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Substance use and Violence among Youth: A Daily Calendar Analysis

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Abstract

Background—While researchers have identified factors that contribute to youth violence, less is known about the details of violent incidents. In addition, substance use has been linked to youth violence; however, little is known about actual substance use on days in which violence occurs.

Objective—This study examined reasons for peer violence and the association between substance use and violence using daily calendar-based analyses among at-risk urban youth.

Methods—Data were collected from Emergency Department (ED) patients (ages 14–24; n=599; 59% male, 65% African American) who screened positive for substance use in the past 6 months. Daily data regarding past 30-day substance use and violence and reasons for violent incidents were obtained via semi-structured interviews. Multi-level multinomial regression models were conducted to test the associations between substance use and peer violence incidents (i.e., none, moderate and severe).

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Results—Conflict over 'personal belongings' was a common reason for violence among males; 'jealousy'/'rumors' were common reasons among females. Moderate victimization was more likely to be reported on days in which participants reported alcohol and cocaine use. Severe victimization was more likely to be reported on days in which participants reported alcohol use. Moderate or severe aggression was more likely to be reported on days in which participants reported alcohol and non-medical sedative use.

Conclusions—Results suggest that youth violence prevention that addresses differential reasons for violence among males and females as well as substance use would be beneficial.

Introduction

Youth violence[1], which for the purposes of this paper includes physical victimization or physical aggression, is a significant social and public health problem. Youth who participate in violence are at risk for poor health and social outcomes (Herrenkohl et al., 2000; Centers for Disease Control and Prevention [CDC], 2009). Violence rates peak during the adolescent years, and adolescents disproportionately suffer the consequences of violence, including imprisonment, injury, and death (NAHIC, 2007; CDC, 2009). Members of specific demographic groups, especially males and African Americans, are at particular risk for involvement in serious forms of violence and related negative health and social sequelae (e.g., homicide, incarceration) (Herrenkohl et al., 2000; CDC, 2009). Although death is the most severe consequence of violence, and homicide is the leading cause of death among African American adolescents (CDC, 2009), nonfatal injuries are far more common. In 2011, more than 707,000 10–24 year olds in the United States were treated in emergency departments for injuries caused by violence (CDC, 2012) and the ED is increasingly recognized as an important contact location for youth at risk for future violent injury (Cunningham et al., 2010). In addition, a recent study surveying adolescents presenting to an urban emergency department for any reason found that three quarters of adolescents reported past year peer violence (Walton et al., 2009).

Non-partner violence is defined as violence that occurs between individuals such as friends or strangers but not dating partners. For youth violence, non-partner violence is often termed as 'peer violence' in the literature. Few researchers have examined individual perceptions regarding reasons for peer violence. To date, the majority of studies that have identified factors that contributed to youth violence have used aggregate measures of patterns of violence involvement (e.g. lifetime exposure to violence; Ceballo et al., 2003; Cooley-Quille et al., 2001; Dempsey, 2002; Epstein-Ngo et al., 2013; Gorman-Smith et al., 2004; Guerra et al., 2003; Miller et al., 1999). Although these studies have contributed to our understanding of youth violence, they are limited in their ability to elucidate the unique factors immediately associated with specific incidents of violence (Chermack et al., 2010; Chermack and Blow, 2002; Epstein-Ngo et al., 2012). Studies using timeline follow-back assessment approaches allow for a more detailed look into specific risks associated with incidents of violence at the daily level (Chermack et al., 2010; Epstein-Ngo et al., 2012). Yet, to date, most studies using timeline follow-back methodology have been conducted for

[1]Youth violence is defined by the Centers of Disease Control as interpersonal violence that occurs between the ages 10–24.

adult substance use (Brower et al., 2011, Chermack et al., 2010; Krentzman et al., 2012; Tweedly et al., 2012), for adult violence and substance use (Chermack et al., 2010), or for adolescent substance use and dating violence (Epstein-Ngo et al., 2012; Rothman et al., 2012). This method has not been used to examine factors associated with incidents of substance use and peer violence at the daily level, and no prior work has described in detail the type of substances used that preceded the incident of victimization or aggression among adolescents and young adults. This type of analysis can help us better understand violent behavior among youth and provide insight into the relationship between violent incidents and substance use.

