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More Educated Emergency Department Patients are Less Likely to Receive Opioids for Acute Pain

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Abstract

Inadequate treatment of pain in United States emergency departments (EDs) is common, in part due to the limited and idiosyncratic use of opioids by emergency providers. We sought to determine the relationship between patient socioeconomic characteristics and the likelihood they would receive opioids during a pain-related ED visit. We conducted a cross-sectional analysis of ED data obtained as part of a multi-center study of outcomes after minor motor vehicle collision (MVC). Study patients were non-hispanic whites between the ages of 18–65 who were evaluated and discharged home from one of nine EDs in four states. Socioeconomic characteristics included educational attainment and income. Of 690 enrolled patients, the majority had moderate or severe pain (80%). Patients with higher education attainment had lower levels of pain, pain catastrophizing, perceived life-threat, and distress. More educated patients were also less likely to receive opioids during their ED visit. Opioids were given to 54% of patients who did not complete high school vs. 10% of patients with post-college education (chi-square test p<.001). Differences in the frequency of opioid administration between patients with the lowest educational attainment (39%, 95% CI 22%–60%)and highest educational attainment (13%, 95% CI 7%–23%) remained after adjustment for age, sex, income, and pain severity (p=.01). In this sample of post-MVCED

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patients, more educated patients were less likely to receive opioids. Further study is needed to assess the generalizability of these findings and determine the reason for the difference.

1. Introduction

The growing problem of prescription drug abuse, superimposed on a chronic national epidemic of under treated pain, has generated unprecedented scrutiny on physician opioid prescribing in the United States. However, despite this increased attention, little is known about the characteristics that differentiate patients in pain who receive opioids from those who do not. Characterizing the epidemiology of opioid prescribing (how things are) would seem a necessary and important first step in understanding physician-patient interactions related to opioid prescribing (why things are), and whether or how such interactions can be improved to produce better patient outcomes.

One medical setting in which opioids are commonly prescribed is the emergency department (ED). Previous studies have described lower rates of opioid administration for children[4, 15], the elderly[18, 19, 38], and ethnic minorities[27, 31, 38–40]. However, no studies have examined the association between patient socioeconomic characteristics and ED opioid prescribing. Patient socioeconomic characteristics have been associated with important differences in both health behaviors and medical care across a broad spectrum of medical conditions [10, 11, 14, 23, 33]. The ED may be particularly useful for examining the influence of socioeconomic characteristics on patient health outcomes because patient and physician are generally meeting for the first time. In such situations, sociodemographic factors may take “center stage” in influencing patient-provider interactions, because influences resulting from longstanding relationships are not present.

The purpose of this study was to examine the effect of patient education and income on ED opioid prescribing, using data obtained from a large prospective study of European American patients presenting to the ED after minor motor vehicle collision (MVC). In actuality, ‘minor MVC’ is an ED term that describes patients, not collisions: a minor MVC patient is an MVC patient discharged to home after ED evaluation. Such patients represent the great majority of all ED MVC patients[26], and typically have little external evidence of tissue trauma. However, such patients frequently have moderate or severe pain in the ED[5, 16, 17, 24]. This combination of substantial pain but little external evidence of injury is typical of many pain conditions for which patients seek medical care. In such conditions, the provider’s perception of the patient’s credibility and the provider’s empathy with the patient may be influenced by patient sociodemographic characteristics[35]. Based on prior evidence that ethnic minorities receive less opioids in the ED[27, 31, 36, 39, 40], and the fact that minorities are often socioeconomically disadvantaged, we hypothesized that patients with higher educational attainment and higher income would be more likely to receive opioids after minor MVC.

2. Methods

2.1. Design and setting

We analyzed cross-sectional data obtained as part of a prospective longitudinal study of patients evaluated in the ED following minor MVC. Data were collected at eight EDs in four “no fault” insurance states (Michigan, Massachusetts, New York and Florida)between February 2009 and December 2010. The study was approved by the institutional review boards of all participating hospitals, and each participant provided written informed consent.

2.2. Participants

Patients age 18 to 65 who presented to the ED within 24 hours after a minor MVC and who were unlikely to require admission were screened for eligibility. Patients who were likely to require hospitalization(as judged by the treating physician), had fractures other than phalangeal fractures, had more than 4 lacerations requiring sutures or a single laceration more than 20 cm in length, or had intracranial or spinal injuries were excluded. Spinal injury was defined by the presence of a fracture, dislocation, or new neurologic deficit. Enrollment was also limited to non-Hispanic whites (the most common ethnicity at study sites), because the study included the collection of genetic data and genetic analyses are potentially biased by population stratification [9]. Patients who were not alert and oriented were also excluded, as were pregnant patients, prisoners, patients unable to read and understand English, patients taking a β-receptor antagonist, or patients taking opioids above a total daily dose of 30 mg of oral morphine or equivalent.

