Socioeconomic and drug use determinants of smoking status in a Canadian urban adult population of black African descent

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Abstract

Our aim was to examine the influence that socioeconomics and drug use had on current smokers ($n=137$) and nonsmokers ($n=143$) from an urban adult population of black African descent. Participants were a median of 33 years (range 20–59). Smokers consumed a median of 8 cigarettes per day (range 0–35). Interestingly, 86% smoked <15 cigarettes per day and only 8% smoked menthol cigarettes. Socioeconomic and drug use variables that were significantly associated with smoking status in univariate analyses were included in a multiple logistic regression model that controlled for gender and age. Compared to nonsmokers, smokers were less likely to be university educated (adjusted odds ratio (AOR)=0.08 [95% CI: 0.02–0.43]), more likely to be divorced/separated/widowed (AOR=10.3 [2.8–37.6]), more likely to be current alcohol users (AOR=3.5 [1.8–7.0]) and more likely to be current marijuana users (AOR=7.1 [3.5–14.2]). Unexpectedly, household income and employment status were not associated with smoking status. Among current alcohol users, smokers consumed three times the number of drinks per month compared to nonsmokers (median 12 vs. 4, respectively; $P<0.001$). Among current marijuana users, smokers consumed over five times the number of joints per month compared to nonsmokers (median 22 vs. 4, respectively; $P<0.001$). Overall, lower education, divorce, alcohol and marijuana use were significantly associated with increased likelihood of smoking among this population.

Keywords

black African descent; smoking; socioeconomics; drug use

INTRODUCTION

Despite smoking substantially fewer cigarettes per day (Office of Applied Studies [OAS], 2006), African American smokers are at an increased risk of tobacco-related morbidity and mortality compared to other ethnoracial groups (Haiman et al., 2006; U.S. Department of Health and Human Services [USDHHS], 1998). An extensive body of literature describes

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Possible conflicts of interest:

Drs. RF Tyndale and EM Sellers hold shares in Nicogen Research Inc., a company focused on novel smoking cessation treatment approaches. None of the data contained in this manuscript alters or improves any commercial aspect of Nicogen and no Nicogen funds were used.

distinctive patterns of smoking initiation (Kandel, Kiros, Schaffran, & Hu, 2004; White, Nagin, Replogle, & Stouthamer-Loeber, 2004), maintenance (Giovino et al., 1994; Kabat, Morabia, & Wynder, 1991) and cessation (Murray, Connett, Buist, Gerald, & Eichenhorn, 2001) between ethnoracial groups. Compared to European Americans, African Americans start smoking later in life (Trinidad, Gilpin, Lee, & Pierce, 2004); smoke fewer cigarettes a day (OAS, 2006); tend to choose brands higher in nicotine and tar (Hahn, Folsom, Sprafka, & Norsted, 1990; Wagenknecht et al., 1990); and are less likely to successfully quit (Murray et al., 2001; Wagenknecht et al., 1998) despite strong motivation to stop smoking (Pederson, Ahluwalia, Harris, & McGrady, 2000; Royce, Hymowitz, Corbett, Hartwell, & Orlandi, 1993). Nevertheless, there is a paucity of research regarding the determinants of smoking status among adult African Americans. Moreover, there is little research regarding smoking etiology, behaviors and determinants in populations of black African descent residing in Canada. Thus, the aim of this manuscript is to report interesting observations from secondary analyses examining smoking determinants in Canadian current smokers and nonsmokers of black African descent. Notwithstanding cultural differences, findings will be discussed with reference to the literature available for other population of black African descent, namely African Americans, Haitian blacks, Caribbean blacks and US born blacks. We are conscious of the ethnic diversity and consequently the limitations of the descriptor 'of black African descent' for the population under investigation, however our hope is that the findings reported here will generate the impetus for some large-scale Canadian based studies.

We expected that the socioeconomic dimensions, the prevalence of drug use and the level of drug use that are typically associated with smoking status would be somewhat different in this population for two reasons. First, the distinctive patterns of smoking behaviors and disease risk across ethnoracial groups suggest differences in social, environmental and/or biological factors. Second, the determinants of smoking status are typically construed from predominately European American multiethnic study populations thus limiting the generalizability of findings to other ethnoracial groups. Specifically, we examined the differences between smokers and nonsmokers in the prevalence and levels of alcohol and marijuana use as well as the use of other licit and illicit drugs; and whether the determinants of smoking status (i.e. education, income, employment, marital status, number of dependents, acculturation, alcohol and marijuana use) were applicable to this population.

