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A Daily Calendar Analysis of Substance Use and Dating Violence among High Risk Urban Youth*

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Abstract

Background—Dating violence (DV) among youth is an important public health problem. This study examined reasons for physical DV and the association between substance use and youth DV using daily calendar-based analyses among at-risk urban youth.

Methods—Patients (ages 14–24) presenting to an urban Emergency Department (ED) for a violent injury and a proportionally-selected comparison sample of non-violently injured youth who screened positive for substance use in the past 6 months (n=599) were enrolled in this study. Multi-level, multinomial regressions were conducted using daily-level substance use data from Time Line Follow Back (TLFB) responses and physical DV data that were obtained by coding Time Line Follow Back –Aggression Module responses for the 30 days prior to visiting the ED.

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Conflict of interest

None of the authors has any financial interests or relationships relevant to the subject of this manuscript.

Contributors

All authors contributed to the conceptualization and writing of the manuscript, and reviewed and approved the final manuscript. Drs. Cunningham, Walton, Booth, Zimmerman, Blow, and Whiteside were responsible for designing the overall study and supervising data collection. Drs. Epstein-Ngo, Cunningham, Chermack, and Walton were responsible for initially conceptualizing and analyzing the current paper, and preparing the initial manuscript. Drs. Cunningham, Whiteside, Booth, Zimmerman, and Blow provided critical feedback on analyses and editing of the final manuscript.

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Results—The two most commonly reported reasons for physical dating aggression and victimization, across sexes, were “jealousy/rumors” or “angry/bad mood.” Multi-level multinomial regression models, adjusting for clustering within individual participants, showed that among females, cocaine use and sedative/opiate use were associated with severe dating victimization and alcohol use was associated with severe dating aggression.

Conclusions—Use of TLFB data offers a unique opportunity to understand daily-level factors associated with specific incidents of DV in more detail. This study provides novel data regarding reasons for DV and the relationship between daily substance use and DV among urban youth, with alcohol, cocaine, and sedative/opiate use being associated with various types of DV. ED based DV interventions should be tailored to address youths’ reasons for DV as well as reducing their substance use.

Keywords

adolescents; dating violence; substance use

1. INTRODUCTION

Adolescent physical dating violence (DV, aggression and victimization) is a significant public health concern with one in ten adolescents reporting past year dating victimization (CDC, 2009) and two in ten reporting aggression (Rothman et al., 2010). Youth DV has been associated with substance use and adult intimate partner violence (Erickson et al., 2010; Silverman et al., 2001; Whiteside et al., 2009). It is critical to understand the motivations for DV and the role of substance use in order to develop interventions.

Previous research has examined physical dating victimization or aggression alone limiting our understanding of potential differences in factors (e.g., motivations for conflicts, substance use) related to youth DV (Foshee et al., 2011; Temple and Freeman, 2011). In one study that examined victimization and aggression, almost half of those experiencing DV (49.7%) report aggression by both partners, termed reciprocal violence (Whitaker, 2007). Although some research show no gender differences in substance use and DV (Boden et al., 2012), others find higher rates of physical dating aggression among females than males (Carroll et al., 2011; Ranney et al., 2011), some show that males report more severe physical aggression than females (Archer et al. 2000) and that females are at increased risk for injury (Chermack et al., 2010; Walton et al., 2007). Few researchers have examined motivations for physical dating aggression and victimization, which could differ by sex among youth and may provide critical information for intervention development. Hettrich and O’Leary (2007) found that the primary reasons for physical dating aggression among college females were anger or poor communication. In contrast, Foshee and colleagues (2007) found that the primary reason for physical dating aggression among females was responding “to violence perpetrated by the boyfriend,” whereas males reported aggression in self-defense and dating victimization due to jealousy or anger over their infidelity. Although this study provides important findings, they only assessed the first and most severe incidents.

A key correlate of physical dating victimization and aggression is substance use (Erickson et al., 2010; Whiteside et al., 2009). Prior studies have been limited by examining aggregate substance use and violence patterns (e.g., past year frequency) which cannot elucidate the relationship between substance use and specific incidents of youth physical dating aggression and victimization (Temple and Freeman, 2011; Testa et al., 2011). Further, studies examining physical dating aggression and victimization have been limited by examining alcohol alone (Reyes et al., 2011) or drugs collapsed across classes (Erickson et al., 2010). Among adults, daily calendar data showed that alcohol and other drug use was associated with incidents of violence (Chermack and Blow, 2002; Chermack et al., 2010;

Parks et al., 2004). Findings from adult studies vary by drug, with acute alcohol and cocaine use associated with increased risk of aggression, some evidence of a link between heroin use and aggression, but no association between marijuana use and aggression (Chermack and Blow, 2002; Chermack et al., 2010). Among adolescents, one study found that daily alcohol use was associated with dating aggression and victimization for males and females (Rothman et al., 2012^b). However, this study did not examine other drugs. Consequently, data regarding daily associations between substance use and adolescent DV is needed.

For youth who do not attend school regularly, the Emergency Department (ED) may be uniquely suited to address DV. One in 4 adolescents lack a primary care physician (McCormick and Stoto, 2000), making the ED an important point of contact for adolescents (Bernstein et al., 2009; Pitts et al., 2008). Further, rates of DV among female youth are higher in ED than in national samples (e.g., 28–37%; Erickson et al., 2010; Walton et al., 2009). Before implementing DV interventions in the ED, additional data is needed.

