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Age of sexual debut and cannabis use in the United States

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Abstract

Background—Understanding the interrelationships between risky health behaviors is critical for health promotion efforts. Conceptual frameworks for understanding substance misuse (e.g. stepping-stone models) have not yet widely incorporated other risky behaviors, including those related to sexual health.

Objectives—The goals of this study were to assess the relationship between early sexual debut and cannabis use, examine the role of licit substance use in this association, and evaluate differences by gender and race/ethnicity.

Methods—Data came from the National Comorbidity Survey-Replication (NCS-R). Primary analysis was restricted to respondents who reported sexual debut at 12 years ($n=5,036$). Age at sexual debut was categorized as early (<18 years), average (18 years) and late (>18 years). Logistic regression was used to assess the relationship between age at sexual debut and cannabis use. Interaction terms were used to evaluate effect modification by gender and race/ethnicity.

Results—Later age of sexual debut was associated with lower odds of cannabis use relative to the average age of debut (AOR = 0.50, 95% CI = 0.37 – 0.66). For every year that respondents delayed their sexual debut, the relative odds of lifetime cannabis use declined by 17%. After

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

accounting for alcohol and tobacco use the association between early sexual debut and cannabis was attenuated (AOR = 0.90, 95% CI = 0.68 – 1.20), while later age of debut remained protective (AOR = 0.57, 95% CI = 0.42 – 0.78). Results were generally consistent across race/ethnicity and gender.

Conclusions—Multifactorial intervention strategies targeting both sexual health and substance use may be warranted.

Keywords

cannabis; marijuana; sexual debut; sexual initiation; substance use; risky behaviors

BACKGROUND

Cannabis is the most widely used illicit drug in the U.S., more common than the use of psychotherapeutics, cocaine, hallucinogens, inhalants, and heroin combined (Substance Abuse and Mental Health Services Administration [SAMHSA], 2011; SAMHSA, 2014). According to the 2013 National Survey on Drug Use and Health, an estimated 19.8 million people aged 12 or older (7.5% of population) were current cannabis users (SAMHSA, 2014). Cannabis is also the most commonly used drug among first-time illicit drug users (70.3%), and some have argued that cannabis use – either directly or through shared risk pathways – is directly linked with risk of using other illicit substances (Degenhardt et al., 2010; Levine et al., 2011; O'Donnell & Clayton, 1982; SAMHSA, 2014). This is consistent with the gateway theory that posits a temporal progression of substance use beginning with tobacco and alcohol, followed by marijuana, and then other illicit drugs (Degenhardt et al., 2010; Kandel, 1975).

As an alternative to these “stepping stone” models, it is possible that the emergence of risky behaviors result from common etiologic pathways (Embry, 2002) or shared opportunities to engage in other risky behaviors (Ghandour, Mouhanna, Yasmine, & El Kak, 2014) (e.g., sensation-seeking in adolescents, low parental monitoring). It is increasingly recognized that risk factors of cannabis use are often shared with other adverse health behaviors, including risky sexual behaviors (Madkour, Farhat, Halpern, Godeau, & Gabhainn, 2010; Staton et al., 1999). For example, cannabis use has been associated with having multiple sex partners, inconsistent condom use, and initiating sex at an earlier age in adolescence and young adulthood (Graves & Leigh, 1995; Parkes, Wight, Henderson, & Hart, 2007; Rosenbaum & Kandel, 1992). These risky sexual behaviors may lead to increased risk of sexually transmitted infections, unintended pregnancy, and adverse reproductive health outcomes (Kaestle, Halpern, Miller, & Ford, 2005; Mardh et al., 2000; Tapert, Aarons, Sedlar, & Brown, 2001).

