

Physical and Sexual Dating Violence and Nonmedical Use of Prescription Drugs

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abstract

BACKGROUND: Little information is available on the associations between nonmedical use of prescription drugs (NMUPD) and dating violence victimization (DVV) among high school students and how associations vary by sex.

METHODS: We used data from the 2015 national Youth Risk Behavior Survey, a cross-sectional survey of a nationally representative sample of students in grades 9 to 12. The sample was restricted to students who dated during the 12 months before the survey, resulting in a sample of 5136 boys and 5307 girls. Sex-stratified logistic regression models estimated adjusted prevalence ratios (aPRs) and 95% confidence intervals (CIs) for associations between lifetime NMUPD and DVV. In our analyses, we examined a 4-level DVV measure: no DVV, physical only, sexual only, and both physical and sexual.

RESULTS: Male students had a significantly lower prevalence of DVV compared with female students. By using the 4-level measure of DVV, after adjusting for covariates, sexual DVV only (aPR = 1.61, 95% CI: 1.21–2.12) and both physical and sexual DVV (aPR = 1.65, 95% CI: 1.26–2.17) were positively associated with NMUPD among boys, whereas among girls, physical DVV only (aPR = 1.42, 95% CI: 1.16–1.75) and both physical and sexual DVV (aPR = 1.43, 95% CI: 1.03–1.99) were positively associated with NMUPD.

CONCLUSIONS: NMUPD was associated with experiences of DVV among both male and female students. Community- or school-based adolescent violence and substance use prevention efforts would be enhanced by considering the association between DVV and substance use, particularly NMUPD among both male and female adolescents, to address these public health problems.

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WHAT'S KNOWN ON THIS SUBJECT: Information on the association between NMUPD and types of dating violence victimization among adolescents is limited. Studies of emergency department settings and small geographic areas suggest an association may exist, although how that association may vary by sex is not clear.

WHAT THIS STUDY ADDS: In this study, we provide sex-stratified, nationally representative data on the association between NMUPD and dating violence victimization among US high school students. NMUPD was associated with dating violence, but the association between types of dating violence and NMUPD varied by the sex of the student.

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Nonmedical use of prescription drugs (NMUPD) (that is, using a prescription medication without a prescription or in a manner that is unintended, particularly opioids) has reached epidemic proportions in the United States.¹ Since 1999, the rate of overdose deaths attributable to prescription opioids and the number of opioid prescriptions have quadrupled.^{1,2} Understanding the impact of this epidemic on adolescents is necessary to guide prevention efforts for this population. In the 2015 National Survey on Drug Use and Health, a household survey, it is estimated that nearly 6% of 12- to 17-year-olds misused prescription psychotherapeutic drugs in the past year, whereas in the school-based Monitoring the Future survey, it is reported that a higher annual prevalence of 12.0% among 12th-graders misused prescription psychotherapeutic drugs during the same time period.^{3,4} According to the 2015 national Youth Risk Behavior Survey (YRBS), 16.8% of US high school students indicated that they had used prescription drugs without a doctor's prescription at some point in their lifetime.⁵

Although dating in adolescence is common and is considered a healthy form of social development,^{6,7} some adolescent relationships can be unhealthy. Intimate partner violence (IPV), often called teen dating violence (DV) when involving adolescents, can include sexual violence, physical violence, stalking, and psychological aggression.⁸ In 2015, among high school students who reported dating during the 12 months before the survey, 9.6% of students indicated that they had experienced physical DV, whereas 10.6% experienced sexual DV.⁵ National surveillance data of adults revealed that among victims of contact sexual violence, physical violence, and/or stalking by an intimate partner, almost a quarter (23.1%) of female victims and 14% of

male victims first experienced these or other forms of IPV between the ages of 11 and 17.⁹ Dating violence victimization (DVV) among youth has been associated with other adverse health outcomes and risk-taking behaviors, such as substance use, mental health disorders, eating disorders, sexual risk-taking, future DV or IPV, and suicide ideation.¹⁰⁻¹⁴

