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Early Sexual Experience and Later Onset of Illegal Drug Use among African American Students on HBCU Campuses

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Abstract

Few studies examine whether early sexual experience is associated with subsequent illegal drug use among adolescents. A sample of 7,372 African-American students who had not used illegal drugs before the age of 14 were identified in the dataset of the 2001 Historically Black Colleges and Universities (HBCU) Substance Use Survey. Using self-reported ages of onset, discrete-time survival models estimated the hazard of illegal drug use onset after age 13 subsequent to first sexual intercourse. Early sex was modestly associated with subsequent illegal drug initiation, particularly among females. Drug prevention services should be provided to youth engaged in early sexual activity.

Keywords

African Americans; Substance abuse; Sexual behavior; Gender

Introduction

Many risky behaviors, such as early sexual debut and illegal drug use, have their onset during adolescence. Half of high school graduates have used at least one illegal drug (51 %), with approximately a third (30 %) initiating use as early as age 13 or 14 (Johnston, O'Malley, Bachman, and Schulenberg, 2005). Many factors have been found to be

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associated with the onset of illegal drug use in adolescence, including illegal drug use by peers or parents, parental socioeconomic status, religion, and individual tobacco or alcohol use, and early sexual experiences, among others (Chen, Dormitzer, Bejarano, and Anthony, 2004; Ellickson, Tucker, Klein, and Saner, 2004; Miller and Miller, 1997; Wagner and Anthony, 2002; Ensminger, 1990). In this study, we turn our attention to the association between early sexual experience and drug use initiation.

About half of high school students have initiated sexual intercourse (median age of sexual debut at around age 17) with approximately 6% initiating intercourse before the age of 13 (Eaton et al., 2006). In addition to early sexual experiences leading to unwanted pregnancy, becoming adolescent parents, and increasing the likelihood of STD or HIV infection (CDC, 2000; Kaestle, Halpern, Miller, and Ford, 2005; O'Donnell, O'Donnell, and Stueve, 2001), numerous cross-sectional studies find early onset of sexual intercourse coexists with drug use (Brook, Balka, Abernathy, and Hamburg, 1994; Ensminger, 1990; Shrier and Crosby, 2003; Zabin, Hardy, Smith, and Hirsch, 1986). Several hypotheses have been proposed on the mechanisms for the association between early sexual behavior and drug use: (1) Use of illicit drug use, similar as use of alcohol, might affect cognitive functioning and influence adolescents' decision making, including early onset of sexual intercourse and other risky sexual behaviors (Brook, Brook, Pahl, and Montoya, 2002). (2) Involvement in one deviant behavior is linked to higher tolerance of other deviant behaviors among adolescents. For example, the second deviant behavior, e.g. illegal drug use, might occur due to decreased influence of protective factors subsequent to engaging in an initial risk behavior, e.g. initial sexual intercourse (Mott and Haurin, 1988). And (3), there might be common factors underlying the co-occurrence of risky sexual behavior and illegal drug use. These common factors might include personality traits, such as sensation seeking (Stanton, Li, Cottrell, and Kaljee, 2001) or problem behavior (Jessor and Jessor, 1977).

While many studies indicate that use of illegal drugs is associated with subsequent initiation of sexual intercourse (Capaldi, Crosby, and Stoolmiller, 1996; Guo et al., 2005; Mott and Haurin, 1988; Ohene et al., 2005; Rosenbaum and Kandel, 1990; Rosenthal et al., 1999; Santelli et al., 2004), no more than a few studies have examined whether early sexual experience is associated with subsequent onset of drug use among adolescents (Mott and Haurin, 1988; Poikolainen et al. 2001; Stanton et al., 2001). For example, there are virtually no reports on the timing of drug use onset comparing youth with early sexual experiences to those without them; and even less particularly for minority youth. In addition, gender variation tends to be ignored in the investigation of the relationship between onset of early sexual intercourse and drug use.