Alcohol and drug use are risk factors for physical victimization and aggression among youth. Conceptually, some researchers posit that the link between violence and substance use is due to the acute and chronic pharmacological effects of substances on individual functioning (Rothman, McNaughton Reyes, et al., 2012). For instance, disruptions in cognitive processes, irrational behavior, increased arousal, and a reduction in the inhibition of aggressive impulses may all contribute to increased violence (Chermack & Giancola, 1997; Ito, Miller, & Pollock, 1996; Pihl & Peterson, 1995; Virkkunen & Linnoila, 1993). Numerous studies have indicated strong associations between violence (victimization and aggression) and alcohol use (Rothman et al., 2011; Swahn and Donovan, 2006; Swahn et al., 2004) and/or drug use among youth (Cunningham et al., 2006, Epstein-Ngo et al., 2012; White et al., 2012,Walton et al., 2009). The National Survey on Drug Use and Health, for example, indicated that youth who used any illicit drug in the past year were almost twice as likely to have engaged in violence compared to youth who did not report use of illicit drugs (SAHMSA, 2006). In most instances, however, these studies indicated that the frequency of alcohol or drug use was correlated with the reported frequency of involvement in aggression during the same time period (e.g., past year). Swahn et al. (2004) found in a national study of adolescents that those who drank frequently, binged, and had drinking problems were more likely to be involved in physical fighting than their peers with less substance use. While these associations suggest the *clustering* of risk behaviors during adolescence (i.e., alcohol and/or drug use and violence involvement), they do not necessarily indicate that youth are engaging in violence while under the influence of alcohol or drugs (i.e., co-occurrence), and therefore do not inform specific violent event or substance use intervention development. In addition, the few researchers that have examined the co-occurrence of peer violence and substance use among youth have focused on alcohol-related fighting (Swahn and Donovan, 2006; Swahn et al., 2004). Thus, little is known about the actual co-occurrence of peer violence and substance use among youth at the daily level. Our study expands this current literature by examining substance use (i.e., drug and/or alcohol use) on days in which peer violent incidents occur compared to days in which there are no violent incidents.

The current study addresses an important gap in the literature by providing descriptive data regarding the reasons for peer aggression and victimization among both males and females, and by examining the associations between daily incidents of peer aggression and victimization severity and substance use for both conflict days (i.e., days in which victimization or aggression occurred) and non-conflict days (i.e., days in which no

victimization or aggression occurred). The goal of this study was to examine the relationship between peer violence and substance use through the use of daily analysis on data collected through the timeline follow-back method. We examined specific substance use on days in which peer violence occurred compared to days in which there are no violent incidents. Because we hypothesized that specific substance use may differ based on aggression versus victimization, we examined these relationships separately for peer aggression and victimization.

Methods

Flint Youth Injury Study

Data for the current study were collected as part of the *Flint Youth Injury (FYI) Study*, a longitudinal, observational study examining substance use trajectories among at-risk, inner-city youth who were treated at the emergency department. Study procedures were approved and conducted in compliance with the University of Michigan's and Hurley Medical Center's Institutional Review Boards (IRB) for Human Subjects. A Certificate of Confidentiality was obtained for this study. Participants were recruited at Hurley Medical Center, a Level 1 Trauma Center, located in Flint, MI between December, 2009 and September, 2011. Hurley Medical Center is the only public hospital in the city. The community has high levels of poverty, unemployment, and crime, and was recently listed in FBI crime reports as one of the most violent cities in the US with 22 violent incidents per 1,000 people (FBI, 2011). ED patients aged 14–24 years who presented for care of a violent injury (e.g., fight leading to cuts, lacerations, knife wounds, gunshot wounds, broken bones), along with proportional age and sex enrolled comparison group patients presenting for another medical reason (e.g., diarrhea, fever, car crash), were eligible for screening. Patients who had an altered mental status that precluded informed consent, or who presented with acute sexual assault, child abuse, or suicidal ideation or attempt were excluded from the study. Participants not medically stable in the ER were recruited after admission if they stabilized within 72 hours. In addition, adolescents less than 18 years of age who were not accompanied by a parent/guardian were excluded (5%). Patients were approached by research assistants to determine potential study eligibility. After obtaining written consent/assent from the patient (and parent/guardian if the patient was under age 18), participants privately completed a self-administered computerized screening survey (approximately 30 minutes). Participants received a $1.00 gift (i.e., cards, keychain) after completion of the screening survey.

Screened participants (350 violently injured and 250 comparison) who reported past 6 month drug use on the Alcohol, Smoking and Substance Use Involvement Screening Tests (i.e., marijuana, cocaine, heroin, hallucinogens, methamphetamines, inhalants, and prescription sedative, opiate, or stimulants in a manner other than prescribed; ASSIST; Humeniuk, et al., 2008; WHO ASSIST Working Group, 2002) were eligible to participate in the longitudinal study and completed a baseline interview during their ED visit. This study utilized this purposeful oversampling of violently injured youth to allow in-depth analysis of violent events. The interview included both computer self-administered and research

assistant administered components (e.g., Time Line Follow Back [TLFB] audio-taped interview). Participants received $20 for completing the baseline survey.

