HHS Public Access

Author manuscript

J Pain. Author manuscript; available in PMC 2015 July 01.

Published in final edited form as:

J Pain. 2014 July ; 15(7): 704–711. doi:10.1016/j.jpain.2014.03.004.

A longitudinal linear model of patient characteristics to predict failure to attend an inner-city chronic pain clinic

N Shaparin,

Montefiore Pain Center, Montefiore Medical Center, Albert Einstein College of Medicine, 3400 Bainbridge Avenue, LL400 Bronx, NY 10467

RS White,

Department of Anesthesiology, Montefiore Medical Center, Albert Einstein College of Medicine, 111 East 210th Street, Bronx, NY 10467

MH Andreae,

Department of Anesthesiology, Montefiore Medical Center, Albert Einstein College of Medicine, 111 East 210th Street, New York, NY 10467

CB Hall, and

Department of Epidemiology and Population Health Saul B. Korey Department of Neurology, Albert Einstein College of Medicine, Mazer 220A 1300 Morris Park Avenue Bronx, NY 10461

AG Kaufman

Department of Anesthesiology, New Jersey Medical School, 90 Bergen Street, Suite 3400, Newark, New Jersey 07103

N Shaparin: nshapari@montefiore.org; RS White: robert.white@med.einstein.yu.edu; MH Andreae: mhandreae@gmail.com; CB Hall: charles.hall@einstein.yu.edu; AG Kaufman: kaufmaga@rutgers.njms.edu

Abstract

Patients often fail to attend appointments in chronic pain clinics for unknown reasons. We hypothesized that certain patient characteristics predict failure to attend scheduled appointments pointing to systematic barriers to access chronic pain services for certain underserved populations. We collected retrospective data from a longitudinal observational cohort of patients at an academic pain clinic in Newark, New Jersey. To examine the effect of demographic factors on appointment status, we fit a marginal logistic regression using generalized estimating equations with exchangeable correlation. 1394 patients with 3488 total encounters between January 1, 2006

Disclosures:

Mr. White is supported by grants UL1TR000086, TL1RR000087, and KL2TR000088. Dr. Hall is supported by CDC grants 1U01-OH10412-01 (Project Primary Investigator), 1U01OH010411-01, 1U01OH010513-01, NIH grants P01 AG03949, R01 AG034119, 2R01AG022092-06A1, 1UL1TR001073-01, and 5P30-CA013330-40, along with CDC contracts 200-2011-39378 and 200-2011-39489. Dr. Kaufman and Dr. Shaparin report no grant support. Dr. Shaparin serves on the Speaker's Bureau for Cadence Pharmaceutical and Salix Pharmaceuticals. Dr. Kaufman serves on the Speaker's Bureau for Perdue Pharma, Insys Pharmaceuticals, and Jazz Pharamceuticals. Dr. Hall's wife received a $300 fee for record review from Services for the Underserved, New York NY. Mr. White and Dr. Andreae report no conflicts of interest.

and December 31, 2009 were included. Spanish spoken as a primary language (alternatively Hispanic or other race) and living between five and ten miles from the clinic were associated with reduced odds of arriving for an appointment; making an appointment for a particular complaint such as cancer pain or back pain, an interventional pain procedure scheduled in connection with the appointment, unemployed status, and continuity of care (as measured by office visit number) were associated with increased odds of arriving. Spanish spoken as primary language and distance to the pain clinic predicted failure to attend a scheduled appointment in our cohort. If these constitute systematic barriers to access, they may be amendable to targeted interventions.

Perspective—We identified certain patient characteristics, specifically Spanish spoken as primary language and geographic distance from the clinic, that predict failure to attend an inner-city chronic pain clinic. These identified barriers to access chronic pain services may be modifiable by simple cost effective interventions.

Key words for Indexing

Health care disparities; chronic pain; Hispanic Americans; Appointments and Schedules; Logistic Models

Introduction

Patients often fail to attend appointments in chronic pain clinics for unknown reasons, frequently without calling to cancel beforehand. Failure to attend (FA) a scheduled appointment[1, 4, 10, 12, 14, 17–21, 23, 25, 29, 30, 37, 38, 43, 46], especially without the benefit of a cancellation call can add to already considerable wait times for pain clinic appointments, a problem that is only magnified in resource limited clinic settings. Overbooking is an imperfect answer in this situation; it can result in crowded waiting areas, patient frustration, and provider stress. More importantly, beyond the obvious excess cost associated with FA, is this phenomenon pointing to unmet needs in the treatment of chronic pain for certain populations?

Inner-city pain clinics cater to underserved and minority populations with high Medicaid insurance rates, lower socioeconomic status, and a substantial level of hospital provided charity care. These demographic groups have previously been identified as more likely to miss clinic appointments[4, 10, 17, 21, 32, 43, 46]. Health care disparities persist for these minorities and socioeconomically disadvantaged patients seeking pain treatment [2, 11, 13, 16, 28, 44]. Minority patients often experience longer appointment wait times, hindered access to appropriate analgesic medications, increased requirements for physician referrals, concerns about finance and about addiction/dependency to medications [2, 8, 9, 11, 16, 24, 25, 27, 28, 34, 35, 42, 44, 45]. Long term interventional trials and policy initiatives have been undertaken [6, 9, 18, 19, 26, 40] in an attempt to improve attendance and to counteract the potential for systematic discrimination of vulnerable and underserved populations by our health care system[33]. While there is some research on acute pain service utilization by minorities, for example labor epidural delivery[15, 42, 47], important questions still remain concerning experience and decision making by underserved populations in regards to utilization of individually offered chronic pain services[11]. This particularly holds

for research concerning health care disparities concerning access to chronic pain services; our literature search found no studies in this area.