Of particular concern in public health is the association between substance use behaviors and DVV among adolescents.¹¹⁻²² For example, in a study conducted in a large university emergency department (ED) among patients aged 14 to 20 years, 1 out of 4 youth who reported alcohol misuse had experienced DV in the 12 months before seeking care in the ED.²¹ In another study in which researchers used self-reported data collected from high school students in Maryland, students who had experienced physical or psychological DVV were more likely than students who had not experienced such victimization to be classified as polysubstance users (users of multiple types of substances) or as users of just alcohol and marijuana than to be classified as nonsubstance users.²² It is likely that the association between substance use and DVV operates in both directions because researchers have suggested that substance use may increase the risk for violence victimization and that those who have experienced violence victimization may be more likely to engage in substance use behaviors, perhaps as an unhealthy coping mechanism.^{14,23}

Although associations between substance use and DV have been observed, limited information exists on the associations between NMUPD and DV. The authors of studies that focused on adult populations suggest that IPV is associated with NMUPD,²⁴⁻²⁶ but evidence among adolescent populations is both scarce and conflicting. Only a few studies relating to the associations between substance use and DV among adolescent

populations have been published,^{11,21,27} the majority of which rely on ED data, which have utility for capturing more extreme outcomes and thus are not generalizable. For example, researchers in 1 study of the nonmedical use of prescription opioids and sedatives conducted among adolescents aged 14 to 20 years in the University of Michigan ED reported that the nonmedical use of prescription opioids was not associated with DV, but the nonmedical use of prescription stimulants was associated with DV.²⁷ Researchers of another study who used data collected from ED patients in Michigan and focused on youth aged 14 to 24 years who screened positive for substance use, reported that prescription sedative and opioid misuse were more likely to be reported before DV than alcohol use or alcohol and marijuana use.¹¹ It should be noted that DV as assessed in both of these studies combined DV aggression and victimization into a single DV measure, and there was no exploration of different types of DV (eg, sexual or physical). Researchers of another study of Michigan ED patients aged 14 to 20 years reported that NMUPD was not associated with DV aggression or DVV.²¹ In other studies, researchers have looked at the issue of NMUPD and violence victimization among adolescent populations but they have not focused specifically on the dating context. For example, a nationally representative study of adolescents 12 to 17 years old found physical or sexual assault (regardless of dating context) was not associated with past year NMUPD.²⁸

With the relatively high prevalence of both NMUPD and DVV among adolescents and the negative outcomes independently associated with both of these experiences, it is important to explore the potential relationship between NMUPD and DVV. Because much of the published literature on NMUPD and DV among adolescents derives from a small geographic setting and cites mainly ED data, there is a

need to explore the role of NMUPD in DVV among a broader population of adolescents, that is a study in which researchers provide national estimates for an adolescent population. As such, with this study we address the gap in literature by analyzing data from a nationally representative sample of US high school students to investigate the association between NMUPD and physical and sexual DVV. Furthermore, with this study we examine variation in these associations by sex because it is not clear from available literature if any associations observed would vary substantially by the sex of the respondent.

METHODS

Study Population

The Centers for Disease Control and Prevention has conducted the national YRBS biennially since 1991. The YRBS is a school-based cross-sectional survey in which researchers use an independent 3-stage cluster sample design to obtain a nationally representative sample of ninth through 12th grade students who attend public and private schools in the 50 states and the District of Columbia.

Measures

The exposure of interest in this study was DVV. Two types of DVV were assessed on the 2015 YRBS questionnaire: physical and sexual DVV. Physical DVV was assessed with the following question: "During the past 12 months, how many times did someone you were dating or going out with physically hurt you on purpose? (Count such things as being hit, slammed into something, or injured with an object or weapon)." Response options included the following: I did not date or go out with anyone during the past 12 months, 0 times, 1 time, 2 or 3 times, 4 or 5 times, or 6 or more times. Sexual DV was assessed with the following question: "During the past 12 months, how many times did someone you were dating or going out with force

you to do sexual things that you did not want to do? (Count such things as kissing, touching, or being physically forced to have sexual intercourse)." Response options included the following: I did not date or go out with anyone during the past 12 months, 0 times, 1 time, 2 or 3 times, 4 or 5 times, or 6 or more times. To differentiate students who only experienced 1 form of DVV and those who experienced both types of DVV, a combined DVV variable was constructed by combining responses (≥ 1 or more times) to the physical and sexual DVV questions to form 4 DVV categories: no DVV, physical DVV only, sexual DVV only, and both physical and sexual DVV.

