

Nonsuicidal Self-Injury Among a Representative Sample of US Adolescents, 2015


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Objectives. To provide prevalence estimates of adolescent nonsuicidal self-injury (NSSI) based on large, representative, nonclinical samples of high-school students, and to explore gender differences in health risks associated with NSSI.

Methods. We used 2015 Centers for Disease Control and Prevention Youth Risk Behavior Surveillance System data to estimate the prevalence of self-injury and variables potentially associated with self-injury for high-school-age boys ($n = 32\ 150$) and girls ($n = 32\ 521$) in 11 US states. We used logistic regression analysis to consider associations between NSSI and other health risks.

Results. Rates of boys reporting purposefully hurting themselves without wanting to die over the past 12 months ranged from 6.4% (Delaware) to 14.8% (Nevada). Rates for girls varied from 17.7% (Delaware) to 30.8% (Idaho). Rates declined with age and varied by race and ethnicity. Depression; suicidal thoughts, plans, and attempts; sexual minority status; being electronically bullied; smoking; and substance use were associated with NSSI. There were minor differences in associations between NSSI and health risk variables by gender.

Conclusions. Nonclinical populations of adolescents are at high risk for self-injury. Nonsuicidal self-injury was higher among girls than among boys, but patterns of association with other health risks were similar. (*Am J Public Health.* 2018;108:1042–1048. doi:10.2105/AJPH.2018.304470)

 See also Westers and Culyba, p. 981.

Nonsuicidal self-injury (NSSI) appears to occur relatively frequently among adolescents.¹ Studies of developed nations have indicated that between 7% and 18% of adolescents deliberately injure themselves without intending to die at least once.^{2,3} However, the prevalence of NSSI among American adolescents is not clear. Recent publications claiming an increase in this behavior among US youths have tended to rely on data collected before 2012.^{4–6} Most of the available research has relied on clinical samples or convenience samples of nonclinical populations.^{3,7} Exceptions include a study that is nearly 20 years old⁸ and 2 European studies.^{9,10} In addition, some studies that use the term “self-harm” do not report whether self-injuries were or were not intended to cause death.¹¹ To address these concerns, we used data gathered through the Centers for Disease Control and Prevention’s (CDC’s) Youth Risk Behavior Surveillance System (YRBSS) in 2015 to evaluate the prevalence of NSSI among representative

samples of high-school students from 11 states in the United States that added a discretionary question on NSSI to their surveys.

Youths appear to engage in nonsuicidal self-injurious behavior at higher rates than adults.¹² However, previous research suggests that the prevalence of NSSI may not be evenly distributed across adolescent age groups,¹³ and insufficient evidence is available to identify durable age-graded patterns in adolescent NSSI behavior. Although studies that examine racial and ethnic differences in NSSI prevalence are sparse, a few nonrepresentative samples^{14,15} suggest that racial and ethnic minorities in the United States may engage in the behavior at

higher rates than Whites. Research on gender differences in NSSI prevalence consistently indicates that females self-injure more than males^{8,16} and are more likely to receive treatment for it.^{17–19} However, studies have not yet clarified whether other variables associated with self-injury vary by gender.

Research has linked NSSI with depression and anxiety^{20–22} as well as other, more generalized negative emotions such as stress and worry.^{10,16,23} Suicidal thoughts, plans, and attempts^{24,25} are associated with NSSI. Other issues linked to NSSI include sexual abuse,^{8,26} being bullied,¹⁶ body issues,²⁷ and identifying as a sexual minority.⁹ In addition, cigarette,^{10,27} alcohol,²⁴ and drug use¹⁰ have been linked to self-injury.

Because NSSI is intrinsically harmful and is associated with other negative psychological and behavioral outcomes, including an elevated risk of suicide, a better understanding of NSSI prevalence rates and health risk behaviors that may be associated with NSSI is crucial for developing better screening and intervention efforts. The present study provides prevalence estimates for NSSI in 11 large, nonclinical, state-level samples of adolescents in the United States, examines patterns of NSSI by age and race/ethnicity, and investigates gender differences in rates of NSSI and associated risk behaviors.