This study fills an important gap in the literature by providing data regarding reasons for physical dating aggression and victimization among females *and* males, and by examining daily associations between incidents of DV aggression and victimization severity and substance use. We expect similar findings for aggression and victimization with substance use given the reciprocal nature of DV (Rothman et al., 2011; Testa et al., 2011). We hypothesized that:

1. Alcohol, cocaine, and sedative/opiate use will be more likely on days in which DV occurred than on days without DV. The association between alcohol, cocaine, and aggression is well established among adults (Chermack and Blow, 2002; Chermack et al., 2010; Chermack and Giancola, 1997). Although findings for sedative/opiate use are more mixed, we believe that they will be associated with DV based on prior adult experimental and daily-calendar studies (Ben-Porath and Taylor, 2002; Weisman et al., 1998).
2. Marijuana use will *not* be more likely on days with DV than on days without DV. Although several studies have found an association between aggregate marijuana use (e.g., Rothman et al., 2010; Moore et al., 2008), in experimental and daily-calendar studies, there was no evidence of an association between marijuana use and violence (Chermack et al., 2010; Myerscough and Taylor, 1985).
3. The associations between substance use and DV will be similar for males and females based on prior studies using aggregate data (Boden et al., 2012); however, the reasons for DV will differ by sex.

2. METHODS

2.1 Procedures

This paper presents data from a longitudinal, observational study examining substance use among youth treated in an urban ED (The Flint Youth Injury Study). Participants were recruited at Hurley Medical Center (HMC), a Level 1 Trauma Center in Flint, MI (December, 2009 to September, 2011). Protocols were approved by the University of Michigan and HMC Institutional Review Boards. A National Institute of Health Certificate of Confidentiality was obtained. This study was designed to oversample youth (14–24 years) presenting to the ED for violent injury (i.e., assault-related) and reporting past 6 month substance use. Patients completed screening and surveys during their ED visit. However, those with violent injuries too severe to participate in the ED were recruited if they stabilized in the hospital within 72 hours. Based on the age block (14–17, 18–20, 21–24) and sex (male/female) of enrolled youth presenting with violent injury, a proportionally-selected comparison group was sampled of youth who presented for non-assault-related complaints

(e.g., abdominal pain, fever) and reported past 6 month substance use. Comparison youth were approached based on triage time, to mirror the proportion of participants in each age / sex group of violently injured participants.

Patients were approached by research assistants to participate in a screening survey to determine eligibility. Patients presenting to the ED for an acute sexual assault, child abuse, or suicidal ideation or attempt, were excluded. Upon written consent/assent from the patient (and parent/guardian if age < 18), participants self-administered a computerized screening survey (~ 25 minutes) and chose a \$1.00 gift (i.e., cards, lotion). Participants completed the surveys in treatment spaces without others present, in order to ensure confidentiality. Screened participants in the violently injured and comparison group reporting past 6 month substance use on the ASSIST (i.e. marijuana, cocaine, prescription stimulant opiates, or sedatives/sleeping pills, methamphetamine, inhalants, hallucinogens, street opiates; World Health Organization ASSIST Working Group, 2002) were enrolled in the longitudinal study and completed a baseline assessment (~ 90 minutes; \$20 remuneration), and a urine drug screen (\$5) and oral HIV testing (\$5; not reported here). The baseline interview included self-administered and research assistant administered portions (e.g., Time Line Follow Back (TLFB) interview). Our IRB did not allow for collection of additional data from refusals without written informed consent.

2.2 Measurement

2.2.1 Substance Use—Drug and alcohol use for the 30 days prior to ED visit were assessed using the TLFB semi-structured interview (Sobell et al. 1979), for the purpose of obtaining detailed, reliable and valid quantitative data about frequency of *daily* substance use (Maisto et al., 1979; Sobell et al., 1979, 1988). Use of alcohol, illicit drugs (e.g., cocaine, inhalants, heroin), and non-medical use (i.e., to get high, taking someone else's, taking more than prescribed) of prescription drugs (e.g., sedatives, opiates, stimulants) over a specified interval (e.g., 30–180 days) was assessed with the TLFB utilizing monthly calendars beginning on the day of the assessment and working backwards (Sobell et al., 1979). Data from the semi-structured interviews were coded for quantitative analysis.

2.2.2. Dating Violence—The TLFB – Aggression Module (TLFB-AM), developed to be used with the TLFB, assessed detailed characteristics of incidents of physical violence in the past 30 days (Chermack and Blow, 2002; Chermack et al., 2006). Following the TLFB for substance use, the TLFB-AM was administered. Again, using monthly calendars and beginning on the day of assessment and working backwards, participants were asked to identify specific dates in which they experienced interpersonal conflict (e.g., physical violence) (Chermack et al., 2010). For each of the conflict incidents, participants were asked about the setting (e.g., home, bars, work, “the streets,”), substance use before or during the conflict (e.g. alcohol, cocaine), and their relationship with the other person (e.g., spouse, girlfriend/boyfriend, friend, stranger, co-worker). Next, participants were given a list of behaviors adapted from the physical assault and injury scales of the Conflict Tactics Scales-2 (CTS-2; Straus et al., 1996) and asked to identify which acts occurred with “your current or ex-boyfriend/girlfriend, dating partner, or fiancée,” and who committed the act. The other CTS scales (e.g., sexual assault) were not included due to time limitations. Severity of aggression or victimization was coded: moderate (pushed, grabbed or shoved, slapped) and severe (beat up, hit with a hard object, used a knife or gun), consistent with CTS-2 categories. Participants reporting moderate and severe behaviors were placed into the “severe” category.

