

# Age of Substance Use Initiation and Sexual Violence Victimization among Female Adolescents

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**Objective:** In this study, I examined the association between age of substance use initiation and sexual violence (SV) among adolescent girls. **Methods:** Data were drawn from the 2017 Youth Risk Behavior Survey, and the sample included 7526 girls. Logistic regression was used to estimate the relationship between age of initiation of alcohol use, marijuana use and cigarette smoking, and SV, assessed by forced sexual intercourse and experiencing SV. **Results:** A dose-response association was observed between age of substance use initiation and SV. Across all 3 substance use variables and for both SV outcomes, those who initiated substance use before age 15 were more likely to experience SV than those who initiated at or after age 15, who, in turn, had a higher likelihood of experiencing SV than those who had never initiated substance use. **Conclusion:** Early initiation of substance use may be a meaningful marker of risk for SV victimization in later adolescence. SV prevention programs could use early initiation of substance use to identify adolescents who are at increased risk for SV and provide them with targeted interventions. To be more effective, primary prevention of SV may need to begin targeting substance use in early adolescence.

**Key words:** adolescents; substance use; age of initiation; sexual violence

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Every year, millions of Americans experience sexual violence (SV), a serious problem that affects people of every sex, sexual orientation, and age. The US Centers for Disease Control and Prevention (CDC) defines SV as “a sexual act that is committed or attempted by another person without freely given consent of the victim or against someone who is unable to consent or refuse.”<sup>1</sup> It encompasses forced or alcohol/drug facilitated penetration of a victim, forced or alcohol/drug facilitated incidents in which the victim was made to penetrate a perpetrator or someone else, non-physically pressured unwanted penetration, intentional sexual touching, or non-contact acts of a sexual nature.<sup>2</sup>

Although both males and females experience SV, most victims are female. Estimates from the CDC’s National Intimate Partner and Sexual Violence Survey show that one in 4 women and nearly one in 10 men have experienced SV during their lifetime; moreover, nearly one in 5 women and one in 38 men have experienced completed or attempted

rape during their lifetime.<sup>2</sup> In a study of more than 23,000 students across 9 institutions of higher education, Krebs et al<sup>3</sup> found that the prevalence for completed sexual assault experienced by undergraduate students was 10.3% for females and 3.1% for males. Also, the prevalence for completed rape among undergraduate students was 4.1% and 0.8% for female and male students, respectively.<sup>3</sup> Among high school students, in 2017, about one in 9 girls and one in 36 boys reported having experienced sexual dating violence in the previous year.<sup>4</sup>

The effects of SV are many and include both physical and psychological functioning deficits. Compared to women who do not experience SV, those that do have higher levels of a myriad of adverse outcomes, including depression,<sup>5</sup> anxiety,<sup>6</sup> and feelings of worthlessness.<sup>7</sup> Also, among women, SV has been associated with health-compromising behaviors and conditions such as smoking and binge drinking, being obese, and reporting more poor mental health days.<sup>8</sup>

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Substance use is a modifiable factor that has been linked to SV. Cross-sectional data reveal an association between substance use and SV, with studies demonstrating positive associations between SV and the use of alcohol,<sup>9,10</sup> marijuana<sup>9,11</sup> and cigarettes.<sup>12,13</sup> Temporal relationships between SV and substance use also have been reported. Findings from a longitudinal investigation showed that **daily smokers at baseline were more likely than nonsmokers to report SV victimization at 2 subsequent waves of data.**<sup>14</sup> SV also has been assessed as a predictor of substance use. In one study, SV in early adulthood predicted substance use in young adulthood.<sup>15</sup> **Among high school students, exposure to SV served as a risk factor for daily cigarette smoking,<sup>16</sup> and for use of alcohol, marijuana and other drugs.**<sup>11</sup> In a study among college students, experiencing SV predicted next day marijuana use.<sup>17</sup> The findings on SV predicting substance use suggest that substance use may be used to cope with having experienced SV. Clearly, there is a relationship between substance use and SV; however, the mechanisms underlying this association are yet to be well understood.<sup>18</sup>