METHODS

We drew data from the 2015 YRBSS, a system of national and state surveys coordinated by the CDC. The state surveys are

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usually administered by departments of health or education and provide data representative of public high-school students. The YRBSS is designed to “monitor health risk behaviors that contribute markedly to the leading causes of death, disability, and social problems among youths and adults in the United States,” including injuries, violence, sexual behavior, drug and alcohol use, eating habits, and physical activity.²⁸ In addition to a common set of 89 questions, states may include optional questions. In 2015, Arizona, Connecticut, Delaware, Florida, Idaho, Kentucky, Massachusetts, Nevada, New Hampshire, New Mexico, and Vermont asked a single question on whether respondents had purposely hurt themselves without wanting to die during the past 12 months. Three additional states also included the question about self-injury; their data were not included in this study because response rates were insufficient for generalizability.

The YRBSS uses a multistage cluster design to yield a representative sample of public high-school students in a given state.²⁹ Questionnaires were administered and collected during a single class period. Among the states in this study, response rates, calculated by multiplying the school response rate by the student response rate, exceeded 60% (from 61% for Massachusetts to 77% for Idaho, Kentucky, and Vermont), the minimum required by the CDC for results to be considered representative of public school students attending grades 9 through 12.²⁹ We counted only completed questionnaires in response rates, and 1.4% of respondents (unweighted) failed to answer the question on self-injury. Still, response rates on the self-injury question exceeded 60% among the 11 states in this study, according to either CDC or American Association of Public Opinion Research formulas.³⁰

Measuring Nonsuicidal Self-Injury

The item used by to evaluate NSSI asked, “during the past 12 months, how many times did you do something to purposely hurt yourself without wanting to die, such as cutting or burning yourself on purpose?” Response choices included “0 times” (82.5%), “1 time” (4.6%), “2 or 3 times” (5.2%), “4 or 5 times” (2.2%), and “6 or more times” (5.5%). Delaware is not included in

these percentages because it provided only a dichotomous self-injury variable (using an identical question), but it was included in all other analyses. Because a large majority of respondents did not report self-injury, we dichotomized the variable to indicate the presence or absence of reported NSSI over the preceding 12 months.

Measuring Other Health Risk Behaviors

We included several other variables potentially associated with NSSI in this study. We dichotomized variables with ordinal responses to indicate the presence or absence of the risk behavior, so that 1 indicated the presence of the quality or behavior and 0 indicated its absence. The remaining variables were already dichotomous. These variables included whether the respondent reported being sad every day for a 2-week period over the past year; reporting suicidal thoughts, plans, or attempts over the past year; and whether a suicide attempt had led to medical treatment over the past year.

Also included were whether the respondent reported sex with 1 or more persons over the previous 3 months, whether they had ever been forced to have sex, whether they fought in the past 12 months, and whether they had been electronically bullied over the previous year. We included trying to lose or gain weight and describing oneself as gay, lesbian, bisexual, or “not sure” (1 = responses other than straight and 0 = straight or heterosexual), as well as the following substance use variables: having consumed alcohol (30 days), smoked 1 or more cigarettes (30 days), or used marijuana (30 days). Our variable on hard drug use was imprecise, as states differed in the hard, nonprescription drugs they included and the time periods specified. We recoded any reported use of hard, nonprescription drugs (e.g., cocaine, methamphetamine, heroin) over any period of time as exposure.

Statistical Analysis

We calculated statistics with SAS version 9.4 (SAS Institute, Cary, NC). Population and group sizes are reported with unweighted data. We calculated parameter estimates, coefficients, significance tests, and goodness-of-fit statistics with appropriate sample weights, by using SAS SURVEY procedures,

a program module capable of handling the deliberate stratification, clustering, and unequal selection probabilities employed in the YRBSS.²⁹ We calculated population parameters and standard errors for NSSI in each state. We performed cross-tabulations with χ^2 tests of independence to look for differences in NSSI prevalence by gender, age, and race/ethnicity. To examine variables potentially associated with NSSI, we calculated weighted prevalence estimates of 15 previously described risk behaviors and computed cross-tabulations to evaluate gender differences.