A question, “What was the reason for the fight?” was added, with the following response options: 1) Jealousy (e.g., boyfriend/girlfriend), 2) Angry/Bad Mood, 3) Personal belongings

(e.g., money, clothes, phones), 4) Drunk/high on drugs, 5) Retaliation (e.g., getting even), 6) Power or respect (e.g., show me respect/leave me alone), 7) Rumors (e.g., he said/she said), 8) Sex (e.g., fighting over having sex, NOT sexual assault), 9) Personal space (e.g., touching, stares, throwing things), 10) Argument over drug use, 11) Aiding someone during physical attack, 12) Aiding someone during verbal attack, 13) Territory (e.g., doesn't belong in my neighborhood), 14) Bullying, 15) Jumped or mistaken identity, 16) Got shot, 17) Other. Research staff coded all the reasons for each violent incident. Data from the semi-structured interviews were coded for quantitative analysis.

2.2.3. Aggregate measure of dating violence—DV in the 6 months prior to the ED visit was assessed using a modified version of the physical assault scale of the CTS-2 (Strauss et al., 1996), which asked about frequency of moderate or severe behaviors (see above) that your dating partner or you did.

2.2.4. Demographics—Demographic items included age, sex, race, ethnicity, and receipt of public assistance (Harris et al., 2003).

2.3 Data analysis

Analyses were conducted separately for males and females due to potential sex differences in DV (Rutter et al., 2012; Shorey et al., 2011), using MPlus version 6.11 (Muthén and Muthén, 2010). Comparison group participants were grouped with violent injury participants because comparisons could have experienced DV prior to ED visit. As this paper focuses on youth DV, we excluded married participants ($n=5$; Shorey et al., 2008). Descriptive data is provided for reasons for DV. We also described findings from questions regarding whether substance use preceded the DV incident on days in which substance use and DV occurred. Because of the limited time frame (past 30 days) and low base rates (e.g., cocaine use), subsequent analyses focused on associations between *daily* substance use and DV. Bivariate analyses were conducted in order to examine associations between DV and individual substances for conflict days (i.e., DV incident is reported) and non-conflict days (i.e., no DV incident is reported) (e.g., ANOVA, Kruskal-Wallis Test). Due to low base rates of misuse of prescription and illicit sedatives and opiates, these substances were combined into 1 category. Stimulants were not included as only one person reported one day of use.

We used hierarchical linear modeling (HLM) to estimate multi-level multinomial logistic regressions to account for the fact that individual conflict incidents were nested within individuals (Raudenbush and Bryk, 2002); failing to account for the nesting of data can result in standard errors that are under-estimated, increasing the likelihood of Type I errors (Chermack et al. 2010). These models were used to test the associations between days of substance use and DV severity, with separate models examining aggression and victimization (reference category = days with no DV; see Supplementary Material¹). Race and age were included as covariates because prior work has shown higher rates of DV and lower rates of alcohol consumption among African Americans and younger adolescents (Walton et al., 2009). (Initial analyses were conducted controlling for the sampling design (i.e., violent injury or comparison), which showed that the violently injured group was more likely to report dating victimization and aggression, and that older youth were more likely to report dating aggression. Findings for the relationship between substance use and DV, however, were identical with those that did not control for the sampling design. Because the TLFB data (the outcome variable) included the incident of DV that resulted in the ED visit, models presented do not include violent injury as a covariate.)

¹Supplementary material can be found by accessing the online version of this paper at <http://dx.doi.org> and by entering doi:...

3. RESULTS

Of the 849 violently injured and 838 comparison youth approached in the ED, 84.6% (n=718) and 86.4% (n=727), respectively, were screened; 54.0% (n=388) of the violently injured and 38.5% (n=281) of the comparison youth reported past 6 month substance use and 350 (90.2%) of the violently injured and 250 (89.0%) of the comparisons completed the baseline assessment. Refusal rates by sex were not significant ($\chi^2=2.8757$, $p=ns$). However, African Americans had a lower refusal rate (6.5%) than Caucasians (13.5%) or Other races (23.1%) ($\chi^2=12.54$, $p=0.001$). Only 5% reported Hispanic ethnicity. One participant was excluded due to missing data in the TLFB (i.e., n=599).

3.1 Descriptive Analyses: Females

Among the 247 females (mean age 20.1; SD=2.4; Table 1), 58% (n=143) were treated in the ED for a violent injury; 25.6% (n=63) of females presented because a DV injury. Results of the TLFB for the past 30 days found that marijuana was most common. Based on aggregate measures (CTS-2), 75.7% (n=187) of females reported DV in the past 6 months; 10.9% (n=27) reported moderate and 64.8% (n=160) reported severe violence. According to 30 day calendars, female participants reported a total of 218 incidents (n=76, 30.8% of sample) of dating victimization and 117 incidents (n=59, 23.9%) of dating aggression. The most common reasons for dating victimization and aggression were angry or bad mood, and/or jealousy (Table 2).