The outcome of interest in our study was NMUPD. This variable was assessed through the following question: "During your life, how many times have you taken a prescription drug (such as OxyContin, Percocet, Vicodin, codeine, Adderall, Ritalin, or Xanax) without a doctor's prescription?" Response options included the following: 0 times, 1 or 2 times, 3 to 9 times, 10 to 19 times, 20 to 39 times, and 40 or more times. For the purpose of our analysis, NMUPD responses were categorized into either a "yes" or "no" category.

Data Analysis

We calculated the distribution of demographic and key study variables by sex and compared distributions using the χ^2 test. Sex-stratified analyses were conducted to compare the prevalence of physical DV only, sexual DV only, and both physical and sexual DVV by demographic characteristics by using the χ^2 test. Significant differences were those with $P < .05$. Sex-stratified logistic regression models assessed the association between DVV and NMUPD by calculating unadjusted and adjusted prevalence ratios (aPRs) with corresponding 95% confidence intervals (CIs). In the first stage of modeling, unadjusted sex-stratified specific associations between the DVV variables (exposure variables)

and NMUPD (outcome variable) were estimated. In the second stage of modeling, sex-stratified associations between DVV and NMUPD were estimated while adjusting for race and ethnicity (white, referent; African American; Hispanic; and other), grade (ninth, referent; 10th; 11th; and 12th), and sexual identity (heterosexual, reference; gay or lesbian; bisexual; and not sure). The third stage of modeling included adjustment for race and ethnicity, grade, sexual identity, and substance use variables (includes use of cigarettes, alcohol, marijuana, and other substances [synthetic marijuana, cocaine, heroin, methamphetamines, inhalants, ecstasy, and injection drug use] at any time). In addition, we employed logistic regression to examine the sex-stratified association between the frequency of any physical DVV and any sexual DVV and NMUPD. Final models adjusted for race and/or ethnicity, grade, sexual identity, and substance use variables. Sexual identity was included because rates of substance use and violence victimization are significantly higher among sexual minority high school students.²⁹ It was necessary to include substance use covariates in the models for DVV and NMUPD because past researchers have demonstrated that other types of substance use are associated with DVV and NMUPD.^{22,26,30} Lastly, linear contrasts were performed to compare NMUPD with levels of any physical and any sexual DVV frequency.

All analyses were conducted by using SUDAAN statistical software (RTI International, Research Triangle Park, NC), which accounted for the complex sample design of the survey. The national YRBS has been approved by the Centers for Disease Control and Prevention's Institutional Review Board.

RESULTS

Nationwide, 68.6% of high school students reported dating in the 12

TABLE 1 Demographic Characteristics, Prevalence of DVV, and Prevalence of NMUPD Among Students Who Dated or Went Out With Someone During the 12 Months Before the Survey, by Sex (National YRBS, 2015)