We computed logistic regression models, with NSSI as a dependent variable and select health risk behaviors as independent variables, for the total pooled sample and separately by gender of respondent. One regression model included only variables common to every state questionnaire. A second model comprised only respondents in the 6 states that included all 15 variables: Arizona, Delaware, Florida, Kentucky, Massachusetts, and Nevada. We ran each regression model with no selection criteria applied. We evaluated model fit through $-2 \log L$ and Wald statistics. We performed multicollinearity diagnostics for each regression model (including computation of variance inflation factors and tolerance statistics for independent variables) in SAS with unweighted data. All variance inflation factor values were less than 3, and all tolerance values were greater than 0.66, indicating no problematic multicollinearity. To consider whether results obtained in the pooled-sample logistic regression models were consistent with state-level patterns, we also conducted regression analyses for each state separately. Because results of the state-level findings were consistent, with only minor differences in strength and significance, we do not report regression results by state.

Several questions were not asked by some of the states, including questions on suicidal thoughts (Vermont), suicide plans (Connecticut, New Hampshire), suicide attempts requiring medical care (Connecticut), fighting (New Hampshire), trying to change weight (New Mexico), and sexual orientation (Idaho, New Hampshire). Missing cases resulting from respondent errors or skipped questions were rare, ranging from 0.7% for feeling sad for 2 weeks and electronic bullying, to 5.7% for drinking alcohol during the past month. Because most missing data

were attributable to states' decisions not to include certain questions on their surveys, imputation of missing values was not appropriate. For χ^2 tests, we excluded missing cases pairwise. For regression analyses, we performed listwise deletion for missing values.

RESULTS

Table 1 reveals that the total pooled sample across the 11 states included 64 671 respondents (32 150 boys and 32 521 girls). White non-Hispanic respondents represented 52.26% of the total sample; 26.98% were Hispanic; 13.12% identified as Black; Asian/Pacific Islanders represented 2.97% of the sample; and "other" constituted 3.45%. The mean age of the pooled sample was 16.05 years.

Overall, 17.59% of respondents reported at least 1 nonsuicidal self-injurious act during the previous 12 months (Table 1). In the pooled sample, female adolescents were twice as likely as male adolescents (23.8% vs 11.3%) to report at least 1 incident of NSSI ($\chi^2 = 1763.60$; 1 *df*; $P < .001$). The prevalence of self-injury appeared to decline with age ($\chi^2 = 34.30$; 4 *df*; $P < .001$). Rates of NSSI in the pooled sample ranged from 19.4% for 14-year-old respondents, to 14.7% among 18-year-old respondents. There were also differences in NSSI

observed in the pooled sample among adolescents of different races and ethnicities ($\chi^2 = 52.44$; 4 *df*; $P < .001$). More than 20% of youths who identified as Native American reported NSSI in the year preceding the survey; by contrast, just over 12% of Black adolescents reported NSSI in the previous 12 months.

Comparisons of NSSI by state are also contained in Table 1. We did not compute tests of statistical significance among the states, but a review of the table reveals substantial variation in NSSI among the 11 states included in the study. Whereas NSSI prevalence rates in Delaware and Florida were 12.1% and 14.79%, respectively, in 4 of the 11 states (Idaho, Kentucky, Nevada, and New Mexico) adolescent NSSI prevalence exceeded 20%.

A decline in NSSI by age observed in the pooled sample was a consistent feature across the state-level results. Gender differences in NSSI patterns were also stable across the states; in all but 2 states (Connecticut and Nevada) the prevalence of NSSI behavior for girls was at least double the rate calculated for boys. Self-injury prevalence rates by ethnic and racial background varied somewhat among the states included in the study.

Gender differences in select health risk behaviors for the pooled sample of respondents are reported in Table 2. We observed statistically significant gender differences

($P < .05$) in 15 of the 16 variables in the table. We found no statistically significant difference by gender in the proportion of respondents who indicated sexual activity in the previous 3 months. The data in Table 2 reveal that girls were more likely than boys to report feeling sad, having suicidal thoughts, planning suicide, attempting suicide, and making suicide attempts requiring medical treatment. They were also much more likely than boys to report having been forced to have sex, being electronically bullied, and identifying as gay, lesbian, bisexual, or unsure. They were more likely than boys to report trying to change their body weight and drinking alcohol. Boys were more likely to report fighting, smoking cigarettes, using marijuana, and using hard drugs.