METHODS

Overview

We conducted a case-control study in current smokers (≥ 100 cigarettes, lifetime and currently smoking at least five of seven days) and nonsmokers (1 to 99 cigarettes, lifetime) from a community-based metropolitan population of black African descent (n=280). Nonsmokers had baseline breath CO levels <10 ppm (Mwenifumbo, Sellers, & Tyndale, 2007). Participants were 47% male and 49% smokers. There were 77 smoker men, 60 smoker women, 54 nonsmoker men and 89 nonsmoker women. Participants were a median of 33 years of age (range 20–59). The University of Toronto ethics board approved the

protocol and the Institutional Review Board Services (Toronto, Canada) approved and monitored the study.

Study Recruitment

Participants were recruited primarily for involvement in a pharmacokinetic/pharmacogenetic study where they were administered oral nicotine. Details of the pharmacokinetic analyses are described elsewhere (Mwenifumbo et al., 2007). Participants were from a sample of unrelated healthy volunteers recruited by advertisements, radio announcements and posters that were targeted to individuals of African or Black Caribbean heritage. Recruitment initially targeted nonsmokers and smokers who averaged at least 10 cigarettes per day. However, this requirement served to be problematic and consequently recruitment was opened to all smokers who smoked at least five days of seven. Qualified subjects were: men and non-pregnant women (18–60 years of age); either a current smoker or a tried nonsmoker; at least three grandparents of black African descent; no known contraindications to the administration of oral nicotine; no current use of any prescription or non-prescription medication thought to induce/inhibit hepatic enzymes; good general health and medical history; capacity to give written informed consent; and willingness to abide by the rules of the study. Participants received 100 Canadian dollars in compensation for their time.

Questionnaire

All participants were interviewed using the Pharmacogenetics Drug History Questionnaire - a standardized drug history questionnaire used to acquire information on demographics, ethnic admixture, drug use and drug dependency as assessed by the Diagnostics and Statistical Manual fourth edition (DSM-IV) (Schoedel, Hoffmann, Rao, Sellers, & Tyndale, 2004).

Data analysis

The Chi-square test was used to examine differences in the descriptive variables between smokers and nonsmokers. Spearman's coefficient was used to measure the strength of correlative relationships. Mann-Whitney and Kruskal-Wallis were used to examine difference between groups. Univariate logistic regression analyses were used to identify socioeconomic and psychoactive substance use factors associated with smoking status. Factors significantly associated with smoking status in univariate analyses, providing unadjusted odds ratios (UOR), were included in the multiple logistic regression model, which provided adjusted odds ratios (AOR). Statistical analyses were carried out using SPSS software version 11.0.4 for Macintosh.

RESULTS

Smoking Status

The majority of smokers were light cigarette consumers reporting a median of eight cigarettes per day (range 0–35). Overall, 74% of smokers smoked 10 cigarettes per day and 86% smoked <15 cigarettes per day. Among smokers, the median duration of regular smoking was 15 years (range 3–38) and 8% smoked menthol cigarettes.

Socioeconomics

Table 1 shows the descriptive statistics for the total sample and by smoking status. The proportion of smokers versus nonsmokers was higher at the lower levels of education and the proportion of smokers that did not finish high school was over five times that of nonsmokers. The distribution of marital status was significantly different between smokers and nonsmokers and the proportion of smokers who were divorced/separated/widowed was over five times that of the nonsmokers. A slightly greater proportion of smokers were born in Canada than not and more smokers had lived in Canada more than 10 years. Household income level, employment status and number of dependents were not different between smokers and nonsmokers.

Drug use

Both alcohol and marijuana use patterns were significantly different between smokers and nonsmokers. As the level of alcohol or marijuana use increased the proportion of smokers versus nonsmokers became greater (Table 1). Among all study participants, other licit and illicit drug use was relatively low; still a greater proportion of smokers had ever-tried other licit and illicit drugs compared to nonsmokers (Table 1).

Multivariate logistic regression analyses

Table 2 shows both the univariate and the multiple logistic regression analyses of the demographic variables and smoking status. From the multiple logistic regression model, compared to nonsmokers, smokers were much less likely to have completed, college (AOR=0.08) or university (AOR=0.08) rather than having not completed high school. Compared to nonsmokers, smokers were substantially more likely to be divorced/separated/widowed (AOR=10.3); to be current alcohol users (AOR=3.5); and to be current marijuana users (AOR=7.1). Household income, employment status and number of dependents did not differ between smokers and nonsmokers. Neither being born in Canada nor living in Canada greater than ten years was significant in the final model. Of note, the odds ratio for most variables did not change substantially between univariate and multivariate analyses.

