HHS Public Access

Author manuscript

Am J Drug Alcohol Abuse. Author manuscript; available in PMC 2019 January 15.

Published in final edited form as:

Am J Drug Alcohol Abuse. 2018 ; 44(6): 660–667. doi:10.1080/00952990.2017.1417417.

Cigarette Smoking and Quit Attempts among Latinos in Substance Use Disorder Treatment

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Abstract

Background—Differences in tobacco use behaviors have been identified between Latinos and non-Latino whites in the general United States population. Little is known about cigarette smoking and quitting behaviors of Latinos in treatment for substance use disorders (SUD), who represent two major tobacco-vulnerable groups.

Objectives—To compare, in a national sample of persons enrolled in SUD treatment, demographic, drug use, and smoking and quitting prevalence and behaviors between Latinos and non-Latino whites.

Methods—We surveyed 777 SUD treatment clients, sampled from 24 clinics selected at random from the NIDA Clinical Trials Network (Latino client $n = 141$; 40% female). We then conducted univariate and multivariate analyses to identify correlates of smoking behaviors by Latino/non-Latino white ethnicity.

Results—Latinos' smoking prevalence resembled that of non-Latino whites (78.7% vs. 77.4%). In regression analyses, Latino smokers ($n = 111$) tended to smoke fewer cigarettes per day (CPD) than non-Latino white smokers ($n = 492$); were more often nondaily smokers and menthol smokers; more often reported a smoking quit attempt in the last year; and tended to report higher numbers of past-year quit attempts. Among Latino smokers, those with less education and those reporting opioids as their primary drug of use reported higher CPD.

Conclusions—Latinos in SUD treatment are at equally high risk of being current heavy smokers as compared to non-Latino whites in SUD treatment. At the same time, Latinos in SUD treatment exhibit ethnic-specific smoking and quitting behaviors that should be considered when designing smoking interventions for this group.

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Declaration of Interest

The authors have no conflicts of interest to declare.

Keywords

addiction; treatment; tobacco; Latino; cessation

INTRODUCTION

Tobacco use is a major health risk for persons with substance use disorders (SUDs). Clients in SUD treatment smoke at 3 to 4 times the rate of the U.S. general population, with prevalence rates of approximately 70% or higher (1). Additionally, persons in SUD treatment tend to smoke heavily and are less likely to quit successfully than the general population (2). Consequently, they are at significantly higher risk of death from tobacco-related causes than the general population (3, 4).

Latinos are another important tobacco disparity group. Although Latinos smoke at lower rates than non-Latino whites, they have disproportionately high rates of lung cancer death (5). Service providers may underestimate the severity of Latino smoking due to Latinos' greater likelihood of being light and intermittent smokers (LITS) (6). Previous research has shown that Latinos in the general population are less likely than non-Latino whites to receive tobacco cessation services including screening, counseling, and NRT (7, 8).

Although there is substantial research on ethnic differences in tobacco use among the general population, (8, 9) little is known about such differences within SUD treatment populations. Understanding ethnic variations in tobacco use and quit attempts within this high-prevalence population is critical for identifying potential disparities and informing the delivery of tobacco cessation services within SUD treatment programs.

Latino smokers in SUD treatment represent an "intersectional" population (10, 11). That is, they embody multiple identity characteristics—Latino/a, person in SUD recovery, perhaps low-income and/or immigrant—that interact with social-structural forces in different ways to influence their tobacco use and access to smoking cessation services. Based on research concerning Latinos' diminished access to SUD treatment (12, 13) and smoking cessation help (14, 15), Latino smokers in SUD treatment may be more likely to encounter barriers to cessation services due to lack of health insurance, limited access to primary care, limited English proficiency, and lack of information about available cessation resources. Even if available, tobacco cessation services may not be culturally or linguistically appropriate, particularly for recent immigrants (16).

To address service provision to Latinos in SUD treatment, more information is needed about their smoking and quitting prevalence and behaviors. The only published study to date on this population examined smoking status and substance use treatment outcomes among Spanish-speaking Latino clients receiving motivational enhancement therapy (MET) as part of a NIDA clinical trial (17). At a 16-week follow-up, smokers had lower rates of abstinence from nontobacco substances than non-smokers. Since the trial was not focused on tobacco use (18), trial participants were asked about smoking status, but not about smoking or quitting behaviors.