For females, on days when DV occurred, mean (SD) number of drinks per day was 1.7 (4.1); percent of days of marijuana, cocaine, and sedative/opiate use were 56.4%, 14.7% and 16.4%, respectively. On non-conflict days, mean (SD) number of drinks per day was 0.7 (2.9); and percent days of marijuana, cocaine, and sedative/opiate use were 46.0%, 0.9% and 1.0%, respectively. Alcohol ($\chi^2=33.56$, $p<0.0001$) and other drug use ($\chi^2_{\text{marijuana}}=9.6240$, $p<0.01$; $\chi^2_{\text{cocaine}}=320.58$, $p<0.001$; $\chi^2_{\text{sed/opiates}}=351.43$, $p<0.001$) were higher on days involving DV. For days in which alcohol use and DV occurred, alcohol use preceded incidents: 75% for moderate victimization, 100% for severe victimization, 53.8% for moderate aggression and 88.9% for severe aggression. For days in which marijuana use and DV occurred, marijuana use preceded incidents: 88.9% for moderate victimization, 57.1% for severe victimization, 85.7% for moderate victimization and 67.5% for severe aggression. For days in which cocaine use and DV occurred or sedative/opiates and DV occurred, substance use occurred 100% of the time before the conflict incident.

3.2 Descriptive Analyses: Males

The sample was 58.9% male (n=352 males, mean age 20.0 (2.5); Table 1). Fifty-nine percent of the males (n=206) were treated in the ED for a violent injury; 4.0% (n=14) of males reported because of an injury from DV. Based on past 30 day TLFB data, marijuana use was most common. Based on aggregate measures (CTS - 2), 55.7% (n=196) of males reported DV in the past 6 months; 14.8% (n=52) reported moderate violence and 40.9% (n=144) reported severe violence. According to TLFB data, males reported 20 incidents (n=20, 5.7%) of dating victimization and 13 incidents (n=13, 3.7%) of dating aggression in the past 30 days. The most frequently reported reasons for dating victimization and aggressions among males were angry/bad mood and/or jealousy (Table 2).

Based on the TLFB data, for males, on days when DV occurred, mean (SD) number of drinks per day was 1.2 (4.3); percent of days of marijuana, cocaine, and sedative/opiate use were 45.5%, 0.0% and 0.0%, respectively. On non-conflict days, mean (SD) number of drinks per day was 0.8 (3.4); percent days of marijuana, cocaine, and sedative/opiate use were 55.7%, 0.3% and 3.4%, respectively. For days in which alcohol use and DV occurred,

alcohol use preceded incidents 100% for severe victimization and aggression. For days in which marijuana use and DV occurred, marijuana use preceded incidents: 66.7% for severe victimization, 33.3% for moderate aggression and 25.0% for severe aggression. For the one day of cocaine use and one day of sedative/opiate use that DV occurred substance use preceded the conflict. Finally, given the small number of males (n=22) reporting DV during the 30 day time frame, it is not possible to draw conclusions regarding differences in conflict and non-conflict day substance use. Further, given the small number of DV incidents reported by males, subsequent analyses focus on females.

3.3 Bivariate Analyses

The bivariate relationships between DV type (victimization severity, aggression severity) and daily substance use among females are presented in Table 3. Among females, all substances were significantly related to higher rates of dating victimization, and all substances, except cocaine, were related to dating aggression.

3.4 Multi-level Multinomial Logistic Regression Models

For females, two multi-level, multinomial models were conducted with severity of DV (victimization and aggression: none, moderate and severe) as the dependent variables, accounting for clustering of violent incidents within individuals and with age and race as covariates (see Table 4). Due to multi-collinearity concerns, “any alcohol” was included in lieu of binge drinking in order to maximize data (11.0% any alcohol use, 6.5% binge drinking). Severe victimization was significantly more likely on days in which cocaine (AOR=11.51, 95% CI=3.06–43.29) and sedative/opiate use (AOR=11.18, 95% CI=2.99–41.81) were reported. In the dating aggression model, cocaine use was excluded due to inadequate cell size. Alcohol use was significantly more likely on days in which severe dating aggression occurred (AOR=2.26, 95% CI=1.22–4.20).

4. DISCUSSION

Despite the adverse sequelae of youth DV, few prevention programs exist (Foshee et al., 2004; Temple and Freeman, 2011; Whitaker et al., 2006). Designing effective prevention programs has been impeded by the limited research regarding reasons for DV (Temple and Freeman, 2011) and the relationship with daily substance use. The need for ED-based interventions is underscored by the fact that DV was common and often severe.

4.1 Substance Use and Dating Violence

Consistent with prior adult studies, bivariate analyses among female youth showed that substance use was more likely to occur on conflict days than on days with no DV conflict (Chermack and Blow, 2002; Chermack et al., 2010; Murphy et al., 2005). This was true for moderate and severe dating victimization and aggression. These findings do not account for nesting of conflict incidents within individuals and cannot identify the relative impact of specific substances on DV. Although it was not possible to adequately analyze the relationship between substance use and DV based on timing (before the incident) given the small assessment window (past 30 days), data suggested that alcohol use typically preceded severe DV, marijuana preceded severe DV less often, and cocaine and sedative/opiates always preceded the DV. Multi-level analyses of 30-day calendar data revealed that alcohol use was the most robust substance associated with severe physical dating aggression. The findings for alcohol use and aggression are consistent with prior adult studies using the TLFB-AM (Chermack et al., 2010), laboratory alcohol administration studies (Chermack and Giancola, 1997), and adolescent studies using aggregate measures (Rothman et al., 2012a; Testa et al., 2011).