Few studies have examined the relationship between cannabis use and sexual debut in nationally representative samples of adults who have completely passed through the peak risk period for cannabis initiation. Pechansky *et al.* (2011) reported that early sexual debut was associated with lifetime cannabis use. However, this study was restricted to current ecstasy/LSD users and is thus not generalizable to the broader population. Whitaker *et al.* (2010) also reported that early sexual initiation was associated with alcohol and cannabis

among male African-American adolescents (ages 11 to 15); however, they did not examine cannabis use separate from alcohol. Other reports among adults have shown that younger age, male gender, racial/ethnic minority status, lower education, unemployment, and living in urban areas are associated with both early sexual debut and cannabis use (SAMHSA, 2011; SAMHSA, 2014; Whitaker et al., 2010).

As a result of limitations with extant research, our understanding of the pathways linking risky sexual behaviors and cannabis use is incomplete, particularly in young adulthood when sexual initiation becomes more normative. Furthermore, it is unknown whether this relationship varies by gender and race/ethnicity.

Thus, the current study aims to: 1) examine the association between age at sexual debut and cannabis use among a nationally-representative sample of US adults, 2) determine whether the relationship between age at sexual debut and cannabis use is due to licit substance use, and 3) explore differences in these relationships by gender and race/ethnicity.

METHODS

Study Population

Data for this study come from the National Comorbidity Survey – Replication (NCS-R), a cross-sectional, nationally-representative household survey of U.S. adults. Respondents were selected using a multi-stage clustered area probability sampling of households (University of Michigan, 2012). Face-to-face interviews were conducted, and the survey was administered in two parts which included a core diagnostic assessment of all respondents ($n = 9,282$) and additional questions on risk factors, consequences, services, and other correlates of core disorders for a subsample ($n = 5,692$). The NCS-R obtained a Certificate of Confidentiality to encourage honest responses to questions on sensitive behaviors. Further details of the study design have been described elsewhere (Kessler & Ustun, 2004; Kessler et al., 2004; Pennell et al., 2004). The present study is limited to 5,036 respondents with complete data on age of sexual initiation and cannabis use. We excluded 117 participants from the primary analysis who reported an age of sexual debut <12 years because these cases likely represent victims of sexual assault; however, we included these participants in a sensitivity analysis to compare results. This study received an approval from the Institutional Review Board at Virginia Commonwealth University.

Measures

Lifetime cannabis use was measured by an item that asked, “The next questions are about medicines that are often used for any reason other than a health professional said you should use them...have you ever used marijuana or hashish, even once?” Responses to lifetime cannabis use were dichotomized as yes or no. Participants who reported ever using cannabis were prompted to answer a question on past-year cannabis use that asked, “Did you use marijuana or hashish at any time in the past 12 months?” Past-year cannabis use was categorized as yes (used in the past 12 months) or no (used more than 12 months ago or never used).

Age of sexual debut or initiation was assessed by a question that asked, “How old were you the first time you had sexual intercourse?” Respondents who reported a sexual debut of less than 12 years were excluded. The remaining responses to this item were recoded into two variables: (1) a continuous variable centered on the mean age of sexual debut (18 years), and (2) age of sexual debut categorized as early (<18 years i.e. 12 – 18 years), average (18 years) and late (>18 years i.e. 19 – 46 years) (Sandfort, Orr, Hirsch, & Santelli, 2008). The three-level category distinguished early and late sexual initiates compared to the population mean age for sexual initiation (Finer & Philbin, 2013). Median and mode values for age of sexual debut were 17 and 18, respectively.

Demographic characteristics included age at interview, gender, race/ethnicity, education, marital status, and income-to-needs ratio (SAMHSA, 2011; Whitaker et al., 2010). Other sexual risk behaviors included condom use and number of sexual partners in the past year (Graves & Leigh, 1995; Parkes et al., 2007; Rosenbaum & Kandel, 1992). We also considered childhood experiences that are associated with a broad range of risky behaviors, all coded as dichotomous (yes/no) variables (Chung et al., 2010; Dube et al., 2003; Hillis, Anda, Felitti, & Marchbanks, 2001; Klein, Elifson, & Sterk, 2007). These included importance of religion while growing up, family receipt of government assistance for at least 6 months, experiencing physical abuse as a child, living with a parent/guardian who abused drugs or alcohol, frequency of being left alone or unsupervised at an early age, and family disruption before age 16.

