.002$). Blacks had significantly higher pain scores (mean 6.7, 95% confidence interval (CI) 6.4 to 7.0) compared with whites (mean 5.6, 95% CI 5.3 to 5.9). There were no significant racial differences in the percentage of

Table 1. Patient Characteristics ($n=397$)*

Characteristic	White ($n=219$)	Black ($n=178$)	P-value
Socioeconomic data			
Age, mean years (SD)	53.4 (± 11.9)	53.4 (± 13.3)	.96
Married	91 (41.6%)	42 (23.6%)	<.001
Sex			
Male ($n=123$)	84 (38.4%)	39 (21.9%)	
Female ($n=274$)	135 (61.6%)	139 (78.1%)	<.001
Educational level, mean years (± SD)	12.3 (± 3.4)	11.6 (± 2.6)	.03
No insurance (%)	16	34	<.001
Income under $20,000 ($n=344$) (%)	58	59	.78
Clinical data			
BMI, mean (SD)[†]	32.6 (± 7.9)	32.3 (± 9.2)	.69
Top five major comorbidities[‡]	Patients having disorder (%)		
Arthritis ($n=273$)	70.3	66.9	.46
Hypertension ($n=208$)	48.9	56.7	.12
Depression ($n=157$)	45.6	32.0	.006
Emphysema ($n=101$)	28.8	21.4	.09
Diabetes ($n=86$)	20.1	23.6	.40
Resident physician as primary care provider	79.3	71.4	.08
Pain data			
Median duration of pain in months (IQR)	60 (26 to 120)	39 (13 to 96)	.002
Mean pain score (0 to 10)	5.6 (5.3 to 5.9)	6.7 (6.4 to 7.0)	<.001
Working 0 hours per wk (%)	64.8	72.5	.27
Receive a disability check (%)	35.6	34.1	.76

*Sixty-six out of 463 (14%) patients identifying themselves as Cuban (14), Mexican (6), Other Hispanic (25), American Indian (6), Multi-Race individuals (5), Other (2), and No Race (8) were excluded from the analysis between White and Black patients.
[†]Body mass index (BMI) calculated from patient's self-estimated height and weight.
[‡]Self-reported comorbidities included diabetes, hypertension, CAD, depression, emphysema, heart failure, thyroid disease, HIV/AIDS, liver disease, arthritis, kidney disease, stomach ulcers, paralysis from stroke, poor circulation.
IQR, interquartile range; CAD, coronary artery disease.

Table 2. Bivariate Analysis of Race Versus Outcomes ($n=397$)

Outcome	White patients (%)	Black patients (%)	P-value	Total N (%)
Use of NSAIDS	46.6	50.3	.46	191 (48.2)
Use of physical therapy*	46.8	35.1	.02	162 (41.5)
Use of opioids*	45.7	32.2	.006	157 (39.6)
Use of pain specialist	37.6	30.8	.16	135 (34.6)
Use of other specialists[†]	41.5	37.5	.42	156 (39.7)

*$P<.05$.
[†]Other specialists include orthopedist, rheumatologist, chiropractor, acupuncturist, podiatrist, reflexologist, and herbalist.
NSAIDS, non-steroidal anti-inflammatories.

patients currently not working and currently receiving a disability check.

Treatment Choices

Of the different treatment choices, the most common was usage of NSAID medications followed by treatment by a physical therapist. About 40% of patients reported ongoing use of opioid analgesics. Among those referred for specialty care, 34% of patients had seen a pain specialist, and the most common referrals in the "other specialists" group were to orthopedic physicians (21%) and rheumatologists (16%).

Table 2 depicts significant bivariate differences between blacks and whites regarding the different treatment modalities. Whites were more likely to be treated with opioids than blacks (45.7% vs 32.2%, $P=.006$) and more likely to receive physical therapy (46.8% vs 35.1%, $P=.02$). There were no significant racial differences in the use of NSAIDS, pain specialists, or other specialty providers.

Table 3 reports all analgesic use according to race. The breakdown of opioid usage revealed that whites were significantly more likely to receive stronger ($P<.03$) and longer-acting ($P<.001$) opioids. There were no significant differences in the use of acetaminophen, adjuvant medications, Ultram, or illicit substances, but only 7 patients (1.8%) admitted to using substances of abuse to treat their pain.