In a national sample of persons enrolled in SUD treatment, we compared demographic, drug use, and smoking and quitting prevalence and behaviors between Latinos and non-Latino whites. We tested three main hypotheses: first, that Latino clients would have lower smoking prevalence than non-Latino white clients (9); second, that Latino clients who smoked would exhibit behaviors similar to those documented in the general U.S. population [in comparison to non-Latino white clients, higher rates of light/nondaily smoking (6); less use of e-cigarettes (19); lower cigarettes per day, or CPD (20); more use of menthol (21); less use of nicotine replacement therapy, or NRT, and more quit attempts (22)]; and third, that demographic characteristics of Latino smokers would reflect those documented among the general U.S. Latino population [in comparison to Latino nonsmokers, more males, lower educational attainment (23)].

METHODS

Sampling Design

In a larger study of tobacco use among persons enrolled in substance use treatment, we developed a random sample of treatment programs involved in the National Institute on Drug Abuse (NIDA) Clinical Trials Network (CTN). Eligible for inclusion were 48 CTN-affiliated programs that a) were publicly-funded, b) had at least 60 active clients, and c) were able to assign a staff liaison to coordinate data collection with our research team. We excluded a) privately funded programs; b) adolescent programs; c) Veterans Administration (VA) programs (since they have specific tobacco-related policies that differ from non-VA programs); and d) programs based in hospital systems or criminal justice agencies that would require a separate IRB process. Our research plan was to enroll 25 programs, and we drew a stratified (by program type) random sample of 33 programs to allow for refusals (15 outpatient, 13 residential, and 5 methadone programs). Of these 33, 6 had discontinued their participation in the CTN, 2 programs declined to participate, and 1 was not necessary to meet our patient recruitment goal. The final sample included 24 programs (7 outpatient, 10 residential, 7 methadone) located in 14 states (CA, CT, FL, HI, NC, NY, OH, OR, PA, SC, SD, TX, WV, VA). It included at least 1 program from each of the 4 U.S. census regions (Northeast, Midwest, South, and West).

We did not collect data on the specific national/cultural backgrounds of Latino participants since the larger study was not focused on racial/ethnic comparisons. However, it is important to note the considerable variation among Latino populations in the regions where programs were located. The states in our sample with the largest percentages of Latinos in their populations were California (38%), Texas (38%), Florida (22.8%), and New York (18%) (24). In Northeastern states such as New York, Puerto Ricans account for up to one-third of the Latino population. In the South, Florida is somewhat of an anomaly since about one-third of its Latino population is of Cuban origin (Puerto Ricans and South Americans are other large Latino subgroups in Florida). Western states such as California and Texas are home to mostly Mexican-origin Latinos, although California also has a large population of Central Americans (24). Mexican-origin persons also predominate in the Latino populations of Midwestern states such as South Dakota (25).

Participants and Procedures

The research team visited each site between April and December 2015 (Year 2 of the study) and surveyed 1,122 clients (777 are included in this analysis based on Latino or non-Latino white ethnicity). Both smokers and non-smokers were eligible if they had been in treatment for at least 10 days, and if they were present in the program on the day(s) of the site visit. These criteria yielded a systematic sample in outpatient and methadone programs, and a census sample in residential programs. At the time of the survey, the total client capacity across the 24 programs was estimated (according to director report) at 6,801.

One staff member in each program coordinated the site visit and client recruitment with the research team. In residential programs, participants were recruited into multiple time slots during the day, in methadone programs clients were recruited during morning dosing hours, and in outpatient programs clients were recruited either at the beginning or end of group counseling sessions. The research team explained the study to clients and completed informed consent procedures. No record was made of persons who were not interested to participate, and all those who completed consent also completed the survey. Participants completed the surveys on iPads in groups of up to six, determined by the number of iPads the team had available. Surveys were provided in English as none of the participating programs offered bilingual services.

Site visits were completed in one day for residential and methadone clinics, where most clients are in the clinic daily. Site visits lasted 2-3 days in outpatient clinics, because most clients visit the clinic on weekly basis, and recruitment of up to 50 participants took more than one day. The number of participants recruited per clinic ranged from 28 to 53, with a median of 50. Each respondent received a $20 gift card, and each program received a $2,000 incentive after the site visit. All study procedures were approved by the University of California, San Francisco Institutional Review Board.

Measures

Items used in this analysis included demographic questions assessing age, gender, race/ethnicity, marital status, employment status, and education. Type of SUD treatment was categorized as outpatient, residential or methadone maintenance. Participants were also asked to identify their primary drug and how many weeks they had been in treatment.

Current smokers were defined as having smoked more than 100 cigarettes in their lifetime and also reporting being a current smoker. Current smokers reported number of cigarettes per day (CPD); number of serious quit attempts (for at least 24 hours) made in the past year; use of mentholated cigarettes; current use of electronic cigarettes (e-cigarettes); and lifetime use of nicotine replacement therapy (NRT: patch, gum, lozenge, inhaler, or nasal spray). Because e-cigarette use may be infrequent or experimental, we defined “current use” as having used e-cigarettes at least weekly over the past 30 days.