Research on substance use shows that the age at which substance use was initiated has a bearing on the outcome under examination – the younger respondents were when they first began to use substances, the greater the likelihood of the outcome. For example, previous studies on risky behaviors among adolescents demonstrate that **those who were younger when they started using substances had greater odds of driving while drunk,<sup>19</sup> and of being in a motor vehicle crash due to drinking.**<sup>20,21</sup> In their study, where age of initiation was assessed as an ordinal variable, Hingson et al<sup>21</sup> reported that the risk of being in a fight increased with each decreasing age category. Literature on sexual risk behavior reveals that **early initiators of substance use are more likely to report multiple partners,<sup>22,23</sup> unprotected sexual intercourse, and being drunk or high during sexual intercourse.**<sup>22</sup> Inquiries on mental health report that **earlier onset of hard drug use increases the likelihood of suicide risk factors such as depressive symptoms, and suicide ideation,<sup>24,25</sup> and of developing dependence or abuse.**<sup>26</sup> This body of literature on age of substance use initiation and risk behaviors demonstrates that although those who use substances are at higher risk for these health-compromising outcomes, a younger age at initiation of substance use confers an even greater risk.

## Current Study

Although the link between substance use and SV among adolescents is well established, few studies have examined the relationship between age of substance use initiation and the likelihood of SV victimization. Undeniably, SV victimization is not a risk behavior; nevertheless, it is plausible that age of substance use initiation could have a relationship with SV, not unlike the one observed with risk behaviors, where those with a younger age at initiation are more likely to experience SV victimization. Indeed, one examination of substance use onset and SV found that participants who had experienced sexual abuse or SV were more likely to report having initiated smoking prior to age 13 as opposed to age 13 or older.<sup>16</sup> There is, however, a dearth of research on age of substance use onset and SV. Given the prevalence of SV among adolescents, more research on factors that may be associated with SV is needed. Findings from such research could provide useful information to help SV preventive programs in identifying adolescents who may be at greater risk of SV victimization. In the current study, I sought to extend the research linking substance use and SV victimization by examining the effect of age at substance use initiation and SV victimization among female adolescents. Based on findings from studies on substance use and health-risk behaviors, I hypothesized that adolescents who initiated substance use at a younger age would have a higher likelihood of experiencing SV.

## METHODS

### Participants

Data for this study were drawn from 2017 Youth Risk Behavior Survey (YRBS). The YRBS is a cross-sectional survey that monitors 6 categories of health risk behaviors that contribute to morbidity and mortality among adolescents: (1) behaviors that contribute to unintentional injuries and violence, (2) tobacco use, (3) alcohol and other drug use, (4) sexual behaviors contributing to the contraction of STIs and unintended pregnancy, (5) unhealthy dietary behaviors, (6) and physical inactivity.<sup>4</sup> Information including the objectives, methods, and sampling procedure of the YRBS are described elsewhere.<sup>27</sup> The survey utilized a 3-stage cluster sample design to produce a nationally representative sample of students in grades 9-12 who attend public and

private schools. The 2017 YRBS included 14,764 participants. Of these, 7526 were girls, who comprised the sample of the current study.

## Measures

**Outcome variables.** The 2 outcome variables were being physically forced to have sexual intercourse and experiencing sexual violence. Being physically forced to have sexual intercourse and was measured based on the response to the question: "Have you ever been physically forced to have sexual intercourse when you did not want to?" Participants who answered "Yes" were coded 1, and those who answered "No" were coded 0. For experiencing sexual violence, participants were asked: "During the past 12 months, how many times did anyone force you to do sexual things that you did not want to do?" Response options ranged from 0 times to 6 or more times. Responses were dichotomized into 1 for those who answered one or more times and 0 for those who indicated "0."