Although it was not possible to examine the association between cocaine use and physical dating aggression because of a lack of adequate cell sample size, among female youth cocaine use was associated with severe physical dating victimization. This novel finding is consistent with research showing a link between cocaine use and injury as a result of adult partner violence (Chermack et al., 2008). Cocaine use may be viewed as a more deviant behavior than the use of other drugs. Thus, female youth who are using cocaine may be with partners who are using cocaine and these partners may have more problem behaviors such as dating aggression (Chermack et al., 2008, Temple and Freeman, 2011), due to acute pharmacological effects (Chermack and Blow, 2002; Moore et al., 2008) or social/contextual factors (Chermack and Blow, 2002; Chermack et al. 2010).

Although marijuana use was associated with DV conflict days in bivariate analyses, in multivariate analyses of daily data it was no longer significant. These findings may be a reflection of the fact that marijuana use was often in combination with alcohol and other drugs. The multivariate analyses revealed that the relative impact of other drugs on DV was stronger than the influence of marijuana. Further, studies examining acute marijuana use in laboratory settings or with daily calendar data are typically not associated with aggression (Chermack et al., 2010; Myerscough and Taylor, 1985). Nonetheless, aggregate data has shown that marijuana use is correlated with DV, likely due to shared risk and promotive factors (Walton et al., 2009; Testa, 2011).

Despite recent concerns regarding non-medical use of prescription drugs (Blanco et al., 2007), few studies have examined the association between sedatives or opiates and DV (Cole and Logan, 2010). Daily sedative/opiate use was related to physical dating victimization among females, which is consistent with a prior adult study using aggregate measures (Cole and Logan, 2010). Given the rise in prescription drug misuse (Substance Abuse and Mental Health Services Administration, 2010), the relationship between sedatives/opiates and DV among female youth warrants future investigation.

4.2 Reasons for Dating Violence

Although we were unable to conduct analyses for males due to the limited number of incidents reported, the descriptive analyses make an important contribution given the paucity of research on males and reasons for DV. Consistent with Foshee et al. (2007), the most common reasons for male and female physical dating victimization and aggression was jealousy and being in an angry/bad mood. This data suggests that DV prevention programs should include information about navigating dating relationships, impulse control, and anger management, in addition to addressing issues of substance use. Although low rates reported by males precluded statistical examination of sex differences, some trends were noteworthy and could inform interventions. For example, males reported power/respect as a reason for physical aggression more often than females. Females reported sex as a reason for physical victimization more than males. Being drunk/high was mentioned for aggression among males but for victimization among females. Similarly, personal belongings were mentioned for aggression among males but for victimization among females.

4.3 Limitations

Several limitations require acknowledgement. First, this study used a 30 day calendar, which limited analyses for some substances (e.g., cocaine) and categories (e.g., sedatives/opiates). Future studies with longer time frames are needed. Second, analyses for males were limited and conclusions could not be drawn due to the small number reporting DV, perhaps reflecting the short 30-day time frame, more under-reporting among males, and sampling in which females were more likely than males to present to the ED for injury from DV (25.6% vs. 4.0% respectively). Additionally, although our sample is reflective of the race/ethnicity

in which our ED is located (5% Hispanic across all racial groups), future research is needed to examine these issues among Hispanics. Third, because of the limited time frame, we were only able to provide descriptive data of whether substance use preceded the DV incident. This is an area for future research because it may be that alcohol use prior to the incident of DV could lower inhibitions and contribute to the escalation of the violence. Alternatively, substance use may have followed incidents of DV as a coping strategy. Future studies are needed using more detailed measures of the within day, temporal relationship between substance use and DV (e.g. ecological momentary assessment). Future research should assess verbal and sexual DV. Finally, this study relied on retrospective self-report data, limiting the ability to infer causal relationships. Despite these limitations, the present findings are novel, strengthened by the multi-level daily-calendar analyses, thus making an important contribution.

4.4 Conclusions

Overall, findings indicate that youth in the ED who use substances may be at enhanced risk for DV. Whether because of pharmacological influences or due to socio-contextual factors, alcohol use was related to physical dating aggression, and cocaine and sedative/opiate use were associated with physical dating victimization. Findings suggest that ED based DV interventions should address the relationship between DV and daily use of alcohol and drugs, as well as being tailored to address youths' reasons for physical dating aggression and victimization.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

- Archer J. Sex differences in aggression between heterosexual partners: a meta-analytic review. *Psychol Bull.* 2000; 126:651–680. [PubMed: 10989615]
- Ben-Porath DD, Taylor SP. The effects of diazepam (valium) and aggressive disposition on human aggression: an experimental investigation. *Addict Behav.* 2002; 27:167–177. [PubMed: 11817760]
- Bernstein E, Bernstein JA, Stein JB, Saitz R. SBIRT in emergency care settings: are we ready to take it to scale? *Acad Emerg Med.* 2009; 16:1072–1077. [PubMed: 20053225]
- Blanco C, Alderson D, Ogburn E, Grant BF, Nunes EV, Hatzenbuehler ML, Hasin DS. Changes in the prevalence of non-medical prescription drug use and drug use disorders in the United States: 1991–1992 and 2001–2002. *Drug Alcohol Depend.* 2007; 90:252–260. [PubMed: 17513069]
- Boden JM, Fergusson DM, Horwood LJ. Alcohol misuse and criminal offending: findings from a 30-year longitudinal study. *Drug Alcohol Depend.* 2012; 122:135–141. [PubMed: 22015176]
- Carroll BC, Raj A, Noel SE, Bauchner H. Dating violence among adolescents presenting to a pediatric emergency department. *Arch Pediatr Adolesc Med.* 2011; 165:1101–1106. [PubMed: 22147777]
- Center for Disease Control Prevention. Youth Risk Behavior Surveillance United States. *MMWR* Accessed January. 2009; 24:2012.
- Chermack ST, Blow FC. Violence among individuals in substance abuse treatment: the role of alcohol and cocaine consumption. *Drug Alcohol Depend.* 2002; 66:29–37. [PubMed: 11850133]