Race is a robust factor associated with early sexual activity. Black adolescents engage in first sexual intercourse earlier than Whites or Hispanics (Grunbaum et al., 2004), possibly due to cultural norms for Blacks on sexual intercourse or the early maturity among Blacks, especially males (Sun et al., 2002). In contrast, they are in general, less likely than Whites or Hispanics to use illegal drugs (Johnston et al., 2005). Early onset of sexual intercourse might be a more normative behavior in Blacks and, therefore, its relationship with other deviant behaviors, e.g. use of illegal drugs, might be not consistent with other racial/ethnic groups. The few existing studies offer inconclusive and basically opposing results. For example,

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Brook et al. (1994) reported a positive association between early sexual experience and drug use among African American adolescents, while Stanton et al. (1993) reported no such an association among them. In addition, other studies suggest that the relationship between sexual activities and drug use among African American youth is not as strong as among White youth (Mott and Haurin, 1988; Ohene et al., 2005; Rosenthal, et al., 1999).

Addressing some limitations of prior research and seeking to help increase knowledge about the determinants of illegal drug use among young African Americans, we explore the hypothesis that African American youth involved in early sexual activities (by age 13) would be more likely than their counterparts to subsequently start illegal drug use. The study uses a large dataset from more than 30 Historically Black Colleges and Universities (HBCUs), with survival analyses that allow estimating the probability of drug use initiation and the timing of the event, while controlling for selected potential confounders and mediators. The study also explores possible male-female differences in the association between early sexual experience and illegal drug use.

Previous research finds initiation of drug use is often related with other factors, e.g. peer drug use (Miller and Miller, 1997) and Grade Point Average (GPA, Ellickson et al., 2004), parental socioeconomic status (Miller and Miller, 1997; Wang et al., in press), importance of religion (Sinha et al., 2007; Wills et al., 2003), and individual tobacco or alcohol use (Ellickson et al., 2004; Miller and Miller, 1997; Wagner and Anthony, 2002). However, a limitation of cross-sectional data is it is difficult to establish temporal sequences of these variables, which were collected among college students but are likely to be more dynamic over the developmental stages of adolescence, with onset of illegal drug use. Therefore we included several potential confounders or mediators that would be relatively static, e.g. family socioeconomic status, as well as factors for which we could figure out their sequences with onset of illegal drug use based on the survey data, e.g. prior alcohol or tobacco use.

Methods

Data source:

This study used data from the 2001 Historically Black Colleges and Universities (HBCU) Substance Use Survey conducted by the National HBCU Substance Use Consortium with funding from the Center for Substance Abuse Treatment (Browne, Clubb, Wang, and Wagner, in press; Washington, Wang and Browne, 2009). An anonymous survey was administered to entering freshmen on 35 HBCU campuses located in 17 states in the southern, mid-western and eastern regions of the United States. The survey was conducted during freshmen orientation, freshman classes, and freshman assemblies in 2001-2002 school year. The goal of the survey was to assess drug use and sexual behaviors at designated institutions. The questionnaire was divided into seven content areas: demographic data, education, religion/spirituality, family and social history, alcohol and drug knowledge, alcohol and drug use, and sexual behaviors.

MayaTech Corporation implemented the survey and their Institutional Review Board deemed the survey exempt; however, signed consent was obtained from each participant.

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Trained research staff described the purpose of the survey, risks, and benefits before distributing survey packets. Students completed the paper-and-pencil questionnaire and put it into a sealed box after completion. Morgan State University IRB committee approved the secondary analyses of this data.

A total of 10,546 participants completed the questionnaires, including 10,132 African American students. Among the African American students, 1,785 participants did not report an age of their first sexual intercourse. Other 162 participants did not report their drug use history and 307 participants did not report their gender among the African American with information on age of first sexual intercourse. Participants having initiated illegal drug use before age 14 were further excluded (n=506), leaving 7,372 eligible African-American students for our analysis. A greater proportion of the students in the analytic sample tended to be less than 19 years old (73% versus 69% among excluded sample) and female (65% versus 52%) as compared to the African American students excluded from the analyses; no significant differences were detected in family income and parental educational level .