2.3. Measures

Interviews were conducted by research assistants at the time of the ED visit using a web-based survey with explicit definitions of variables. Study questionnaires and additional details regarding data collection have been published separately[30]. Before enrolling patients in the ED, each research assistant completed a study training module followed by an interview with a standardized mock ED patient. Comparison of mock ED patient data across research assistants demonstrated an error rate of 1.3 %. Injury characteristics and medications administered in the ED were obtained by data extraction from the ED medical record. Data extraction was conducted by trained research assistants using an electronic template with explicit definitions of all variables. Both ED medical providers and research assistants were blinded to the investigator's interest in examining differences in care based on patient education and income. The processes for data collection, both by interview and by data extraction, were reviewed during weekly conference calls with study site coordinators throughout the course of the study.

2.3.1. Patient educational attainment and income—Patient education and income were obtained via patient self-report during the research interview. Patients were asked to select their educational attainment from five categories based on their highest grade obtained, and to select their income level from seven categories(Table 1). The "Post-High School" category included both technical schooling after high school and college education without graduation.

2.3.2. Collision and Injury Characteristics—Collision characteristics were obtained from the patient during the ED interview. The severity of motor vehicle damage was rated by the patient as being minor, moderate, or severe, with severe damage defined as the vehicle not being drivable. Other collision characteristics assessed included seat belt use, air bag deployment, and direction of vehicle impact. Injury characteristics were obtained from the ED medical record and included the presences of fractures of the phalanges and lacerations.

2.3.3. Pain and psychological symptoms—Patient overall pain severity was assessed using a 0 to 10 verbal numeric rating scale. Consistent with previously established cut-points[13] and medical practice[20], moderate pain was defined as a pain score of 4 to 7 and severe pain was defined as a score >7. Pain catastrophizing was measured using the Pain Catastrophizing Scale[34]. This 13-item scale (combined score range 0–52) assesses an individual's tendency to experience fear, anxiety, and helplessness in response to pain[34]. A 0 to 10 numeric rating scale was used to record the participant's perception of how life

threatening the collision was. Patient distress was rated by the research assistant who conducted the ED interview on a 0 to 10 scale.

2.3.4. ED analgesic administration—Study site research assistants extracted information from medication administration records regarding all medications given in the ED including medication name, route, and dose. For each patient, these medications were then reviewed by one of the investigators to determine whether the patient did or did not receive an opioid, a nonsteroidal anti-inflammatory drug (NSAID), or acetaminophen. These determinations were repeated by a second study author to confirm accuracy. The primary outcome was the administration of an opioid in the ED (oral, intramuscular, or intravenous route).

2.4. Data analyses

Univariate statistics were used to examine means and standard deviations for continuous variables and frequencies for categorical variables. Next, bivariate relationships between each of the potential predictors and the dichotomous outcome of ED opioid administration were examined, using the Student's t-test for continuous variables and Pearson's chi-square test for categorical variables. Both educational attainment and income were treated as categorical variables to avoid the assumption of a linear relationship between these variables and frequency of opioid administration. Differences in crash characteristics were compared across education categories using the Chi-square test. Analysis of variance was used to compare post-collision psychological symptoms among patients of different educational background.

Multivariable logistic regression was used to determine the relationship between patient educational attainment and income and the ED administration of opioids. Because the correlation between educational attainment and income was low ($r=.33$, $p<.001$), both variables were included in a single model. Patient age, sex, and pain severity were also included as covariates, because prior studies suggest that these variables might confound the relationship between socioeconomic characteristics and receipt of opioids in the ED[7, 18, 19, 38]. A multiple degree-of-freedom likelihood ratio test ($p<.05$) was used to assess whether interactions were present between model covariates. The final multivariable logistic regression model was used to calculate the predicted probability of receiving an opioid for patients from each of the five education categories adjusted for income, age, sex, and pain severity. Because odds ratios overestimate risk when outcomes are common[8], we reported outcomes as adjusted percents with p-values reflecting the overall significance of education treated as a categorical variable.