**Explanatory variables.** The 3 explanatory variables of interest were age at first alcohol use, age at first marijuana use, and age at first cigarette smoking. The original question on alcohol use asked participants: "How old were you when you had your first drink of alcohol other than a few sips?" Response options were: "I have never had a drink of alcohol other than a few sips," "8 years old or younger," "9 or 10 years old," "11 or 12 years old," "13 or 14 years old," "15 or 16 years old," and "17 years old or older." For this study, the variable was recoded as "0 = never (non-initiators)," "1 = 15 years or older (later initiators)," and "2 = before age 15 (early initiators)." Defining early initiation as less than 15 years old is consistent with other studies that have used this cut-off to define early substance use initiation.<sup>28,29</sup> For marijuana use, YRBS participants were asked: "How old were you when you tried marijuana for the first time?" with response options ranging from "I have never tried marijuana" to "17 years old or older." For consistency with the coding for alcohol use, responses were recoded into "0 = never (non-initiators)," "1 = 15 years or older (later initiators)," and "2 = before age 15 (early initiators)." The original question on cigarette smoking was: "How old were you when you first tried cigarette smoking, even one or 2 puffs?" Response options ranged from: "I have never tried cigarette

smoking, not even one or 2 puffs" to "17 years old or older." This variable also was recoded into "0 = never (non-initiators)," "1 = 15 years or older (later initiators)," and "2 = before age 15 (early initiators)."

**Control variables.** A literature review identified the following variables that were considered as potential confounders in the current study: depression, perceived bodyweight, and sexual minority. Research among women has shown that women with higher levels of depression symptoms are more likely to experience SV than women with lower levels.<sup>30</sup> Participants in the YRBS were asked: "During the past 12 months, did you ever feel so sad or hopeless almost every day for 2 weeks or more in a row that you stopped doing some usual activities?" For this study, participants who answered "Yes" were coded 1, and those who answered "No," 0. Among girls, perceived bodyweight has been associated with dating violence victimization, type of victimization, and number of victimization acts.<sup>31</sup> Perceived bodyweight was measured with the item "How do you describe your weight?" Response options were: "Very underweight," "Slightly underweight," "About the right weight," "Slightly overweight," and "Very overweight." For this study, adolescents were coded 1 if they responded "Slightly overweight" and "Very overweight;" otherwise, they were coded 0. The likelihood of SV victimization also has been found to be greater for sexual minority individuals than for heterosexual individuals.<sup>32</sup> For sexual minority, adolescents were coded 1 if they self-identified as lesbian, gay or bisexual; otherwise, they were coded 0. The following variables were also controlled for: age, grade level, and race/ethnicity. Age was measured as a continuous variable. Grade was coded "0 = 9th grade," "1 = 10th grade," "2 = 11th grade," and "3 = 12th grade." Race/ethnicity was coded as follows: "0 = white," "1 = black or African-American," "2 = Hispanic," and "3 = other." Socioeconomic status (SES) data are not available in the YRBS; consequently, no adjustment could be made in the analysis.

## Data Analysis

I used descriptive statistics to characterize the sample and bivariate analyses to explore associations between age of substance use initiation and the probability of experiencing SV. Variables that were significant in the bivariate analysis were included

**Table 1**  
**Description of the Study Sample**

Characteristic	N	%
<b>Age</b>		
12-14	1090	14.48
15-16	3738	49.67
17-18	2695	35.81
<b>Race</b>		
White	3245	43.12
African American	1442	19.16
Hispanic	1857	24.67
Other	821	10.91
<b>Forced sex</b>		
No	6543	86.94
Yes	800	10.63
<b>Sexual violence</b>		
No	6108	81.16
Yes	1040	13.82
<b>Age of alcohol use initiation</b>		
Never	2913	38.71
≥ 15 years	1744	23.17
< 15	2391	31.77
<b>Age of marijuana use initiation</b>		
Never	4685	62.25
≥ 15	1294	17.19
< 15	1400	18.60
<b>Age of cigarette smoking initiation</b>		
Never	4498	59.77
≥ 15	608	8.08
< 15	1003	13.33

**Table 2**  
**Logistic Regression Results of the Association Between Age of Substance Use Initiation and Sexual Violence**

Predictor	Physically forced sexual intercourse	Ever experienced sexual violence
	OR (95% CI)	OR (95% CI)
<b>Age of alcohol use initiation</b>		
Never smoked	Ref.	Ref.
≥ 15 years	1.91 (1.50-2.44)	2.01 (1.61-2.50)
< 15 years	2.69 (2.17-3.35)	2.74 (2.27-3.31)
<b>Age of marijuana use initiation</b>		
Never used	Ref.	Ref.
≥ 15 years	1.83 (1.46-2.29)	2.01 (1.65-2.45)
< 15 years	3.93 (3.25-4.75)	2.49 (2.09-2.97)
<b>Age of cigarette smoking initiation</b>		
Never drunk	Ref.	Ref.
≥ 15 years	2.38 (1.82-3.10)	1.83 (1.43-2.35)
< 15 years	3.23 (2.63-3.97)	2.06 (1.70-2.50)