Table 3 provides results of logistic regression analyses evaluating associations between selected health risks and the probability of reporting NSSI. The independent variables in model 1 tap 9 health risk questions asked of respondents in all 11 states that comprise the pooled data sample. All independent variables in model 1 (except marijuana use) reach statistical significance in the pooled sample, suggesting that each health risk in the model is independently associated with the probability of an adolescent NSSI report. Only 1 health risk in model 1 was associated with a reduction in odds that an NSSI report would be registered:

TABLE 1—Rates of Nonsuicidal Self-Injury by Full Sample and Selected Demographic Characteristics (Weighted): Youth Risk Behavior Surveillance System, United States, 2015

Characteristic	State											Pooled Data, % (SE)
	AZ, % (SE)	CT, % (SE)	DE, % (SE)	FL, % (SE)	ID, % (SE)	KY, % (SE)	MA, % (SE)	NV, % (SE)	NH, % (SE)	NM, % (SE)	VT, % (SE)	
Total	19.45 (1.28)	18.48 (0.98)	12.10 (0.82)	14.79 (0.53)	21.32 (1.28)	20.76 (1.37)	17.98 (0.90)	20.28 (1.36)	19.09 (0.44)	20.47 (0.76)	17.47 (0.44)	17.59 (0.00)
Age, y												
14	25.34 (4.38)	22.64 (2.32)	17.18 (2.83)	15.82 (1.64)	27.61 (2.92)	20.50 (3.26)	16.52 (1.91)	18.44 (3.36)	19.26 (1.58)	22.90 (1.26)	19.46 (0.72)	19.40 (0.81)
15	19.71 (1.64)	18.75 (1.31)	11.89 (1.32)	15.71 (0.75)	22.34 (1.06)	22.23 (2.88)	16.91 (1.29)	26.67 (2.56)	20.24 (0.75)	22.30 (1.29)	18.97 (0.51)	18.79 (0.49)
16	21.56 (1.64)	17.64 (1.55)	14.03 (1.58)	17.78 (0.95)	18.97 (2.38)	19.79 (2.98)	19.92 (1.61)	19.69 (1.98)	20.29 (0.85)	19.21 (1.06)	17.73 (0.54)	18.25 (0.62)
17	17.26 (2.47)	17.82 (2.09)	10.28 (1.28)	12.49 (0.83)	24.31 (3.02)	17.32 (2.60)	17.82 (1.45)	17.96 (1.93)	17.16 (0.82)	18.60 (1.03)	16.36 (0.54)	15.96 (0.56)
18	13.93 (2.63)	16.88 (1.91)	8.74 (1.93)	13.02 (1.39)	10.35 (2.64)	19.00 (2.72)	17.45 (2.47)	14.42 (3.29)	16.52 (1.06)	16.08 (2.26)	13.72 (0.73)	14.72 (0.80)
Gender												
Male	12.34 (1.28)	14.32 (1.15)	6.35 (0.76)	9.15 (0.59)	12.52 (1.13)	13.29 (1.30)	11.50 (0.95)	14.78 (1.29)	10.84 (0.42)	12.48 (0.65)	8.82 (0.28)	11.29 (0.39)
Female	26.43 (2.04)	22.58 (1.51)	17.68 (1.44)	20.24 (0.90)	30.83 (2.14)	28.01 (2.47)	24.43 (1.32)	25.67 (1.88)	27.64 (0.75)	28.58 (1.26)	26.30 (0.49)	23.83 (0.55)
Race/ethnicity												
Hispanic	21.79 (1.67)	24.10 (1.61)	14.32 (2.37)	15.05 (0.71)	24.28 (2.03)	26.45 (4.59)	21.44 (2.00)	23.67 (2.00)	23.76 (1.65)	20.08 (0.87)	24.44 (1.46)	19.19 (0.67)
Black	6.84 (3.28)	20.29 (2.69)	6.58 (1.07)	10.49 (1.06)	17.13 (8.22)	23.40 (3.17)	10.28 (2.46)	13.64 (3.80)	15.35 (2.39)	24.18 (3.91)	15.58 (1.85)	12.10 (0.95)
Asian/Pacific Islander	16.71 (5.95)	10.43 (3.02)	7.37 (2.57)	17.34 (7.09)	19.11 (8.44)	17.27 (7.73)	13.49 (3.86)	14.96 (3.40)	10.09 (1.50)	16.98 (3.10)	9.93 (1.03)	14.98 (1.42)
Native American/Alaska Native	19.02 (3.20)	37.12 (18.01)	23.48 (12.49)	17.04 (7.09)	27.43 (12.09)	20.20 (13.76)	9.89 (6.68)	22.41 (10.01)	23.98 (2.83)	23.77 (2.81)	22.27 (2.15)	20.79 (1.91)
White	18.15 (1.40)	16.45 (1.11)	14.83 (1.26)	15.83 (0.83)	20.20 (1.41)	19.82 (1.63)	18.44 (1.08)	18.89 (1.98)	18.00 (0.48)	20.30 (1.50)	17.04 (0.35)	17.71 (0.43)