Based on anecdotal personal experience and the literature we hypothesized that certain patient characteristics such as belonging to an ethnic or racial minority and speaking non-English as preferred/primary language would predict failure to attend clinic appointments pointing to systematic barriers to access chronic pain services for certain populations. Our retrospective observational cohort examined patients scheduled to attend an academic chronic pain clinic at the University Hospital of New Jersey Medical School in Newark, formerly the University of Medicine and Denistry of New Jersey (UMDNJ) Newark, New Jersey over a four year period. We fitted a longitudinal generalized linear regression model to investigate the association between certain patient specific characteristics and arrival to appointment and likelihood of making a cancellation phone call for a missed appointment.

Materials and Methods

We collected retrospective data from a longitudinal observational cohort of patients with a scheduled appointment at the New Jersey Medical School Department of Anesthesiology's Pain Clinic in Newark, New Jersey. Following institutional review board approval the study subjects were selected from the pain clinic administrative database (formerly General Electric Logitian Electronic Medical Record, now Centricity electronic medical record). Due to the retrospective nature of the study the informed consent requirement was waived by the institutional review board. Patients were selected based on the following criteria: (1) age 18 yr to 90 yr; (2) scheduled for the clinic's charity care/ reduced fee weekly (every Wednesday afternoon) clinic during the period January 1, 2006 to December 31, 2009. We limited our analysis to charity care clinic patients because the results of an internal quality assessment revealed that the vast majority of insured patients arrived for their scheduled visits on time or called to cancel beforehand (unpublished data). The substantial no show rate in our charity clinic meanwhile suggested barriers to access to care in this population. Data collection was implemented through chart review. Patients were not denied clinic appointments based on prior clinic appointment outcome (arrived, cancellation call, no call). All patients with a pain clinic appointment during this time period were included in the analysis, regardless of race, ethnicity, and insurance status or if they attended, failed to attend, or cancelled the appointment. The following demographic data was collected for each patient: appointment date, patient age, sex, appointment status (arrived, cancelled, no show), nature of pain complaint, whether a procedure was previously performed as part of treatment plan (yes, no), insurance type, ethnicity, primary spoken language, employment status (employed, unemployed, on disability), distance from clinic based on zip code data, and referring physician specialty. Patient past medical history was not transcribed. 1394 patients with 3488 total encounters were included in this analysis.

Statistical Analysis

Analyses were performed using STATA software, version 12.1 (College Station, Texas). Baseline characteristics were compared separately for appointment status of arrival vs. failure to attend; and for cancellation call vs. no call. Continuous variables were compared

using two-sample t-test (or the Mann Whitney U test), and categorical variables were compared using the Pearson chi-square test or Fisher's exact test.

To examine the effect of demographic factors on appointment status, we fit marginal logistic regression models to our data using generalized estimating equations with exchangeable correlation; odds ratios (OR) with robust 95% confidence intervals (CI) were reported[22]. These models take into account the fact that individuals contribute repeated observations to the analyses. We developed separate models for arrival vs. failure to attend and for cancellation call vs. no call. We fit two additional models – a marginal logistic model with a lag one autoregressive correlation, and a random-intercept logistic regression model; these models produced similar results [data not shown]. As expected, we found strong collinearity between language spoken and race/ethnicity; hence, we ran separate models for spoken language and for race/ethnicity. We built our models using backward selection based on the Wald statistic including variables that had results of bivariate baseline testing $p < 0.25$; or variables, such as race and language, that were selected a priori, assigning statistical significance at an alpha level of 0.05 and interaction at 0.05. The following covariates were deemed time-dependent with visit number as the time scale: patient age, nature of pain complaint, whether a procedure was previously performed as part of treatment plan (yes, no), insurance type, employment status (employed, unemployed, on disability), and distance from clinic based on zip code data; statistical interactions terms between these terms and visit number were assessed for. Additionally we investigated confounding. Elevated odds ratios indicate increased odds of arriving for appointments or making a cancellation call. The odds ratio for continuous variables such as age and office visit number represents the change in odds for each additional unit change (year of age or visit number).

Results

Comparison of baseline characteristics by baseline pain clinic appointment status outcome
All 1394 patients enrolled had at least one pain clinic appointment. Table 1 shows descriptive characteristics of this cohort, grouped according to clinic appointment status: arrive vs. failure to attend. The composition of our cohort and their insurance status is typical for an underserved inner-city population with a high rate of uninsured, unemployed patients and minorities. 668 patients arrived to the clinic (average age 49.8 years; 55.09% female) versus 726 (average age 50.79; 59.23% female) who failed to attend at baseline. The two groups differed significantly in zip code distance from clinic data ($p<0.040$) and patients who arrived were more likely to have a particular complaint (85.67% vs. 54.66%; $p<0.001$). The bivariate comparison showed no significant difference in payment type, race, spoken language, employment status, and referring physician between the patients who arrived to clinic and those who failed to attend.

668 patients failed to present for their baseline pain clinic appointment. Table 2 shows descriptive characteristics of this cohort, grouped according to call status: cancellation call vs. no cancellation call. 497 patients did not call (average age 49.42 years; 53.92% female) versus 171 patients (average age 50.95; 58.48% female) who called to cancel at baseline. These two groups differed significantly: patients who called to cancel were more likely to have a particular complaint (68.21% vs. 49.76%; $p<0.001$).