Finally, we sought to examine the impact of licit substance use on the relationship between sexual debut and cannabis use. Tobacco and alcohol use were assessed by self-report (Anthony, 2012; Brook, Brook, Arencibia-Mireles, Richter, & Whiteman, 2001; Kirby & Barry, 2012; Levine et al., 2011; Vanyukov et al., 2012). Smoking status was categorized as current, former, and never smoker. Because the majority of respondents had used alcohol at least once, early alcohol use based on age at first drink was dichotomized as <18 vs. 18 or older. In our analytic sample there were no individuals who had never consumed alcohol.

Statistical analysis

Bivariate group comparisons between lifetime cannabis users and nonusers were made using chi-square tests for categorical variables and t-test for continuous variables. Logistic regression models provided estimate crude and adjusted relative odds of both lifetime and past-year cannabis use. Log likelihood ratio tests were used to assess improvement in model fit accounting for demographic characteristics, childhood factors, sexual health behaviors, and licit substance use. Gender and race/ethnicity were assessed as potential effect modifiers using stratified analyses and interaction terms ($p < 0.05$).

Licit substance use was assessed as a potential intermediate (Anthony, 2012; Brook et al., 2001; Kirby & Barry, 2012; Levine et al., 2011; Vanyukov et al., 2012). In general, a mediator must meet the following conditions: 1) variations in levels of the exposure significantly account for changes in the mediator, 2) variations in the mediator significantly account for variations in the outcome, and 3) when both paths are controlled, a previously statistically significant relationship between the exposure and outcome is no longer significant and the magnitude of the path estimate is attenuated (Baron & Kenny, 1986).

Thus, we examined whether the covariance between sexual debut and cannabis use (both lifetime and past-year) was largely due to licit substance use using the aforementioned steps.

As a sensitivity analysis, we refit our main analytic models including individuals who reported an age of sexual debut <12 years old. Analyses were conducted in SAS 9.4 accounting for the complex sampling design, and weighted to reflect the entire adult U.S. population; all *p*-values refer to two-tailed tests.

RESULTS

In this sample of adults (mean age at interview: 43.6 years), the mean age of sexual debut was 17.7 years (*SD*=3.3) and mean age of first cannabis use was 18 years (*SD*=5.7). Table 1 shows descriptive characteristics of the sample by lifetime history of cannabis use and crude odds ratios between these characteristics and lifetime cannabis use. Overall, 51.6% reported first having sex at 17 years of age or younger, 15.6% at age 18, and 32.8% at age 19 or older. Respondents who had ever used cannabis were younger and were more likely to be male, never married, and sexually active with multiple partners in the past year. Respondents who had ever used cannabis were more likely to report that religion was not very important or at all important during childhood and were more likely to endorse all of the negative early life experiences. Finally, respondents who had ever used cannabis were significantly more likely to be current/former smokers and first use alcohol at younger ages.

Lifetime Cannabis Use

Age of sexual debut was significantly associated with lifetime cannabis use in unadjusted models (crude odds ratio [COR] = 0.79, 95% CI = 0.77 – 0.82). For every one year that respondents delayed their sexual debut, the relative odds of lifetime cannabis use declined by 21% (Table 2). This relationship persisted after accounting for demographic, sexual health behaviors, and childhood factors (adjusted odds ratio [AOR] = 0.83, 95% CI = 0.81 – 0.86). Similar results were obtained when age at sexual debut was modeled as a three-level categorical variable (Table 2). Unadjusted models shows that compared to respondents who first had sex at 18 years of age, those who first had sex at age 17 or younger had 1.45 times greater odds of lifetime cannabis use (COR = 1.45, 95% CI = 1.13 – 1.85). There was nominal difference in lifetime cannabis use after controlling for demographic characteristics and health behaviors but results were not statistically significant (AOR = 1.25, 95% CI = 0.98 – 1.61). In contrast, respondents who delayed having sex until after 18 were significantly less likely to use cannabis than those who had sex at 18 (COR = 0.41, 95% CI = 0.32 – 0.54). Estimates were attenuated but remained statistically significant after controlling for demographic factors, health behaviors, and childhood factors (AOR = 0.50, 95% CI = 0.37 – 0.66).

