Drug and Alcohol Dependence 183 (2018) 69–72

Contents lists available at ScienceDirect

Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdep

Short communication

Past 15-year trends in lifetime cocaine use among US high school students

Kristin E. Schneider[a,*], Noa Krawczyk[a], Ziming Xuan[b], Renee M. Johnson[a]

[a] Johns Hopkins Bloomberg School of Public Health, Department of Mental Health, Baltimore, MD, United States
[b] Boston University School of Public Health, Department of Community Health Sciences, Boston, MD, United States

ARTICLE INFO

Keywords:
Cocaine
Adolescents
Sex differences
Race/ethnicity

ABSTRACT

Background: Most recent research on adolescent drug use has focused on alcohol, tobacco, and marijuana. Less is known about the recent epidemiology of adolescent cocaine use, which has serious health consequences.
Purpose: To describe recent trends in cocaine use by U.S. high school students, and identify differences in lifetime and repeated use across sex and racial/ethnic groups.
Methods: We used data from the national Youth Risk Behavior Surveys (YRBS) from 1999 to 2015. We estimated the prevalence of lifetime cocaine use (LCU) and repeated lifetime cocaine use (RLCU) across years by race/ethnicity and sex and tested for linear and quadratic trends.
Results: The prevalence of LCU decreased from 1999 to 2015 (9.54%–5.19%). RLCU also decreased (5.13%–2.84%). Despite the overall decline, LCU and RLCU both rose between 2009–2015 (LCU:2.78%–5.19%, RLCU:1.58%–2.84%). Boys had higher rates of LCU and RLCU than girls (LCU:6.42% vs 4.65%; RLCU:3.69% vs 2.18%). American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, and Hispanic adolescents had the highest overall prevalence of LCU. Black adolescents' LCU patterns differed from other racial/ethnic groups. The prevalence of LCU among Black boys increased over time, while the prevalence for Black girls remained consistently low.
Conclusions: Adolescent cocaine use is less common today than in the 1990s. However, rates of adolescent cocaine use have risen across all racial/ethnic groups in the past few years. Public health efforts should address at risk groups with particularly high or rising rates of cocaine use.

1. Introduction

Substance use in adolescence is a key predictor of later substance use and related health consequences, including substance use disorders, mental illness, low educational achievement, and incarceration (Aarons et al., 1999; Hall et al., 2016; Hussong et al., 2017; Macleod et al., 2004; Weinberg et al., 1998). Most research on adolescent substance use has focused on alcohol, marijuana, and tobacco. Relatively little attention has been paid to cocaine use, which has many severe health consequences (Afonso et al., 2007; Gawin, 1991; Glauser and Queen, 2007; Jovanovski et al., 2005; Rezkalla and Kloner, 2007; Schierenbeck et al., 2008; Schwartz et al., 2010; Stankowski et al., 2015). Given these significant health harms, monitoring the epidemiology of youth cocaine use is important to assure proper prevention and treatment efforts are in place.

Cocaine use among U.S. adolescents reached a peak in the mid-1980s and declined sharply in the early 1990s. Recently, cocaine use among adolescents has remained relatively low, with moderate increases observed in 1999 and 2006 (Miech et al., 2016). Conversely, (2015) work indicated that adolescent cocaine use had declined over this period and suggests that the prevalence then doubled from 2009 to 2011. Currently, the literature is mixed on how rates of cocaine consumption in the United States are changing, and findings vary by the cocaine indicators used (Kilmer and Midgette, 2017).

Less is known about recent trends in adolescent cocaine use, including differences by race/ethnicity and sex. Although boys typically have higher rates of substance use than girls, sex differences vary by substance (Johnston et al., 2010, 2017; Moss et al., 2014; Palmer et al., 2013; Wallace et al., 2003) and race/ethnicity (Johnson et al., 2015; Moss et al., 2014; Newcomb et al., 2014; Palmer et al., 2013; White et al., 2016). Identifying subgroups at high risk for early cocaine use provides foundational knowledge and is important for public health planning (Holder et al., 1999). We aim to update the literature by examining recent trends in cocaine use among US high school students by race was: *"During your life, how many times have you used any form of cocaine, including powder, crack, or freebase*?" (responses: 0, 1–2, 3–9,

* Corresponding author at: Johns Hopkins Bloomberg School of Public Health, Department of Mental Health, 624 North Broadway, 8th Floor, Room 886, Baltimore MD 21205-1999, United States.
E-mail address: kschne18@jhu.edu (K.E. Schneider).

https://doi.org/10.1016/j.drugalcdep.2017.10.028
Received 9 June 2017; Received in revised form 15 October 2017; Accepted 17 October 2017
Available online 08 December 2017
0376-8716/

Table 1
National estimate of the percentage (and 95% Confidence Interval) of U.S. High School Students Who Reported Lifetime Cocaine Use by Year and Sex.