Alcohol and marijuana use consumption

Table 3 shows the daily, weekly and monthly median consumption of alcohol and marijuana for current users, by smoking status. Smokers who were current alcohol users were heavier drinkers and consumed three times the number of drinks per month than nonsmokers. Although smokers drank more, the number of drinks consumed per day, week and month did not correlate with the cigarettes per day, week and month (Spearman's $\rho=0.186, 0.162$ and $0.075, P=0.05, 0.92$ and $0.44, n=109$). Smokers who were current marijuana users consumed over five times the number of joints per month compared to nonsmokers. Although smokers used more marijuana, the number of joints consumed per day, week and month did not correlate with the cigarettes per day, week and month (Spearman's $\rho=0.107, 0.138$ and $0.104, P=0.35, 0.22$ and $0.36, n=80$).

DISCUSSION

This study investigated the influence of several key socioeconomic dimensions and drug use variables on smoking status for an urban population of black African descent. We found that lower education, divorce, alcohol and marijuana use were significantly associated with increased likelihood of smoking. In addition, both the prevalence and consumption levels of alcohol, marijuana and other drug use were significantly greater in smokers versus nonsmokers. The majority of African Americans smokers are light smokers (Caraballo et al., 1998; Giovino et al., 1994). Consistent with this, the participants in this study, although not recruited as such, were predominately light smokers. This is of particular interest because the rate of nicotine metabolism has been shown to influence levels of nicotine consumption (Benowitz & Jacob P 3rd, 1985). CYP2A6 is the human hepatic enzyme responsible for the majority of nicotine's metabolic inactivation (Messina, Tyndale, & Sellers, 1996). We and others have found that slower metabolism and/or CYP2A6 activity is associated with lower cigarette consumption (Mwenifumbo et al., 2007). African Americans have slower nicotine metabolism compared to European Americans (Benowitz et al., 1999). Together these findings suggest that metabolic rates may be contributing to the lower cigarette consumption in populations of black African descent. Of note, only 8% of the smokers in this population used menthol cigarettes in contrast to the three of every four African American smokers who prefer menthol (USDHHS, 1998).

Education is the socioeconomic dimension that is most robustly associated with smoking behaviors (Pierce, Fiore, Novotny, Hatziaandreu, & Davis, 1989; Zhu, Giovino, Mowery, & Eriksen, 1996). However, it has been suggested that this relationship is weaker among populations of Haitian-, Caribbean-, & US born blacks and African Americans (Kiefe et al., 2001; Taylor, Kerner, Gold, & Mandelblatt, 1997) and the predominance of European Americans in many study populations limits the generalizability of findings to other ethnic groups (Winkleby, Jatulis, Frank, & Fortmann, 1992). Our data strongly suggests that a substantial association of education with smoking status exists in this population.

Despite typically being associated with smoking status, both household income and employment status were similar between the smokers and nonsmokers of this sample. Generally there is an inverse relationship between smoking prevalence and income level (Rock et al., 2005). Moreover, low income has been found to be a powerful determinant of smoking initiation among African American males (Kiefe et al., 2001). The lack of association between smoking and income in this study was somewhat unexpected and may be region specific, as there is a the distinct distribution of social and economic resources in Canada that may blunt the effects of income inequality (Ross et al., 2000). Being unemployed as a young adult is a risk factor for being an adult smoker (Hammarstrom & Janlert, 2003). Moreover, the unemployed have a greater likelihood of being current smokers, even when other socioeconomic variables (e.g. education) are controlled (Zhu et al., 1996). However, we found that employment was not associated with smoking in this population.

Smokers have a substantially increased risk of divorce (Doherty & Doherty, 1998). Two studies, specifically in populations of Haitian-, Caribbean-, & US born blacks and African

Americans, found that being married/cohabitation does not lessen the odds of being a smoker (Hu, Davies, & Kandel, 2006; Taylor et al., 1997). However, the results of these studies may be difficult to interpret because one was in young adults exclusively (Hu et al., 2006) and neither study had a specific group for divorced participants. Our data indicate that persons who were divorced/separated/widowed were more likely to be smokers. The socioeconomic dimensions of education, income, employment and marital status are intrinsically related. Although related, these variables were not redundant as they contributed, or not, independently to the likelihood of being a smoker.