Tobacco and Alcohol Use

Tobacco use (COR_{former} = 2.44, 95% CI = 1.89 – 3.17; COR_{current} = 4.42, 95% CI = 3.68 – 5.31) and early alcohol consumption (COR = 5.03, 95% CI = 4.31 – 5.86) were strongly associated with lifetime cannabis use (Table 1). Age of sexual debut was inversely associated with use of licit substances such as alcohol and tobacco use (AOR = 0.81, 95% CI

= 0.78 – 0.85; AOR = 0.85, 95% CI = 0.83 – 0.88, respectively) even after adjusting for age, race/ethnicity, gender, education, marital status, and income (not shown in tables). In multiple logistic regression models, including use of licit substances attenuated the estimate slightly (AOR = 0.90, 95% CI = 0.87 – 0.93) such that for every year of delayed initiation of sex, the relative odds of lifetime cannabis use declined by 10% (Table 2). In models with the categorical exposure variable, after additionally accounting for licit substance use there were no significant difference between respondents who first had sex before 18 years of age compared to those at age 18 (AOR = 0.90, 95% CI = 0.68 – 1.20). However later age of sexual debut remained significantly associated with lower likelihood of lifetime cannabis use (AOR = 0.57, 95% CI = 0.42 – 0.78).

Past-year Cannabis Use

Approximately 12.4% (n = 597) of respondents reported using cannabis in the past year. Results for this form of the outcome were similar to those for lifetime cannabis use (Table 2, Supplementary Table 1). Participants with early sexual debut were significantly more likely to report past-year cannabis use than those who first had sex at 18 after accounting for demographic characteristics, health behaviors, and childhood factors (AOR = 1.42, 95% CI = 1.06 – 1.89); however, this association was no longer statistically significant after additionally controlling for licit substance use (AOR = 1.16, 95% CI = 0.84 – 1.60). Results were similar to delayed sexual debut and past-year cannabis use (AOR = 0.62, 95% CI = 0.37 – 1.04); that is, the association was in the same direction, but not statistically significant, seen for lifetime cannabis use.

Gender and Racial/Ethnic Differences

In general, the inverse relationship between age of sexual debut and lifetime cannabis use was consistent across race/ethnicity and gender groups (Table 3). However, protective effects of delaying sexual debut were not observed among black males (AOR = 0.99, 95% CI = 0.77 – 1.28). When treated as interaction terms, there was no evidence that these relationships differed by race/ethnicity ($p = 0.72$) or gender ($p = 0.08$) (Table 3). Findings were similar for past-year cannabis use (interaction terms for race/ethnicity ($p = 0.67$) and gender ($p = 0.12$)).

Sensitivity Analysis

Findings from the sensitivity analysis which included respondents who reported sexual intercourse before age 12 were similar to results from the primary analysis (Supplementary Table 2). For every year of delayed initiation of sex, the relative odds of lifetime cannabis use declined by 14% (AOR = 0.86, 95% CI = 0.83 – 0.89). Respondents with early sexual debut (<18 years) were significantly more likely to report lifetime cannabis use compared to those who had sex at 18 years of age (COR = 1.45, 95% CI = 1.14 – 1.84). Later sexual initiation (>18 years) remained significantly associated with lower likelihood of lifetime cannabis use (AOR = 0.50, 95% CI = 0.38 – 0.66).

DISCUSSION

Delaying age of sexual initiation was significantly associated with lower odds of lifetime cannabis use, and this protective association remained even after accounting for history of

licit substance use. Conversely, early sexual debut was positively associated with higher odds of lifetime and past-year cannabis use. However, our analysis suggests that licit substance use accounts for a large portion of the covariance between early initiation of sex and cannabis use. Findings were generally consistent across race/ethnicity and gender, and were similar when examining past-year cannabis use.