Marginal logistic model results

GEE population-averaged model for attending visit appointment

1298 Individuals had complete covariate data and were able to be included in the marginal regression model of language; one individual was missing data on race. Table 3 shows the results of the GEE models run separately for both language and race. Spanish spoken as a primary language, Hispanic race, “other” race, and living between five and ten miles from the clinic were significantly associated with reduced odds of arriving for a clinic appointment. Making an appointment for a particular complaint such as cancer pain or back pain as compared to a nonspecific complaint, having an interventional pain procedure scheduled and performed in connection to the appointment, being unemployed, and continuity of care (as measured by office visit number) were statistically significantly associated with increased odds of arriving for the appointment. Table 4 shows the odds ratios for the time-dependent covariates – office visit, particular complaint such as cancer pain or back pain as compared to a nonspecific complaint, and having an interventional pain procedure scheduled and performed in connection to the appointment.

GEE population-averaged model for making a cancellation call

Table 5 shows the results of the GEE model run separately for both language and race. Increased age, making an appointment for a particular complaint such as cancer pain or back pain as compared to a nonspecific complaint, living five to ten miles from the clinic, and living thirty plus miles from the clinic were significantly associated with an increased odds of making a cancellation call.

Discussion

In our marginal logistic regression model, Spanish spoken as a primary language, and living between five and ten miles from the clinic were statistically significantly associated with reduced odds of arriving for an appointment at an inner city pain clinic in our retrospective observational cohort of chronic pain patients (Table 3). Seeking an appointment for a particular complaint such as cancer pain or back pain as compared to a nonspecific complaint, scheduling an interventional pain procedure performed in connection to the appointment, unemployment status, and continuity of care (as measured by office visit number) were associated with increased odds of arriving for the appointment. Additionally, the effects of office visit number and seeking an appointment for a particular complaint such as cancer pain or back pain as compared to a nonspecific complaint were found to be time dependent variables with increasing odds, while having a procedure performed in connection to appointment was found to be a time dependent variable with decreasing odds of arriving for an appointment (Table 3 and 4). Performing a subgroup analysis for those who fail to attend (Table 5), we found that increased age, an appointment for a particular complaint and increased geographic distance to the clinic were associated with increased odds ratio of calling to cancel the appointment.

To our knowledge, our study is the first to examine statistical association between patient demographic characteristics and failure to attend an academic pain clinic in the United

States [11]. Our findings replicate previous studies identifying risk factors for failure to attend clinic appointments in other settings[4, 12, 14, 17, 19–21, 30, 32, 37, 38, 43, 46].

The observed association lends support to the hypothesis that language is a barrier to even arrive at a pain clinic appointment, pointing to systematic barriers to access care. The strong collinearity, or statistical association, between race/ethnicity and language spoken meant that we could not include both language spoken and race/ethnicity at the same time in our model. We choose to focus on the language model (Table 3), where speaking Spanish was strongly associated with failure to attend a schedule appointment. In a separate model (shown in the same Table 3, right for comparison), Hispanic ethnicity/race and "other race" were found to be statistically significant predictors for failing to attend an appointment. A notable finding was that in this model based on race/ethinicty, both African American and Caucasian patients had statistically equal odds of attending their pain clinic appointment demonstrating no difference between these demographic groups (Table 3, right). Previous research has shown that Hispanics are less likely than Caucasians and African Americans to visit any type of physician or health care provider for pain [39]. We hypothesize this is because an important determining factor that increases the odds of failing to attend an appointment is the primary language spoken, specifically non-English. 57.14% of Hispanics spoke Spanish as a primary language and 5.67% spoke "other language" (not English, not Spanish); 90.32% of Spanish speakers identified themselves as Hispanic. For speakers of "other language" 36.23% identify as Hispanic and 40.58% identify as other race.

Another intruiging finding was that patients who were unemployed were more likely to attend their clinic appointment. Prior research has identified an inability to take time off from work as a frequent reason for missing doctor's appointments [14, 37, 43]. However this cannot exclude possibiltiy that those without gainful employment are further along their disease process and are in more dire need of pain management care.

Studies have also shown that minority populations are given less analgesic therapy, including opioids than caucasian patients[2, 8, 11, 13, 16, 25, 27, 28, 34, 44]. These findings are replicated in both the acute settings such as the emergency room and in more longer term care settings such as a primary care or chronic pain clinic settings[2, 8, 11, 13, 16, 25, 28, 34, 35, 44]. Minority patients often experience longer waiting times before appointments, the need for earlier physician referrals, concerns about finance and about addiction/dependency to medications[2, 8, 11, 13, 16, 28, 44]. Physicians willlingly or unwillingly may harbor preconceptions concerning issues of race and ethnicity or the patient's socioeconomic status that can influence their approach to certain patients[8, 11, 16, 25, 28, 34, 35, 44]. Doctors could have increased apprehension prescribing pain medicine to minorities because of a perceived potential for medication abuse[8, 11, 16, 25, 28, 34, 44]. Language and cultural barriers between patient and provider can complicate these issues even further[16, 34, 44]. Financial constraints and access to healthcare insurance coverage further increase the variability in healthcare provided to minority patients vs nonminority patients[2, 8, 9, 11, 13, 16, 24, 25, 27, 28, 34, 35, 44, 45].