During the recruitment period, 849 violently injured patients were approached in the ED; 718 patients (84.6%) completed the screening survey. Of screened participants, 54% (n = 388) reported past six-month drug use and were eligible for the baseline phase of the study; 350 (90.2%) of the violently injured group completed the baseline assessment. With regard to the proportionally matched group presenting to the ED for reasons other than violent injury, 846 comparison patients were approached in the ED; 730 (86.3%) patients completed the screening survey. Of screened participants, 281 (38.5%) were eligible for the baseline phase of the study (reported past 6 month drug use); 250 (89.0%) of the comparison group completed the baseline assessment. Overall, participants who completed the screening survey were more likely to be females ($\chi^2 = 16.08$, $p < .001$), between the ages of 18–24 years old ($\chi^2 = 4.79$, $p < .05$), and African Americans (9.7%; $\chi^2 = 33.00$, $p < .001$) than those who refused participation. At baseline, European American/Other youth were more likely to refuse participation than African Americans ($\chi^2 = 9.33$, $p < .01$); participation did not differ by gender or age at baseline.

Study Sample—Analyses for the current study utilized data obtained from participants' baseline interviews. The demographic characteristics for the study sample (n = 599; the original study included 600 participants; 1 participant was excluded due to missing calendar data) are displayed in Table 1.

Measurement

Substance use: Patterns of alcohol and drug use over the past 30 days were assessed using the Time Line Follow Back (TLFB) semi structured interview (Sobell et al., 1979). This method uses calendars to examine daily alcohol and drug consumption beginning on the day of the assessment and working backwards (Sobell et al., 1979). Reliability and validity of this measure has been previously established (Maisto et al., 1979; Sobell et al., 1979, 1988, 1986). For the present study, past 30 day daily use of alcohol, marijuana, cocaine, and other illicit drugs (e.g., heroin, inhalants) were assessed, as well as non-medical use (i.e., did not have a doctor's prescription, used more than was prescribed, used for reasons other than was prescribed) of psychoactive prescription drugs (sedatives, opiates, and stimulants).

Peer violence – aggression and victimization: The Time Line Follow Back – Aggression Module (TLFB-AM), developed to be used in conjunction with the TLFB substance use module, was used to assess incidents of specific interpersonal conflicts during the past 30 days (Chermack and Blow, 2002; Chermack et al., 2006). As with the TLFB module for substance use, participants were asked to identify specific dates in which they experienced interpersonal physical conflicts, beginning on the day of the assessment and working backwards. Participants reported who committed the act (themselves, the other person, or both), their relationship with the other person (i.e., friend, stranger, co-worker), and their substance use before or during the conflict (e.g., alcohol, cocaine). In addition, participants were given a list of aggressive behaviors adapted from the physical assault and injury scales of the Conflict Tactics Scale-2 (CTS-2) (Straus et al., 1996) and were asked to identify

which aggressive acts occurred on each of the conflict days. Participants were also asked about the reason for the fight (i.e., *What was the reason for the fight?*). Participants' responses were coded independently by two research assistants (yes/no) into 17 response options (i.e., power/respect, retaliation; complete list of response options available in Table 2). Any discrepancies were later discussed and resolved. The current study focuses on peer aggression and victimization (relationship categories: friends, family member, strangers, acquaintance, gang). Conflicts with dating partners and/or spouses and conflicts with the police were not included in this analysis. For analysis, conflict incidents were categorized by severity (moderate: pushed or hit; severe: used knife or gun) and whether the violence was toward others (aggression) or toward the participant (victimization). For both aggression and victimization, we then created a nominal variable with three categories (none, moderate, severe).

Additional measures: Questions assessing demographic characteristics were included in the initial screening survey: age, sex, race, ethnicity, receipt of public assistance, and highest education level attained (Harris et al., 2003). Participants were asked to report their age in years, and their sex (male = 1, female = 0). Participants were asked to report yes/no to the five racial categories (Black or African American, White or Caucasian, Asian, American Indian/Alaskan Native, Native Hawaiian or Pacific Islander) and to report whether they were of Hispanic/Latino ethnicity (no = 1, yes = 2). As a marker of socioeconomic status, participants were asked, "Do your parents, or the most important person raising you, receive public assistance?" Response options were *Yes* (1) or *No* (0). Participants reported the highest grade they had completed (1 = 8^{th} grade or less, 2 = some high school, 3 = high school or GED, 4 = some college, 5 = college graduate, 6 = any post-graduate work).