youths who reported sexual activity in the 3 months before survey administration were only 83% as likely to report NSSI, compared with respondents who indicated no sexual activity. All other variables reaching statistical significance in model 1 were associated with a greater probability of an NSSI report.

Results of model 1 are also reported separately by gender of respondent. In general, the data reveal similar patterns in the associations between health risks and NSSI for boys and for girls to those observed in the pooled sample. However, some discrepancies are noteworthy. The negative association between sexual activity and NSSI observed in the pooled sample was statistically significant among girls but not boys. The relationship between experiencing sexual coercion and NSSI also appeared to vary by gender. Although the odds ratios for the variable “forced to have sex in the previous year” were positive for both male (1.61) and female (1.36) respondents, the difference was only statistically significant in the model limited to female respondents.

Model 2 included all variables in model 1 and additional measures of health risks not available in every state. The added variables included suicidal ideation, suicide attempts requiring medical treatment, fighting, efforts to control weight, and sexual orientation. Because the number of respondents in model 2 is smaller than it is in model 1, caution should be exercised in interpreting results.

The results reveal consistency in associations between several independent variables that are present in both models 1 and 2 and NSSI: feeling sad, attempted suicide, electronic bullying, tobacco use, and hard drug use in each were associated with an increased probability of an NSSI report. However, some differences are notable. Although experiencing forced sex increased the odds of NSSI by 56% in model 1, the relationship was no longer statistically significant in model 2. Fighting and efforts to change weight were not statistically significantly associated with NSSI. Adolescents in model 2 who self-identified as a gay, lesbian, bisexual, or unsure were more than 2.5 times more likely to report NSSI than were those who identified as straight.

All else being equal, respondents who contemplated suicide were almost 3 times more likely to report NSSI than were youths who reported no such thinking, and developing a suicide plan increased the odds of NSSI by

TABLE 2—Gender Differences in Rates of Nonsuicidal Self-Injury and Associated Health Risks: Youth Risk Behavior Surveillance System, United States, 2015