Characteristics	Males (n = 5136)		Females (n = 5307)		P ^a
	n	% (95% CI)	n	% (95% CI)	
Race and/or ethnicity ^b					.55
White (Non-Hispanic)	2279	54.4 (48.4–60.3)	2457	56.5 (50.4–62.4)	
African American (Non-Hispanic)	602	14.8 (11.7–18.4)	569	13.1 (10.9–15.8)	
Hispanic	1653	22.0 (17.7–27.0)	1725	22.2 (17.7–27.4)	
Grade					.18
9	1200	26.0 (23.7–28.5)	1239	23.5 (21.9–25.1)	
10	1266	23.2 (20.1–26.6)	1347	26.3 (24.6–28.1)	
11	1361	25.8 (24.1–27.6)	1396	25.3 (23.4–27.3)	
12	1277	24.9 (23.3–26.6)	1303	24.9 (23.6–26.3)	
Sexual identity					<.0001
Heterosexual	4590	94.4 (92.6–95.8)	4177	84.2 (81.8–86.2)	
Gay, lesbian, or bisexual	193	3.7 (2.7–5.0)	692	13.2 (11.4–15.2)	
Not sure	97	1.9 (1.4–2.7)	160	2.7 (2.2–3.3)	
Experienced DVV during the past 12 mo					<.0001
None	4485	90.4 (89.1–91.6)	3993	78.6 (75.6–81.3)	
Physical DVV only	228	4.2 (3.6–5.0)	328	5.8 (4.7–7.2)	
Sexual DVV only	130	2.3 (1.7–3.1)	477	9.7 (8.3–11.2)	
Both physical and sexual DVV	143	3.1 (2.4–4.0)	309	5.9 (5.0–7.0)	
Ever used prescription drugs without a doctor's prescription	1081	21.3 (19.5–23.3)	1004	18.5 (16.9–20.2)	<.01

Each student reported NMUPD 1 or more times during their life.

^a χ^2 .

^b Data for other race and/or ethnicity subgroups are not presented because of limited sample size and interpretability.

months before the survey. Of those students who dated, 50.8% were boys and 49.2% were girls. The distribution of students who dated or went out with someone during the 12 months before the survey by race and ethnicity and grade did not differ by sex (Table 1). However, female students were more likely than male students to identify as gay, lesbian, or bisexual (13.2% vs 3.7%). Male students were more likely than female students to experience no physical or sexual DVV on the basis of the 4-level combined DVV variable (90.4% vs 78.6%). The prevalence of NMUPD was significantly higher among male than female students (21.3% vs 18.5%).

In the first stage of a 3-stage logistic regression modeling strategy for estimating the association between DVV and NMUPD, we used sex-stratified unadjusted analyses that demonstrated a significant positive association between DVV and NMUPD among both male and female students (Table 2). In the second stage, demographic covariates (race and ethnicity, grade, and sexual identity)

were included in the sex-stratified models, and again DVV was positively associated with NMUPD among both male and female students. In the third stage, substance use variables were included with the demographic variables, allowing for an exploration of the potential independent contribution of DVV to NMUPD. Among male students, physical DVV only was not associated with NMUPD, but sexual DVV only (aPR = 1.61; 95% CI: 1.21–2.12) and both physical and sexual DVV (aPR = 1.65; 95% CI: 1.26–2.17) were significantly positively associated with NMUPD. Among female students, physical DVV only (aPR = 1.42; 95% CI: 1.16–1.75) and both physical and sexual DVV (aPR = 1.43; 95% CI: 1.03–1.99) were significantly positively associated with NMUPD.

Some significant variation in the association of frequency of DVV with NMUPD was observed among male and female students (Table 3). For male students, higher frequencies of any sexual DVV (occurring 2 or 3 times [aPR = 1.53; 95% CI: 1.07–2.18] or 4 or more times [aPR = 2.29; 95% CI: 1.79–2.93]) were significantly associated

with NMUPD. According to the results of a linear trend analysis, each of these levels differed significantly from each other, suggesting a dose-response relationship for frequency of any sexual DVV and NMUPD among male students. No such dose-response relationship between any physical DVV and NMUPD among male students was observed, with only 1 level of frequency significantly associated with NMUPD (2 or 3 times). Among female students, only the highest frequency level (4 or more times) of any sexual DVV was associated with NMUPD (aPR = 1.55; 95% CI: 1.12–2.15). According to linear contrast analysis, this level varied significantly from 0 times and 1 time but not 2 or 3 times. All levels of frequency of any physical DVV were associated with NMUPD among female students. Although, with the exception of comparison with 0 times, the results of the linear contrast analysis indicated that the higher levels of any physical DVV did not vary significantly from each other with regard to association with NMUPD, thus no dose-response relationship was suggested among female students.