The relationship between cigarettes and alcohol is particularly important for a number of reasons. For instance, alcohol use has been associated with increased likelihood of being a smoker in an adult populations of Haitian-, Caribbean-, and US born blacks (Taylor et al., 1997), is associated with a decreased likelihood of quitting smoking (Hyland et al., 2004; Osler, Prescott, Godtfredsen, Hein, & Schnohr, 1999) and both alcohol and cigarettes have been clearly linked to premature disability and death (USDHHS, 1994). The prevalence of regular drinking in the smokers and the nonsmokers was similar to the 79% of all Canadians that were current past year drinkers (Adlaf, Begin, & Sawka, 2005). Compared to nonsmokers, smokers in this sample were about three times more likely to be current users of alcohol, consistent with one other study in an adult population of Haitian-, Caribbean-, and US born blacks, where alcohol users were twice as likely to be ever smokers (Taylor et al., 1997). Moreover, the smokers consumed greater quantities of alcohol, compared to the nonsmokers.

Marijuana and tobacco are frequently co-abused (Richter et al., 2005), moreover vehicles for smoking marijuana can contain tobacco (Golub & Johnson, 1999). The relationship of smoking with marijuana is particularly important because marijuana use is associated with greater likelihood of being a smoker in adult populations, (Rigotti, Lee, & Wechsler, 2000) an increased risk of smoking persistence (Ford, Vu, & Anthony, 2002) and a decreased likelihood of quitting smoking (Ford et al., 2002; Hyland et al., 2004). Recent Canadian Addiction Survey (2004) statistics indicate that 46% of all Canadians have ever-tried marijuana (Adlaf et al., 2005). This is considerably lower than the 89% of cigarette smokers who had tried marijuana but comparable to the 44% of nonsmokers who had tried marijuana in this population. We found that current marijuana use was a strong determinant of smoking status, even more so than regular alcohol use. Similar findings have been demonstrated in young adults, where the likelihood of being a smoker was about four times greater for marijuana users and only three times greater for binge drinkers (Rigotti et al., 2000). Our analyses are unique in that, to the authors' knowledge, no data regarding the difference in the levels of marijuana consumption between adult smokers and nonsmokers has been reported. We found that even light smoking was associated with considerably heavier marijuana use and that marijuana use is not a phenomenon restricted to youth or college students.

The generalizability of these results are tempered by several caveats. First, these are secondary analyses of a nicotine pharmacokinetic/pharmacogenetic study. As such, it has potential selection bias. For instance, participants were not sampled randomly but were specially selected according to eligibility criteria specific to the parent study. Moreover, the

overnight nonsmoking requirement may have introduced self-selection for light smokers. However, our laboratory has conducted other similar pharmacokinetic studies where relatively heavy smokers from a different ethnoracial group were recruited without difficulty despite a required overnight abstinence suggesting that this may be a minimal source of bias (Xu et al., 2002). Second, although we enhanced the homogeneity of the study population by the inclusion criteria of three grandparents of similar ancestry, the descriptor of black African descent does not define a homogenous ethnic group. All who qualified for entry into the study reported the ethnicity of their grandparents. If three or four of the grandparents were of the same ethnic group then the participants were clustered as such. Overall, 4% were Black North American, 13% were African, 32% were Jamaican, 37% were Black Caribbean and 39% were of mixed Black ethnicity.

The external validity of demographic variables generally thought to predict smoking was tested in this population of black African descent. Smokers in this study were generally light cigarette consumers. Lower education, divorce, current alcohol and marijuana use were strongly associated with increased likelihood of smoking. Notably, the strength and significance of the associations between the socioeconomic and drug use variables and smoking status remained similar after multivariate analyses adjustment, highlighting the independence of the determinants and more generally, the complexity of smoking etiology. The findings of this study identified important variables and relationships for further investigation may assist in designing science-based anti-smoking and treatment campaigns tailored to populations of black African descent.

Acknowledgments

The Canadian Institutes of Health Research (CIHR) MOP-53248 and the Centre for Addiction and Mental Health supported this study. JCM receives funding from SPICE (McGill) and CIHR-TUSP. RFT holds a Canadian Research Chair in Pharmacogenetics. We also thank Dr. Jennifer Payne for valuable guidance in the statistical analyses and Eric Siu for his careful review of the manuscript.