In bivariate analysis, opioid use also correlated with a younger age ($P=.04$), higher pain score ($P<.001$), and having seen an attending physician (49.5% vs 36.1%, $P<.02$). Gender, insurance status, educational level, duration of pain, presence of depression, income, current number of hours worked, and receipt of a disability check were not associated with opioid use. The use of physical therapy was related to higher pain scores ($P<.02$), having health insurance ($P<.03$), and a higher educational level ($P<.02$), but not with other demographic variables, physician level, or use of opioid medications.

Regression Analyses

We performed a logistic regression analysis on the 2 outcomes (use of opioids and use of physical therapy) with racial differences in bivariate analysis to assess whether race remained a significant variable after controlling for other factors. As shown in Table 4, whites were more than twice as likely (odds ratio (OR) 2.67, 95% CI 1.71 to 4.15) to be on opioids than blacks. In models exploring opioid use by category, we found

Table 3. Breakdown of Medication Usage by Race

Type of medication	White patients (n=219)	Black patients (n=178)*	P-value	Total N (%)
NSAIDS	102/219 (46.6%)	89/177 (50.3%)	.46	191/396 (48.2)
Acetaminophen	61/219 (27.9%)	57/177 (32.2%)	.35	118/396 (29.8)
Opioids (Total)	100/219 (45.7%)	57/177 (32.2%)	.006	157/396 (39.6)
Weak	40/159 (25.2%)	35/155 (22.6%)	.59	75/314 (23.9)
Strong	28/147 (19.1%)	13/133 (9.8%)	.03	41/280 (14.6)
Long acting	32/151 (14.6%)	9/129 (7.0%)	.001	41/280 (14.6)
Adjuvant	22/219 (10.1%)	16/177 (9.0%)	.74	38/396 (9.6)
Ultram	18/219 (8.2%)	9/177 (5.1%)	.22	27/396 (6.8)
Illicits	4/219 (1.8%)	3/177 (1.7%)	.92	7/396 (1.8)

*One African-American patient did not answer the questions on medication usage.
NSAIDS, non-steroidal anti-inflammatories.

that racial differences were more pronounced when considering stronger opioids (OR 3.62 in favor of whites, 95% CI 1.75 to 7.46) and longer-acting opioids (OR 3.08, 95% CI 1.35 to 7.06). Opioid use was also associated with higher pain severity (OR 1.25, 95% CI 1.09 to 1.44) and duration of pain (OR 0.997, 95% CI 0.995 to 0.999), but not with any other variables studied. When stratified by physician level, the relationship between race and opioid use persisted (resident OR 2.81, 95% CI 1.27 to 6.26, and attending OR 2.59, 95% CI 1.12 to 5.97), and an interaction term between race and physician level in the regression model confirmed that the effect of race did not differ across type of physician. To test for potential site biases, a test of homogeneity was performed and did not demonstrate a site effect.

The difference in utilization of physical therapy by whites and blacks was not significantly different (OR 1.46, 95% CI 0.89 to 2.37) after controlling for other demographics. Instead, we found simply that patients reporting higher pain levels used physical therapy more frequently (OR 1.15, 95% CI 1.01 to 1.32). Physician level did not affect the relationship between physical therapy and race in this model.

DISCUSSION

This study suggests that patient race plays a significant role in the management of chronic nonmalignant pain in the primary care setting. Our results show that whites were significantly more likely to be using opioid analgesics, particularly stronger and longer-acting opioids, in the treatment of chronic pain as compared with blacks. This disparity occurred in the setting of

Table 4. Logistic Regression Identifying Significant Correlations with Opioid Use

Variables	Odds ratio	95% CI	P-value
Race, white*	2.67	1.71 to 4.15	<.001
Higher degree of pain*	1.25	1.09 to 1.44	.002
Older age	0.99	0.98 to 1.00	.07
Gender, male	1.32	0.55 to 3.17	.53
Duration of pain (mo)*	0.997	0.995 to 0.999	.02
Insurance status: yes	1.14	0.62 to 2.12	.67
Educational level	1.06	0.99 to 1.13	.11
Comorbidity (depression)	0.92	0.63 to 1.35	.67
Current work hours	0.99	0.97 to 1.01	.33
Disability check	1.35	0.75 to 2.43	.31
Use of physical therapy	1.00	0.54 to 1.85	.99

*P<.05.
CI, confidence interval.

blacks having significantly higher pain scores compared with whites. Interestingly, race did not play a role in pain management with nonopioid-related therapies. Although disparities in opioid prescribing have been described in the acute and hospital setting,[9–11] to our knowledge this is the first study that demonstrates this disparity in an ambulatory primary care setting.