- Chermack ST, Giancola PR. The relation between alcohol and aggression: an integrated biopsychosocial conceptualization. *Clin Psychol Rev.* 1997; 17:621–649. [PubMed: 9336688]
- Chermack ST, Grogan-Kaylor A, Perron BE, Murray RL, De Chavez P, Walton MA. Violence among men and women in substance use disorder treatment: a multi-level event-based analysis. *Drug Alcohol Depend.* 2010; 112:194–200. [PubMed: 20667666]
- Chermack ST, Murray RL, Walton MA, Booth BA, Wryobeck J, Blow FC. Partner aggression among men and women in substance use disorder treatment: correlates of psychological and physical aggression and injury. *Drug Alcohol Depend.* 2008; 98:35–44. [PubMed: 18554825]
- Chermack ST, Wryobeck JM, Walton MA, Blow FC. Distal and proximal factors related to aggression severity among patients in substance abuse treatment: family history, alcohol use and expectancies. *Addict Behav.* 2006; 31:845–858. [PubMed: 16002224]
- Cole J, Logan TK. Nonmedical use of sedative-hypnotics and opiates among rural and urban women with protective orders. *J Addict Dis.* 2010; 29:395–409. [PubMed: 20635288]
- Erickson MJ, Gittelman MA, Dowd D. Risk factors for dating violence among adolescent females presenting to the pediatric emergency department. *J Trauma.* 2010; 69:S227–232. [PubMed: 20938314]
- Foshee VA, Bauman KE, Linder F, Rice J, Wilcher R. Typologies of adolescent dating violence: identifying typologies of adolescent dating violence perpetration. *J Interpers Violence.* 2007; 22:498–519. [PubMed: 17429020]
- Foshee VA, Benefield TS, Ennett ST, Bauman KE, Suchindran C. Longitudinal predictors of serious physical and sexual dating violence victimization during adolescence. *Prev Med.* 2004; 39:1007–1016. [PubMed: 15475036]
- Foshee VA, Reyes HL, Ennett ST, Suchindran C, Mathias JP, Karriker-Jaffe KJ, Bauman KE, Benefield TS. Risk and protective factors distinguishing profiles of adolescent peer and dating violence perpetration. *J Adolesc Health.* 2011; 48:344–350. [PubMed: 21402262]
- Harris, K.; Florey, F.; Tabor, J.; Bearman, P.; Jones, J.; Udry, J. [Accessed May 21, 2008] The National Longitudinal Study of Adolescent Health: research design. 2003. <http://www.cpc.unc.edu/projects/addhealth/design>
- Hettrich EL, O'Leary KD. Females' reasons for their physical aggression in dating relationships. *J Interpers Violence.* 2007; 22:1131–1143. [PubMed: 17704459]
- Maisto SA, Sobell MB, Cooper A, Sobell LC. Test-retest reliability of retrospective self-reports in three populations of alcohol abusers. *J Behav Assess.* 1979; 1:315–326.
- McCormick MC, Stoto MA. HIV screening. *Pediatrics.* 2000; 105:1375. [PubMed: 10877672]
- Moore TM, Stuart GL. A review of the literature on marijuana and interpersonal violence. *Aggress Violent Behav.* 2005; 10:171–192.
- Moore TM, Stuart GL, Meehan JC, Rhatigan DL, Hellmuth JC, Keen SM. Drug abuse and aggression between intimate partners: a meta-analytic review. *Clin Psychol Rev.* 2008; 28:247–274. [PubMed: 17604891]
- Murphy CM, Winters J, O'Farrell TJ, Fals-Stewart W, Murphy M. Alcohol consumption and intimate partner violence by alcoholic men: comparing violent and nonviolent conflicts. *Psychol Addict Behav.* 2005; 19:35–42. [PubMed: 15783276]
- Muthén, LK.; Muthén, BO. Mplus Version 6.11. Los Angeles, CA: 2010.
- Myerscough R, Taylor S. The effects of marijuana on human physical aggression. *J Pers Soc Psychol.* 1985; 49:1541–1546. [PubMed: 3003332]
- Parks KA, Fals-Stewart W. The temporal relationship between college women's alcohol consumption and victimization experiences. *Alcohol Clin Exp Res.* 2004; 28:625–629. [PubMed: 15100614]
- Pitts SR, Niska RW, Xu J, Burt CW. National Hospital Ambulatory Medical Care Survey: 2006 emergency department summary. *Natl Health Stat Rep.* 2008:1–38.
- Ranney ML, Mello MJ. A comparison of female and male adolescent victims of violence seen in the emergency department. *J Emerg Med.* 2011; 41:701–706. [PubMed: 21536402]
- Raudenbush, SW.; Bryk, AS. Hierarchical Linear Models: Applications and Data Analysis Methods. Sage Publications; Thousand Oaks, CA: 2002.