Data Analysis

First, using the full sample, we compared Latino (n=141) and non-Latino white (n=636) clients on demographic variables, SUD treatment variables (primary drug, program type,

number of weeks in treatment), and smoking status (current, former, or never smoker). Then, because subsequent analyses concerned the subset of current smokers only, we compared Latino smokers (n=111) and non-Latino white smokers (n=492) on the same set of variables named above, and compared these groups on smoking (CPD, non-daily smoking, menthol use, current use of electronic cigarettes) and quitting behaviors (any past-year quit attempts, number of past-year quit attempts, lifetime use of NRT products or other pharmaceutical quit aids). Statistical comparisons were done using t-tests for continuous variables and Chi-square tests/Fisher's exact tests for categorical variables.

Next, we conducted multivariate regression analyses to assess whether differences observed for Latino versus non-Latino white smokers in univariate analyses would persist after adjusting for other factors. Demographic and SUD treatment variables that were statistically significant at a 0.10 alpha level in the univariate analysis were controlled for in these multivariate regression models. Significant variables were gender, education, primary drug, program type, and time in treatment program. Because the data were collected from 24 clinics, the models also accounted for nesting participants within clinics. Missing data was low (less than 2%). The multivariate regression models used complete case analysis.

Last, we compared Latino smokers and Latino non-smokers to assess how these Latino subgroups may differ with respect to demographic, drug use, and treatment program characteristics. We also analyzed demographic, drug use, and program characteristics within the subgroup of Latino smokers. Statistical comparisons were done using t-tests for continuous variables and chi-square tests for categorical variables. All analyses were conducted using SAS version 9.3 (26).

RESULTS

Comparison of Latinos and non-Latino Whites in SUD Treatment

The left side of Table 1 displays results for univariate analyses comparing all clients (N=777) on demographic characteristics, primary drug, program type and time, and smoking status. With a mean age of 35.6 (SD=10.95), Latino participants (n=141) were younger (t= −2.1, df=216, p=0.037), included a higher proportion of males (Fisher's exact test p=0.017) and had lower educational attainment (χ^2=14.2, *df*=2, p<0.001) than non-Latino white participants (n=636). About 50% of non-Latino whites had completed at least some college, as compared to 35% of Latinos. Latino participants also differed from their non-Latino counterparts on primary drug of use, reporting higher rates of stimulants, cannabis and "other" drugs (e.g., barbiturates, hallucinogens), but lower rates of alcohol and opioids as the primary drug(s) for which they were receiving treatment (χ^2=50.4, *df*=4, p<0.0001). Higher percentages of Latinos were in residential (40.5%) or outpatient (34%) programs, while a higher percentage of non-Latino whites were in methadone programs (38.7%). Latino participants had spent less time in their treatment programs in comparison to non-Latinos at the time of data collection: 62.7 (SD=142.7) versus 91.3 (SD=158.8) weeks, respectively (t= −2.1, df=223.9, p=0.036). Treatment stays were relatively long due to the participation of clients from long-term residential and methadone programs. There were no differences between Latino and non-Latino participants in terms of marital status or employment status.

The bottom left of Table 1 shows smoking status for Latino versus non-Latino white clients. There was no difference in smoking status by ethnicity, such that 78.7% of Latinos versus 77.4% of non-Latino whites were current smokers.

Comparison of Latino and non-Latino White Smokers in SUD Treatment

The right side of Table 1 shows results for univariate analyses comparing Latino and non-Latino smokers (N=603) on demographic characteristics, primary drug, and program type and time. Latino smokers included higher proportions of males as compared to non-Latino white smokers (Fisher's exact test p=0.006). The two groups also differed on primary drug of use, such that more Latino smokers reported higher rates of stimulant, cannabis, and "other" drug use, while more non-Latino white smokers reported more alcohol and opioids (χ^2=41.1, df=4, p<0.0001). Again, a higher percentage of Latino smokers were in residential or outpatient programs as compared to non-Latino white smokers, 41.1% of whom were in methadone programs (χ^2=7.4, df=2, p=0.025). There were no differences between the two groups regarding age, education, marital status, or employment status.

Comparison of Latino and non-Latino white smokers on smoking and quitting variables are shown in Table 2. Latino smokers (n=111) smoked fewer cigarettes per day (CPD) (t=−5.4, df=176.4, p<0.0001), were more often non-daily smokers (χ^2=17.5, *df*=1,p<0.0001), smoked more menthol cigarettes (χ^2=29.3, *df*=1, p<0.0001); more often reported a quit attempt in the past year (χ^2=14.6, *df*=1, p<0.001); reported higher numbers of past-year quit attempts (t=2.3, df=123.3, p=0.021); more often reported current e-cigarette use (χ^2=5.1, *df*=1, p=0.023); and were less likely to report using NRT (χ^2=4.5, *df*=1, p=0.034) than non-Latino white smokers (n=492). There was no difference in use of other pharmaceutical aids between the two groups.