	Girls (N = 66,919)		Boys (N = 65,721)		Total (N = 133,164)	
	LCU	RLCU	LCU	RLCU	LCU	RLCU
All years	4.65 (4.3, 5.03)	2.18 (1.98, 2.39)	6.42 (6.01, 6.85)	3.69 (3.42, 3.98)	5.57 (5.24, 5.92)	2.96 (2.77, 3.17)
1999	8.41 (6.99, 10.09)	4.00 (3.3, 4.83)	10.66 (8.99, 12.61)	6.26 (5.13, 7.62)	9.54 (8.17, 11.11)	5.13 (4.37, 6.02)
2001	8.44 (7.22, 9.84)	4.27 (3.48, 5.24)	10.34 (9.06, 11.77)	5.88 (5.00, 6.91)	9.38 (8.25, 10.65)	5.05 (4.33, 5.89)
2003	3.55 (2.65, 4.73)	1.49 (1.1, 2.02)	4.6 (3.81, 5.55)	2.52 (1.95, 3.25)	4.14 (3.37, 5.08)	2.06 (1.66, 2.56)
2005	2.77 (2.17, 3.52)	1.11 (0.8, 1.52)	3.97 (3.2, 4.92)	2.05 (1.61, 2.61)	3.38 (2.81, 4.07)	1.59 (1.28, 1.96)
2007	2.54 (1.99, 3.23)	1.17 (0.85, 1.59)	3.99 (3.41, 4.66)	2.5 (2.06, 3.03)	3.26 (2.79, 3.8)	1.83 (1.52, 2.21)
2009	1.97 (1.58, 2.46)	1.03 (0.77, 1.38)	3.51 (2.93, 4.2)	2.08 (1.63, 2.63)	2.78 (2.43, 3.18)	1.58 (1.34, 1.87)
2011	5.68 (4.89, 6.6)	2.54 (2.03, 3.17)	7.89 (7.01, 8.86)	4.42 (3.82, 5.12)	6.84 (6.17, 7.57)	3.52 (3.1, 4.0)
2013	4.46 (3.54, 5.6)	2.11 (1.57, 2.81)	6.61 (5.41, 8.06)	3.89 (3.23, 4.68)	5.53 (4.57, 6.69)	3.00 (2.48, 3.62)
2015	3.79 (3.09, 4.64)	1.77 (1.34, 2.34)	6.34 (5.16, 7.78)	3.67 (2.87, 4.68)	5.19 (4.33, 6.21)	2.84 (2.3, 3.52)
Linear Trend	$\beta = -0.26$ (< 0.001)	$\beta = -0.27$ (< 0.001)	$\beta = -0.24$ (< 0.001)	$\beta = -0.24$ (< 0.001)	$\beta = -0.25$ (< 0.001)	$\beta = -0.25$ (< 0.001)
Quadratic Trend	$\beta = 0.01$ (< 0.001)	$\beta = 0.01$ (< 0.001)	$\beta = 0.01$ (< 0.001)	$\beta = 0.01$ (< 0.001)	$\beta = 0.01$ (< 0.001)	$\beta = 0.01$ (< 0.001)

Note. LCU = used at least once, RLCU (Repeated Lifetime Cocaine Use) = used ≥3 times during lifetime

10–19, 20–39, and ≥40). We derived two cocaine use variables: (1) *any lifetime cocaine use* (LCU) (0 vs. ≥1 times), and (2) *repeated lifetime cocaine use* (RCLU) (0–2 vs. ≥3 times).

2. Methods

2.1. Data

We used data from CDC's Youth Risk Behavior Survey (YRBS), which monitors health risk behaviors among U.S. adolescents (CDC, 1999–2015). The YRBS uses a multi-stage, cluster sampling design. Estimates are representative of US high school students. We used data from nine biennial cross-sectional samples (1999–2015).