Data analysis—Descriptive analysis examining reasons for violence were conducted separately for males and females to explore the potential for gender differences in reasons for peer violence (Yonas et al., 2005). Bivariate analyses were conducted to examine the within day associations between peer aggression and victimization and individual substances for conflict and non-conflict days (i.e., Chi-square for categorical variables and ANOVA for continuous variables). In addition, descriptive data are presented regarding whether substance use preceded the violent incident on days in which substance use and violence occurred. Due to the relatively short 30 day time frame, we have limited incidents of specific substances (e.g., cocaine use). As a result, our bivariate analyses and multivariate models examined the associations between *daily* substance use (use that occurred on the same day as the violent incidents, regardless of timing in relation to the conflict) and peer aggression and victimization.

Multi-level multinomial logistic regression was used to test the associations between substance use and peer violence incidents, with separate models examining aggression and victimization (with *none* as the reference category). We used multi-level multinomial logistic regression to account for the fact that individuals reported multiple conflict incidents and that these incidents were nested within individuals (i.e., individual violent incident/ occurrence of peer aggression or victimization at level 1; the participant at level 2; Raudenbush and Bryk, 2002). Sex, race, and age were included as covariates as prior work

has shown higher rates of severe non-partner peer aggression and victimization among males, and higher rates of violence and lower rates of alcohol consumption among African Americans and younger adolescents (Walton et al., 2007). Data analyses were conducted in Mplus version 6.11 (Muthen and Muthen, 2010).

Results

Descriptive Findings: Violence

Overall, the following days of violence were observed, with most violence being severe: 37 days of moderate aggression (by 35 people); 192 days of severe aggression (by 163 people); 32 days of moderate victimization (by 32 people); and 316 days of severe victimization (by 279 people).

Reasons for peer violence are described in Table 2. For males, a common reason mentioned for victimization was ‘conflicts over personal belongings’ typically related to retrieving stolen items. Younger males noted rumors as a common reason for aggression and the need to demonstrate power or respect as a reason for victimization. Older males also noted the need to demonstrate power or respect as a common reason for aggression and being shot as a reason for victimization. In contrast, younger females noted jealously and the need to demonstrate power or respect as reasons motivating both aggression and victimization. Among older females, the most common reason for both aggression and victimization was ‘conflict over personal belongings’. On days in which aggression occurred, the majority of events were with people known to the participant (i.e., 40% [n = 93] of the incidents were with acquaintances, 16% [n = 37] with friends, and 16% [n = 37] with family members); only 30% (n = 68) of the incidents of aggression were with strangers. On days in which victimization occurred, the majority of events were with people known to the participant (i.e., 34%, [n = 118] with acquaintances, 12% [n = 41] with friends, and 11% [n = 11] with family members); only 35% (n = 121) of the incidents of victimization were with strangers (10% were unknown). Participants reported very few incidents of either aggression or victimization with co-workers/boss or gang related (e.g., only 1% reported victimization due to gangs). Females reported a greater percentage of incidents of aggression and victimization with an acquaintance. While males also reported a high percentage of incidents of aggression and victimization with acquaintances, they reported a higher percentage of incidents that involved strangers compared to their female counterparts.

Descriptive Findings: Substance use and violence

Regarding substance use, 1962 days of alcohol use (by 393 people), 9314 days of marijuana (by 538 people), 123 days of cocaine (by 36 people), 211 days of sedatives (by 47 people) and 265 days opiates (by 47 people) were observed. More males (n = 118; 34% of male participants) than females (n = 74; 30% of female participants) reported aggression. Male participants (n = 212; 60% of male participants) also reported more victimization than their female counterparts (n = 92; 37% of female participants).

Table 3 describes substance use on violent incident days. For example, participants reported alcohol use on 25% of moderate victimizations days and 25% of severe victimization days.

Similarly, participants reported alcohol use on 27% of moderate aggression days and 25% of severe aggression days.

For days in which alcohol use and peer violence occurred, participants reported that alcohol use preceded the violent incident 100% of the time for moderate victimization, 97.5% of the time for severe victimization, 90% of the time for moderate aggression, and 95.9% of the time for severe aggression. For days in which marijuana use and peer violence occurred, participants reported that marijuana use preceded the violent incident 70.6% of the time for moderate victimization, 69.1% of the time for severe victimization, 53.3% of the time for moderate aggression, and 73.3% of the time for severe aggression. For days in which cocaine use and peer violence occurred, cocaine use preceded the violent incident 100% of the time for moderate victimization, 75% of the time for severe victimization, and 66.7% of the time for severe aggression. For days in which sedative use and peer violence occurred, sedative use preceded the violent incident 87.5% of the time for severe victimization, 50% of the time for moderate aggression, and 66.7% of the time for severe aggression. For days in which opiate use and peer violence occurred, opiate use occurred 100% of the time before the conflict incident (i.e., for both victimization and aggression).