Item	Affirmative Responses, %	Test for Gender Differences ^a	
		χ^2	P
Nonsuicidal self-injury (12 mo)		1763.6	< .001
Male (n = 32 150)	11.3		
Female (n = 32 521)	23.8		
Total (n = 64 671)	17.6		
Sad 2 wk (12 mo)		2072.8	< .001
Male (n = 32 330)	19.7		
Female (n = 32 822)	38.2		
Total (n = 65 152)	28.8		
Suicidal thoughts (12 mo)		665.8	< .001
Male (n = 21 592)	10.9		
Female (n = 22 311)	19.7		
Total (n = 43 903)	15.3		
Suicide plan (12 mo)		608.4	< .001
Male (n = 24 161)	9.3		
Female (n = 24 822)	16.9		
Total (n = 48 983)	13.1		
Attempted suicide \geq 1 times (12 mo)		452.4	< .001
Male (n = 29 230)	5.7		
Female (n = 30 438)	10.5		
Total (n = 69 668)	8.1		
Suicide attempt required doctor visit (12 mo)		97.4	< .001
Male (n = 27 902)	2.0		
Female (n = 29 141)	3.3		
Total (n = 57 043)	2.7		
Had sex with \geq 1 people (3 mo)		7.1	.23
Male (n = 29 479)	28.3		
Female (n = 31 018)	27.3		
Total (n = 60 497)	27.8		
Forced to have sex (ever)		580.7	< .001
Male (n = 31 740)	4.7		
Female (n = 32 016)	9.7		
Total (n = 63 756)	7.2		
Fought \geq 1 times (12 mo)		1003.1	< .001
Male (n = 25 085)	26.4		
Female (n = 25 924)	15.1		
Total (n = 51 009)	20.8		
Electronically bullied (12 mo)		1228.1	< .001
Male (n = 32 329)	9.5		
Female (n = 32 839)	19.2		
Total (n = 65 168)	14.3		
Trying to change (lose or gain) weight		226.9	< .001
Male (n = 28 008)	61.2		
Female (n = 28 389)	67.3		
Total (n = 56 397)	64.2		

Continued

TABLE 2—Continued

Item	Affirmative Responses, %	Test for Gender Differences ^a	
		χ^2	P
Gay, lesbian, bisexual, unsure		899.4	<.001
Male (n = 23 900)	8.0		
Female (n = 24 585)	16.9		
Total (n = 48 485)	12.4		
Drank alcohol (30 d)		45.1	<.001
Male (n = 30 402)	30.9		
Female (n = 31 409)	33.4		
Total (n = 61 811)	32.1		
Smoked cigarettes ≥ 1 times (30 d)		68.0	<.001
Male (n = 31 355)	11.1		
Female (n = 32 261)	9.1		
Total (n = 63 616)	10.1		
Used marijuana ≥ 1 times (30 d)		21.3	.010
Male (n = 31 912)	22.3		
Female (n = 32 694)	20.8		
Total (n = 64 606)	21.6		
Hard drug use (lifetime)		78.7	<.001
Male (n = 31 782)	9.4		
Female (n = 32 405)	7.4		
Total (n = 64 187)	8.4		

Note. Frequencies reported are unweighted counts; affirmative responses and significance tests computed with weighted data.

^aAll Rao-Scott χ^2 tests had 1 degree of freedom.

78%. The additional variables introduced in model 2 reduced the association between suicide attempts and NSSI, which had an odds ratio of 8.95 in model 1 and 3.36 in model 2.

When run separately by gender, the model 2 logistic regression analyses revealed few results that deviated from the patterns observed in the total pooled sample. Although there was a statistically significant association between being in a fight and NSSI in the pooled sample, this was not the case in the sample limited to girls. By contrast, drug and alcohol use increased the odds of NSSI among female but not male adolescents.

DISCUSSION

This investigation provides parameter estimates of NSSI among US high-school students. Prevalence rates of NSSI by age, race, and ethnicity are also reported across 11 states. Building on previous research that identified gender differences in NSSI, we

evaluated whether a set of 15 health risk behaviors potentially associated with a single-item measure of NSSI varied in their strength of association by gender. The findings should prove useful to epidemiologists, clinical researchers, and policymakers working to address adolescent health risks.

Our results provide convincing evidence that NSSI is relatively common among American adolescents and may be carried out by more than 1 in 10 high-school-aged boys and about 1 in 4 high-school-aged girls in a given year. These estimates are consistent with a recent meta-analysis of nonclinical samples.⁶ Previous studies of NSSI involving multi-item measures of self-injury have revealed even higher prevalence rates.⁸ Thus, nonsuicidal self-injurious behavior appears to occur widely among nonclinical populations of adolescents in the United States.

The present study is consistent with previous reports that indicate that self-injury in adolescence is more common among girls than among boys. In addition, female youths

were more likely than male youths to report experiencing most of the health risks believed to be associated with NSSI, including depression, suicidal thoughts, forced sex, and electronic bullying. However, with more than 10% of male adolescents in our analyses also reporting NSSI, researchers and clinicians must acknowledge that it is a significant public health problem for boys as well. Furthermore, no particular racial or ethnic group is immune from NSSI, though rates were higher among Native Americans, Hispanics, and Whites than they were among Asians and Blacks.