2.2. Measures

Demographics included sex (male/female) and race/ethnicity (Hispanic, White, Black, Asian, American Indian/Alaskan Native [AI/AN], Native Hawaiian/Pacific Islander [NH/PI], Multi-Racial). The cocaine use question was: *"During your life, how many times have you used any form of cocaine, including powder, crack, or freebase?"* (responses: 0, 1–2, 3–9, 10–19, 20–39, and ≥40). We derived two cocaine use variables:(1) *any lifetime cocaine use* (LCU) (0 vs. ≥1 times), and (2) *repeated lifetime cocaine use* (RCLU) (0–2 vs. ≥3 times).

2.3. Analyses

We estimated the prevalence of LCU and RLCU and 95% confidence intervals for each survey year and pooled across years between 1999 and 2015. Then, we estimated total and annual prevalence estimates stratified on sex and race/ethnicity.

Sampling weights in YRBS data were used to account for sampling probabilities and nonresponse (Brener et al., 2013). The weights were scaled so that the weighted proportions of high school students in each grade level are consistent with the proportions in national populations. We conducted Chi-square tests to assess statistical significance across groups. In all cases, we conducted logistic regression models to evaluate the significance of linear and quadratic trends in cocaine use over time. For the linear trend analysis, we estimated the log odds of cocaine use as linear function of time where time was treated as a continuous predictor. For the quadratic trend analysis, a squared term of time variable was added to regression model and evaluated its significance. Non-significant quadratic time variable was removed from the final regression for the trend test. We conducted the analyses using complex survey procedures in SAS software version 9.4 (SAS, 2013).

3. Results

LCU prevalence was 9.5% in 1999, declined to 4.1% by 2003, reached a low of 2.8% in 2009, and increased to 5.2% by 2015. Tests for both linear ($\beta = -0.25$, $p < 0.001$) and quadratic ($\beta = 0.01$, $p < 0.001$) trends were statistically significant (Table 1), indicating a linear decrease over the study period, coupled with a deceleration of decrease.

Across all years, 47% of girls and 57% of boys who ever tried cocaine used it three or more times. The prevalence of RLCU followed the same pattern as any LCU (Table 1). The average prevalence across years for RLCU was 2.96%. The observed linear ($\beta = -0.25$, $p < 0.001$) and quadratic ($\beta = 0.01$, $p < 0.001$) trends were similar to those for LCU. We observed an overall decline in RLCU with a slight incline in recent years.

Boys had higher rates of LCU (Boys: 6.42%, Girls: 4.65%) and of RLCU (Boys: 3.69%, Girls: 2.18%) than girls. Trends over time for both sexes followed the overall pattern. For girls, the prevalence of LCU ranged from 8.44% in 2001–2.54% in 2007. Prevalence for boys ranged from 10.66% in 1999–3.51% in 2009. Boys also had a higher prevalence of RLCU than girls across years (Boys: 3.69%, Girls: 2.18%). The prevalence of RLCU ranged from 6.26% in 1999–2.05% in 2005 for boys and from 4.27% in 2001–1.03% in 2009 for girls. The gender gap declined from 1999 (2.25%) to its lowest point in 2003 (1.05%) and has increased steadily since to its highest point in 2015 (2.55%).

Across years, AI/AN adolescents had the highest prevalence of LCU (10.33% (95% CI: 7.87, 13.44)), followed by NH/PI adolescents (9.18% (95% CI: 6.79, 12.31)) and Hispanic adolescents (8.35% (95% CI: 7.64, 9.12)). Black (2.18% (95% CI: 1.87, 2.53)) and Asian adolescents (3.96% (95% CI: 3.16, 4.93)) had the lowest average prevalence of LCU. White and Multi-Racial adolescents had intermediate rates of cocaine use (White: 5.37% (95% CI: 4.98, 5.79), Multi-Racial:7.48% (95% CI: 6.07, 9.17)).

Due to sample size limitations, we were only able to conduct trend analyses for White, Black, and Hispanic race/ethnic groups. We combined all other racial/ethnic categories into an "Other" group (Fig. 1). White and Hispanic adolescents had similar trends in LCU as the overall pattern described above. Black adolescents followed a different LCU pattern than White and Hispanic adolescents. LCU among Black adolescents remained low over time (Range: 1.09–3.85%). Black LCU reached its highest point in 2015 (3.85% (95% CI: 2.65, 5.57)). Prevalence among other ethnic/racial adolescents was highest in 1999, declined gradually until 2005, then increased in 2011. The 2015 prevalence for any LCU by adolescents in the other race/ethnicity group was 5.44% (95% CI: 3.6, 8.16).

Within each racial/ethnic group, boys had a higher prevalence of LCU than girls across time, except for White and Hispanic youth in