**Note.**  
OR = odds ratio; CI = confidence interval

as covariates in the regression analyses, which used multivariable logistic regression to assess adjusted associations. The associations were estimated in terms of odds ratios (ORs) with 95% confidence intervals (CIs). The logistic regression models were checked for fit and multicollinearity. Data were analyzed using IBM SPSS Statistics version 26.

**RESULTS**

**Description of the Sample**

Nearly half of the sample (49.7%) was between 15 and 16 years of age (Table 1). Whites comprised the largest proportion of the sample (43.1%), followed by Hispanics (24.7%). Being forced to have

sexual intercourse or experiencing sexual violence was reported by 10.6% and 13.8%, respectively. Alcohol use, smoking marijuana, and smoking cigarettes were mostly reported among those under the age of 15. Initiation before age 15 years for alcohol, marijuana, or cigarettes was reported by 31.8%, 18.6% and 13.3%, respectively.

**Association between Age of Substance Use Initiation and SV**

When compared to adolescents who never drank alcohol, smoked marijuana or smoked cigarettes, those who had engaged in the 3 behaviors were significantly more likely to experience SV, with early initiators having the greatest odds. Specifically, later initiators had greater odds of SV than non-initiators but lower odds than early initiators, indicating a dose-response association between age at substance

use initiation and SV. For instance, for alcohol use, compared to non-initiators, ORs for forced sexual intercourse were 1.91 (95% CI 1.50-2.44) for later initiators and 2.69 (95% CI 2.17-3.35) for early initiators. Similarly, for sexual violence, the ORs were 2.01 (95% CI 1.61-2.50) and 2.74 (95% CI 2.27-3.31) for later and early alcohol use initiators, respectively. This dose-response association was observed for all 3 independent variables and for both outcomes (Table 2).

## DISCUSSION

In this study, I examined the association between age of substance use initiation and SV. Consistent with previous research, users of alcohol,<sup>9,11</sup> marijuana,<sup>33</sup> and cigarettes<sup>13,14</sup> were more likely to experience SV. The findings extend the literature regarding the relationship between substance use and SV among adolescent girls by demonstrating a dose-response association between age of substance use initiation and SV. As hypothesized, the younger the age at substance use initiation, the higher the likelihood was of experiencing SV. Specifically, for all 3 substance use variables and for both SV outcomes, those who initiated substance use before the age 15 were more likely to experience SV than those who initiated at or after age 15, who, in turn, had a higher likelihood of experiencing SV than those who never initiated substance use.

Given the association between substance use and SV, early initiators of substance use could have a higher likelihood of experiencing SV because of the duration of time that they have been using substances. Friends' and peers' substance use is a robust and proximal correlate and predictor of adolescent substance use.<sup>34,35</sup> Because adolescents who use substances tend to have substance-using peers, exposure to SV can stem from adolescents' social networks if those networks include friends and acquaintances who have tendencies toward sexually violent behaviors. Exposure to SV also could result from substance-using adolescents frequenting settings and social contexts where violence is more likely to occur.<sup>36</sup> For example, in obtaining substances, they may interact with more deviant individuals, who use or sell illicit drugs, or who engage in high levels of violence. Therefore, those who initiate substance use early may have an early exposure to SV from their social contexts, resulting in a greater cumula-

tive level of SV compared to later initiators.