TABLE 2 DVV Associated With NMUPD Among Students Who Dated or Went Out With Someone During the 12 Months Before the Survey, by Sex (National YRBS, 2015)

	NMUPD ^a					
	PR	95% CI	aPR ^b	95% CI	aPR ^c	95% CI
Males						
Experienced DVV during the past 12 mo						
None	Reference	—	Reference	—	Reference	—
Physical DVV only	1.87	1.44–2.43	1.71	1.29–2.25	1.17	0.86–1.59
Sexual DVV only	2.19	1.64–2.93	2.25	1.72–2.94	1.61	1.21–2.12
Both physical and sexual DVV	2.98	2.38–3.72	2.68	2.08–3.47	1.65	1.26–2.17
Females						
Experienced DVV during the past 12 mo						
None	Reference	—	Reference	—	Reference	—
Physical DVV only	2.47	1.99–3.07	2.38	1.95–2.91	1.42	1.16–1.75
Sexual DVV only	1.46	1.15–1.87	1.41	1.10–1.81	1.06	0.80–1.39
Both physical and sexual DVV	2.97	2.39–3.68	2.76	2.16–3.53	1.43	1.03–1.99

PR, prevalence ratio; —, not applicable.

^a One or more times during their life.

^b Models adjusted for race and/or ethnicity, grade, and sexual identity.

^c Models adjusted for race and/or ethnicity, grade, sexual identity, and substance use variables (includes use of cigarettes, alcohol, marijuana, and other substance use behaviors at any time [use of synthetic marijuana, cocaine, heroin, methamphetamines, inhalants, ecstasy, and injection drug use at any time]).

TABLE 3 Frequency of Sexual and Physical DVV and NMUPD Among Students Who Dated or Went Out With Someone During the 12 Months Before the Survey, by Sex (National YRBS, 2015)

DVV Frequency	NMUPD ^a			
	Males		Females	
	Experienced Any Sexual DVV During the Past 12 mo	Experienced Any Physical DVV During the Past 12 mo	Experienced Any Sexual DVV During the Past 12 mo	Experienced Any Physical DVV During the Past 12 mo
	aPR (95% CI) ^b	aPR (95% CI) ^b	aPR (95% CI) ^b	aPR (95% CI) ^b
0 times	Referent	Referent	Referent	Referent
1 time	1.06 (0.64–1.75)	1.18 (0.76–1.83)	1.01 (0.72–1.43)	1.33 (1.03–1.73) ^c
2 or 3 times	1.53 (1.07–2.18) ^c	1.45 (1.09–1.93) ^c	1.07 (0.79–1.46)	1.44 (1.05–1.96) ^c
≥4 times	2.29 (1.79–2.93) ^{c,d,e}	1.28 (0.93–1.75)	1.55 (1.12–2.15) ^{c,d}	1.47 (1.07–2.02) ^c

^a One or more times during their life.

^b Models adjusted for race and/or ethnicity, grade, sexual identity, and substance use variables (include use of cigarettes, alcohol, marijuana, and other substance use behaviors at any time [use of synthetic marijuana, cocaine, heroin, methamphetamines, inhalants, ecstasy, and injection drug use at any time]).

^c Linear contrast indicates significantly different from 0 times at $P < .05$ or 95% CI does not include 1.

^d Linear contrast indicates significantly different from 1 time at $P < .05$.

^e Linear contrast indicates significantly different from 2 or 3 times at $P < .05$.