Why might Spanish spoken as a primary language be significantly associated with failure to attend in our cohort? Previous studies of healthcare disparities in pain management have

reported that the amount of pain is often underestimated and less often recorded in minority populations[28]. Some minorities may by unwilling to communicate pain because they value stoicism and feel that pain must be tolerated or they may have different coping strategies for dealing with pain, though the inverse may be true for others[16, 28, 41, 44]. Difficulties in communication and a language barrier should not be understated as important contributors to the underreporting[2, 3, 36, 44]. It should be noted that an onsite Spanish interpreter was available along with telephone interpretation services for all languages. In addition, one of the regular providers was a certified Spanish interpreter.

Our study does not elucidate if the patients failed to keep their appointment because they feared they would not be understood and hence receive inadequate care or alternatively if language is a surrogate marker for other barriers and attitudes that prevented the patient from arriving at our clinic[2, 3, 7, 36, 44].

Other reasons for no shows to appointments identified in studies besides communication problems are the medical reason for the appointment (and the urgency or severity associated with it), lack of a personal physician, issues concerning transportation, emotions, perceived disrespect from health care system, fear of the physician encounter, and patient forgetfulness[4, 12, 14, 19–21, 30, 37, 38, 46]. In our study, patients with a particular complaint were more likely to attend an appointment, possibly pointing to an increased sense of urgency and importance. The geographic distance as measured from zip code data represented a barrier to access care in our study possibly reflecting issues concerning transportation. These could have exaggerated the barriers underlying cultural and/or language differences.

This study has several limitations. We utilized billing data from a sample of chronic pain clinic patients, attending an academic pain clinic in Newark, New Jersey. The majority of patients were either Medicaid insured or provided hospital charity care. Our observations likely pertain specifically to an underserved resource-poor minority/immigrant population attending our inner city pain clinic and may not be generalizable to other settings. The colinearity between language and race/ethnicity did not allow us to include both in the same model. We acknowledge that there are other potential clinical or demographic patient charactersitics that could act as a confounder and that we did not abstract. Only a prospective randomized trial can be expected to balance the unknown confounders. The observed association therefore needs to be validate both in randomized trials and with the patients' perspective: We did not validate the presumed causal relationship between language barrier and failure to attend, for example through the use of survey questionaire, focus groups or structured interviews[12, 20, 29, 37, 38]. Prior work by Pieper and DiNardo utilized such a survey and found that the top reasons for clinic non-attendance were transportation, forgetfulness, financial, work related, feeling better from illness, and not feeling like going to appointment [37, 38]. Unfortunately, no such work has been performed utilizing patients attending academic pain clinics. Future research should include the patients attending pain clinics to ground our causal inferences in the lived experiences of the underserved populations we try to serve better. Clearly, we ought to also explore the patient's perspectives of reasons for missed appointments[37, 38].

Several studies have identified ways to improve patient satisfaction and enhance the patient-doctor relationship with the goal of improving attendance rates, albeit none in our pain clinic setting. Interventions include more accurate scheduling to reduce wait time, and the use of pre-appointment reminder calls 24 or 48 hours before the appointment to reduce potential patient forgetfulness or misunderstandings concerning the scheduling system. One study showed that the use of reminder phone calls over a 6 month period caused the no show rates to drop from 50% to 4%[49]. Additionally, the phone call allowed for patients to cancel an appointment for either social, illness-related, or personal reasons, if necessary, without any additional mental anxiety and stress placed on the patient. These suggestions may improve doctor-patient communication and patient satisfaction for all patient groups[19, 20]. Similar studies have shown that a reminder text messaging system is both effective and cost efficient in reducing appointment no-shows[18, 19].

Interventions could also specifically address language as an important barrier to access care as evidenced by the strong association between Spanish spoken and failure to attend. We propose to conduct interventional studies [6, 9, 26, 40] to address precisely the factors our model exposed: language and geographic distance. These could include pre-appointment phone calls or text messages in the patient's predominant language, suggesting to the patient that he or she will be seen by a physician fluent in the patient's idiom and understanding of their cultural wants and needs. Additionally, the offer of public transportation fare can help to alleviate transportation and financial constraints on patients [2, 4–7, 32, 36, 46, 48].

Our study also has a number of strengths. The regression model controlled for covariates and allowed to identify the strong association between language and failure to attend (Table 3), revealing an association not apparent in the bivariate comparison (Table 1). The use of a marginal logistic regression model allowed the inclusion of all data points for patients with several repeating appointments and accounted for correlation between attendances at different appointments for any given patient. Our study's statistical models are well powered and robust. Newark, New Jersey is an ethnically diverse city. (Although not all patients attending our clinic are from Newark.) Census data shows that its population is 26.3% white, 52.4% black, 33.8% Hispanic and as such representative of many underserved communities in the US (2010 Census Data). All age groups older than 18 years are represented.

The present study has shown that certain patient characteristics predict the failure to attend a scheduled appointment in an academic pain clinic, specifically Spanish spoken as a primary language, being Hispanic, and living at a larger distance to the pain clinic. If non-English speaking and other demographic characteristics are obstacles to access chronic pain services then this should be addressed in a timely, considerate, respectful, culturally sensitive and mutually understanding manner that will promote the doctor-patient relationship with positive healthcare outcomes [20, 24, 31].

Acknowledgments

We would like to thank the following people for their assistance in data collection: Jane Kim, Steven Carvalho, Ron Avraham, Fatimah Habib, Ummais Khan, Sam Nia, and David Gottlieb.