Debate remains as to whether licit substances are causally related to use of cannabis and other illicit substances, or whether these correlations are better explained by common risk factors (shared liability model) (Anthony, 2012; Brook et al., 2001; Kirby & Barry, 2012; Levine et al., 2011; Vanyukov et al., 2012). In this cross-sectional study, we are unable to definitively test whether licit substances mediate the relationship between sexual debut and cannabis use, or are simply indicators of a common risk pathway linking both substance use and sexual health behaviors (Madkour et al., 2010; Stueve & O'Donnell, 2005). However, from a prevention standpoint it is likely that both conceptual frameworks are relevant. Consistent with this notion, previous studies indicate that environmental factors (e.g. school context, parental reinforcement, community involvement) alter the trajectory of multiple risky behaviors (Cooper et al., 2014; Embry, 2002; Madkour et al., 2010) even into adulthood (Kellam et al., 2014).

To our knowledge there has been only limited investigation as to whether the relationship between age of sexual debut and cannabis use is modified by gender or race/ethnicity. For example, Rosenbaum and Kandel (1992) investigated risk factors of early sexual debut using a sample of 2,711 young adults. Respondents were asked about initiation of sexual activity before age 16 and substance use. Both men and women who initiated sex at younger age groups were more likely to report ever using cannabis and other illicit substances. Our study is among the first to examine whether the relationship between sexual debut and cannabis use differs by race/ethnicity. Despite differences in both age of sexual debut (Cavazos-Rehg et al., 2009; Eaton et al., 2010; Grunbaum et al., 2002) and likelihood of using cannabis (Pacek, Malcolm, & Martins, 2012; SAMHSA, 2011), we found no evidence that the relationship between sexual debut and cannabis use significantly differs by race/ethnicity. While in our stratified analyses there was not a protective effect of delaying sexual debut for black males, we note that this is contrary to prior research that has found significant associations between risky sexual behaviors (e.g. early debut, multiple partners) and cannabis use in this group (Berger, Khan, & Hemberg, 2012; Whitaker et al., 2010). Differences in study design or sample composition may explain these mixed findings. We note that classroom interventions (e.g. Good Behavior Game) (Kellam et al., 2014) and engagement in community activities (Cooper et al., 2014) are promising methods for reducing the likelihood of multiple risky behaviors among young black males.

These findings should be interpreted in light of study strengths and limitations. Notable strengths include the large, nationally-representative sample which allowed us to test for effect modification by gender and race/ethnicity, as well as generate estimates of the relationship between sexual debut and cannabis use that are representative of the general U.S. population. The NCS-R also utilized standardized data collection protocols that minimized the potential for information bias and underreporting of stigmatized and illegal activities. Our study also addresses gaps in the literature that fail to distinguish the

relationship between sexual debut and specific types and classes of drugs (e.g. licit vs. illicit; marijuana vs. cocaine). This is an important issue because the decisional pathways leading to the use of cannabis may differ from those related to licit substances or other illicit drugs. Lastly, this study accounts for important factors such as adverse childhood factors (e.g. parental loss or divorce) that previous studies have not taken into consideration (Whitaker et al., 2010).