Our findings on the health risks associated with NSSI are generally consistent with previous research. In this study, adolescents were more likely to report deliberate self-injury if they noted being sad or thinking about or attempting suicide. Drug and alcohol use were also associated with NSSI, as was fighting, being electronically bullied, and forced sex. State-level variability in prevalence and the large number of health risks associated with NSSI suggest that interventions to address NSSI among adolescents should be multidimensional and attentive to regional context.

Our findings indicate that the scope of NSSI among adolescents is so widespread that individual clinical and therapeutic interventions may be insufficient to address this public health problem. School-based and community health programs could address some of the risk factors identified by this and other research.³¹ Because many of the factors associated with NSSI in this study have been linked to other mental health problems, efforts to prevent NSSI should be incorporated into broader efforts to address mental health among children and adolescents.

Limitations

The YRBSS surveys employ straightforward measures designed to provide an epidemiologic overview of the health risks facing adolescents and to track progress in addressing these risks over time. In this study, NSSI was measured by a single item, as were most of the other variables. The study offers no insights about the severity of injuries associated with NSSI reports or what participants may have thought about their own behavior. Hence, our findings may lack a level of precision available in more in-depth analyses involving

TABLE 3—Binary Logistic Regression of Variables Associated With Nonsuicidal Self-Injury: Pooled Sample and Gender Differences: Youth Risk Behavior Surveillance System, United States, 2015

Independent Variable	Both Genders, No. or OR (95% CI)	Female, No. or OR (95% CI)	Male, No. or OR (95% CI)
Model 1 (all states)^a	50 493	26 147	24 346
Sad 2 wk (past year)	5.22 (4.58, 5.94)	4.87 (4.27, 5.54)	4.49 (3.60, 5.61)
Suicide attempt (past year)	8.95 (7.27, 11.02)	8.80 (6.54, 11.85)	9.12 (6.57, 12.65)
Sexually active (past 3 mos)	0.83 (0.71, 0.97)	0.78 (0.66, 0.93)	0.95 (0.75, 1.20)
Forced to have sex (ever)	1.56 (1.24, 1.97)	1.36 (1.06, 1.75)	1.61 (0.92, 2.82)
Electronically bullied (past year)	2.47 (2.08, 2.92)	2.21 (1.83, 2.68)	2.46 (1.75, 3.44)
Drank alcohol (past month)	1.18 (1.01, 1.37)	1.14 (0.95, 1.36)	1.18 (0.92, 1.53)
Smoked cigarettes (past month)	1.56 (1.25, 1.95)	1.57 (1.17, 2.10)	1.82 (1.31, 2.53)
Used marijuana (past month)	1.06 (0.90, 1.25)	1.27 (0.99, 1.63)	0.84 (0.65, 1.07)
Hard drug use (ever)	1.62 (1.27, 2.07)	1.93 (1.43, 2.59)	1.51 (1.01, 2.28)
Model 2 (all variables)^b	12 446	6 716	5 730
Sad 2 wk (past year)	3.30 (2.76, 3.95)	3.27 (2.69, 3.98)	2.60 (1.84, 3.68)
Suicidal thoughts (past year)	2.91 (2.26, 3.76)	3.40 (2.57, 4.50)	2.50 (1.62, 3.86)
Made suicide plan (past year)	1.78 (1.36, 2.34)	1.70 (1.29, 2.26)	1.91 (1.09, 3.34)
Suicide attempt (past year)	3.36 (2.33, 4.86)	2.73 (1.68, 4.44)	4.42 (2.44, 8.00)
Suicide attempt requiring care (past year)	0.92 (0.51, 1.68)	1.03 (0.47, 2.23)	0.68 (0.28, 1.66)
Sexually active (past 3 mos)	0.83 (0.67, 1.02)	0.79 (0.62, 1.01)	0.88 (0.64, 1.21)
Forced to have sex (ever)	1.30 (0.96, 1.77)	1.19 (0.85, 1.66)	1.20 (0.57, 2.55)
Electronically bullied (past year)	2.17 (1.75, 2.70)	2.00 (1.56, 2.57)	1.87 (1.26, 2.78)
In a fight (past year)	1.06 (0.84, 1.34)	1.17 (0.88, 1.57)	1.39 (1.01, 1.90)
Trying to change weight	1.17 (1.00, 1.36)	1.16 (0.96, 1.41)	1.05 (0.83, 1.32)
Gay, lesbian, bisexual, or unsure	2.64 (2.17, 3.21)	2.12 (1.68, 2.67)	3.39 (2.30, 5.00)
Drank alcohol (past month)	1.14 (0.95, 1.36)	1.08 (0.87, 1.34)	1.17 (0.87, 1.56)
Smoked cigarettes (past month)	1.38 (1.04, 1.83)	1.42 (1.00, 2.01)	1.51 (0.96, 2.39)
Used marijuana (past month)	1.03 (0.82, 1.29)	1.24 (0.90, 1.71)	0.75 (0.52, 1.09)
Hard drug use (ever)	1.61 (1.14, 2.26)	1.82 (1.17, 2.83)	1.61 (0.86, 3.01)