- Reyes HL, Foshee VA, Bauer DJ, Ennett ST. The role of heavy alcohol use in the developmental process of desistance in dating aggression during adolescence. *J Abnorm Child Psychol*. 2011; 39:239–250. [PubMed: 20838876]
- Rothman EF, Johnson RM, Azrael D, Hall DM, Weinberg J. Perpetration of physical assault against dating partners, peers, and siblings among a locally representative sample of high school students in Boston, Massachusetts. *Arch Pediatr Adolesc Med*. 2010; 164:1118–1124. [PubMed: 21135340]
- Rothman EF, McNaughton Reyes L, Johnson RM, LaValley M. Does the alcohol make them do it? Dating violence perpetration and drinking among youth. *Epidemiol Rev*. 2012a; 34:103–119. [PubMed: 22128086]
- Rothman EF, Stuart GL, Winter M, Wang N, Bowen DJ, Bernstein J, Vinci R. Youth alcohol use and dating abuse victimization and perpetration: a test of the relationships at the daily level in a sample of pediatric emergency department patients who use alcohol. *J Interpers Violence*. 2012b; 27:2959–79. [PubMed: 22550149]
- Rothman EF, Stuart GL, Greenbaum PE, Heeren T, Bowen DJ, Vinci R, Baughman AL, Bernstein J. Drinking style and dating violence in a sample of urban, alcohol-using youth. *J Stud Alcohol Drugs*. 2011; 72:555–566. [PubMed: 21683037]
- Rutter LA, Weatherill RP, Taft CT, Orazem RJ. Examining gender differences in the relationship between dating violence victimization and anger in college students. *Violence Vict*. 2012; 27:70–77. [PubMed: 22455185]
- Shorey RC, Cornelius TL, Bell KM. Critical review of theoretical frameworks for dating violence: comparing the dating and marital fields. *Aggress Violent Behav*. 2008; 13:185–194.
- Shorey RC, Stuart GL, Cornelius TL. Dating violence and substance use in college students: a review of the literature. *Aggress Violent Behav*. 2011; 16:541–550. [PubMed: 22125415]
- Silverman JG, Raj A, Mucci LA, Hathaway JE. Dating violence against adolescent girls and associated substance use, unhealthy weight control, sexual risk behavior, pregnancy, and suicidality. *JAMA*. 2001; 286:572–579. [PubMed: 11476659]
- Sobell LC, Maisto SA, Sobell MB, Cooper AM. Reliability of alcohol abusers' self-reports of drinking behavior. *Behav Res Ther*. 1979; 17:157–160. [PubMed: 426744]
- Sobell LC, Sobell MB, Leo GI, Cancilla A. Reliability of a timeline method: assessing normal drinkers' reports of recent drinking and a comparative evaluation across several populations. *Br J Addict*. 1988; 83:393–402. [PubMed: 3395719]
- Straus MA, Hamby SL, Boney-McCoy S, Sugarman DB. The Revised Conflict Tactics Scales (CTS2): development and preliminary psychometric data. *J Fam Issues*. 1996; 17:283–316.
- Substance Abuse and Mental Health Services Administration. NSDUH Series H-38A, HHS Pub No SMA 10–4586. Office of Applied Studies; Rockville, MD: 2010. Results from the 2009 National Survey on Drug Use and Health: Volume 1. Summary of National Findings.
- Temple JR, Freeman DH Jr. Dating violence and substance use among ethnically diverse adolescents. *J Interpers Violence*. 2011; 26:701–718. [PubMed: 20587475]
- Testa M, Hoffman JH, Leonard KE. Female intimate partner violence perpetration: stability and predictors of mutual and nonmutual aggression across the first year of college. *Aggress Behav*. 2011; 37:362–373. [PubMed: 21462201]
- Walton MA, Cunningham RM, Chermack ST, Maio R, Blow FC, Weber J. Correlates of violence history among injured patients in an urban emergency department: gender, substance use, and depression. *J Addict Dis*. 2007; 26:61–75. [PubMed: 18018809]
- Walton MA, Cunningham RM, Goldstein AL, Chermack ST, Zimmerman MA, Bingham CR, Shope JT, Stanley R, Blow FC. Rates and correlates of violent behaviors among adolescents treated in an urban emergency department. *J Adolesc Health*. 2009; 45:77–83. [PubMed: 19541253]
- Weisman AM, Berman ME, Taylor SP. Effects of clorazepate, diazepam, and oxazepam on a laboratory measurement of aggression in men. *Int Clin Psychopharmacol*. 1998; 13:183–188. [PubMed: 9727729]
- Whitaker DJ, Haileyesus T, Swahn M, Saltzman LS. Differences in frequency of violence and reported injury between relationships with reciprocal and nonreciprocal intimate partner violence. *Am J Public Health*. 2007; 97:941–947. [PubMed: 17395835]

- Whitaker DJ, Morrison S, Lindquist CA, Hawkins SR, O'Neil JA, Nesius AM, Mathew A, Reese L. A Critical Review of Interventions for the Primary Prevention of Perpetration of Partner Violence. *Aggress Violent Behav.* 2006; 11:151–166.
- Whiteside LK, Walton MA, Stanley R, Resko SM, Chermack ST, Zimmerman MA, Cunningham RM. Dating aggression and risk behaviors among teenage girls seeking gynecologic care. *Acad Emerg Med.* 2009; 16:632–638. [PubMed: 19508314]
- WHO ASSIST Working Group. The Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST): development reliability and feasibility. *Addiction.* 2002; 97:1183–94. [PubMed: 12199834]