Assessment of initiation of illegal drug use

Students reported their age of first use of the following drugs if at all: marijuana, crack/rock cocaine, powder cocaine, speed, sedatives, PCP, hallucinogens, heroin/any opiate, inhalants, steroids, designer drugs, other stimulates, and prescription drugs. For each drug listed, respondents could mark a “never” category as well as several age categories. All participants who started illegal drug use before age 14 were excluded, as discussed earlier. Therefore, the age categories in the present analyses included “14/15 years old”, “16/17 years old”, “18-20 years old” and “21 years or older”. For this report, the youngest age category reported to any of the drug questions was used to indicate the age of initiation of illegal drug use.

Assessment of early sexual experience and other time-invariant covariates

Sexual experiences were assessed by several questions inquiring about the age when the participant first participated in vaginal sex, anal sex, or same-gender sex. Response choices included a “never” category, and age categories of “10 or younger”, “11-13 years old”, “14-16 years old”, “17-19 years old”, “20 or older”. The youngest age category reported to any of these behaviors was used to indicate the age of first sex experience. Participants who initiated sexual activities by age 13 (at or before age 13) were categorized as “with early sexual experience” and the others were categorized as “without early sexual experience”.

Other covariates were selected based on prior research and included: age of the respondent at the time of assessment, gender, total family income, parental educational level, the personal importance of religion, and the college attended. Since the age range of survey respondents was very narrow, we did not treat age as a continuous variable but instead chose to categorize it as “18 years or younger” or “older than 19” based on quintiles. The students older than 19 years are within the highest quintile. Total family income was categorized as “less than or equal to $30,000 per year” or “more than $30,000 per year”. Religion was categorized as “extremely or very important” or “not very important” based on the question “How important is religion/spirituality in your life?” Parental educational level used the

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highest education level of either mother or father and was categorized as “less than college” or “some college or more”.

Assessment of a time-variant covariate (tobacco or alcohol use)

Tobacco or alcohol use was assessed by multiple questions regarding “At what age did you first actually use any of these substances (cigars, cigarettes, smokeless tobacco, beer, wine/wine cooler and hard liquor)?” Responses included a “never” category and age categories of “under 10 years old”, “10/11 years old”, “12/13 years old”, “14/15 years old”, “16/17 years old”, “18-20 yeas old” and “21 years or older”. The first three age categories are further collapsed into age category of “less than 13 years old”. The youngest age reported at first use of any of the tobacco or alcohol products was used to indicate the age of tobacco or alcohol (tobacco/alcohol) initiation. To analyze its prospective association with no time ambiguity, tobacco or alcohol use was treated as a time-variant and a time-lagged variable, indicating lifetime tobacco or alcohol use in the age period right before illegal drug use (e.g. a student who started tobacco or alcohol use at age “14/15 years” was counted as positive when assessing illegal drug use at age “16/17 years” old and beyond).

Statistical analyses

We conducted basic contingency table analyses and then turned to survival models to estimate the hazard of onset of illegal drug use at age 14 or older by early sexual intercourse. Discrete-time survival models were applied because time was assessed in “discrete chunks”. The survival time was defined as “age” from birth to the age of onset of first illegal drug use set as the earliest age marking the categorized age groups (e.g., 14/15 years old was operationalized as age 14). In preparation for survival analyses, the cross-sectional data were re-organized into person-age records where each observation describes the experience of a student at a given age interval. Kaplan-Meier methods were used to estimate the cumulative probability of use of illegal drugs up to the age period (t) and discrete-time survival analyses were modeled in the logistic regression framework to estimate the hazard ratios and corresponding confidence intervals (Singer and Willett, 1993). A comparison between the unadjusted and adjusted hazard ratio estimates (including covariates) provides information about the extent to which the association between illegal drug use and early sex may depend on other suspected determinants of illegal drug use. As for the possibility of collinearity between parental education level and family income, we ran different tests and found that estimates did not change significantly when variables were entered in separate models, and a closer examination of the correlation matrix via diagnostic procedures of Harkness (Belsley, Kuh, and Welsch, 1980) confirmed that collinearity between these two variables was not problematic.

Results

The sample is composed of about two-third females (65%) and one-third males (35%). Most students (96%) were 21 years or younger when surveyed and about three-fourths were 18 years or younger. Table 1 presents the cumulative probability of illegal drug use, sexual intercourse, tobacco and alcohol use by age for females and males, separately. About 9% of the students had initiated illegal drug use by age 15, 21% by age 17 and 26% by age 20.