Bivariate Analyses: Substance use and violence

For both aggression and victimization, younger participants were more likely to endorse violent incidents ($\chi^2_{aggression} = 6.93$, $p<0.001$; $\chi^2_{victimization} = 5.59$, $p<0.05$). Male participants were more likely than female participants to endorse severe victimization ($\chi^2=19.57$, $p<0.001$). The bivariate relationships between peer violence type (aggression and victimization) and severity (moderate, severe) and substance use (i.e., alcohol, marijuana, cocaine, sedatives, and opiates) on days in which conflict occurred are presented in Table 3. Any alcohol ($\chi^2=78.68$, $p<0.0001$), binge drinking ($\chi^2=46.86$, $p<0.0001$), cocaine ($\chi^2=24.63$, $p<0.0001$), and sedatives ($\chi^2=6.57$, $p<0.05$) were significantly more likely to occur on days in which victimization occurred. Any alcohol ($\chi^2=54.20$, $p<0.0001$), binge drinking ($\chi^2=35.54$, $p<0.0001$), and sedative use ($\chi^2=12.53$, $p<0.01$) were significantly more likely to occur on days in which aggression occurred.

Multivariate Models: Substance use and violence

Two multivariate models (victimization and aggression) were conducted with severity of peer violence (none, moderate, and severe) as the dependent variable, accounting for the clustering (or nesting) of violent incidents within individuals (Table 4). Based on our bivariate findings, we adjust for the influence of age and sex in our victimization model, and for the influence of age in our aggression model. Due to multi-collinearity between binge drinking and any alcohol use, both could not be included. “Any alcohol” was included in lieu of binge drinking to be consistent with the drug use variables (i.e., drug use variables did not assess the amount or frequency of use). When compared to days with no victimization, moderate victimization was significantly more likely to be reported on days in which participants reported alcohol use (AOR=2.54, 95% CI=1.14–5.51) and cocaine use (AOR=8.73, 95% CI=2.50–30.55). Severe victimization was significantly more likely to be reported on days in which participants reported alcohol use (AOR=2.75, 95% CI=2.09–3.63). In the peer aggression model, cocaine use was excluded due to lack of adequate cell

sample size. Moderate aggression was significantly more likely to occur on days in which participants reported alcohol use (AOR=3.40, 95% CI=1.65–7.02) and sedative use (AOR=4.57, 95% CI=1.00–20.88). Severe aggression was also significantly more likely to occur on days in which participants reported alcohol use (AOR=2.94, 95% CI=2.07–4.18) and sedative use (AOR=2.24, 95% CI=1.01–4.95).

Discussion

This study provides valuable insights on the reasons for peer violence altercations and on the relationship between daily substance use and incidents of both aggressive behavior and victimization among urban youth using an innovative calendar based approach. Our results suggest situational differences in violent incidents for males and females, and differential effects of substance use exposure for perpetrators of violence versus victims of violence. Consistent with controlled experimental laboratory studies our findings show a positive within day association between aggression and use of alcohol, opiates, and sedatives, but no within day association between aggression and marijuana use. Our calendar based approach provides a different way to examine the link between substance use and violence, and provides useful information about the patterning of these behaviors. Most importantly, this approach provides guidance for points of intervention that have been more difficult to identify with prior approaches. Our findings suggest prevention strategies for youth should include tailored peer violence interventions to address unique reasons for violence among males and females, and the use of alcohol and other substances before and after violence incidents.

Data regarding reasons for peer violence, and the relationship between substance use and peer violence incidents at the daily level are particularly novel. Our study provides one of the first examinations of the reasons for peer aggression and victimization among youth that includes both males and females. Although there were similarities between males and females and younger and older participants, differences in reasons for aggression and victimization were identified. Among both younger (aged 14 – 18) and older (aged 19 – 24) males, a common reason for victimization was ‘conflicts over personal belongings’ typically related to retrieving stolen items. Younger males noted ‘rumors’ as a common reason for aggression and ‘power or respect’ as a reason for victimization. Older males noted ‘power or respect’ as common reasons for aggression and ‘being shot’ as a reason for victimization. In contrast, younger females noted ‘jealously’ and ‘power or respect’ as common reasons for both aggression and victimization, typically related to males or possessions (i.e., clothes). Among older females, the most common reason for both aggression and victimization was ‘conflict over personal belongings’. Thus, peer violence interventions should be tailored to the unique reasons for peer violence among males and females.