Results of multivariate regression models predicting specific smoking behaviors between Latino versus non-Latino smokers are summarized in Table 3. Multivariate analyses adjusted for demographics (gender, education), time in treatment program, program type, and primary drug of use, and controlled for nesting of participants within clinics. Following these analyses, Latinos remained significantly more likely than non-Latino whites to be menthol users (OR=3.35, 95% CI=2.35, 4.78), be nondaily smokers (OR=3.30, 95% CI=1.62, 6.71), and have attempted to quit smoking in the past year (OR=2.30, 95% CI=1.54, 3.43). In addition, Latinos are more likely to smoke less than non-Latino whites; the expected CPD for Latinos was 29% (95% CI= 20%, 37%) less than for non-Latino whites. Finally, Latinos were more likely to report higher numbers of past-year quit attempts (OR=1.79, 95% CI=1.20, 2.67).

Comparison of Latino smokers and nonsmokers

Next, we evaluated demographic, drug use, and program characteristics in relation to smoking prevalence among Latino smokers and Latino nonsmokers (data not shown). There were no significant differences in smoking prevalence among Latino clients by demographic characteristics (including gender and educational attainment, as hypothesized), primary drug of use, or program type.

Within-group comparison of Latino smokers

Finally, we evaluated demographic, drug use, and program characteristics associated with smoking variables (CPD, menthol use, nondaily smoking, quit attempts) among Latino smokers (data not shown). Latino smokers with less than a high school education reported higher CPD than Latino smokers with a high school education and higher [13.9 (SD=10.12) versus 9.7 (SD=6.44)] (t=2.1, df=36.4, p=0.040). Latino smokers in recovery from opioid use also reported higher CPD than Latino smokers who were *not* in recovery from opioid use [12.6 (SD=8.33) versus 9.5 (SD=7.12)] (t=2.1, df=87.4, p=0.041).

DISCUSSION

Ethnic differences in smoking and quitting behaviors may influence how ethnically diverse groups of smokers respond to smoking cessation interventions. Persons in treatment for substance use disorders (SUDs) have high, recalcitrant smoking rates and may require tailored cessation interventions to address their needs during treatment. In this study, we examined ethnic differences in smoking among persons in SUD treatment. We found that Latinos exhibited some smoking-related characteristics previously associated with SUD treatment populations, and others previously associated with Latinos in the general U.S. population.

In our comparison of all Latino clients versus all non-Latino clients, Latinos were significantly younger and had lower educational attainment. In addition to mirroring patterns in the general U.S. population (20), similar findings also surfaced in a previous study of demographic differences between Latino and non-Latino white SUD treatment clients (27). Latinos had significantly lower rates of alcohol and opioids as primary drug, but higher rates of stimulants and “other” drugs. These findings differ from previous research which found higher rates of primary opioid use among Latino as compared to non-Latino white SUD treatment clients (27, 28). However, our findings are aligned with research reporting lower rates of alcohol as primary drug among Latino SUD treatment clients versus clients from other ethnic groups (12).

Contrary to expectations, there was no difference in smoking prevalence between Latino and non-Latino white study participants. This finding contrasts with Latinos’ lower smoking prevalence in the general population (29), and reflects higher smoking rates among persons in SUD treatment as reported by previous studies (1).

Second, we compared smoking behaviors between Latino and non-Latino white current smokers in the sample. Latino smokers reported several smoking behaviors associated with Latino smokers in the general population, including more nondaily smoking, more past-year quit attempts, and lower CPD. Although any level of smoking poses health risks (30), these behaviors might be considered “protective.” However, Latino smokers in our study were still heavy smokers, with a mean CPD of 10.9. They were also more likely than non-Latino white smokers to use mentholated cigarettes, which may decrease the odds of successfully quitting (21, 31).

Our final analyses focused on Latino SUD treatment clients only. We first compared Latino smokers to Latino nonsmokers and found no significant differences with regard to any demographic characteristics, including two characteristics associated with higher smoking prevalence within the U.S. Latino population: male gender (9) and lower educational attainment (23). In this case, the high smoking prevalence in this Latino SUD treatment sample (78.7%) may have eclipsed sociodemographic nuances found among U.S. Latino smokers overall.