Secondary analyses examined the relationship between educational attainment and receiving an NSAID while in the ED. The consistency of the relationship between patient educational attainment and receipt of opioids within each of the eight study sites was also assessed. In addition, the Sobel-Goodman mediation test was used to examine the extent to which pain severity and ED psychological symptoms (interviewer-rated distress, pain catastrophizing, and perceived life threat)mediated the observed relationship between educational attainment and opioid administration[3]. In order to perform the mediation tests, educational attainment was treated as a continuous variable. Four separate mediation tests were conducted to assess the contribution of pain and three psychological symptoms to the relationship between educational attainment and ED opioid use. All available data were used for analyses, and no sample size calculation was performed. All analyses were conducted using StataIC 11.0 (StataCorp LP, College Station, Texas).

3. Results

3.1. Participant characteristics

Of 6,181 patients who were screened for eligibility between February 2009 and December 2010, 1,136 patients met eligibility criteria. Six hundred and ninety European American patients consented to study participation and completed the ED evaluation; these patients formed the study sample. The majority of patients were female (63%), and the mean age was 35 (Table 1). Educational attainment was broadly distributed across the sample, with one quarter having only a high school education and more than a third having completed college. Four out of five patients were in moderate or severe pain during their ED visit. An opioid was given to 27% of patients, and an analgesic of some kind (i.e. an NSAID, acetaminophen, or an opioid) was administered to 58% of patients. Income information was missing for 68 of 690 patients (9.9%). Patients with missing income information were younger than patients who provided income information (age 31.6 vs. 35.9, $p<.01$) but did not differ from patients who provided income information in regard to sex, educational attainment, pain severity, or receipt of an opioid during the ED visit.

3.2. Bivariate analyses

In unadjusted analyses examining relationships between patient characteristics and the primary outcome, patients with higher educational attainment and lower pain scores were more likely to receive opioids during ED evaluation (Table 2). There was a large reduction in the frequency of opioid administration during ED evaluation with increasing educational attainment (e.g. 54% of the least educated patients received opioids vs. 10% of the most educated patients). Bivariate analyses showed that the proportion of patients reporting severe car damage and the proportion reporting air bag deployment did not vary according to educational attainment but that patients with higher educational attainment were more likely to be wearing a seat belt (Table 3). A lower frequency of being rear-ended was reported by patients with post-high school educational attainment than by patients with other education levels, but patients in the highest and lowest categories of education attainment were similar to one another. Fractures were rare (n=3 total) in the study sample. The frequency of lacerations was similar for patients in each of the 5 education categories and ranged from 2% to 8%. Comparison of pain and psychological symptoms by educational attainment showed that patients with higher educational attainment had lower pain and pain catastrophizing scores, perceived the accident as being less life-threatening, and were rated by the interviewer as being in less distress than patients with lower educational attainment (Table 4).

3.3. Multivariable analyses

Complete information regarding educational attainment, age, sex, pain severity, and income was missing in 75 patients (11%). In the great majority of cases (68/75, 91%), this was due solely to missing income data. When these patient characteristics were included as independent variables in a logistic regression model evaluating receipt of ED opioids (n=615), education level and pain severity emerged as significant predictors of ED opioid administration. No significant interactions between the independent variables were observed. Predicted frequencies of ED opioid use by education level, adjusted for other factors, are shown in Table 5. More educated patients were less likely to receive opioids, with 39% (95% CI, 22%–60%) of the least educated patients receiving opioids vs. 13% (95% CI, 7%–23%) of the most educated patients. The direction of the relationship between patient education and ED opioid administration was the same at 7 of the 8 sites as it was for the entire sample (i.e. patients with higher educational attainment were less likely to receive opioids in the ED); the magnitude of the differences across education categories were also similar (data not shown). There was a non-significant trend toward higher rates of NSAID

use in patients with more education (Table 6). The association between increased educational attainment and reduced receipt of opioids was not changed when smoking status or measures of alcohol and drug use were added to the model (data not shown).

3.4. Mediation

In assessing the separate contribution of potential mediating factors in explaining the relationship between educational attainment and opioid administration, pain accounted for 38% of the effect ($p<.01$ for the indirect effect of pain), distress as measured by the interview accounted for 11% of the effect ($p<.01$), pain catastrophizing accounted for 8% of the effect ($p<.01$), and perceived life threat accounted for 5% of the effect ($p< .01$). Neither interviewer rating of patient distress, pain catastrophizing, or perceived life threat had a meaningful effect on the estimates of rates of opioid administration across categories of educational attainment when added as covariates to a multivariable logistic regression model that included patient income, age, sex, and pain severity.