DISCUSSION

With this study, we sought to address the deficit in knowledge about the association between DVV and NMUPD among adolescents using data from a 2015 nationally representative sample. We observed that NMUPD was associated with DVV, although there was some variation in associations by type of victimization (sexual or physical DVV) and sex of the respondent. Our findings are consistent with some of the limited available literature,^{11,27} although direct comparisons are difficult because assessment of DVV in our study varied substantially from

that of other studies. For example, the few studies in the literature focused on NMUPD and DV among adolescent populations include both DVV and perpetration,^{11,27} making it difficult to interpret findings from the perspective of developing targeted DV and substance use prevention efforts. Furthermore, in our study we differentiated associations by physical DVV only, sexual DVV only, and experiences with both physical and sexual DVV for both male and female adolescents. Interestingly, we observed in our study that for female students, NMUPD was associated with only the physical form of DVV, with the exception of frequent (occurred 4

or more times in the past year) sexual DVV. Among male students, NMUPD was associated with both sexual and physical DVV. The frequency of the violence appears to be an important factor in understanding the relationship of types of DVV and NMUPD. With the findings in this study, we suggest that the frequency of DVV impacts the relationship with NMUPD for both male and female DV victims, although for girls, it is the frequency of any sexual and any physical DVV, and for boys, the frequency of any sexual DVV. More research is needed to better understand these sex differences by type and frequency of DVV.

A unique contribution of our study was exploring the association between types of DVV and NMUPD by sex. Available literature on adolescent populations either focuses solely on girls or adolescents in general, without regard to sex. Male adolescents have not received as much attention, possibly because the prevalence of DVV among boys is significantly lower than the prevalence observed for girls.⁵ In studies, researchers have suggested that sexual minority (ie, gay, lesbian, bisexual) high school students may be at an increased risk of experiencing physical and sexual DV.^{29–31} It should be noted that we were able to include sexual identity as a covariate in our sex-stratified models of DVV and NMUPD, and as a result, with our findings we demonstrate that DVV is associated with NMUPD regardless of sexual identity.

Although we are the first to present nationally representative data on the association between adolescent physical and sexual DVV and NMUPD, several limitations of this study should be considered. Because behaviors were self-reported, it is not possible to determine the extent to which the overreporting or underreporting of behaviors occurred, although it is important to note that YRBS questions have generally demonstrated good test-retest reliability.^{32,33} In addition, because these data apply only to youth who attend high school, our results are not representative of all individuals in this age group. According to researchers who conducted a national study of youth in 2012, ~3% of individuals aged

16 to 17 years had not completed high school and were not enrolled in a high school program.³⁴ Because the YRBS is a cross-sectional survey, it was not possible to determine the temporality of the association between the lifetime measure of NMUPD and past year experiences of physical or sexual DVV. The differing time periods for exposure may have impacted our results. NMUPD could have occurred well before the DVV events that occurred during the 12 months before the survey. It is likely that the association operates in both directions because researchers have suggested that substance use behaviors may increase the risk for violence victimization but also that youth who have been victimized may be more likely to engage in substance use behaviors.^{14,23} In addition, it should be noted that the YRBS measure for NMUPD is not specific to a class of drugs, therefore it was not possible to determine if differential associations exist by drug class. Finally, the measurement of DVV did not include psychological or stalking violence. Also, the limited number of items may have resulted in underestimates of physical and sexual DVV. Several behaviorally specific questions are recommended to increase opportunities for disclosure.^{35,36}

CONCLUSIONS

With this study, we are the first to present nationally representative data on the association between 2 types of DVV (physical and sexual) and NMUPD among male and female

high school students. Although the mechanisms behind the associations we observed are likely complex and temporality cannot be determined from our data, it is important to consider addressing substance use broadly to include NMUPD in preventive interventions for teen-aged DV. Community- or school-based adolescent violence and substance use prevention efforts, including ones that incorporate positive parenting and strengthening families, would be enhanced by considering the association between DVV and substance use, particularly NMUPD among both male and female adolescents, to more efficiently address these public health problems. Clinicians may consider the association between these behavioral health concerns when screening their adolescent populations for experiences of DV or substance use. Lastly, additional research is needed to understand the mechanisms behind of the differential association with types of DV and NMUPD by sex.

ABBREVIATIONS

aPR: adjusted prevalence ratio
 CI: confidence interval
 DV: dating violence
 DVV: dating violence victimization
 ED: emergency department
 IPV: intimate partner violence
 NMUPD: nonmedical use of prescription drugs
 YRBS: Youth Risk Behavior Survey

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