Note. CI = confidence interval; OR = odds ratio. Frequencies reported are unweighted counts; ORs and CIs computed with weighted data.

^aModel 1 fit: Full sample: $-2 \log L = 988012.89$; Wald = 284.02; $P < .001$. Female: $-2 \log L = 612511.52$; Wald = 200.75; $P < .001$. Male: $-2 \log L = 360110.05$; Wald = 55.56; $P < .001$.

^bModel 2 fit: Full sample: $-2 \log L = 691984.70$; Wald = 127.33; $P < .001$. Female: $-2 \log L = 430077.50$; Wald = 65.59; $P < .001$. Male: $-2 \log L = 250278.67$; Wald = 26.76; $P < .001$.

clinical samples. In addition, the YRBSS does not ask about additional factors likely to be associated with NSSI, such as family dynamics. Finally, the data examined in this study are cross-sectional, and though they can yield insights into relationships between variables, they cannot answer whether the health risks associated with NSSI are causal or coincidental, or whether NSSI might itself be a cause of other health risk behaviors.

Recommendations for Future Research

The state-specific estimates of NSSI reported here provide sound baseline rates with which to compare future waves of YRBSS data as they become available. Though no

previous studies have provided representative trend data using the same measures over time, it is important to determine whether the high rates revealed by this and other research reflect a trend or merely increased measurement and public recognition of the phenomenon.³² If NSSI has become more common, future research should evaluate the mechanisms through which adolescents have come to discover and experiment with NSSI.

Future research should investigate whether the decline in NSSI prevalence by age observed in this study continues beyond high school, as well as whether self-injury generally has lasting effects or is largely a transitory pattern of behavior experienced primarily in adolescence. Differences in NSSI prevalence by race and ethnicity also lead to

questions about how the phenomenon is experienced and communicated within youth subcultures. These issues and the substantial variation in NSSI across states leads to questions about variations in other health risk behaviors by region or race and ethnicity. Such patterns could prove sociologically interesting, especially if they reflect consistent differences in the social contexts in which adolescence is experienced.

Future research could build on the patterns described here to provide important information regarding intervention and treatment of NSSI. For example, although our findings suggest common clusters of other health risk behaviors associated with NSSI among male and female adolescents, this does not mean that interventions or treatment

strategies for male and female adolescents should be identical. Clinical research could help to fill in these gaps, especially regarding interventions and treatments for boys. Future research could also help to clarify the association between NSSI and suicide, as well as how these health risk behaviors are clinically and phenomenologically related. **AJPH**

CONTRIBUTORS

M. A. Monto procured data from participating states, cleaned data, ran preliminary analyses, and was primarily responsible for writing later drafts. N. McRee ran intermediate and final statistical analyses, wrote portions of the article, and provided heavy editing and proofreading. F. S. Deryck originated the project, wrote the initial draft, and provided continued editorial feedback.

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HUMAN PARTICIPANT PROTECTION

No protocol approval was needed for this study, because de-identified secondary data were used.

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