References

- Adlaf, EM, Begin, P., Sawka, E., editors. Canadian Addiction Survey (CAS). Ottawa: Canadian Centre on Substance Abuse; 2005. A national survey of Canadians' use of alcohol and other drugs: Prevalence of use and related harms: Detailed report.
- Benowitz NL, Jacob P 3rd. Nicotine renal excretion rate influences nicotine intake during cigarette smoking. *The Journal of Pharmacology and Experimental Therapeutics*. 1985; 234(1):153–155. [PubMed: 4009497]
- Benowitz NL, Perez-Stable EJ, Fong I, Modin G, Herrera B, Jacob P 3rd. Ethnic differences in N-glucuronidation of nicotine and cotinine. *The Journal of Pharmacology and Experimental Therapeutics*. 1999; 291(3):1196–1203. [PubMed: 10565842]
- Caraballo RS, Giovino GA, Pechacek TF, Mowery PD, Richter PA, Strauss WJ, Sharp DJ, Eriksen MP, Pirkle JL, Maurer KR. Racial and ethnic differences in serum cotinine levels of cigarette smokers: Third national health and nutrition examination survey, 1988–1991. *The Journal of the American Medical Association*. 1998; 280(2):135–139. [PubMed: 9669785]
- Doherty EW, Doherty WJ. Smoke gets in your eyes: Cigarette smoking and divorce in a national sample of adults. *Families, Systems & Health*. 1998; 16:393–400.
- Ford DE, Vu HT, Anthony JC. Marijuana use and cessation of tobacco smoking in adults from a community sample. *Drug and Alcohol Dependence*. 2002; 67(3):243–248. [PubMed: 12127195]

- Giovino, GA., Schooley, MW., Zhu, BP., Chrismon, JH., Tomar, SL., Peddicord, JP., Merritt, RK., Husten, CG., Eriksen, MP. Morbidity and Mortality Weekly Report. Vol. 43. Centers for Disease Control and Prevention Surveillance Summaries; 1994. Surveillance for selected tobacco-use behaviours - United States, 1900–1994; p. 1-43.
- Golub AL, Johnson BD. Cohort changes in illegal drug use among arrestees in manhattan: From the heroin injection generation to the blunts generation. *Substance Use and Misuse*. 1999; 34(13):1733–1763. [PubMed: 10540971]
- Hahn LP, Folsom AR, Sprafka JM, Norsted SW. Cigarette smoking and cessation behaviors among urban blacks and whites. *Public Health Reports*. 1990; 105(3):290–295. [PubMed: 2113689]
- Haiman CA, Stram DO, Wilkens LR, Pike MC, Kolonel LN, Henderson BE, Le Marchand L. Ethnic and racial differences in the smoking-related risk of lung cancer. *The New England Journal of Medicine*. 2006; 354(4):333–342. [PubMed: 16436765]
- Hammarstrom A, Janlert U. Unemployment - an important predictor for future smoking: A 14-year follow-up study of school leavers. *The Scandinavian Journal of Public Health*. 2003; 31(3):229–232. [PubMed: 12850978]
- Hu MC, Davies M, Kandel DB. Epidemiology and correlates of daily smoking and nicotine dependence among young adults in the United States. *American Journal of Public Health*. 2006; 96(2):299–308. [PubMed: 16380569]
- Hyland A, Li Q, Bauer JE, Giovino GA, Steger C, Cummings KM. Predictors of cessation in a cohort of current and former smokers followed over 13 years. *Nicotine and Tobacco Research*, 6 Suppl. 2004; 3:S363–369.
- Kabat GC, Morabia A, Wynder EL. Comparison of smoking habits of blacks and whites in a case-control study. *American Journal of Public Health*. 1991; 81(11):1483–1486. [PubMed: 1951809]
- Kandel DB, Kiros GE, Schaffran C, Hu MC. Racial/ethnic differences in cigarette smoking initiation and progression to daily smoking: A multilevel analysis. *American Journal of Public Health*. 2004; 94(1):128–135. [PubMed: 14713710]
- Kiefe CI, Williams OD, Lewis CE, Allison JJ, Sekar P, Wagenknecht LE. Ten-year changes in smoking among young adults: Are racial differences explained by socioeconomic factors in the Cardia study? *American Journal of Public Health*. 2001; 91(2):213–218. [PubMed: 11211629]
- Messina ES, Tyndale RF, Sellers EM. A major role for CYP2A6 in nicotine C-oxidation by human liver microsomes. *The Journal of Pharmacology and Experimental Therapeutics*. 1997; 282(3):1608–1614. [PubMed: 9316878]
- Murray RP, Connett JE, Buist AS, Gerald LB, Eichenhorn MS. Experience of black participants in the lung health study smoking cessation intervention program. *Nicotine and Tobacco Research*. 2001; 3(4):375–382. [PubMed: 11694205]
- Mwenifumbo JC, Sellers EM, Tyndale RF. Nicotine metabolism and CYP2A6 activity in a population of black African descent: Impact of gender and light smoking. *Drug and Alcohol Dependence*. 2007; 89(1):24–33. [PubMed: 17161559]
- Osler M, Prescott E, Godtfredsen N, Hein HO, Schnohr P. Gender and determinants of smoking cessation: A longitudinal study. *Preventive Medicine*. 1999; 29(1):57–62. [PubMed: 10419801]
- Pederson LL, Ahluwalia JS, Harris KJ, McGrady GA. Smoking cessation among African Americans: What we know and do not know about interventions and self-quitting. *Preventive Medicine*. 2000; 31(1):23–38. [PubMed: 10896841]
- Pierce JP, Fiore MC, Novotny TE, Hatziandreu EJ, Davis RM. Trends in cigarette smoking in the United States. Educational differences are increasing. *The Journal of the American Medical Association*. 1989; 261(1):56–60. [PubMed: 2908995]
- Richter KP, Kaur H, Resnicow K, Nazir N, Mosier MC, Ahluwalia JS. Cigarette smoking among marijuana users in the United States. *Substance Abuse*. 2005; 25(2):35–43.
- Rigotti NA, Lee JE, Wechsler H. US college students' use of tobacco products: Results of a national survey. *The Journal of the American Medical Association*. 2000; 284(6):699–705. [PubMed: 10927777]
- Rock, VJ., Malarcher, A., Kahende, JW., Asman, K., Husten, C., Caraballo, R. Morbidity and Mortality Weekly Report. Vol. 54. Office on Smoking and Health, National Center for Chronic