We then examined associations between smoking behaviors and demographic characteristics within the subset of Latino smokers. We found higher CPD among Latino smokers in recovery from opioid use, a finding which has surfaced in other research on smoking among persons in SUD treatment, irrespective of ethnicity (32). We also identified higher CPD among Latino smokers with less education. While previous research has identified a direct association between education and CPD for non-Latino white smokers in the general U.S. population, the association is less clear for Latino smokers (6).

The generalizability of our findings is limited by the non-random nature of the client sample and the fact that all programs were drawn from the NIDA Clinical Trials Network. Previous research has found that opioid treatment programs in the CTN are more likely than non-CTN opioid treatment programs to be non-profit, have more employees and clients, and to have clients with higher rates of Medicaid use, criminal justice involvement, and unemployment (33). Another study found that clients enrolled in CTN clinical trials were more likely to have full-time employment and higher educational attainment (34). Further, we did not assess acculturation or immigration/nativity, which may be associated with smoking prevalence and CPD (35), quit attempts (36), and nicotine dependence (37) in Latinos, since these variables were not part of the original study goals and thus were not included on the survey. However, all surveys were completed in English, and responding in English to English-language data collection instruments has been linked to high acculturation (38). High acculturation, in turn, has been linked to greater smoking prevalence (23). It also was not possible to explore patterns among ethnic subgroups (e.g., Mexican American, Puerto Rican) due to small sample sizes, although differences in smoking prevalence and behaviors have been documented among Latino subgroups in the general population (20, 39). Since we were unable to collect data on clients who declined to participate, we cannot draw conclusions about the representativeness of our sample at the program level. Participants also reported being in their programs for long periods of time, which may affect the generalizability of our findings. Despite these limitations, this study provides innovative data on a hard-to-reach population that is largely invisible in both research and policy. To our knowledge, it is the first study of smoking and quitting behaviors among English-speaking Latinos in SUD treatment.

Overall, our findings suggest the need for more research into the smoking cessation needs of Latinos in SUD treatment. Although Latino smokers might be considered lower-risk for tobacco-related health problems based on their tendency toward light(er)/intermittent smoking and more quit attempts, this study suggests that Latinos in SUD treatment are at equally high risk of being current heavy smokers. At the same time, they exhibit ethnic-specific smoking and quitting behaviors that should be considered when designing smoking

interventions for this group. For instance, cessation interventions that focus on non-daily smoking, product preferences such as menthol cigarettes, and encouraging the use of NRT could be of particular benefit to Latinos.

Ethnic minorities and persons with SUDs are treated within health policy and scientific literature as distinct groups with specific risk factors for tobacco use and related disease, but in everyday life individuals occupy more than one social category. Thus, tobacco cessation efforts must confront multiple sources of risk and inequality to reach intersectional populations such as Latinos with SUDs. The findings presented here not only attest to the complexity of such efforts, but also signal their necessity.

Acknowledgments

The authors would like to thank the NIDA (National Institutes on Drug Abuse) Clinical Trials Network for assistance with our sample, as well as the treatment programs that participated in this study.

Funding

This work was supported by the National Institute on Drug Abuse (P50 DA 009253), and by a joint grant from the National Institute on Drug Abuse and the Food and Drug Administration Center for Tobacco Products (R01 DA 036066). Dr. Gubner was also supported by a Postdoctoral Training Grant from the National Institute on Drug Abuse (T32 DA007250). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or the Food and Drug Administration.

References

1. Guydish J, Passalacqua E, Tajima B, Chan M, Chun J, Bostrom A. Smoking prevalence in addiction treatment: a review. Nicotine Tob Res. 2011; 13(6):401–11. [PubMed: 21464202]
2. Weinberger AH, Pilver CE, Hoff RA, Mazure CM, McKee SA. Changes in smoking for adults with and without alcohol and drug use disorders: longitudinal evaluation in the US population. Am J Drug Alcohol Abuse. 2013; 39(3):186–93. [PubMed: 23721534]
3. Callaghan RC, Gatley JM, Sykes J, Taylor L. The prominence of smoking-related mortality among individuals with alcohol- or drug-use disorders. Drug Alcohol Rev. 2016:n/a–n/a.
4. Bandiera FC, Anteneh B, Le T, Delucchi K, Guydish J. Tobacco-related mortality among persons with mental health and substance abuse problems. PLoS One. 2015; 10(3):e0120581. [PubMed: 25807109]
5. American Cancer Society. Cancer Facts & Figures for Hispanics/Latinos 2015–20172015. Nov 23, 2016. Available from: http://www.cancer.org/acs/groups/content/@research/documents/document/acspc-046405.pdf
6. Trinidad DR, Perez-Stable EJ, Emery SL, White MM, Grana RA, Messer KS. Intermittent and light daily smoking across racial/ethnic groups in the United States. Nicotine Tob Res. 2009; 11(2):203–10. [PubMed: 19246433]
7. Sonnenfeld N, Schappert SM, Lin SX. Racial and Ethnic Differences in Delivery of Tobacco-Cessation Services. Am J Prev Med. 2009; 36(1):21–8. [PubMed: 18977111]
8. Trinidad DR, Perez-Stable EJ, White MM, Emery SL, Messer K. A nationwide analysis of US racial/ethnic disparities in smoking behaviors, smoking cessation, and cessation-related factors. Am J Public Health. 2011; 101(4):699–706. [PubMed: 21330593]
9. Martell BN, Garrett BE, Caraballo RS. Disparities in Adult Cigarette Smoking — United States, 2002–2005 and 2010–2013. Morb Mortal Wkly Rep. 2016; 65(30):753–8.
10. Bowleg L. The Problem With the Phrase Women and Minorities: Intersectionality—an Important Theoretical Framework for Public Health. Am J Public Health. 2012; 102(7):1267–73. [PubMed: 22594719]