4. Discussion

In this observational study of adult European Americans evaluated in the ED after minor MVC, patients with the highest educational attainment were much less likely to receive opioids than patients with the lowest educational attainment. Even after adjusting for age, sex, income, and pain severity, patients with the highest educational attainment were three times less likely to receive opioids than patients with the lowest education attainment. The magnitude of the absolute difference in opioid administration between patients with the highest and lowest educational attainment (44% unadjusted, 26% adjusted) in our study is larger than differences previously described for ethnicity or sex[7, 27, 31, 39, 40]. Patients with higher educational attainment were more likely to have been rear ended, but other collision and injury characteristics were similar across patients with different levels of educational attainment. However, patients with higher educational attainment had lower pain severity, appeared less distressed, and reported less sense of life threat than patients with lower educational attainment.

Our findings are consistent with those from a study of long-term opioid use in patients visiting spine specialty centers in the US[21]. In that study, patients who did not report opioid use were significantly more likely to have attended college than those who did report opioid use. This suggests that the relationship between higher educational attainment and lower opioid use may not be limited to the acute pain setting. Another study of long-term opioid use in spine specialty centers did not observe this relationship, but the very low rate of long-term opioid use among patients in this study (3.4%) suggests that the use of opioids may have been underreported or incompletely captured [12].

Educational attainment and income are distinct dimensions of socioeconomic status, with most studies showing only weak or moderate correlation between them[6, 42]. The correlation between education and income in our study ($r=.33$) is consistent with results from prior studies. Our results suggest that patient educational attainment has a stronger influence on ED opioid prescribing than does patient income. This finding parallels findings from other studies showing that educational attainment has a stronger influence than income on health behaviors [42] and long term health[29]. Educational attainment may also have a greater influence than income on factors such as patient understanding of their condition and self-efficacy regarding recovery.

The relationship we report between educational attainment and reduced receipt of opioids in the ED setting has not previously been reported, perhaps because of the lack of availability of a measure of educational attainment in most medical records and national research

datasets such as the National Hospital Ambulatory Medical Care Survey. The direction of the observed relationship between educational attainment and ED opioid use is the opposite of that anticipated based on prior studies of differences in opioid use between whites and ethnic minorities. Importantly, this suggests that if educational attainment were included as a covariate in analyses of ethnic differences in ED opioid prescribing, the effect of ethnic minority status may be substantially greater than previously described.

As noted above, a wide gap in opioid use according to educational attainment remained after adjustment for other patient demographic factors and pain severity. Exploratory analyses examining mediating factors suggest that differences in pain cognitions among patients with higher educational attainment, such as reduced pain catastrophizing and lower distress levels, might partly explain reduced receipt of opioids in these patients. It is unclear whether these cognitive and emotional differences result in either physicians believing patients with higher educational attainment do not require opioids and therefore not offering this class of medication; or patients with higher educational attainment declining medication; or patients with lower educational attainment, higher distress, and more negative cognitions requesting opioids. Differences in pain catastrophizing and distress, as well as pain severity, accounted for less than half of the observed reduction in opioid administration rates among patients with higher educational attainment. Therefore, it is likely that additional factors are important in shaping the physician patient interaction regarding opioid use.

One such factor may be that patients with lower educational attainment may consciously or unconsciously see receipt of opioids as a way to obtain validation of their pain in the face of a sense of physician discounting or mistrust. There is some evidence that there are variations in physician trust of a patient's symptoms based on patient demographic characteristics. Emergency physicians appear to be more likely to perceive that a patient is exaggerating their pain if the patient is a minority[28]. Similarly, in patients with sickle cell disease, an adverse pathway has been described in which provider mistrust creates patient anxiety and decreased confidence in self management of pain, which then leads patients to desire a greater intensity of care[25]. While these studies examined ethnic minority populations, it is possible that patients who are less educated have similar experiences.

Greater fear of addiction may also contribute to reduced receipt of opioids among patients with higher educational attainment. Fear of addiction has been previously reported as a reason for patients to decline opioids in the ED[37] and has also been reported in studies of post-operative pain management[22, 41]. Although the actual likelihood of addiction to opioids resulting from short-term treatment of acute pain is extremely low[32], patients with higher educational attainment may view opioid addiction as a greater potential problem.