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About 14% of the students initiated sexual intercourse by age 13, 52% by age 16 and 76% by age 19. The probability of illegal drug use and the probability of sexual intercourse were higher for males, compared to those for females at each age. An estimated 27% of students had used tobacco and 57% had used alcohol by age 20. Similarly, the probabilities of using tobacco and alcohol were higher for males compared to those for females at each age.

Figure 1 illustrates the Kaplan-Meier cumulative probability of using illegal drugs by a specific age period stratified by early sexual experience. Age by age, the probabilities of using illegal drugs were the highest among the males with early sex, followed by the females with early sex, and then by the males without early sex. The lowest probabilities were found among the females who did not engage in sexual activities prior by age 13. This figure also shows that the difference in the cumulative hazards between those with early sex and without early sex appears to be greater for females than for males.

Table 2 presents detailed information on initiating illegal drug use at age 14 or older among those with or without early sex for males and for females, separately, with and without adjustment for covariates. Among the females, 21% of those without early sex and 37% of those with early sex used illegal drugs after age 14 (χ^2_1 $p<0.001$), while among the males, 30% of those without early sex and about 42% of those with early sex used illegal drugs after age 14 (χ^2_1 $p<0.001$).

The unadjusted discrete-time survival analyses suggest that the hazards of illegal drug use are twice as high for females with early sexual experience as compared to those without early sexual experience (crude hazard ratio, HR=2.1, 95% CI: 1.8-2.6), as well as for males with early sexual experience (HR=1.6, 95% CI: 1.4-1.9), compared to those without early experience. Having a history of tobacco or alcohol use, being older in age, higher family income, higher parental education level, and regarding religion as “not important” are associated with a higher hazard of initiating illegal drug use.

The adjusted discrete-time survival analysis suggested a significant interaction between gender and early sex ($LR\chi^2_1$= 4.58, p=0.032); meanwhile, an unanticipated significant interaction between early sex and tobacco/alcohol use was also detected ($LR\chi^2_1$=5.07, p=0.024). To avoid a complicated three-way interaction, an interaction term between early sex and tobacco or alcohol use was included in the gender-specific models. The crude and adjusted hazard ratio (HR) estimates for the gender-specific models are summarized in Table 2. Early sex remained independently related to more likelihood of initiating illegal drug use even in the presence of other covariates for each gender. Among students with no history of tobacco or alcohol use, the hazard of initiating illegal drug use was increased among those with early sex as compared to students without early sex (adjusted hazard ratio, aHR=2.1, 95% CI: 1.6, 2.8 for females; aHR=1.5, 95% CI: 1.2, 1.9 for males). A history of tobacco or alcohol use was found to be related to a higher likelihood of initiating illegal drug use, separately, for each gender. The students with early sex as well as a history of tobacco or alcohol use had even higher likelihood of initiating illegal drug use than students with either behavior alone, particularly among females. Regarding religion as “not important” was

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found to be associated with subsequent initiation of illegal drug use for each gender; older age at survey was only related to subsequent onset of illegal drug use for females.

Discussion

The main findings of this study suggest that sexual experience by age 13 is modestly related to subsequent onset of illegal drug use in a sample of African American college students on HBCU campuses. Students with early sexual experiences had higher hazards of illegal drug use, compared to those without early sexual experiences. Gender and a history of tobacco and alcohol use modified the association. Females who had early sexual experience and previous tobacco or alcohol use, had higher hazards of using illegal drugs than females with only one or none of the two risky behaviors.

Several limitations of this study need to be mentioned before further discussion. The survey design relies on self report of behaviors over several years. There may be greater bias in recalling the timing of the event than acknowledging event occurrence. However, estimates for the African American youth attending HBCUs were very similar to national rates obtained in the 2005 national Youth Risk Behavior Surveillance Survey (females: HBCU 8% vs. national 7%; males: HBCU 23% vs. national 27%). In addition, we must acknowledge several weaknesses in our age measurement. The analysis would be improved if more specific data on age were obtained, rather than relying on categorized age groups. We recognize that the timing of puberty may differ for males and females, and a definition of early sexual experience based merely on age that ignores the effect of puberty may be biased. This may help explain, at least in part, the interaction between early sex and gender. Finally, we advocate caution in generalizing conclusions drawn from this study to African American youth nationwide. This sample was composed of freshman students from Historically Black Colleges and Universities who tended to come from African American families of relatively higher socioeconomic status. The results based on this sample need to be replicated with more diverse African American samples before being generalized to African American youth of other socioeconomic backgrounds. Future studies should also assess a larger domain of potential confounders or mediators.

