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The Effects of Substance Use and Depressive Symptoms on High-Risk Sexual Behaviors in Sexually Active Vermont Adolescents

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ABSTRACT

Background: There is a high prevalence of substance use, depressive symptoms, and high-risk sexual behaviors (HRSB) among adolescents, but the relationships between these variables is less clear. **Objective:** To identify associations between these behaviors and outcomes, this study aims to address how depressive symptoms paired with substance use impacts HRSB in adolescents. **Methods:** Adolescent self-reported depressive and suicidal symptoms, substance use, and HRSB were obtained from the 2015 Vermont Youth Risk Behavior Survey (YRBS) (n= 17,041). The associations between exposures (substance use and depressive symptoms) with HRSB were studied. Variables were calculated using prevalence ratios with 95% confidence intervals (CI) and logistic regression to determine adjusted odds ratios (OR). **Results:** Adolescents who attempted suicide more than once were >5 times more likely to engage in 4+ HRSB (OR=5.19, P<.001). Low-level drug users were 1.76 times more likely to engage in 4+ HRSB (p<0.05) and high-level users 6.69 times more likely (p<.001). Reporting sexual intercourse with same sex partners was significantly associated with HRSB, while reported sexual orientation was not. **Conclusions:** There are associations between both self-reported depressive symptoms and substance use with high-risk sexual behavior in adolescents.

INTRODUCTION

Research demonstrates high comorbidity between depressive symptoms, substance use, and high-risk sexual behaviors (HRSB) during adolescence.¹ Adolescence is an important period of biological and psychosocial growth when individuals undergo changes that can lead to high-risk decisions.² Mental illness, including depression, can develop during this period, and has been linked to substance use.¹

HRSB include having multiple sex partners, engaging in vaginal, anal, and/or oral sex with ≥ 4 lifetime partners, and/or ≥ 2 partners in the past 3 months. Additional HRSB include first intercourse at age ≤ 13 and unprotected sex.^{3,4}

Sexual minority adolescents report more substance use and negative sexual outcomes than their heterosexual counterparts. These sub-populations are at increased risk of health disparities and poor health outcomes over time.^{5,6}

This study aims to identify relationships between substance use, depressive symptoms, and HRSB among adolescents in Vermont where these behaviors and symptoms are prevalent.^{5,6}

METHODS

The Youth Risk Behavior Survey (YRBS),⁴ is biannually administered to middle and high school students across the United States. This study uses data from 21,013 students who completed the 2015 Vermont YRBS (VT YRBS). This project has been reviewed and approved by the University of Vermont Office of Research Protections under an Instructor's Assurance Process.

Exposures

Exposures of interest were alcohol, marijuana, other drugs, and depressive symptoms, including age at first use and frequency of use of each substance. Depressive symptoms were based on periods of sadness and suicidal ideation/attempts.

Outcomes

Data on sexual behavior included age of first intercourse, lifetime sexual partners, current sexual activity status (number of partners, if any, in the last 3 months), use of alcohol before last intercourse, contraceptive type, and condom use, if any, during last intercourse.

HRSB were categorized as ≥ 4 lifetime partners, ≥ 2 partners in the past 3 months,⁵ and first intercourse at age ≤ 13 .^{4,5} These were combined into two master variables comprising a HRSB continuous scale. For questions describing HRSB, positive responses scored a 1, resulting in a semi-continuous scale of 1-5. STI testing, forms of STI prevention (excluding condom use), oral sex, and penile-anal intercourse were omitted from the analysis because these questions are not included in the YRBS.

Data Analysis

Associations between exposures with HRSB were explored via logistic regression to determine adjusted odds ratios (OR) and corresponding 95% confidence intervals (CI). Statistical analyses were conducted using SPSS (V24).

Age at first alcohol and marijuana use were stratified from <8 to >17 years old. Reported cocaine, heroin, methamphetamines, and huffing use were combined into one master drug use variable.

RESULTS

1. Demographics

The study population was comprised of students ≥ 16 years of age (60.1%), evenly split between gender and high school grade levels. Most students self-identified as white (84.3%) and heterosexual (87.9%).