11. Viruell-Fuentes EA, Miranda PY, Abdulrahim S. More than culture: Structural racism, intersectionality theory, and immigrant health. Soc Sci Med. 2012; 75(12):2099–106. [PubMed: 22386617]
12. Guerrero EG, Marsh JC, Duan L, Oh C, Perron B, Lee B. Disparities in Completion of Substance Abuse Treatment between and within Racial and Ethnic Groups. Health Serv Res. 2013; 48(4): 1450–67. [PubMed: 23350871]
13. Guerrero EG, Marsh JC, Khachikian T, Amaro H, Vega WA. Disparities in Latino substance use, service use, and treatment: Implications for culturally and evidence-based interventions under health care reform. Drug Alcohol Depend. 2013; 133(3):805–13. [PubMed: 23953657]
14. Lopez-Quintero C, Crum RM, Neumark YD. Racial/ethnic disparities in report of physician-provided smoking cessation advice: analysis of the 2000 National Health Interview Survey. Am J Public Health. 2006; 96(12):2235–9. [PubMed: 16809587]
15. Fu SS, Kodl MM, Joseph AM, Hatsukami DK, Johnson EO, Breslau N, et al. Racial/Ethnic disparities in the use of nicotine replacement therapy and quit ratios in lifetime smokers ages 25 to 44 years. Cancer Epidemiol Biomarkers Prev. 2008; 17(7):1640–7. [PubMed: 18583471]
16. Marin G, Marin BV, Perez-Stable EJ, Sabogal F, Otero-Sabogal R. Changes in information as a function of a culturally appropriate smoking cessation community intervention for Hispanics. Am J Community Psychol. 1990; 18(6):847–64. [PubMed: 2091458]
17. de Dios MA, Cano MA, Childress S, Vaughan E, Cerna Y, Niaura R. Smoking Status and Substance Use Treatment Outcomes Among Spanish Speakers Enrolled in Substance Abuse Treatment. J Clin Psychol. 2016
18. Carroll KM, Martino S, Ball SA, Nich C, Frankforter T, Anez LM, et al. A multisite randomized effectiveness trial of motivational enhancement therapy for Spanish-speaking substance users. Journal of consulting and clinical psychology. 2009; 77(5):993–9. [PubMed: 19803579]
19. Syamlal G, Jamal A, King BA, Mazurek JM. Electronic cigarette use among working adults—United States, 2014. MMWR Morbidity and mortality weekly report. 2016; 65:557–61. [PubMed: 27281058]
20. Rodriquez EJ, Oh SS, Pérez-Stable EJ, Schroeder SA. Changes in Smoking Intensity Over Time by Birth Cohort and by Latino National Background, 1997–2014. Nicotine Tob Res. 2016; 18(12): 2225–33. [PubMed: 27613930]
21. Trinidad DR, Perez-Stable EJ, Messer K, White MM, Pierce JP. Menthol cigarettes and smoking cessation among racial/ethnic groups in the United States. Addiction. 2010; 105(Suppl 1):84–94. [PubMed: 21059139]
22. Levinson AH, Pérez-Stable EJ, Espinoza P, Flores ET, Byers TE. Latinos report less use of pharmaceutical aids when trying to quit smoking. Am J Prev Med. 2004; 26(2):105–11. [PubMed: 14751320]
23. Kaplan RC, Bangdiwala SI, Barnhart JM, Castañeda SF, Gellman MD, Lee DJ, et al. Smoking Among U.S. Hispanic/Latino Adults: The Hispanic Community Health Study/Study of Latinos. Am J Prev Med. 2014; 46(5):496–506. [PubMed: 24745640]
24. Brown A, Lopez MH. Mapping the Latino population by state, county, and city. Washington, D.C.: Pew Research Center; 2013. [updated August 29, 2013. Available from: http://www.pewhispanic.org/2013/08/29/mapping-the-latino-population-by-state-county-and-city/
25. United States Census Bureau. South Dakota, Hispanic or Latino by Type 2010. [updated November 6, 2017. Available from: https://factfinder.census.gov
26. Institute SAS. SAS Version 9.3. Cary, N.C: SAS Institute; 2011.
27. Reif S, Horgan CM, Ritter GA. Hispanics in Specialty Treatment for Substance Use Disorders. J Drug Issues. 2008; 38(1):311–33.
28. Bluthenthal RN, Jacobson JO, Robinson PL. Are Racial Disparities in Alcohol Treatment Completion Associated With Racial Differences in Treatment Modality Entry? Comparison of Outpatient Treatment and Residential Treatment in Los Angeles County, 1998 to 2000. Alcohol Clin Exp Res. 2007; 31(11):1920–6. [PubMed: 17908265]
29. Jamal A, King BA, Neff LJ, Whitmill J, Babb SD, Graffunder CM. Current Cigarette Smoking Among Adults — United States, 2005–2015. Morb Mortal Wkly Rep. 2016; 65(44):1205–44.