Notwithstanding these and other limitations, this study is among the few that examine the association between early sexual debut and subsequent onset of illegal drug use and its possible gender variation in a large sample of African American youth. The positive, yet modest association between early sexual intercourse and illegal drug use is consistent with findings from several other studies which indicate that patterns of early risky behaviors for African American youth may be similar to youth of other racial groups or youth from other countries (Mott and Haurin, 1988; Poikolainen et al., 2001; Stanton et al., 2001).

A temporal sequence of earlier onset of sexual intercourse and later onset of illegal drug use, as identified in this study, does not necessarily indicate a causal relationship of early sexual intercourse on later onset of drug use. However, results of this study suggest a clustering of early-onset of risky behaviors, e.g. sexual intercourse and illegal drug use, within African American individuals and have implications for the prevention of early-onset risky behaviors in adolescents. Some speculations about the modest and significant relationship between

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early onset of sexual behavior and later onset of drug use might be explained by common factors underlying both behaviors, such as unconventional psychosocial attitudes and behaviors (Jessor & Jessor, 1977) or sensation seeking (Stanton et al., 2001). Higher tolerance of other deviant behaviors of illegal drug use among adolescents (Mott and Haurin, 1988) after being involved in the first sexual intercourse might also account for the positive association. An alternative possibility is that adolescents who engage in early risky sexual behavior are more likely to be involved with adolescents who engage in other problem behaviors, such as illegal drug use, and therefore are exposed to more opportunities to use illegal drugs (Brook et al., 2002; Jersild, Brook, and Brook, 1978).

A stronger association between sexual activities and later illegal drug use for females was also found by Mott and Haurin (1988) among their national cohort samples. Mott and Haurin postulated that the association may represent a more deviant trait for girls than for boys. A study focused on female adolescents suggested that greater age difference is likely to exist between younger girls and their sex partners (Abma, Martinez, Mosher, and Dawson, 2004). Their older sex partners may serve as vectors to expose girls to more opportunities to use illegal drugs (Wagner and Anthony, 2002).

Early onset of sexual intercourse has been found to be associated with risky sexual behaviors, e.g. multiple sexual partners (O'Donnell et al., 2001). This study suggests that early-onset sexual experiences are also associated with other risky behaviors, such as illegal drug use. Hence, health centers and school-based wellness programs may contribute to the prevention of drug use by making services available to youth who have already engaged in other risky behaviors.

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Glossary

African Americans:	Persons living in the United States having origins in any of the Black groups of Africa.
Substance abuse:	It refers to the harmful or hazardous use of psychoactive substances, including alcohol and illicit drugs.
Sexual behavior:	Sexual activities of humans.
Gender:	A person's concept of self as being male and masculine or female and feminine, or ambivalent, based in part on physical characteristics, parental responses, and psychological and social pressures.