This study also has limitations. Inferences on temporality cannot be made to clearly delineate between the stepwise and common risk factors explanations for cannabis use and sexual debut given the cross-sectional study design. Indeed, the mean age of sexual debut and cannabis use were similar. However, prior research has suggested a temporal dose-relationship between age of first intercourse and marijuana use in young adulthood (Rosenbaum & Kandel, 1992). More importantly, we evaluated past-year cannabis use as a secondary outcome and found similar findings to lifetime cannabis use. Recall bias may have also affected accounts of early life experiences. However, previous studies have found moderate agreement with data collected from birth records or childhood and later adulthood (Batty, Lawlor, Macintyre, Clark, & Leon, 2005; Hardt & Rutter, 2004; Hardt & Rutter, 2004; Widom & Morris, 1997). Another limitation was that respondents who reported early childhood sex (less than 12 years of age) were assumed to be possible rape victims although this information could not be verified from the data. However, we felt confident with this decision based on previous reports that victims aged 12 or younger account for 15% of all rape and nearly half of all sexual assaults (45%) committed by violent offenders in state prisons reporting single victims (Greenfeld, 1997). Combining this non-normative group with the overall population may have biased the association between the exposure and outcome of interest. Lastly, differences in mean age at interview for cannabis users and non-users suggest potential age effects; however, since cannabis use has generally become more common over time, this age effect may reflect a period effect (Miech & Koester, 2012). Miech & Koester (2012) used data from the 1985-2009 National Survey on Drug Use and Health to explore whether increasing rates of cannabis use among adolescents in recent years were specific to the younger generation or represented a general trend present among all ages (i.e. historical period effect). They found that the recent increase in cannabis use was not due to cohort-specific influences but stemmed from a historical period effect that increased prevalence across all birth cohorts. In addition, when we re-ran the main analyses using a subsample of participants aged 50 years or younger at the time of interview, findings for the relationship between age of sexual debut and lifetime cannabis use were very similar to the main results comprised of all participants, including those aged 50 year or older. Alternatively, the mean age differences between cannabis users and non-users may be due to mortality associated with cannabis use. For instance, a recent cohort study found that regular use of opiates or barbiturates was a risk factor for drug-related premature death (Nyhlén, Fridell, Bäckström, Hesse, & Krantz, 2011).

Notwithstanding limitations such as these, the results from this study have important implications. The transition from adolescence to young adulthood is an important developmental milestone and holds potential for behavioral change. Since the majority of substance use is initiated before adulthood (Degenhardt et al., 2008; Nonnemaker & Farrelly, 2011; Oh et al., 2010; SAMHSA, 2014), interventions that encourage delay of sexual

initiation may be beneficial to older adolescents and young adults, particularly in college settings where the prevalence of alcohol, smoking and substance use increases after graduating from high school (Fromme, Corbin, & Kruse, 2008; O'Malley & Johnston, 2002). Our results contribute to a growing body of literature indicating that health risk behaviors do not occur in isolation and suggest that a comprehensive approach to prevention is warranted (Flory, Lynam, Milich, Leukefeld, & Clayton, 2004; Jessor, Chase, & Donovan, 1980; van den Bree & Pickworth, 2005; Zimmer-Gembeck & Helfand, 2008). Although risk factors may have varying contributions to the development of problem behaviors (Henderson, Butcher, Wight, Williamson, & Raab, 2008; Marion, Russell, Daniel, & Charles, 2008; Zimmer-Gembeck & Helfand, 2008), targeting several health risk behaviors through comprehensive programs that address multiple domains may be more effective and efficient than addressing a single risk behavior (Hale, Fitzgerald-Yau, & Viner, 2014; Jackson, Geddes, Haw, & Frank, 2012). Similarly, our findings suggest support for incorporating substance use (i.e. cigarette, alcohol, and marijuana) prevention materials into existing sex education curriculum.

Our findings contribute evidence to inform the debate about the relationship among risky health behaviors (i.e. use of substances and early sexual debut) in adolescence and young adulthood. Future research that builds upon findings from the current study could further explore decisional mediating pathways that lead to illicit drug use and risky sexual behaviors among younger age groups in order to better elucidate optimal intervention strategies.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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GLOSSARY

Age of sexual debut	age of sexual initiation
Marijuana or cannabis	a greenish-gray mixture of the dried shredded leaves and flowers of <i>Cannabis sativa</i> . Used for recreational or medicinal purposes.