30. Bjartveit K, Tverdal A. Health consequences of smoking 1-4 cigarettes per day. Tob Control. 2005; 14(5):315–20. [PubMed: 16183982]

31. Gandhi KK, Foulds J, Steinberg MB, Lu SE, Williams JM. Lower quit rates among African American and Latino menthol cigarette smokers at a tobacco treatment clinic. Int J Clin Pract. 2009; 63(3):360–7. [PubMed: 19222622]

32. Pagano A, Guydish J, Le T, Tajima B, Passalacqua E, Soto-Nevarez A, et al. Smoking Behaviors and Attitudes Among Clients and Staff at New York Addiction Treatment Programs Following a Smoking Ban: Findings After 5 Years. Nicotine Tob Res. 2016; 18(5):1274–81. [PubMed: 26014456]

33. Ducharme LJ, Roman PM. Opioid treatment programs in the Clinical Trials Network: Representativeness and buprenorphine adoption. J Subst Abuse Treat. 2009; 37(1):90–4. [PubMed: 19004597]

34. Susukida R, Crum RM, Stuart EA, Ebnesajjad C, Mojtabai R. Assessing sample representativeness in randomized controlled trials: application to the National Institute of Drug Abuse Clinical Trials Network. Addiction. 2016; 111(7):1226–34. [PubMed: 26825855]

35. Ackerson LK, Viswanath K. Communication inequalities, social determinants, and intermittent smoking in the 2003 Health Information National Trends Survey. Prev Chronic Dis. 2009; 6(2):A40. [PubMed: 19288983]

36. Gundersen DA, Echeverria SE, Lewis MJ, Giovino GA, Ohman-Strickland P, Delnevo CD. Heterogeneity in past year cigarette smoking quit attempts among Latinos. Journal of Environmental Public Health. 2012; 2012:378165. [PubMed: 22675373]

37. Castro Y, Businelle MS, Correa-Fernandez V, Kendzor DE, Mazas CA, Cofta-Woerpel L, et al. Associations between indicators of acculturation and tobacco dependence among Spanish-speaking Latino smokers. Addict Behav. 2012; 37(10):1101–8. [PubMed: 22688345]

38. Lee S, Nguyen HA, Tsui J. Interview Language: A Proxy Measure for Acculturation Among Asian Americans in a Population-Based Survey. Journal of Immigrant and Minority Health. 2011; 13(2): 244–52. [PubMed: 19639411]

39. Blanco L, Garcia R, Perez-Stable EJ, White MM, Messer K, Pierce JP, et al. National trends in smoking behaviors among Mexican, Puerto Rican, and Cuban men and women in the United States. Am J Public Health. 2014; 104(5):896–903. [PubMed: 24625159]