Table 1

Characteristics of Study Sample (Demographics, Substance Use, Violent History and ED Presentation) by Gender

Variable	Males (n=352)	Females (n=247)
Average Age (SD)	20.0 (2.5)	20.1 (2.4)
Race		
African American	223(63.4%)	165(66.8%)
Caucasian	121(34.4%)	80(32.5%)
Other	8(2.3%)	2(0.8%)
Received Public Assistance ***	232(65.9%)	205(83.0%)
Highest Education Level Attained **		
Middle School	17(4.8%)	3(1.2%)
High School	244(69.3%)	157(63.6%)
College	82(23.3%)	73(29.6%)
Not in School	9(2.6%)	14(5.7%)
% of Sample Using Substances 30 Days Prior to ED Visit		
Alcohol	10.8%	11.0%
Marijuana ***	55.7%	46.3%
Cocaine ***	0.3%	1.3%
Sedatives/Opiates ***	3.4%	1.5%
% Treated for Violent Injury (VI) in ED	206(58.5%)	143(57.9%)
% Treated for VI Related to Dating Violence (DV) in ED	14(4.0%)	63(25.6%)
% Reporting Any DV in Past 6 Months ***	196(55.7%)	187(75.7%)
Of those reporting past 6 month DV		
% of Moderate Dating Violence	52(26.5%)	27(14.4%)
% of Severe Dating Violence	144(73.5%)	160(85.6%)

*
p<.05

**
p<.01

p<.0001

Table 2Reasons Cited by Participants for the Initiation of the Dating Violence Incident Reported by Gender^{*}

Reason for DV	Victimization		Aggression	
	Males	Females	Males	Females
1. Jealousy	50.0%	26.6%	46.2%	34.2%
2. Angry/Bad Mood	30.0%	48.6%	30.8%	51.3%
3. Personal Belongings	10.0%	23.9%	23.1%	15.4%
4. Drunk/ High Drugs	10.0%	15.1%	15.4%	8.5%
5. Retaliation	10.0%	1.8%	7.7%	0.9%
6. Power or Respect	5.0%	9.7%	15.4%	9.5%
7. Rumors	0.0%	5.5%	0.0%	7.7%
8. Sex	5.0%	10.6%	0.0%	0.0%
9. Personal Space	0.0%	1.4%	0.0%	2.6%
10. Argue Drug Use	0.0%	1.4%	0.0%	1.7%
11. Aid to Other During Physical Attack	10.0%	0.0%	7.7%	0.0%

^{*} The following reasons for dating violence were also given as options but were not endorsed by any of the participants reporting dating violence: Aid to Other During Verbal Attack, Territory, Bullying, Jumped or Mistaken Identity, Got Shot, Other.

Unadjusted Bivariate Relations between Dating Violence (Aggression and Victimization) and Substance Use for Females (n=243)

Table 3

	No Violence	Dating Victimization (Moderate)	Dating Victimization (Severe)	Chi-square	No Violence	Dating Aggression (Moderate)	Dating Aggression (Severe)	Chi-square
Any Alcohol	10.5%	21.4%	23.5%	34.32 ***	10.5%	24.5%	29.7%	34.76 ***
Binge Drinking	6.1%	14.3%	16.1%	32.27 ***	6.2%	18.9%	15.6%	23.74 ***
Marijuana	46.0%	80.4%	47.5%	26.42 ***	46.0%	66.0%	62.5%	15.28 **
Cocaine	0.9%	1.8%	19.8%	444.67 ***	0.9%	0.0%	1.6%	0.82
Sedatives/Opiates	1.0%	5.4%	21.0%	435.05 ***	1.0%	5.7%	4.7%	18.13 **

Note: Significance in the chi-square statistic denotes a significant difference between the 3 groups, and does not indicate which groups differ.

* p .05;
** p .01;
*** p .001

Table 4

Multi-level, Multinomial Logistic Regression Analyses Examining Predictors of Dating Violence (Aggression and Victimization) Severity among Female Youth (n=243) [†]

	Dating Victimization (Moderate)			Dating Victimization (Severe)			Dating Aggression (Moderate)			Dating Aggression (Severe)		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Age	0.83	(0.57–1.20)		1.12	(0.95–1.32)		0.79	(0.56–1.12)		1.12	(0.99–1.26)	
Race ^{††}	0.22	(0.04–1.34)		0.82	(0.28–2.39)		0.87	(0.19–3.89)		2.15*	(1.03–4.51)	
Any Alcohol	1.87	(0.28–12.46)		1.88	(0.87–4.08)		1.69	(0.22–12.83)		2.26**	(1.22–4.20)	
Marijuana	0.25	(0.05–1.18)		1.14	(0.49–2.66)		0.85	(0.15–4.91)		1.66	(0.95–2.89)	
Cocaine	7.26	(0.51–103.32)		11.51**	(3.06–43.29)		--	--		--	--	
Sedatives/Opiates	1.77	(0.21–14.76)		11.18***	(2.99–41.81)		0.65	(0.13–3.38)		3.96	(0.88–17.82)	

[†] Days on which dating victimization (moderate and severe) was reported are compared to days when no victimization was reported and days on which dating aggression (moderate and severe) was reported are compared to days when no aggression was reported;

* p .05;

** p .01;

*** p .001

^{††} Reference category for race was Caucasian/Other. This reference group was chosen for ease of interpretation of odds ratios as previous literature indicates African Americans are at higher risk for violence.