Adolescents with same-sex sexual partners were more likely to engage in HRSB 1-3 (6.78, $p < 0.001$). Sexual orientation was not associated with HRSB.

2. Exposures

2.1 Mental Health

Feeling sad or hopeless every day for two weeks over the past year, making a suicide plan, and attempting suicide several times were significantly related to engaging in HRSB. Students engaging in ≥ 4 HRSB were 5.2 ($p < 0.05$) times more likely to have attempted suicide more than once (Table 1).

2.2 Substance Use

Drinking alcohol for the first time during childhood had a significant association with HRSB. Drinking before age 8 had the strongest odds of engaging in 1-3 (OR = 2.8, $p < 0.05$) or 4+ HRSB (OR = 9.5, $p < 0.05$). The association remained strong up to age 14 for both 1-3 and 4+ HRSB (Table 1). The odds of engaging in HRSB increased with number of alcoholic drinks consumed per hour (Table 1).

Any history of marijuana use and using at a frequency of ≥ 10 times in the past month were significantly related to HRSB. Using marijuana for the first time at age ≤ 8 was most strongly associated with engaging in 1-3 HRSB (OR = 12.54, $p < 0.05$). High use of cocaine, heroin, methamphetamines, and huffing was most significantly related to engaging in 1-3 (OR = 3.6, $p < 0.05$) or 4+ HRSB (OR = 6.67, $p < 0.05$). Students engaging in 4+ HRSB were more likely to have used marijuana 20+ times per month or used drugs at any frequency ($p < 0.05$, Table 1).

Table 1: Depression, suicidality and substance use as a predictor for High Risk Sexual Behavior

	High Risk Sexual Behaviors Reporting 1 to 3	High Risk Sexual Behaviors Reporting 1 to 3	High Risk Sexual Behaviors Reporting 4 or more	High Risk Sexual Behaviors Reporting 4 or more
	B	OR with 95% CI	B	OR with 95% CI
Sad or Hopeless	0.162	1.18 (1.03, 1.34)*	-0.164	0.85 (0.53, 1.35)
Suicidality – Semi-Continuous Score – (reflects suicide attempts and attempts with injury)				
Never		1 (Ref)*		1 (Ref)*
Suicidality 1	0.123	1.13 (0.94, 1.36)	0.196	1.22 (0.65, 2.29)
Suicidality 2	0.264	1.30 (0.97, 1.74)*	0.472	1.60 (0.77, 3.34)
Suicidality 3	0.605	1.83 (1.30, 2.58)*	-0.035	0.97 (0.39, 2.37)
Suicidality 4	0.917	2.50 (1.53, 4.10)*	0.180	1.20 (0.45, 3.18)
Suicidality 5	0.357	1.43 (0.66, 3.11)	1.646	5.19 (1.80, 14.97)
Suicidality 6	1.195	3.30 (1.22, 8.97)*	1.312	3.71 (1.12, 12.6=36)
Age of First Alcohol Consumption				
Have never had alcohol		1 (Ref)*		1 (Ref)*
8 years old or younger	1.044	2.84 (2.11, 3.90)*	2.257	9.55 (2.73, 33.40)*
9 or 10 years old	1.299	3.67 (2.73, 4.93)*	2.137	8.48 (2.38, 30.15)*
11 or 12 years old	0.961	2.61 (2.10, 3.33)*	1.683	5.38 (1.55, 18.73)*
13 or 14 years old	0.828	2.29 (1.89, 2.77)*	1.426	4.16 (1.24, 13.97)*
15 or 16 years old	0.524	1.69 (1.40, 2.04)*	0.304	1.36 (0.36, 5.05)
17 years old or older	0.316	1.37 (1.03, 1.82)*	-0.210	0.81 (0.07, 8.92)
Binge Drinking / Drinks per Hour				
No drinks in the past 30 days		1 (Ref)*		1 (Ref)*
1 to 2 drinks	0.178	1.20 (1.02, 1.40)*	0.171	1.19 (0.54, 2.63)
3 drinks	0.376	1.46 (1.15, 1.85)*	0.915	2.50 (1.05, 5.97)*
4 drinks	0.911	2.49 (1.93, 3.22)*	-0.033	0.97 (0.28, 3.31)