Table 1

Demographic characteristics, primary drug, treatment program time & type, and smoking status for Latino and Non-Latino White clients

	n (%)/mean (std)					
	All clients (N=777)			Smokers (N=603)		
	Latino (n=141)	Non-Latino White (n=636)	p value	Latino (n=111)	Non-Latino White (n=492)	p value
Age	35.6 (10.95)	37.8 (11.6)	**0.037**	35.5 (10.96)	36.7 (11.02)	0.275
Gender			**0.017**			**0.006**
Male	82 (58.2%)	317 (49.8%)		68 (61.3%)	243 (49.4%)	
Female	57 (40.4%)	318 (50.0%)		42 (37.8%)	249 (50.6%)	
Other	2 (1.4%)	1 (0.2%)		1 (0.9%)	0	
Education			**<0.001**			0.090
< HS/GED	39 (27.9%)	107 (16.9%)		29 (26.4%)	97 (19.8%)	
HS/GED	52 (37.1%)	205 (32.3%)		42 (38.2%)	166 (33.8%)	
> HS/GED	49 (35.0%)	323 (50.9%)		39 (35.5%)	228 (46.4%)	
Marital status			0.098			0.235
Married	12 (8.5%)	100 (15.7%)		8 (7.2%)	64 (13.0%)	
Divorced/Separated/Widowed	38 (27.0%)	182 (28.6%)		27 (24.3%)	137 (27.9%)	
Not married but in a long-term relationship	34 (24.1%)	120 (18.9%)		26 (23.4%)	100 (20.3%)	
Never married	57 (40.4%)	234 (36.8%)		50 (45.1%)	191 (38.8%)	
Currently employed	36 (25.5%)	192 (30.2%)	0.272	26 (23.4%)	132 (26.8%)	0.461
Primary drug			**<0.0001**			**<0.0001**
Alcohol	19 (13.6%)	137 (21.5%)		16 (14.6%)	94 (19.1%)	
Stimulants	32 (22.9%)	83 (13.1%)		22 (20.0%)	70 (14.2%)	
Opioids	56 (40.0%)	371 (58.3%)		46 (41.8%)	300 (61.0%)	
Cannabis	18 (12.9%)	20 (3.1%)		13 (11.8%)	13 (2.6%)	
Other	15 (10.7%)	25 (3.9%)		13 (11.8%)	15 (3.1%)	
Program type			**0.013**			**0.025**
Residential	57 (40.4%)	211 (33.2%)		45 (40.5%)	178 (36.2%)	
Methadone	36 (25.5%)	246 (38.7%)		31 (27.9%)	202 (41.1%)	
Outpatient	48 (34.0%)	179 (28.1%)		35 (31.5%)	112 (22.8%)	

	n (%)/mean (std)					
	All clients (N=777)			Smokers (N=603)		
	Latino (n=141)	Non-Latino White (n=636)	p value	Latino (n=111)	Non-Latino White (n=492)	p value
No. of weeks in the program	62.7 (142.7)	91.3 (158.8)	**0.036**	65.1 (146.1)	97.3 (167.3)	**0.044**
Smoking status			0.335			
Current smokers	111 (78.7%)	492 (77.4%)		—	—	
Former smokers	22 (15.6%)	85 (13.4%)		—	—	
Never smokers	8 (5.7%)	59 (9.3%)		—	—	

Table 2

Smoking rates and smoking behaviors for Latino and non-Latino White smokers

	n (%)/mean (std)		
	Latino	**Non-Latino White**	**p value**
Current smokers (N=603)	***n=111***	***n=492***	
CPD	10.9 (7.85)	15.5 (8.70)	**<0.0001**
Non-daily smoker	23 (20.7%)	37 (7.5%)	**<0.0001**
Menthol user	78 (70.3%)	206 (41.9%)	**<0.0001**
Any quit attempts/past year	67 (60.4%)	199 (40.5%)	**<0.001**
Ns of quit attempts/past year	4.7 (11.45)	2.1 (5.85)	**0.021**
E-cigarette use	13 (11.7%)	104 (21.1%)	**0.023**
Used any NRT products to help quitting	47 (43.9%)	270 (55.2%)	**0.034**
Used other pharmaceutical aids to help quitting	14 (12.8%)	58 (12.3%)	0.886

Table 3

Comparison of smoking behaviors between Latino smokers and Non-Latino White smokers.[1]

	OR (95% CI) Latino vs. Non-Latino White	**p**
Menthol user	3.35 (2.35, 4.78)	**<0.0001**
Non-daily smoker	3.30 (1.62, 6.71)	**0.001**
Any quit attempts/past year	2.30 (1.54, 3.43)	**<0.0001**
E-cigarette use	0.52 (0.27, 1.01)	0.052
Used any NRT products to help quitting	0.73 (0.42, 1.26)	0.255
	Mean ratio (95% CI) Latino vs. Non-Latino White	
CPD	0.71 (0.63, 0.80)	**<0.0001**
Ns of quit attempts/past year	1.79 (1.20, 2.67)	**0.004**

[1]Adjusted for demographics (gender, education), primary drug used, time in treatment program, and treatment program type; and also controlled for nesting of participants within clinics.