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Table 1

Descriptive characteristics of study population by lifetime cannabis use

	Cannabis (lifetime)			
	Total unwtd. N = 5036	Yes unwtd. n = 2625	No unwtd. n = 2411	COR (95% CI)
Mean age (SD)	43.6 (16.4)	37.6(11.9)	50.0(18.1)	
Mean age of sexual debut (SD)	17.7 (3.3)	16.8 (2.5)	18.8 (3.6)	
Weighted %				
Age of sexual debut				
<18	51.6	64.3	40.3	1.45 (1.20-1.76)
18	15.6	16.4	15.0	1.00
>18	32.8	19.3	44.7	0.39 (0.32-0.48)
Socio-demographic factors				
Race/ethnicity				
White	75.2	75.9	73.4	1.00
Black	10.0	9.8	10.8	0.88 (0.69-1.11)
Hispanic	10.9	10.5	11.8	0.86 (0.65-1.14)
Asian/other	4.0	3.8	4.0	0.93 (0.59-1.47)
Gender				
Male	45.8	52.0	36.0	1.93 (1.68-2.21)
Female	54.2	48.0	64.0	1.00
Education				
< High school	15.0	13.2	18.4	0.64 (0.51-0.80)
High school	32.5	31.7	32.9	0.85 (0.73-1.0)
> High school	52.5	55.1	48.8	1.00
Marital status				
Married/cohabiting	62.9	53.5	61.3	1.00
Divorced/separated/widowed	18.3	18.4	24.1	0.88 (0.72-1.06)
Never married	18.8	28.0	14.6	2.20 (1.83-2.65)
Income-to-needs ratio				
0 or 1	21.0	19.8	22.3	0.78 (0.63-0.97)
2	15.3	14.4	16.3	0.77 (0.61-0.98)
3	13.1	12.7	13.5	0.83 (0.65-1.04)
4	12.4	12.6	12.2	0.90 (0.71-1.14)
5	10.5	11.0	9.9	0.97 (0.78-1.22)
6+	27.7	29.5	25.8	1.00
Condom use				
Always	13.5	16.2	13.1	1.00
Mostly/sometimes	11.2	13.8	9.1	1.23 (0.94-1.62)
Rarely/never	75.2	70.0	77.8	0.73 (0.57-0.93)
# of sex partners in past year				
0	16.9	11.5	26.2	0.43 (0.36-0.50)

	Cannabis (lifetime)			
	Total unwtd. N = 5036	Yes unwtd. n = 2625	No unwtd. n = 2411	COR (95% CI)
1	72.4	70.1	68.3	1.00
2+	10.7	18.4	5.5	3.25 (2.56-4.14)
Childhood factors				
Importance of religion				
Very important	43.6	35.9	49.9	1.00
Somewhat important	34.7	36.1	33.1	1.52 (1.33-1.73)
Not very important	15.8	20.1	12.4	2.26 (1.78-2.87)
Not at all important	6.0	7.9	4.6	2.39 (1.78-3.20)
Family received government assistance for a period of at least 6 months	10.1	12.3	8.2	1.56 (1.26-1.93)
Physical abuse	44.4	52.5	37.6	1.83 (1.67-2.01)
Guardian had problems with drugs or alcohol	26.0	33.4	21.4	1.84 (1.60-2.12)
Frequency left unsupervised				
Often/sometimes	9.4	12.5	7.5	1.76 (1.38-2.24)
Rarely/never	90.6	87.5	92.5	1.00
Family disruption (before age 16)				
Lived with both parents	70.0	64.1	74.0	1.00
Parents died/separated/ divorced/never lived together	25.7	31.1	21.6	1.66 (1.42-1.94)
Foster care/left home/other	4.2	4.8	4.3	1.28 (0.96-1.70)
Other substance use				
Smoking status				
Ex-smoker	26.3	28.7	23.0	2.44 (1.89-3.17)
Current	28.5	41.2	18.3	4.42 (3.68-5.31)
Never	45.2	30.1	58.8	1.00
Alcohol consumption				
First drink at age 17 or less	73.2	86.8	56.6	5.03 (4.31-5.86)
First drink at age 18+ years	26.8	13.2	43.4	1.00

Note: Bold values indicate statistically significant results. Unwtd = unweighted, SD = standard deviation, COR = crude odds ratio.