- Disease Prevention and Health Promotion, Center for Disease Control; 2005. Cigarette smoking among adults - united states, 2004; p. 1121-1124.
- Ross NA, Wolfson MC, Dunn JR, Berthelot JM, Kaplan GA, Lynch JW. Relation between income inequality and mortality in Canada and in the United States: Cross sectional assessment using census data and vital statistics. *British Medical Journal*. 2000; 320(7239):898–902. [PubMed: 10741994]
- Royce JM, Hymowitz N, Corbett K, Hartwell TD, Orlandi MA. Smoking cessation factors among African Americans and whites. Commit research group. *American Journal of Public Health*. 1993; 83(2):220–226. [PubMed: 8427327]
- Schoedel KA, Hoffmann EB, Rao Y, Sellers EM, Tyndale RF. Ethnic variation in cyp2a6 and association of genetically slow nicotine metabolism and smoking in adult Caucasians. *Pharmacogenetics*. 2004; 14(9):615–626. [PubMed: 15475735]
- Taylor KL, Kerner JF, Gold KF, Mandelblatt JS. Ever vs never smoking among an urban, multiethnic sample of Haitian-, Caribbean-, and U.S.-born blacks. *Preventive Medicine*. 1997; 26(6):855–865. [PubMed: 9388798]
- Office of Applied Studies [OAS]. The National Survey on Drug Use and Health Report. Vol. 30. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration; 2006. Past month cigarette use among racial and ethnic groups.
- Trinidad DR, Gilpin EA, Lee L, Pierce JP. Do the majority of Asian-American and African-American smokers start as adults? *American Journal of Preventive Medicine*. 2004; 26(2):156–158. [PubMed: 14751329]
- U.S. Department of Health and Human Services [USDHHS]. Preventing Tobacco Use Among Young People: A Report of the Surgeon General. Atlanta, Georgia: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 1994.
- U.S. Department of Health and Human Services [USDHHS]. Tobacco Use Among U.S. Racial/Ethnic Minority Groups - African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics: A Report of the Surgeon General. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 1998.
- Wagenknecht LE, Craven TE, Preisser JS, Manolio TA, Winders S, Hulley SB. Ten-year trends in cigarette smoking among young adults, 1986–1996: The cardia study. Coronary artery risk development in young adults. *Annals of Epidemiology*. 1998; 8(5):301–307. [PubMed: 9669612]
- Wagenknecht LE, Cutter GR, Haley NJ, Sidney S, Manolio TA, Hughes GH, Jacobs DR. Racial differences in serum cotinine levels among smokers in the coronary artery risk development in (young) adults study. *American Journal of Public Health*. 1990; 80(9):1053–1056. [PubMed: 2382740]
- White HR, Nagin D, Replogle E, Stouthamer-Loeber M. Racial differences in trajectories of cigarette use. *Drug and Alcohol Dependence*. 2004; 76(3):219–227. [PubMed: 15561473]
- Winkleby MA, Jatulis DE, Frank E, Fortmann SP. Socioeconomic status and health: How education, income, and occupation contribute to risk factors for cardiovascular disease. *American Journal of Public Health*. 1992; 82(6):816–820. [PubMed: 1585961]
- Xu C, Rao YS, Xu B, Hoffmann E, Jones J, Sellers EM, Tyndale RF. An in vivo pilot study characterizing the new CYP2A6*7, *8, and *10 alleles. *Biochemical and Biophysical Research Communications*. 2002; 290(1):318–24. [PubMed: 11779172]
- Zhu BP, Giovino GA, Mowery PD, Eriksen MP. The relationship between cigarette smoking and education revisited: Implications for categorizing persons' educational status. *American Journal of Public Health*. 1996; 86(11):1582–1589. [PubMed: 8916524]