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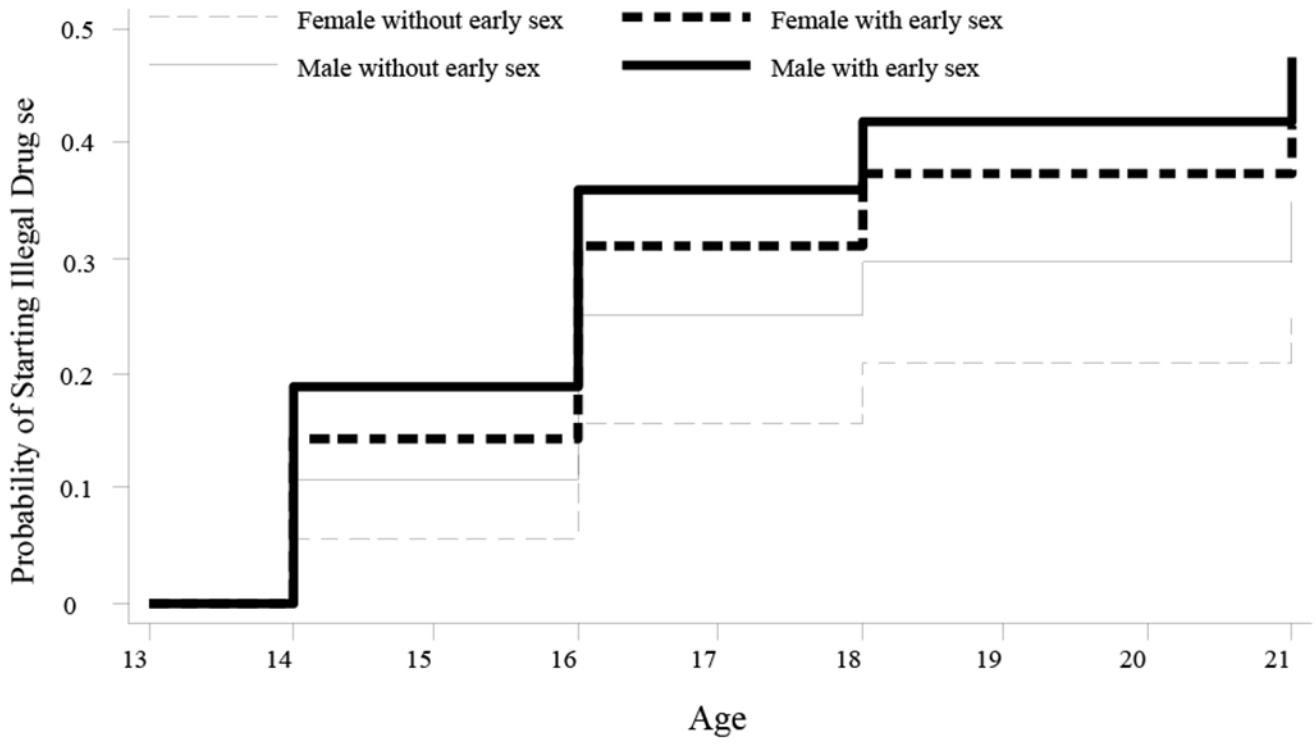

Figure 1.

Kaplan-Meier Estimates of the Cumulative Probability of First Illegal Drug Use by Gender and Early Sexual Experience Among a Sample of African American College Students on HBCU campuses (n=7,372).

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Table 1.

Estimated Cumulative Probability of Illegal Drug Use, Sexual Intercourse, Tobacco and Alcohol Use by Age for Females and Males, Among a Sample of African American College Students on HBCU Campuses Who Had Not Initiated Illegal Drug Use Before age 14 (n=7,372).

	Total (n=7,372)		Female (n=4,775)		Male (n=2,597)	
	%	95% CI	%	95% CI	%	95% CI
Age at first illegal drug use (yrs)						
14-15	8.6	8.0 - 9.3	7.1	5.7- 7.1	14.1	11.5-14.1
16-17	20.8	19.9-21.7	18.1	16.0-18.1	29.5	26.1-29.5
18-20	26.0	25.0-27.0	23.6	21.2-23.6	34.6	30.9-34.6
Age at first sexual intercourse (yrs)						
13 or younger	13.5	12.8-14.3	8.1	7.4- 8.9	23.5	21.9-25.2
14-16	51.7	50.5-52.8	44.0	42.6-45.4	65.8	64.0-67.7
17-19	76.0	75.0-77.0	72.6	71.4-73.9	82.2	80.7-83.6
Age at first tobacco use (yrs)						
Under 10	1.4	1.1- 1.7	1.1	0.9- 1.5	1.8	1.4- 2.4
10-11	3.0	2.6- 3.4	2.7	2.3- 3.2	3.4	2.8- 4.2
12-13	7.0	6.4- 7.6	6.4	5.7- 7.1	8.1	7.1- 9.2
14-15	14.4	13.6-15.2	12.4	11.5-13.4	17.9	16.5-19.5
16-17	23.3	22.3-24.3	20.4	19.2-21.5	28.7	27.0-30.5
18-20	27.2	26.2-28.2	24.2	23.0-25.5	32.6	30.8-34.5
Age at first alcohol use (yrs)						
Under 10	4.7	4.3- 5.3	4.2	4.2- 5.4	4.8	4.0- 5.7
10-11	7.6	7.0- 8.3	6.9	6.9- 8.4	7.6	6.6- 8.7
12-13	13.6	12.8-14.4	12.4	12.4-14.4	13.9	12.6-15.3
14-15	25.9	24.9-26.9	23.7	23.7-26.2	27.6	25.9-29.4
16-17	46.8	45.7-48.0	44.9	44.9-47.7	47.8	45.9-49.8
18-20	57.2	56.0-58.3	56.0	56.0-58.8	56.8	54.9-58.7