References

1. Akhter K, Dockray S, Simmons D. Exploring factors influencing non-attendance at the diabetes clinic and service improvement strategies from patients' perspectives. Practical Diabetes. 2012; 29:113–116.
2. Anderson KO, Green CR, Payne R. Racial and ethnic disparities in pain: causes and consequences of unequal care. J Pain. 2009; 10:1187–1204. [PubMed: 19944378]
3. Anez LM, Paris M Jr, Bedregal LE, Davidson L, Grilo CM. Application of cultural constructs in the care of first generation Latino clients in a community mental health setting. Journal of Psychiatric Practice. 2005; 11:221–230. [PubMed: 16041232]
4. Barron WM. Failed appointments. Who misses them, why they are missed, and what can be done. Prim Care. 1980; 7:563–574. [PubMed: 7010402]
5. Beach MC, Gary TL, Price EG, Robinson K, Gozu A, Palacio A, Smarth C, Jenckes M, Feuerstein C, Bass EB, Powe NR, Cooper LA. Improving health care quality for racial/ethnic minorities: a systematic review of the best evidence regarding provider and organization interventions. BMC Public Health. 2006; 6:104. [PubMed: 16635262]
6. Betancourt JR. Eliminating racial and ethnic disparities in health care: what is the role of academic medicine? Academic Medicine. 2006; 81:788–792. [PubMed: 16936481]
7. Betancourt JR, Carrillo JE, Green AR, Maina A. Barriers to health promotion and disease prevention in the Latino population. Clinical Cornerstone. 2004; 6:16–29. [PubMed: 15707259]
8. Campbell CM, Edwards RR. Ethnic differences in pain and pain management. Pain Management. 2012; 2:219–230. [PubMed: 23687518]
9. Campbell LC, Robinson K, Meghani SH, Vallerand A, Schatman M, Sonty N. Challenges and opportunities in pain management disparities research: implications for clinical practice, advocacy, and policy. J Pain. 2012; 13:611–619. [PubMed: 22560002]
10. Cashman SB, Savageau JA, Lemay CA, Ferguson W. Patient health status and appointment keeping in an urban community health center. J Health Care Poor Underserved. 2004; 15:474–488. [PubMed: 15453182]
11. Cintron A, Morrison RS. Pain and ethnicity in the United States: A systematic review. J Palliat Med. 2006; 9:1454–1473. [PubMed: 17187552]
12. Cosgrove MP. Defaulters in general practice: reasons for default and patterns of attendance. British Journal of General Practice. 1990; 40:50–52. [PubMed: 2107849]
13. Ezenwa MO, Ameringer S, Ward SE, Serlin RC. Racial and Ethnic Disparities in Pain Management in the United States. Journal of Nursing Scholarship. 2006; 38:225–233. [PubMed: 17044339]
14. Frankel S, Farrow A, West R. Non-attendance or non-invitation? A case-control study of failed outpatient appointments. Bmj. 1989; 298:1343–1345. [PubMed: 2502248]
15. Glance LG, Wissler R, Glantz C, Osler TM, Mukamel DB, Dick AW. Racial Differences in the Use of Epidural Analgesia for Labor. Anesthesiology. 2007; 106:19–25. [PubMed: 17197841]
16. Green CR, Anderson KO, Baker TA, Campbell LC, Decker S, Fillingim RB, Kalauokalani DA, Lasch KE, Myers C, Tait RC, Todd KH, Vallerand AH. The Unequal Burden of Pain: Confronting Racial and Ethnic Disparities in Pain. Pain Medicine. 2003; 4:277–294. [PubMed: 12974827]
17. Ide BA, Curry MA, Drobnies B. Factors related to the keeping of appointments by indigent clients. J Health Care Poor Underserved. 1993; 4:21–39. [PubMed: 8448276]
18. Junod Perron N, Dao MD, Righini NC, Humair JP, Broers B, Narring F, Haller DM, Gaspoz JM. Text-messaging versus telephone reminders to reduce missed appointments in an academic primary care clinic: a randomized controlled trial. BMC Health Services Research. 2013; 13:125. [PubMed: 23557331]
19. Perron NJ, Dao MD, Kossovsky MP, Miserez V, Chuard C, Calmy A, Gaspoz JM. Reduction of missed appointments at an urban primary care clinic: a randomised controlled study. BMC Family Practice. 2010; 11:79. [PubMed: 20973950]
20. Lacy NL, Paulman A, Reuter MD, Lovejoy B. Why We Don't Come: Patient Perceptions on No-Shows. The Annals of Family Medicine. 2004; 2:541–545.