Peer aggression and victimization were more likely on days in which alcohol was consumed. This finding is consistent with previous cross-sectional studies linking alcohol use and aggression among adolescents (Cunningham et al., 2006; Rothman et al., 2012; Walton et al., 2009), laboratory studies linking acute alcohol consumption and aggression among adults (Chermack and Giancola, 1997), and in daily studies using timeline follow-back data among adults (Chermack and Blow, 2002, Chermack et al., 2010). In addition, our findings

are consistent with the limited research linking alcohol use and violence victimization (Dang et al., 2012). Youth who are intoxicated may have decreased inhibition and may be more likely to interpret others' behaviors as threatening or provocative, increasing the likelihood of violence. Also, it may be that social situations in which alcohol is consumed (e.g., weekend parties) results in contact with others with whom one has a history of prior conflicts. This notion is supported by the finding that most conflicts occurred with someone who they knew previously. Future research using ecological momentary assessment methods could further elucidate such phenomena.

Although cocaine use was less common in our sample, our findings also support the association between cocaine use and victimization. Note that it was not possible to examine the association between cocaine use and aggression because there were no reports of incidents of aggression that occurred on days in which cocaine was used and cocaine use was a less common drug of choice among this population. While cocaine use is associated with aggression in studies using timeline follow-back calendars among adults (Chermack and Blow, 2002; Chermack et al., 2010), previous studies have also suggested a relationship between cocaine use and dating violence victimization among youth (Epstein-Ngo et al., 2012) and adult injury due to interpersonal violence (Chermack et al., 2010). It may be that the association between victimization and cocaine use among young people may reflect greater involvement in illegal activities associated with drug use which increase the likelihood of victimization (Collins, 1990; Goldstein, 1985).

In contrast, incidence of peer violence was not related to the use of marijuana. This is consistent with both laboratories studies (Myerscough and Taylor, 1985) and findings for dating violence (Epstein-Ngo et al., 2012). In contrast, prior cross-sectional studies showing positive correlations between peer violence and marijuana use (Walton et al., 2009) likely reflect the clustering of problem behaviors as opposed to acute intoxication effects. Implications for interventions targeting marijuana use and peer violence are less clear.

The novel findings for the within day association between aggression and misuse of prescription sedatives in our study is consistent with experimental laboratory studies that link sedative use to increased aggression (Ben-Porath and Taylor, 2002; Boles and Miotto, 2003; Weisman et al., 1998). Although sedatives such as benzodiazepines are often used for their sedating effects, individuals may also use them illicitly to become disinhibited (Boles and Miotto, 2003). Pharmacologically, sedatives such as benzodiazepines are very similar to alcohol and produce a state of intoxication and disinhibition in the first phase after ingestion, in which mood is elevated and self-confidence increases (Ben-Porath and Taylor, 2002), followed by sedation. During this intoxication phase, mood may shift rapidly between a euphoric "rush" and dysphoria (Weisman, Berman, and Taylor, 1998). Similar to alcohol intoxication, sedative intoxication may lead to poor judgment (Boles and Miotto, 2003), which may contribute to an individuals' involvement in violence. Yet, it is also possible that an individual used sedatives after the fight to cope with negative affect or to assist with sleep given potential injury. Few researchers have examined the role of prescription sedative misuse in incidents of peer violence. Further study is required in order to better understand the association and timing of sedative misuse and peer violence.

Limitations

Several limitations of the study require attention. First, our sample was composed of urban youth who presented to an urban emergency department (ED), with half of the sample presenting with violent injuries and all participants reporting alcohol or drug use in the past 6 months. These characteristics limit the generalizability of our findings to all urban youth. While violent and aggressive behaviors are not unusual, our sample may be comprised of youth who are involved in more serious violence due to the study inclusion criteria (i.e., presented to the ED for care of a violent injury). This study used daily calendar data from a 30 day time frame, which limited analyses for some of the substances (e.g., opiates). Future studies which are able to capture a longer time frame are needed. While we presented descriptive data to illustrate whether substance use preceded a violent incident, it was not possible to examine whether substance use preceded or followed the violent incident in our multilevel models. We also could not examine places in which the substance use and violence occurred. This is an area for future research as it is not clear if our data reflect a clustering of risk behaviors that occur at certain times/places (e.g., weekend parties) or the notion that some substances might lead to aggressive behavior because of reduced inhibitions (Smith and Wesson, 1999), while other substances are used to cope with the physical or psychological pain of victimization. In this regard, it was not possible to examine the combined use of substances at the daily level (e.g., alcohol and sedatives), which is an important area for future studies containing longer assessment periods and/or larger sample sizes. Although the oversampling of violently injured patients is a strength of this study, the study was not sufficiently powered to conduct sub-group analyses based on chief presenting complaint. In addition, the age range for our sample was quite broad, including youth 14 through 24 years of age. It is possible that substance use and other factors related to aggression and victimization may vary by age. Future research that examines potential age-related differences may be informative and contribute to the tailoring of violence prevention interventions. Finally, our study relied on detailed retrospective self-report data, which limits the ability to infer causal relationships between substance use and violence. Real-time data collection (using technology/event momentary assessment) to capture the temporal relationship within day between peer violence and substance use could advance our understanding of the acute intoxication influences, as well as motivations for use (e.g., liquid courage, in an effort to cope with stressors). Despite these limitations, the present findings are novel, are strengthened by the multi-level daily calendar analyses used, and thus make an important contribution to the literature.