Table 2

Crude and adjusted odds ratio for the association between age of sexual debut and cannabis use

Age of sexual debut	COR (95% CI)	AOR ^a (95% CI)	AOR ^b (95% CI)	AOR ^c (95% CI)
<u>Lifetime cannabis use</u>				
Age (in years)	0.79 (0.77 – 0.82)	0.82 (0.80 – 0.85)	0.83 (0.81 – 0.86)	0.90 (0.87 – 0.93)
Age groups				
< 18 years old	1.45 (1.13 – 1.85)	1.25 (0.98 – 1.61)	1.22 (0.95 – 1.56)	0.90 (0.68 – 1.20)
18 years old	1.00	1.00	1.00	1.00
> 18 years old	0.41 (0.32 – 0.54)	0.48 (0.36 – 0.62)	0.50 (0.37 – 0.66)	0.57 (0.42 – 0.78)
<u>Past year cannabis use</u>				
Age (in years)	0.76 (0.72 – 0.81)	0.86 (0.81 – 0.92)	0.88 (0.82 – 0.94)	0.93 (0.87 – 1.00)
Age groups				
< 18 years old	2.10 (1.53 – 2.88)	1.50 (1.13 – 1.99)	1.42 (1.06 – 1.89)	1.16 (0.84 – 1.60)
18 years old	1.00	1.00	1.00	1.00
> 18 years old	0.41 (0.23 – 0.70)	0.62 (0.37 – 1.04)	0.62 (0.37 – 1.04)	0.71 (0.42 – 1.21)

Note: Bold values indicate statistically significant results. COR = crude odds ratio, AOR = adjusted odds ratio.

^a Adjusted for socio-demographic characteristics and health behaviors (age, gender, race/ethnicity, education, marital status, income-to-needs ratio, condom use, and number of sex partners in past 12 months).

^b Adjusted for socio-demographic characteristics, health behaviors, and childhood factors (importance of religion, government assistance, physical abuse, guardian drug problems, unsupervision, and family disruption).

^c Adjusted for socio-demographic characteristics, health behaviors, childhood factors, and licit substance use (smoking cigarettes and drinking alcohol).

Table 3

Crude and adjusted odds ratio for the association between age of sexual debut and lifetime cannabis use by gender and race/ethnicity

Age of sexual debut	COR (95% CI)	AOR ^a (95% CI)	AOR ^b (95% CI)	AOR ^c (95% CI)
Male				
White	0.83 (0.79-0.87)	0.87 (0.82-0.92)	0.88 (0.83-0.93)	0.93 (0.88-0.99)
Black	0.92 (0.76-1.12)	0.96 (0.78-1.18)	0.94 (0.78-1.13)	0.99 (0.77-1.28)
Hispanic	0.82 (0.74-0.92)	0.81 (0.73-0.90)	0.82 (0.73-0.91)	0.79 (0.70-0.90)
Asian/other	0.82 (0.69-0.97)	0.54 (0.36-0.82)	0.43 (0.24-0.79)	–
Female				
White	0.73 (0.70-0.77)	0.77 (0.73-0.81)	0.78 (0.74-0.82)	0.87 (0.83-0.91)
Black	0.83 (0.69-1.00)	0.82 (0.67-1.02)	0.81 (0.67-0.98)	0.85 (0.71-1.02)
Hispanic	0.78 (0.64-0.96)	0.77 (0.62-0.96)	0.79 (0.64-0.99)	0.86 (0.68-1.08)
Asian/other	0.71 (0.57-0.88)	0.80 (0.60-1.06)	0.77 (0.59-1.00)	0.73 (0.50-1.08)

Note: Bold values indicate statistically significant results; fully adjusted OR for Asian/other male was not available due to small sample size (n = 51); all estimates correspond to continuous age of sexual debut analysis. COR = crude odds ratio, AOR = adjusted odds ratio.

^a Adjusted for socio-demographic characteristics and health behaviors (age, gender, race/ethnicity, education, marital status, income- to-needs ratio, condom use, and number of sex partners in past 12 months).

^b Adjusted for socio-demographic characteristics, health behaviors, and childhood factors (importance of religion, government assistance, physical abuse, guardian drug problems, unsupervision, and family disruption).

^c Adjusted for socio-demographic characteristics, health behaviors, childhood factors, and licit substance use (smoking cigarettes and drinking alcohol).