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5 drinks	0.768	2.16 (1.73, 2.68)*	1.062	2.89 (1.27, 6.59)*
6 or 7 drinks	0.746	2.11 (1.71, 2.59)*	1.143	3.14 (1.53, 6.45)*
8 or 9 drinks	1.0047	2.73 (2.10, 3.55)*	1.451	4.27 (2.00, 9.11)*
10 or more drinks	1.487	4.42 (3.42, 5.72)*	1.528	4.61 (2.34, 9.06)*
Age of First Marijuana Use				
Have Never tried Marijuana		1 (Ref)*		1 (Ref)
8 years old or younger	2.259	12.54 (6.63, 23.73)*	1.069	2.91 (0.96, 8.88)
9 or 10 years old	2.048	7.75 (4.87, 12.335)*	0.874	2.40 (0.79, 7.28)
11 or 12 years old	1.614	5.02 (3.93, 6.42)*	1.003	2.73 (1.05, 7.08)*
13 or 14 years old	1.238	3.45 (2.89, 4.12)*	0.606	1.83 (0.73, 4.59)
15 or 16 years old	0.897	2.45 (2.07, 2.90)*	0.616	1.85 (0.72, 4.79)
17 years old or older	0.442	1.56 (1.16, 2.09)*	0.580	1.79 (0.32, 10.10)
Frequency of Marijuana Use				
Have Never Tried Marijuana		1 (Ref)*		1 (Ref)*
Low	0.131	1.14 (.098, 1.32)	0.468	1.60 (0.82, 3.10)
Medium	0.662	1.94 (1.53, 2.46)*	0.946	2.58 (1.20, 5.54)*
High	0.772	2.16 (1.78, 2.63)*	1.172	3.23 (1.72, 6.07)*
Illicit Drug Use				
Have never tried illicit drugs		1 (Ref)*		1 (Ref)*
Low	0.339	1.40 (1.17, 1.68)*	0.565	1.76 (1.10, 2.82)*
Medium	0.559	1.75 (0.78, 3.91)	1.759	5.81 (2.61, 12.91)*
High	1.283	3.61 (1.28, 10.18)*	1.900	6.69 (2.75, 16.25)*
Use of ADHD or Pain Medication Without a Prescription Semi-Continuous Score				
Have never taken ADHD or pain medication without a prescription		1 (Ref)*		1 (Ref)
1	-0.006	0.99 (0.83, 1.19)*	0.046	1.05 (0.60, 1.85)
2	0.301	1.35 (1.02, 1.80)*	0.543	1.72 (0.94, 3.17)*
3	0.639	1.89 (1.20, 2.98)	0.161	1.18 (0.49, 2.82)
4	0.192	1.21 (0.75, 1.97)	0.824	2.28 (1.17, 4.45)*

5	0.282	1.32 (0.54, 3.24)	0.081	1.09 (0.38, 3.14)
6	1.667	5.29 (0.67, 42.54)	-0.980	0.38 (0.04, 3.85)

* denotes an OR that is statistically significant to the 0.05 level

DISCUSSION

The findings in this study are consistent with prior studies that explore substance abuse, depressive symptoms, and HRSB. Leherer et al., found, "boys and girls with high depressive symptom levels at baseline were significantly more likely than those with low symptom levels to report ≥ 1 of the examined sexual risk behaviors over the course of the 1-year follow-up period."⁷ Similarly, the results of this study indicated that students engaging in >4 HRSB were 5.2 ($p < 0.05$) times more likely to have attempted suicide more than once (Table 1). This means that individuals who attempted suicide more than once (higher depressive symptoms) were more likely than those who only attempted once or not at all (lower depressive symptoms) to engage in 4+ HRSB.

Additionally, Leherer et al., also indicated that with the "continuous depression measure found significant associations for condom nonuse at last sex, birth control nonuse at last sex, ≥ 3 sexual partners, and any sexual risk behavior."⁷ The results of this study showed an overall trend of an increase in odds in engaging in HRSB as the semi-continuous suicidality score increases.