Several other patient characteristics including smoking status and health insurance status were associated with educational attainment and may also have a causal effect on ED opioid administration. For example, patients with low educational attainment were more likely to report themselves as smokers than patients with high educational attainment. Further, patients who reported themselves as smokers were also more likely to receive opioids than patients who reported themselves as non-smokers (35% vs. 25%, p=.03). However, the addition of smoking status to the model presented in Table 5 did not alter the observed relationship between educational attainment and ED opioid administration. Neither alcohol use nor illicit drug use were statistical associated with educational attainment, and as with smoking status, the inclusion of these variables to the model did not alter the observed association between educational attainment and reduced receipt of ED opioids.

Several limitations should be considered when interpreting our study results. First, our study sample was limited to non-Hispanic whites seen in US EDs for injuries not-requiring

hospital admission after MVC. The relationship between patient education and the ED use of opioids may be different for other races and ethnicities, for elderly or pediatric patients, and for patients with different types of pain conditions. However, we believe our patients with musculoskeletal pain and little evidence of tissue injury are typical of many pain conditions seen in the ED, and the homogeneity of ethnic sample and injury type provided us with geater power to evaluate the specific influence of educational attainment and income on opioid prescribing. In addition, our study did not assess whether an opioid was requested, or in cases where no opioid was given, whether an opioid was offered and declined or not offered, which limits our ability to determine the mechanism for the observed differences. Also, perhaps because the majority of patients in our study were motor vehicle drivers in states with educational levels above the national average [1], our sample had fewer patients with low educational status than the general US population (4.1% of patients in our sample (n=28) reported 8–11 years of formal education in our sample vs. 9.4% of the US population[2]. When we re-analyze the data with the patients reporting 8–11 years of education and patients reporting the completion of high school collapsed into a single category, there are still clinically and statistically significant differences in rates of ED opioid administration across the remaining 4 education levels. Finally, our study did not assess patient satisfaction with the ED visit or obtain pain scores at the time of departure. Therefore, we do not know the impact of reduced rates of opioid prescribing among patients with higher educational attainment on changes in pain symptoms during the course of the ED visit.

The results of this study suggest that physician opioid prescribing may differ substantially according to patient educational attainment. Further studies are needed to replicate this association in other common pain conditions for which ED patients seek care. With respect to the reasons for the differences in opioid prescribing observed, our study results generate more questions than explanations. Further studies examining patient cognitions and patient and provider perceptions around opioid prescribing could provide important new understanding regarding how opioid prescribing practices could be optimized to improve patient outcomes. In addition, the results suggest that educational attainment is an important covariate to include in studies assessing pain management outcomes, including studies examining ethnic differences in ED pain treatment.

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Table 1

Characteristics of the sample (n=690).

Characteristic[a]	Total[b]
Mean Age, y (SD)	35 (13)
Sex	
Male	256 (37)
Female	434 (63)
Education (n=683)	
8–11 years	28 (4)
High School	138 (20)
Post-High School[c]	267 (39)
College Graduate	163 (24)
Post Graduate	87 (13)
Missing	7 (1)
Income (n=622)	
$0–$19,999	104 (17)
$20,000–$39,999	118 (19)
$40,000–$59,999	127 (20)
$60,000–$79,999	81 (13)
$80,000–$99,999	63 (10)
$100,000–$149,999	64 (10)
$150,000 or higher	65 (11)
Missing	68 (10)
Pain Severity (n=684)	
None	25 (4)
Mild	104 (15)
Moderate	380 (56)
Severe	175 (25)
Missing	6 (1)
Pain Medication in ED	
Acetaminophen[d]	140 (20)

Characteristic[a]	Total[b]
NSAIDs	235 (34)
Opioids	188 (27)

[a] Denominators vary due to missing values, n=690 unless otherwise specified.

[b] All numbers are n(%) except for age.

[c] Either technical schools or some college.

[d] Excluding acetaminophen given in combination with an opioid as a single medication.

Table 2

Relationships between patient characteristics and receipt of opioid in the ED.

Characteristic[a]	N	ED Opioid[b]	p-value[c]
Mean Age, y (SD)	690	35 (12)	.81
Sex			.20
Male	256	77 (30)	
Female	434	111 (26)	
Education (n=683)			<.001
8–11 years	28	15 (54)	
High School	138	43 (31)	
Post-High School[e]	267	91 (34)	
College Graduate	163	30 (18)	
Post Graduate	87	9 (10)	
Missing	7	0 (0)	
Income (n=622)			.10
$0–$19,999	104	37 (36)	
$20,000–$39,999	118	38 (32)	
$40,000–$59,999	127	33 (26)	
$60,000–$79,999	81	25 (31)	
$80,000–$99,999	63	10 (16)	
$100,000–$149,999	64	14 (22)	
$150,000 or higher	65	17 (26)	
Missing	68	14 (21)	
Pain Severity (n=684)			<.001
None	25	1 (4)	
Mild	104	9 (9)	
Moderate	380	96 (25)	
Severe	175	82 (47)	
Missing	6	0 (0)	

[a] Denominators vary due to missing values, n=690 unless otherwise specified.