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Table 2.

Selected Sample Characteristics and Hazard Ratio (HR) Estimates of First Illegal Drug Use, Stratified by Gender Among a Sample of African American College Students on HBCU Campuses (n=7,372).

	Onset of illegal drug use									
	Females (person periods= 13,167)					Males (person periods= 6,790)				
	Row %[a] (n=4,775)	Crude HR	p value	aHR(95%CI)[b]	p value	Row %[a] (n=2,597)	Crude HR	p value	aHR(95%CI)[b]	p value
Early sex by age 13										
No	20.9*	1.0		---	---	30.0*	1.0		---	---
Yes	37.1*	2.1(1.8-2.6)	<0.001	See below		42.2*	1.6(1.4-1.9)	<0.001	See below	
Previous tobacco or alcohol (T/A) use										
No	2.3*	1.0		---	---	4.5*	1.0		---	---
Yes	35.0*	2.9(2.6-3.4)	<0.001	See below		50.4*	2.6(2.3-3.1)	<0.001	See below	
Early sex, previous tobacco/alcohol use										
No, no	---	1.0		1.0		---	1.0		1.0	
Yes, no	---	2.2(1.7-2.9)	<0.001	2.1(1.6-2.8)	<0.001	---	1.5(1.2-1.9)	<0.001	1.5(1.2-1.9)	0.001
No, yes	---	3.0(2.6-3.4)	<0.001	2.8(2.4-3.3)	<0.001	---	2.7(2.2-3.2)	<0.001	2.7(2.2-3.3)	<0.001
Yes, yes	---	4.5(3.4-5.9)	<0.001	4.5(3.4-6.0)	<0.001	---	3.4(2.7-4.4)	<0.001	3.2(2.5-4.1)	<0.001
Age group										
18 or younger	21.5*	1.0		1.0		30.8*	1.0		1.0	
19 or older	24.8*	1.1(0.9-1.3)	0.225	1.2(1.0-1.4)	0.025	37.5*	1.2(1.0-1.4)	0.018	1.2(1.0-1.4)	0.097
Annual family income										
$30,000 or below	21.2	1.0		1.0		33.4	1.0		1.0	
More than $30,000	23.1	1.1(1.0-1.3)	0.086	1.1(1.0-1.3)	0.084	33.3	1.0(0.9-1.2)	0.794	1.0(0.9-1.2)	0.718
Importance of religion										
Extremely or very important	20.2*	1.0		1.0		30.9*	1.0		1.0	
Not important	34.3*	1.9(1.7-2.3)	<0.001	1.7(1.5-2.1)	<0.001	39.7*	1.4(1.2-1.7)	<0.001	1.4(1.1-1.6)	0.001
Parental educational level										
Lower than college	21.6	1.0		1.0		32.4	1.0		1.0	
Some college or more	22.5	1.1(0.9-1.3)	0.515	1.1(0.9-1.2)	0.475	33.1	1.0(0.9-1.2)	0.653	1.1(0.9-1.3)	0.356

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*Chi-square test p-value ‹ 0.05;

a. Row % means the percentage of illegal drug use initiated after age 14 for each category of covariates. For T/A use, it means the percent of illegal drug use initiated after age 14 by whether the students initiated T/A use at the survey or not;

b. Adjusted hazard ratio (aHR) estimates were adjusted for the covariates listed in the table and the college attended.

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