The relationship between age of substance use initiation and SV also could have psychological underpinnings. Studies have demonstrated that a younger age at first substance use associates with disinhibited personality traits such as impulsivity and social deviance.<sup>37,38</sup> In their investigation on women arrested for intimate partner violence, Shorey et al<sup>39</sup> found that impulsivity predicted both psychological and physical violence perpetration for women. This suggests that not only could victims of SV be exposed to individuals predisposed to violence, but they themselves may engage in violent behavior if they are predisposed to these personality traits. Also, the possibility that victims of SV may have pre-existing psychological problems that increase vulnerability to SV victimization cannot be ruled out. For instance, research shows that adverse childhood experiences such as child sexual abuse and witnessing interparental violence increase vulnerability to SV victimization,<sup>40,41</sup> and youth who are exposed to adverse childhood experiences are at higher risk for substance use.<sup>42</sup> Because these adverse experiences occur early in childhood, substance use also may occur early in life, possibly as a way to cope with these traumatic events.

Although there is a link between substance use and SV, the mechanisms underlying the association between them are not yet well understood. Aside from the aforementioned situational and environmental factors creating opportunities for exposure to SV victimization, it also is possible that substances like alcohol and marijuana use may cause impaired judgment, resulting in increased vulnerability to victimization. Also, as pointed out, the relationship between substance use and SV could be bidirectional; substance use could be a predictor of SV, but the use of substances could be a coping mechanism in response to the trauma of SV victimization.<sup>17,44</sup> Additional research may shed more light on the mechanisms around this relationship, and factors that may influence it.

These findings have important implications for programs that aim to prevent both SV victimization and substance use. Given that adolescents who are at increased risk for SV victimization are more likely to use substances, interventions for SV and substance use should be intergrated.<sup>45</sup> Programs aimed at preventing substance use should include SV

components in their curricula, as this could address adolescents' potential vulnerability to SV. In fact, early substance use initiation could be a meaningful marker that could help programs identify adolescents who may need targeted intervention for SV prevention. Perpetrators are ultimately responsible for any injuries sustained by victims of SV; however, providing possible potential victims with information and skills regarding SV might empower them and make them less vulnerable to victimization. Because the relationship between substance use and SV can be bidirectional, substance use prevention programs also could be used to identify adolescents who have experienced SV and may need to be referred for crucial psychological services. Programs to prevent SV also should include components of substance use. It would be useful for professionals working with SV victims to assess for substance use and incorporate substance use prevention skills in intervention settings. Because those who begin substance use earlier appear to be at an even higher risk of SV, it is essential to implement interventions early to prevent related adverse outcomes such as SV in later adolescence and adulthood for those youth who do initiate substance use early. Primary prevention of SV may be more effective if efforts begin targeting substance use when adolescents are younger.

### Limitations

This study has several limitations. First, these data apply only to adolescents who attend school, and therefore, are not representative of all persons in this age group. Second, data on substance use and SV were obtained exclusively from self-report; therefore, underreporting or overreporting may have been possible. Third, no adjustment for SES was made because the YRBS does not collect information on SES such as parental income and employment status, or neighborhood. Therefore, the confounding due to SES was possible in the current analyses. Fourth, the SV variable did not identify the context in which violence occurred (eg, a situation involving an intimate partner, a causal date, a party, a bar, etc). Relationships between age of substance use onset and SV in these various situations may vary. Fifth, YRBS questions about SV pertain to victims of SV only. No questions were asked regarding perpetration of SV. Therefore, the relationship between substance use and SV pepe-

tration could not be assessed. Finally, my analyses were based on a cross-sectional study, and can only indicate association, not causality. Despite these limitations, this research provides evidence that adolescents who initiate substance use at an early age are at increased risk for SV.

### Conclusion

These findings support a conclusion that early initiation of substance use may be a meaningful marker of risk for SV victimization in mid- to late adolescence. Sexual violence and substance use prevention programs could be integrated to support dual endpoints. SV prevention programs could use early initiation of substance use to identify adolescents who are increased risk for SV and provide them with targeted interventions. Because those who begin substance use earlier appear to be at an even higher risk of SV, primary prevention of SV may be more effective if efforts begin targeting substance use in early adolescence.

### Human Subjects Approval Statement

The Youth Risk Behavior Survey (YRBS) study protocol was approved by an institutional review board (IRB) of the US Centers for Disease Control and Prevention (CDC). The current study involved secondary data analyses without personal identifiers; therefore, further approval by an IRB was not required.

### Conflict of Interest Disclosure Statement

No conflicts of interest to declare.

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