Table 1

Descriptive Statistics of Total Study Population and by Smoking Status

	Frequencies (%)			<i>P</i> -value* (χ -Stat)
	Total n=280 (%)	Smoker n=137 (%)	Nonsmoker n=143 (%)	
Gender				
Female	149 (53.2)	60 (43.8)	89 (62.2)	0.002
Male	131 (46.8)	77 (56.2)	54 (37.8)	(9.6)
Age Group				
20–29	106 (37.9)	46 (33.6)	60 (42.0)	0.34
30–39	110 (39.3)	54 (39.4)	56 (39.2)	(3.3)
40–49	50 (17.9)	29 (21.2)	21 (14.7)	
50–59	14 (5.0)	8 (5.8)	6 (4.2)	
Education level				
< High school	19 (6.8)	16 (11.7)	3 (2.1)	
High school	91 (32.4)	55 (40.2)	36 (25.2)	< 0.001
Community college	109 (38.9)	44 (32.1)	65 (45.5)	(21.5)
University	61 (21.8)	22 (16.1)	39 (27.3)	
Household income (\$CAN) ^{†‡}				
< 800	33 (11.8)	19 (14.0)	14 (9.8)	0.57
800–1799	70 (25.1)	35 (25.7)	35 (24.5)	(2.0)
1800–3599	91 (32.6)	45 (33.1)	46 (32.2)	
> 3599	85 (30.5)	37 (27.2)	48 (33.6)	
Employment Status				
Unemployed	107 (38.2)	59 (43.1)	48 (33.6)	0.10
Employed	173 (61.8)	78 (56.9)	95 (66.4)	(2.7)
Marital status				
Married/common law	60 (21.4)	25 (18.2)	35 (24.5)	< 0.001
Single	187 (66.8)	84 (61.3)	103 (72.0)	(19.5)
Divorced/separated/widowed	33 (11.8)	28 (20.4)	5 (3.5)	
Number of dependents [‡]				
1–2	154 (55.2)	75(55.1)	79 (55.2)	0.99
3–8	125 (44.8)	61 (44.9)	64 (44.8)	(< 0.001)
Born in Canada				
No	147 (52.5)	63 (46.0)	84 (58.7)	0.03
Yes	133 (47.5)	74 (54.0)	59 (41.3)	(4.6)
Years in Canada				
10	31 (11.1)	9 (6.6)	22 (15.4)	0.02
> 10	249 (88.9)	128 (93.4)	121 (84.6)	(5.5)

	Frequencies (%)			
	Total n=280 (%)	Smoker n=137 (%)	Nonsmoker n=143 (%)	P-value * (χ-Stat)
Alcohol Use				
Never tried/Tried not regular	74 (26.4)	17 (12.4)	57 (39.9)	< 0.001
Regular not current	25 (8.9)	11 (8.0)	14 (9.8)	(29.4)
Current user	181 (64.6)	109 (80.0)	72 (50.4)	
Marijuana Use ‡				
Never tried	94 (33.7)	14 (10.3)	80 (55.9)	< 0.001
Tried not regular	55 (19.7)	23 (16.9)	32 (22.4)	(85.8)
Regular not current	32 (11.5)	19 (14.0)	13 (9.1)	
Current user	98 (35.1)	80 (58.8)	18 (12.6)	
Sedative Use				
Never tried	234 (83.6)	100 (73.0)	134 (93.7)	< 0.001
Tried	46 (16.4)	37 (27.0)	9 (6.3)	(21.9)
Stimulant Use				
Never tried	228 (81.4)	94 (68.6)	134 (93.7)	< 0.001
Tried	52 (18.6)	43 (31.4)	9 (6.3)	(29.1)
Opiate Use				
Never tried	238 (85.0)	108 (78.8)	130 (90.9)	0.005
Tried	42 (15.0)	29 (21.2)	13 (9.1)	(8.0)
Hallucinogen Use				
Never tried	236 (84.3)	99 (72.3)	137 (95.8)	< 0.001
Tried	44 (15.7)	38 (27.7)	6 (4.2)	(29.3)
Antidepressant Use				
Never tried	254 (90.7)	117 (85.4)	137 (95.8)	0.003
Tried	26 (9.3)	20 (14.6)	6 (4.2)	(9.0)