Implications

Our results suggest several strategies that may help reduce violent incidents among youth. Alcohol and aggression were associated at the daily level, with alcohol almost always preceding violence, indicating that alcohol use is a vital consideration for prevention of aggressive behavior. Interventions that educate about the link between violence and alcohol use could help reduce the incidents of peer violence. Consistent with prior research (Rennison, 2001; Uehara et al., 1996), the majority of our sample were engaging in conflict with people known to them (i.e., only about a third of incidents were with strangers), reflecting the need for general anger management and conflict resolution strategies that may be applicable across types of relationships. The finding that these incidents were more likely

to occur when alcohol, in particular, was consumed suggests that violence prevention interventions that address the role of alcohol in escalation of conflicts as well as potentially focus on reducing alcohol use may be warranted. Finally, our results suggest that policy implications for stricter enforcement of underage drinking could also play a role in preventing peer violence.

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Table 1

Descriptive Sample Demographics by Age and Gender

Variable	Age (14–18) N=161, 26.9%		Age (19–24) N=438, 73.1%	
	Male (97, 60.3%)	Female (64, 39.7%)	Male (255, 58.2%)	Female (183, 41.8%)
Race				
African American	57 (58.8%)	40(62.5%)	146(57.3%)	106 (57.9%)
Caucasian	28(28.9%)	17(26.6%)	90 (35.3%)	59(32.2%)
Other	12(12.4%)	7(10.9%)	19(7.5%)	18(9.8%)
Received Public Assistance***	65(67.1%)	46(71.9%)	167(65.5%)	159(86.9%) ***
Drop out of School	23(23.7%)	16(25.0%)	86(33.7%)	55 (30.1%)
% Treated for Violent Injury in ED	57(58.8%)	37(57.8%)	149(58.4%)	106(57.9%)
% of Sample Using Substances 30 Days Prior to ED Visit Based on TLFB				
Alcohol	4.5%	6.5%**	13.2%	12.6%
Marijuana	46.7%	41.2%***	59.1%	48.1%***
Cocaine ***	0.1%	0.1%	0.3%	1.8%***
Non-medical use of prescription drug	2.6%	0.3%***	3.7%	1.9%***
Non-medical use of prescription sedative***	2.3%	0.2%***	1.4%	0.6%***
Non-medical use of prescription opiate***	0.3%	0.1%	2.3%	1.4%***

Note.

* p<.05

** p<.01

*** p<.0001.

Indicates significant differences between males and females within age group.

Table 2

FYI Timeline Follow Back Peer Violence Reason by Gender and Age Group

Reason for Violence	Age (14–18) N=161, 26.9%				Age (19–24) N=438, 73.1%			
	Victimization		Aggression		Victimization		Aggression	
	Males (%)	Females (%)	Males (%)	Females (%)	Males (%)	Females (%)	Males (%)	Females (%)
Personal Belongings[†]	**19.4%**	7.5%	11.4%	2.9%	**24.9%**	**25.0%**	**28.6%**	**27.5%**
Rumors	**16.7%**	12.5%	**22.7%**	**17.6%**	7.5%	**18.8%**	10.2%	**19.6%**
Jealousy	9.7%	**30.0%**	11.4%	**29.4%**	6.4%	14.1%	11.2%	9.8%
Power or Respect	**18.1%**	**20.0%**	**27.3%**	**23.5%**	**15.0%**	7.8%	**20.4%**	11.8%
Retaliation	11.1%	**17.5%**	9.1%	11.8%	8.7%	7.8%	9.2%	9.8%
Angry/Bad Mood	8.3%	7.5%	11.4%	5.9%	6.9%	**18.8%**	7.1%	**21.6%**
Personal Space	6.9%	15.0%	9.1%	**17.6%**	4.0%	3.1%	6.1%	3.9%
Drunk/ High Drugs/Argue Drug use	8.3%	10.0%	9.1%	11.8%	9.2%	9.4%	11.2%	9.8%
Got Shot	13.9%	5.0%	0.0%	0.0%	**19.1%**	3.1%	0.0%	0.0
Aid to Other During Physical Attack	5.6%	10.0%	9.1%	5.9%	6.4%	9.4%	13.3%	13.7%
Aid to Other During Verbal Attack	2.8%	0.0%	6.8%	0.0%	3.5%	3.1%	3.1%	3.9%
Territory	1.4%	2.5%	2.3%	0.0%	3.5%	4.7%	5.1%	5.1%
Jumped or Mistaken Identity	4.2%	2.5%	0.0%	2.9%	7.5%	3.1%	2.0%	2.0%
Sex[‡]	0.0%	0.0	0.0%	0.0%	1.2%	3.1%	2.0%	3.9%
Bullying	0.0%	0.0	0.0%	0.0%	3.5%	4.7%	5.1%	2.0%
Other	1.4%	0.0	0.0%	0.0%	3.5%	3.1%	2.0%	2.0%