21. Lee V, Earnest A, Chen M, Krishnan B. Predictors of failed attendances in a multi-specialty outpatient centre using electronic databases. BMC Health Services Research. 2005; 5:51. [PubMed: 16083504]
22. Liang K-Y, SZ. Longitudinal data analysis using generalized linear models. Biometrika. 1986; 73:13–22.
23. Little B, Cannon C, Whitson B, Jarolim DR. The failed appointment. J Okla State Med Assoc. 1991; 84:455–458. [PubMed: 1757840]
24. McGuire TG, Alegria M, Cook BL, Wells KB, Zaslavsky AM. Implementing the Institute of Medicine Definition of Disparities: An Application to Mental Health Care. Health Services Research. 2006; 41:1979–2005. [PubMed: 16987312]
25. Meghani SH, Byun E, Gallagher RM. Time to Take Stock: A Meta-Analysis and Systematic Review of Analgesic Treatment Disparities for Pain in the United States. Pain Medicine. 2012; 13:150–174. [PubMed: 22239747]
26. Meghani SH, Polomano RC, Tait RC, Vallerand AH, Anderson KO, Gallagher RM. Advancing a National Agenda to Eliminate Disparities in Pain Care: Directions for Health Policy, Education, Practice, and Research. Pain Medicine. 2012; 13:5–28. [PubMed: 22142450]
27. Morrison RS, Wallenstein S, Natale DK, Senzel RS, Huang L-L. "We Don't Carry That" — Failure of Pharmacies in Predominantly Nonwhite Neighborhoods to Stock Opioid Analgesics. New England Journal of Medicine. 2000; 342:1023–1026. [PubMed: 10749965]
28. Mossey J. Defining Racial and Ethnic Disparities in Pain Management. Clin Orthop Relat Res. 2011; 469:1859–1870. [PubMed: 21249483]
29. Neal R, Hussain-Gambles M, Allgar V, Lawlor D, Dempsey O. Reasons for and consequences of missed appointments in general practice in the UK: questionnaire survey and prospective review of medical records. BMC Family Practice. 2005; 6:47. [PubMed: 16274481]
30. Nguyen DL, DeJesus RS, Wieland ML. Missed Appointments in Resident Continuity Clinic: Patient Characteristics and Health Care Outcomes. Journal of Graduate Medical Education. 2011; 3:350–355. [PubMed: 22942961]
31. Nguyen M, Ugarte C, Fuller I, Haas G, Portenoy RK. Access to Care for Chronic Pain: Racial and Ethnic Differences. The Journal of Pain. 2005; 6:301–314. [PubMed: 15890632]
32. Oppenheim GL, Bergman JJ, English EC. Failed appointments: a review. J Fam Pract. 1979; 8:789–796. [PubMed: 429996]
33. Page-Reeves J, Niforatos J, Mishra S, Regino L, Gingrich A, Bulten R. Health Disparity and Structural Violence: How Fear Undermines Health Among Immigrants at Risk for Diabetes. J Health Dispar Res Pract. 2013; 6:30–47. [PubMed: 24052924]
34. Paulson M, Dekker AH. Healthcare Disparities in Pain Management. JAOA: Journal of the American Osteopathic Association. 2005; 105:S14–S17.
35. Paulson MR, Dekker AH, Aguilar-Gaxiola S. Eliminating Disparities in Pain Management. JAOA: Journal of the American Osteopathic Association. 2007; 107:ES17–ES20.
36. Perez-Stable EJ, Salazar R. Issues in achieving compliance with antihypertensive treatment in the Latino population. Clin Cornerstone. 2004; 6:49–61. discussion 62–64. [PubMed: 15707262]
37. Pieper B, DiNardo E. Pearls for Practice. Reasons for Missing Appointments in an Outpatient Clinic for Indigent Adults. Journal of the American Academy of Nurse Practitioners. 1998; 10:359–364. [PubMed: 9801570]
38. Pieper B, DiNardo E. Reasons for nonattendance for the treatment of venous ulcers in an inner-city clinic. Journal of wound, ostomy, and continence nursing: official publication of The Wound, Ostomy and Continence Nurses Society/WOCN. 1998; 25:180–186.
39. Portenoy RK, Ugarte C, Fuller I, Haas G. Population-based survey of pain in the united states: Differences among white, african american, and hispanic subjects. The journal of pain: official journal of the American Pain Society. 2004; 5:317–328. [PubMed: 15336636]
40. Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research. The National Academies Press; 2011.
41. Ruehlman LS, Karoly P, Newton C. Comparing the Experiential and Psychosocial Dimensions of Chronic Pain in African Americans and Caucasians: Findings from a National Community Sample. Pain Medicine. 2005; 6:49–60. [PubMed: 15669950]

42. Rust G, Nembhard WN, Nichols M, Omole F, Minor P, Barosso G, Mayberry R. Racial and ethnic disparities in the provision of epidural analgesia to Georgia Medicaid beneficiaries during labor and delivery. American Journal of Obstetrics and Gynecology. 2004; 191:456–462. [PubMed: 15343221]
43. Sharp DJ, Hamilton W. Non-attendance at general practices and outpatient clinics. Bmj. 2001; 323:1081–1082. [PubMed: 11701560]
44. Shavers VL, Bakos A, Sheppard VB. Race, ethnicity, and pain among the U.S. adult population. Journal of Health Care for the Poor and Underserved. 2010; 21:177–220. [PubMed: 20173263]
45. Shire N. Effects of race, ethnicity, gender, culture, literacy, and social marketing on public health. J Gend Specif Med. 2002; 5:48–54. [PubMed: 11974675]
46. Smith CM, Yawn BP. Factors associated with appointment keeping in a family practice residency clinic. J Fam Pract. 1994; 38:25–29. [PubMed: 8289047]
47. Toledo P, Sun J, Grobman WA, Wong CA, Feinglass J, Hasnain-Wynia R. Racial and Ethnic Disparities in Neuraxial Labor Analgesia. Anesthesia & Analgesia. 2012; 114:172–178. [PubMed: 22075013]
48. Washington DL, Bowles J, Saha S, Horowitz CR, Moody-Ayers S, Brown AF, Stone VE, Cooper LA. Writing group for the Society of General Internal Medicine, Disparities in Health Task Force. Transforming Clinical Practice to Eliminate Racial–Ethnic Disparities in Healthcare. J GEN INTERN MED. 2008; 23:685–691. [PubMed: 18196352]
49. Woods R. The effectiveness of reminder phone calls on reducing no-show rates in ambulatory care. Nurs Econ. 2011; 29:278–282. [PubMed: 22372086]

Table 1

Characteristics of study participants

The characteristics of study participants at baseline (visit #1) by arrival status are typical of an inner city minority population. All data presented in mean (standard deviation), unless otherwise specified. Continuous variables analyzed by ANOVA; categorical variables analyzed by Pearson chi-square test or Fisher's exact test. P-values refer to comparisons between failed to attend and arrived. Particular refers to having a particular complaint such as cancer pain or back pain as compared to a nonspecific complaint. Zip code refers to average distance from pain clinic per participant's zip code.