Why, then, does the disparity between blacks and whites exist for opioid usage, but not for the nonopioid therapies? The existence of disparities in the use of opioids has been theorized to exist for such reasons as inadequate physician training,[17,18] lack of availability of opioids at pharmacies,[19] low pain relief goals among physicians,[6,20] discordance or disagreement in pain levels between patients and physicians,[21–23] and opioiphobia (the fear of prescribing opioids) among physicians.[18,24–26]

Based on our study, we do not believe that the racial disparity for opioid usage is related to problems of access or health care systems. Even though blacks were more likely to be uninsured, the presence of insurance itself had no bearing on the different types of treatment available. In addition, whites and blacks in our study were similar with regard to other socioeconomic elements. If there were differences related to access or referrals, we would expect a difference in the usage of the other 4 treatment strategies (which are also more expensive) as well, but this was not the case.

We also believe that the racial disparity is not because of patient preferences or behaviors. There is evidence that suggests that chronic pain affecting blacks is experienced differently when compared with the experiences of whites, and that blacks have greater pain severity and disability with poorer quality of life.[27–32] We would expect, therefore, that blacks utilize more treatment modalities than whites; yet, this was not the case. Although we cannot explain the directionality of the relationship between pain scores and opioid use (did opioid use lead to lower pain scores, or are there lower pain scores because of opioid use?), the relationship observed among blacks is problematic: significantly higher pain scores among blacks should result in more opioid usage, not less.

If there are no obvious access problems or patient-related factors, we are left to consider whether physicians are simply undertreating minorities with chronic pain. Undertreatment of pain among minorities by physicians has been previously documented in acute settings[9,11,15] and in studies examining the treatment of cancer-related pain.[10,12] One possible explanation for this racial disparity could be physicians' level of training. However, when we analyzed opioid use and race and

whether a physician was a resident or attending, we found that the disparity in opioid use between blacks and whites was not modified by physicians' level of training. Our study methodology does not allow us to determine the reason why physicians may underuse opioid medications, particularly stronger and more potent opioids, in blacks. The more pronounced racial differences for strong and long-acting opioids suggest that systematic mistrust, bias, or stereotyping phenomena could be in play. If physicians are not writing prescriptions, is it because of cultural communication barriers or mistrust that may cause one to discount a patient's pain report? A study by van Ryn and Burke[33] does suggest that physicians hold negative views of blacks and believe that they are less compliant. Alternatively, if patients are not filling the prescription, is the reason financial or a fear of addiction that stems from miscommunication during the clinical encounter?

An alternative explanation for the racial disparity in opioid use is that whites as a group, may be overtreated rather than blacks being undertreated. The prevalence of prescription abuse has risen sharply in the last 10 years and the annual incidence of prescription abuse in whites is significantly higher than blacks (6.9% vs 3.7%).[34] Additionally, mental illness is strongly associated with substance abuse, and a significantly higher proportion of whites in our study had a history of depression. It may be possible that the presence of depression is leading to overutilization of opioids in whites.

The question of undertreatment of blacks with chronic pain versus overtreatment of whites cannot be answered by our methodology. The fact that opioids were clearly used more frequently by whites and the findings of previous studies in the emergency department, cancer-related, and postoperative settings argue for the likelihood that blacks are undertreated. For now, efforts to eliminate racial disparities must include patient and physician education, as well as increased awareness of the problem. Many articles have highlighted the need for more pain education among physicians,[17,20,24,35,36] but training in cultural competency may also be needed.

Our study has specific limitations, including the fact that the research subjects are a sample of convenience. Many of these patients were poor and were treated in an academic setting, so generalizability is a concern. Nonresponder bias can also be entertained. However, the fact that we recruited patients from 12 centers from a variety of geographic locations with only modest refusal to participate suggests that the impact of these issues is minimal. Also, given the observational nature of our study, it is impossible for us to ascertain cause and effect. Despite these limitations, the data demonstrate that racial disparities in chronic pain management continue to be a significant health issue.

CONCLUSION

In a primary care setting, whites with chronic pain are more likely to be treated with opioids than blacks. No inequality of treatment occurred when utilizing nonopioid therapies. Further efforts are needed to better understand why these treatment differences exist. However, increased physician awareness and education on these disparities would be an important initial step toward equalizing racial pain management.

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