Our findings of self-reported substance abuse, depressive symptoms, and sex with same-sex partners were associated with HRSB, while sexual orientation was not. The significant association of HRSB with same-sex partners appears to conflict with the lack of association between HRSB and sexual orientation. In addition, sexual experimentation with same-sex partners may need further investigation, beyond the scope of the YRBS, to elucidate any associations with engaging in HRSB.^{8,9}

The results are subject to limitations and cannot assess causality or temporality. They do not apply to students homeschooled or absent on the day of the YRBS. Depressive symptoms are self-reported; therefore less accurate than those reported by a medical professional.¹⁰ Data was also collected in Vermont, a predominantly white, rural state which may limit generalizability of the findings.¹¹

This study has identified areas of change for the YRBS survey to better address and prevent depressive symptoms and substance use in adolescents through aligning with the idea that adolescents "do not represent a homogenous group," allowing for more vulnerable sub-populations to be outreached.⁷

The YRBS has the opportunity to evolve regarding sexual behavior, STI protection, and sexual minorities. Defining intercourse and asking specific questions about oral and penile-anal sex, protection, safe practices, and sexual orientation would reduce limitations and provide greater representation of HRSB in all students and the LGB community.⁹ A lack of definition for sexual behavior and intercourse in the survey may cause students to answer based on their interpretation of that term; many adolescents may not consider oral sex or penile-anal sex as intercourse¹². Coupled with asking about condom use only for STI prevention, this limits representation of HRSB in all youth.

In conclusion, this study highlights significant associations between substance use, depressive symptoms, and HRSB in Vermont adolescents, and opens the door to areas of YRBS improvement.

REFERENCES

1. Keyes CLM. Mental Health in Adolescence: Is America's Youth Flourishing? *American Journal of Orthopsychiatry*. 2006;76(3), 395-402.
2. Luciana M. Adolescent brain development in normality and psychopathology. *Development and Psychopathology*. 2013;25(4pt2):1325-1345. doi:10.1017/S0954579413000643.
3. The Centers for Disease Control and Prevention. Sexual Risk Behaviors: HIV, STD, & Teen Pregnancy Prevention. <https://www.cdc.gov/healthyouth/sexualbehaviors/index.htm>. Accessed February 5, 2018.
4. Brener ND, Kann L, Kinchen S, et al. (2013) Methodology of the Youth Risk Behavior Surveillance System. *MMWR Recomm Rep* 2013;62(No RR-1).
5. Santelli JS, Brener ND, Lowry R, Bhatt A, Zabin LS. Multiple sexual partners among U.S. adolescents and young adults. *Fam Plann Perspect*. 1998;30(6):271-275
6. Math SB, Seshadri SP. The invisible ones: Sexual minorities. *The Indian Journal of Medical Research*. 2013;137(1):4-6.
7. Lehrer JA, Shrier LA, Gortmaker S, Buka S. Depressive Symptoms as a Longitudinal Predictor of Sexual Risk Behaviors Among US Middle and High School Students. *Pediatrics*. 2006;118(1):189-200. doi:10.1542/peds.2005-1320
8. Olsen EO, Vivolo-Kantor A, Kann L. Physical and Sexual Teen Dating Violence Victimization and Sexual Identity Among U.S. High School Students, 2015. *J Interpers Violence*. May 2017:0886260517708757. doi:10.1177/0886260517708757
9. Matthews DD, Blosnich JR, Farmer GW, Adams BJ. Operational Definitions of Sexual Orientation and Estimates of Adolescent Health Risk Behaviors. *LGBT health*. 2014;1(1):42-49.
10. Hunt M, Auriemma J, Cashaw A. Self-Report Bias and Underreporting of Depression on the BDI-II. *Journal of Personality Assessment*. 2003;80(1):26-30.
11. QuickFacts Vermont. United States Census Bureau.
12. Hopkins Tanne J. US teenagers think oral sex isn't real sex. *BMJ*. 2005;330(7496):865.