* The Chi-square test was performed between smokers and nonsmokers

[†] 1 observation missing

[‡] Monthly household income

Household income was the total pre-tax of all who resided in the household.

Participants were considered employed whether full- or part-time. Housewives, students, retirees those unable to work were considered unemployed.

Regular drinkers were defined as ever having 1 alcoholic drink per month for three consecutive months. An alcoholic drink was defined as one bottle of beer, one glass of wine, one shot of liquor/spirits.

Current alcohol use was defined as drinking 1 drink in the past 30 days.

Inclusion in the never tried marijuana category was defined as never using marijuana, not even a Regular marijuana use was defined as 10 joints during their lifetime.

Current marijuana use was defined as smoking 1 joint in the past 30 days.

Table 2

Factors Associated with Smoking – Logistic Regression Analyses

	Univariate Unadjusted Odds Ratio (95% CI)	Multiple Adjusted Odds Ratio (95 % CI)
Gender		
Female	-	-
Male	2.1 (1.3, 3.4)	1.4 (0.7, 2.6)
Age	1.0 (1.0, 1.1)	1.1 (1.0, 1.1)
Education level		
< High school	-	-
High school	0.29 (0.08, 1.05)	0.23 (0.05, 1.09)
Community college	0.13 (0.04, 0.46)	0.08 (0.02, 0.39)
University	0.11 (0.03, 0.40)	0.08 (0.02, 0.43)
Household income (\$CAN) ^{†‡}		
< 800	-	-
800–1799	0.74 (0.32, 1.70)	n/a
1800–3599	0.72 (0.32, 1.61)	
> 3599	0.57 (0.25, 1.28)	
Employment Status		
Employed	-	n/a
Unemployed	1.5 (0.9, 2.4)	
Marital status		
Married/Common law	-	-
Single	1.1 (0.6, 2.1)	2.1(0.9, 4.7)
Divorced/Separated	7.8 (2.7, 23.1)	10.3 (2.8, 37.6)
Number of dependents [†]		
1–2	-	n/a
3–8	1.0 (0.6, 1.6)	
Born in Canada		-
No	-	-
Yes	1.7 (1.0, 2.7)	1.6 (0.8, 3.1)
Years in Canada		
10	-	-
> 10	2.6 (1.1, 5.8)	1.4 (0.5, 4.0)
Alcohol Use		
Not current	-	-
Current user	3.8 (2.3, 6.5)	3.5 (1.8, 7.0)
Marijuana Use		

	Univariate Unadjusted Odds Ratio (95% CI)	Multiple Adjusted Odds Ratio (95 % CI)
Not current	-	-
Current user	9.9 (5.4, 18.1)	7.1 (3.5, 14.2)

[†] 1 observation missing

[‡] Monthly household income

Numbers in bold were statistically significant $P < 0.05$

Of note, only four individuals had never tried alcohol and they were all nonsmokers, hence they were combined with the tried/not regular drinking group for analyses.

Table 3

Alcohol and marijuana consumption in current users

Current alcohol user	Median (range)			P-value [*]
	Total n=181	Smoker n=109	Nonsmoker n=72	
Drinks/day	0 (0–10)	0 (0–10)	0 (0–3)	0.02
Drinks/week	2 (0–56)	3 (0–56)	1 (0–12)	< 0.001
Drinks/month	8 (1–220)	12 (1–220)	4 (1–24)	< 0.001

Current marijuana user	Sample n=98	Smoker n=80	Nonsmoker n=18	P-value [*]
Joints/day	0 (0–20)	0 (0–20)	0 (0–2)	0.01
Joints/week	4 (0–100)	6 (0–100)	0 (0–14)	0.001
Joints/month	15 (1–200)	22 (1–200)	4 (1–56)	< 0.001

^{*}The Mann-Whitney was performed between smokers and nonsmokers