Variable	Total n= 1394	Failed to attend n = 668	Arrived n = 726	p-value
Demographics				
Age	50.32 (11.03)	49.81 (11.71)	50.79 (10.35)	0.10
Female, N (%)	798 (57.25)	368 (55.09)	430 (59.23)	0.12
Particular, N (%)	927 (71.97)	311 (54.66)	616 (85.67)	<0.001
Race – Caucasian (%)	172 (12.83)	73 (11.76)	99 (13.75)	0.22
Black, N(%)	545 (40.64)	248 (39.94)	297 (41.25)	
Hispanic, N (%)	441 (32.89)	221 (35.59)	220 (30.56)	
Other race, N (%)	183 (13.65)	79 (12.72)	104 (14.44)	
English, N (%)	994 (74.07)	455 (73.27)	539 (74.76)	0.58
Spanish, N (%)	279 (20.79)	130 (20.93)	149 (20.67)	
Other language, N (%)	69 (5.14)	36 (5.80)	33 (4.58)	
Payment Type, N (%)				
Charity Care	419 (31.50)	189 (30.78)	230 (32.12)	0.099
Medicare	91 (6.84)	39 (6.35)	52 (7.26)	
Medicaid	519 (39.02)	261 (42.51)	258 (36.03)	
Private	60 (4.51)	20 (3.26)	40 (5.59)	
Self	26 (1.95)	13 (2.12)	13 (1.82)	
Unknown	215 (16.17)	92 (14.98)	123 (17.18)	
Employed, N (%)	109 (8.14)	59 (9.55)	50 (6.93)	0.14
Unemployed, N (%)	1153 (84.14)	520 (84.14)	633 (87.79)	
Disability, N (%)	77 (5.75)	39 (6.31)	38 (5.27)	
Zip Code (miles), N (%)				
0–5	692 (51.60)	331 (53.22)	361 (50.21)	0.040
5–10	230 (17.15)	118 (18.97)	112 (15.58)	
10–20	238 (17.75)	97 (15.59)	141 (19.61)	
20–30	75 (5.59)	26 (4.18)	49 (6.82)	
30	106 (7.90)	50 (8.04)	56 (7.79)	
Referring Physician, N (%)				
Primary Care	844 (63.99)	403 (66.83)	441 (61.59)	0.073
Neurosurgery	304 (23.05)	134 (22.22)	170 (23.74)	
Orthopedics	171 (12.96)	66 (10.95)	105 (14.66)	

Table 2

Did they call to cancel? Characteristics of study participants who failed to attend at baseline.

Among the study participants who failed to attend their first visit, we compare the characteristics of patients who called to cancel versus those who did not. All data presented in mean (standard deviation), unless otherwise specified. Continuous variables analyzed by ANOVA; categorical variables analyzed by Pearson chi-square test or Fisher's exact test. P-values refer to no cancellation call vs. cancellation call. Particular refers to having a particular complaint such as cancer pain or back pain as compared to a nonspecific complaint. Zip code refers to average distance from pain clinic per participant's zip code.

Variable	Total no show n=668	No cancellation call n = 497	Cancellation call n = 171	p-value
Demographics				
Age	49.81 (11.71)	49.42 (11.70)	50.95 (11.71)	0.14
Female, N (%)	368 (55.09)	268 (53.92)	100 (58.48)	0.30
Particular, N (%)	311 (54.66)	208 (49.76)	103 (68.21)	<0.001
Race – Caucasian, N (%)	73 (11.76)	58 (12.53)	15 (9.49)	0.74
Black, N (%)	248 (39.94)	185 (39.96)	63 (39.87)	
Hispanic, N (%)	221 (35.59)	161 (34.77)	60 (37.97)	
Other race, N (%)	79 (12.72)	59 (12.74)	20 (12.66)	
English, N (%)	455 (73.27)	336 (72.57)	119 (75.32)	0.45
Spanish, N (%)	130 (20.93)	97 (20.95)	33 (20.89)	
Other language, N (%)	36 (5.80)	30 (6.48)	6 (3.80)	
Payment Type, N (%)				
Charity Care	189 (30.78)	141 (30.85)	48 (30.57)	0.70
Medicare	39 (6.35)	25 (5.47)	14 (8.92)	
Medicaid	261 (42.51)	196 (42.89)	65 (41.40)	
Private	20 (3.26)	15 (3.28)	5 (3.18)	
Self	13 (2.12)	11 (2.41)	2 (1.27)	
Unknown	92 (14.98)	69 (15.10)	23 (14.65)	
Employed, N (%)	59 (9.55)	44 (9.57)	15 (9.49)	1.00
Unemployed, N (%)	520 (84.14)	387 (84.13)	133 (84.18)	
Disability, N (%)	39 (6.31)	29 (6.30)	10 (6.33)	
Zip Code (miles), N (%)				
0–5	331 (53.22)	256 (55.29)	75 (47.17)	0.26
5–10	118 (18.97)	81(17.49)	37 (23.27)	
10–20	97 (15.59)	71 (15.33)	26 (16.35)	
20–30	26 (4.18)	21 (4.54)	5 (3.14)	
30	50 (8.04)	34 (7.34)	16 (10.06)	
Referring Physician, N (%)				
Primary Care	403 (66.83)	297 (65.71)	106 (70.20)	0.49
Neurosurgery	134 (22.22)	102 (22.57)	32 (21.19)	
Orthopedics	66 (10.95)	53 (11.73)	13 (8.61)	

Table 3

GEE Model for arrival vs. failure to attend

OR of patient characteristics predicting arrival at the pain clinic in our two marginal logistic regression models, (on the left using language or on the right race/ethnicity as demographic marker) are presented with confidence intervals and p-values. Time-dependent interaction terms were found between particular complaint and office visit number and procedure performed and office visit number.