Note.

[†]Examples include fighting due to being robbed or having money/items stolen/taken from them (e.g., cell phone).

[‡]Examples include a female participant reported being assaulted because “I wouldn’t have sex with him”; a male participant reported being assaulted by his ‘baby mama’ because “I am sexually active [with other women]”.

Items in bold reflect the most common response in that category.

Table 3

Unadjusted Bivariate Relations between Peer Violence (Aggression and Victimization) and Substance Use.

	No Violence	Peer Victimization (Moderate)	Peer Victimization (Severe)	Chi-square	No Violence	Peer Aggression (Moderate)	Peer Aggression (Severe)	Chi-square
Gender (Male)	**59.2%**	**56.3%**	**71.5%**	**19.57*****	58.9%	62.2%	62.9%	1.43
Race (AA)	64.8%	59.4%	64.6%	0.41	64.7%	62.2%	58.8%	3.07
Age	**20.0 (2.4)**	**19.6 (2.1)**	**19.6 (2.4)**	**5.59***	**20.0 (2.4)**	**19.6 (2.1)**	**19.5 (2.6)**	**6.93*****
Any Alcohol	**10.4%**	**25.0%**	**25.2%**	**78.68*****	**10.5%**	**27.0%**	**25.3%**	**54.20*****
Binge Drinking	**5.9%**	**15.6%**	**14.6%**	**46.86*****	**5.9%**	**18.9%**	**14.4%**	**35.54*****
Marijuana	51.8%	53.1%	48.1%	1.76	51.8%	40.5%	46.9%	3.72
Cocaine	**0.5%**	**6.3%**	**1.3%**	**24.63*****	****	****	****	****
Non-medical Sedatives	**1.1%**	**3.1%**	**2.5%**	**6.57***	**1.1%**	**5.4%**	**3.1%**	**12.53****
Opiates	1.3%	3.1%	1.9%	1.71	0.9%	2.7%	1.0%	1.46

Note. Due to small numbers of participants reporting cocaine use, cocaine was unable to be included in aggression model.

* p≤.05;

** p≤.01;

*** p≤.001

Table 4

Multi-level, Multinomial Logistic Regression Analyses Examining Predictors of Peer Violence (Aggression and Victimization) Severity[†]

	Peer Victimization (Moderate)		Peer Victimization (Severe)		Peer Aggression (Moderate)		Peer Aggression (Severe)	
	AOR	**95% CI**	**AOR**	**95% CI**	**AOR**	**95% CI**	**AOR**	**95% CI**
Age	0.89	0.79–1.01	0.90***	0.87–0.94	0.91	0.81–1.02	0.88	0.83–0.93
Gender	1.10	0.56–2.13	**0.58****	**0.46–0.72**	-----	-----	-----	-----
Any Alcohol	**2.54***	**1.14–5.51**	**2.75****	**2.09–3.63**	**3.40****	**1.65–7.02**	**2.94****	**2.07–4.18**
Marijuana	0.97	0.50–1.90	0.84	0.67–1.06	0.55	0.26–1.14	0.80	0.58–1.09
Cocaine	**8.73****	**2.50–30.55**	1.55	0.58–4.10	-----	-----	-----	-----
Non-medical Sedatives	2.34	0.37–14.74	1.49	0.75–2.98	**4.57***	**1.00–20.88**	**2.24***	**1.01–4.95**
Opiate	1.60	0.34–7.49	1.00	0.44–2.25	1.59	0.25–10.11	0.88	0.28–2.77

Note. Gender and cocaine use were not included in the aggression models.

[†]Days on which participants reported peer victimization (moderate and severe) were compared to days participants reported no victimization; days on which participants reported peer aggression (moderate and severe) were compared to days participants reported no aggression;

*p≤.05;

**p≤.01;

***p≤.001