[b] All numbers are n(%) except for age.

[c] p-values compare those receiving and not receiving opioids using t-test for age and chi-square test for sex, education, income, and pain severity.

Table 3

MVC characteristics by education category.

Education	Seat Belt Use[a] % (95% CI)	Severe Car Damage % (95% CI)	Air Bag Deployment % (95% CI)	Read Ended % (95% CI)
All Patients	88 (85–90)	56 (52–59)	27 (24–30)	36 (33–39)
8–11 years	82 (64–92)	48 (30–67)	15 (6–35)	39 (23–58)
High School	82 (75–88)	62 (54–70)	32 (25–40)	33 (26–42)
Post-High School	87 (82–90)	58 (52–64)	25 (20–31)	29 (24–35)
College Graduate	92 (87–95)	49 (41–57)	24 (19–32)	45 (37–53)
Post Graduate	92 (84–96)	54 (44–65)	30 (21–40)	47 (37–58)
p-value[b]	.05	.15	.30	<.01

[a] Total n's are: Seat Belt Use, n=686; Severe Car Damage, n=656; Air Bag Deployment, n=667; Rear Ended, n=690.

[b] Chi-square test.

Table 4

Mean post-MVC pain and psychological symptom scores by education category.

Education	Pain Score[a,b] mean (SD)	Pain Catastrophizing mean (SD)	Perceived Life-Threat mean (SD)	Inteviewer Rating of Distress mean (SD)
All Patients	5.6 (2.5)	11.2 (11.0)	4.4 (3.2)	1.9 (2.2)
8–11 years	7.2 (2.6)	18.3 (14.5)	5.0 (3.6)	2.7 (2.0)
High School	5.9 (2.3)	12.2 (12.7)	5.0 (3.3)	2.1 (2.3)
Post-High School	6.0 (2.5)	11.8 (11.1)	4.5 (3.2)	2.1 (2.4)
College Graduate	5.2 (2.2)	9.6 (8.9)	3.5 (3.0)	1.4 (1.9)
Post Graduate	4.3 (2.3)	8.6 (9.3)	4.0 (3.3)	1.2 (1.6)
p-value[c]	<.001	<.001	<.001	<.001

[a] Total n's are: pain score = 684; pain catastrophizing scale = 678; perceived life-threat = 686; interviewer rating of distress = 689.

[b] Ranges for measures are: pain score 0–10; pain catastrophizing 0–52; perceived life-threat 0–10; interviewer rating of distress 0–10.

[c] Analysis of variance.

Table 5

Crude and adjusted proportions of patients receiving opioids.

Education	N	% Receiving Opioids (95% CI)	N	Adj. % Receiving Opioids (95% CI)
All Patients	683	27 (24–31)	615	-
8–11 years	28	54 (35–71)	26	39 (22–60)
High School	138	31 (24–39)	120	26 (19–35)
Post-High School	267	34 (29–40)	247	29 (23–35)
College Graduate	163	18 (13–25)	142	19 (13–26)
Post Graduate	87	10 (6–19)	80	13 (7–23)
p-value		<.001[a]		.01[b]

[a]Chi-square test.

[b]Overall significance of education as a categorical variable in a logistic regression model with adjustment for patient income, age, sex, and pain severity.

Table 6

Crude and adjusted proportions of patients receiving NSAIDs.

Education	N	% Receiving NSAIDs (95% CI)	N	Adj. % Receiving NSAIDs (95% CI)
All Patients	683	34 (31–38)	615	-
8–11 years	28	29 (15–48)	26	27 (14–46)
High School	138	33 (26–42)	120	33 (26–42)
Post-High School	267	33 (28–39)	247	32 (27–38)
College Graduate	163	36 (29–44)	142	37 (29–45)
Post Graduate	87	37 (27–47)	80	41 (30–53)
p-value		.90[a]		.62[b]

[a] Chi-square test.

[b] Overall significance of education as a categorical variable in a logistic regression model with adjustment for patient income, age, sex, and pain severity.