Language Model (N=1298)				**Race Model (N=1297)**			
Variable	**Odds Ratio**	**95% CI**	**p-value**	**Variable**	**Odds Ratio**	**95% CI**	**p-value**
English language (reference)	1.00	N/A	N/A	Caucasian Race (reference)	1.00	N/A	N/A
Spanish language	0.74	0.61–0.91	0.004	Black Race	0.83	0.65–1.06	0.13
Other language	1.02	0.66–1.58	0.91	Hispanic Race	0.61	0.47–0.79	<0.001
				Other Race	0.60	0.45–0.79	<0.001
Age	1.00	1.00–1.01	0.16	Age	1.00	1.00–1.01	0.15
Female	0.91	0.78–1.06	0.21	Female	0.92	0.79–1.08	0.31
Unemployed	1.50	1.12–1.99	0.006	Unemployed	1.52	1.13–2.04	0.005
Disability	0.96	0.64–1.45	0.85	Disability	0.98	0.65–1.49	0.92
Five-ten miles from clinic	0.76	0.61–0.93	0.008	Five-ten miles from clinic	0.79	0.63–0.97	0.027
Ten-twenty miles from clinic	1.04	0.85–1.27	0.73	Ten-twenty miles from clinic	1.05	0.85–1.30	0.63
Twenty-thirty miles from clinic	1.01	0.76–1.36	0.93	Twenty-thirty miles from clinic	1.01	0.75–1.36	0.93
Thirty plus miles from clinic	0.88	0.68–1.13	0.31	Thirty plus miles from clinic	0.85	0.65–1.12	0.25
Office visit wave	1.12	1.05–2.73	0.001	Office visit wave	1.12	1.05–1.18	<0.001
Particular complaint	3.30	2.50–4.34	<0.001	Particular complaint	3.46	2.64–4.53	<0.001
Particular complaint-office visit wave interaction term	0.90	0.84–0.96	0.003	Particular complaint-office visit wave interaction term	0.90	0.85–0.96	0.001
Procedure performed	2.16	1.71–2.73	<0.001	Procedure performed	2.18	1.72–2.76	<0.001
Procedure performed-office visit wave interaction term	0.87	0.82–0.92	<0.001	Procedure performed-office visit wave interaction term	0.87	0.82–0.92	<0.001

Table 4

OR for time dependent variables in GEE Model for arrival vs. failure to attend

OR for time dependent variables over the course of 3 office visits showing increased OR for particular complaint and procedure performed for each additional office visit.

Language Model				**Race Model**			
Variable	**Visit 1**	**Visit 2**	**Visit 3**	**Variable**	**Visit 1**	**Visit 2**	**Visit 3**
Office visit wave	1.02	1.04	1.06	Office visit wave	1.07	1.15	1.24
Particular complaint	3.33	3.37	3.40	Particular complaint	3.48	3.50	3.52
Procedure performed	2.11	2.06	2.00	Procedure performed	2.12	2.06	2.00

Table 5

GEE Model subgroup analysis for cancellation call vs. no call

OR in our subgroup analysis for cancellation call vs. no call (comparing on the left using language versus on the right race/ethnicity as demographic marker) are presented with confidence intervals and p-values.

Language Model (N=924)				**Race Model (N=924)**			
Variable	**Odds Ratio**	**95% CI**	**p-value**	**Variable**	**Odds Ratio**	**95% CI**	**p-value**
English language (reference)	1.00	N/A	N/A	Caucasian Race (reference)	1.00	N/A	N/A
Spanish language	0.97	0.71–1.32	0.83	Black Race	0.78	0.53–1.15	0.21
Other language	0.45	0.20–1.01	0.054	Hispanic Race	0.80	0.55–1.18	0.27
				Other Race	0.69	0.43–1.11	0.12
Age	1.01	1.00–1.02	0.049	Age	1.01	1.00–1.02	0.050
Female	1.13	0.89–1.45	0.32	Female	1.15	0.90–1.46	0.28
Particular complaint	1.94	1.46–2.57	<0.001	Particular complaint	1.97	1.48–2.62	<0.001
Procedure performed	1.13	0.87–1.48	0.36	Procedure performed	1.13	0.87–1.48	0.36
Unemployed	0.82	0.56–1.22	0.33	Unemployed	0.83	0.56–1.23	0.34
Disability	0.75	0.41–1.37	0.35	Disability	0.75	0.41–1.37	0.34
Five-ten miles from clinic	1.38	1.00–1.91	0.048	Five-ten miles from clinic	1.36	0.93–1.90	0.12
Ten-twenty miles from clinic	1.39	0.99–1.95	0.054	Ten-twenty miles from clinic	0.95	0.57–1.60	0.85
Twenty-thirty miles from clinic	0.99	0.60–1.65	0.97	Twenty-thirty miles from clinic	0.95	0.57–1.60	0.85
Thirty plus miles from clinic	1.78	1.17–2.70	0.007	Thirty plus miles from clinic	1.68	1.07–2.63	0.023
Visit Number	1.02	0.99–1.06	0.25	Visit Number	1.02	0.99–1.06	0.22