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Preadolescents' report of exposure to violence:

Association with friends' and own substance use

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Abstract

Purpose—To evaluate whether children's Exposure to Violence (EV) is associated with their own or their friends' use of alcohol, tobacco, and other drugs (ATOD).

Methods—The Violence Exposure Scale for Children-Revised (VEX-R) and the Substance Exposure Assessment (SXA) were given to 104 children participating in a longitudinal study of in-utero cocaine exposure (IUCE) at age 8.5, 9.5, and 11 years. Survival analyses evaluated the association of the quartile of VEX total score (higher scores indicating more violence exposure) at age 8.5 years, with time to first report of their own and their friends' use of ATOD from age 8.5–11 years.

Results—The sample consisted of 90% African-American/Caribbean children (mean age 8.5 years, SD 3 years), 53% males, and 49% with IUCE. The percentage of children who reported having substance-using friends was 12% at 8.5 years, 25% by 9.5 years, and 45% by 11 years. In multivariate survival analyses controlling for caregiver type, IUCE category, and child gender, children in the upper quartile of VEX-R total score at age 8.5 years were at significantly greater risk of having reported friends' use of ATOD by age 11 compared to those in the first through third quartiles (hazard ratio = 2.2; 95% CI = 1.14, 4.23; $p = .02$). Quartiles of the VEX score, however, were not significantly associated with children's acknowledgment of their own use ($p = .85$).

Conclusions—Our findings suggest an association between EV in childhood and report of peer ATOD use at school age. Campaigns to prevent ATOD use should address the impact of childhood exposure to violence.

Keywords

Violence exposure; Peers; Preadolescents; Risk of early ATOD use

The American Academy of Pediatrics Committee on Substance Abuse Guidelines for Adolescents states that, "Pediatricians should discuss the hazards of alcohol and other drug use with their patients as a routine part of risk behavior assessment . . ." [1] as a standard part of a psychosocial evaluation. Guidelines for care of preadolescents are less clear.

No one factor will determine whether or not a preadolescent is at risk for becoming a user of psychoactive substances. However, a constellation of factors should alert providers to a higher

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likelihood of use. Social-psychological theories of adolescent drug use have converged toward recognition that drug use is determined by multiple influences, but different theoretical approaches emphasize different risk or protective factors [2,3]. Protective factors may include warm, authoritative, involved parenting; positive peer relations; school success; and involvement in structured extracurricular activities such as after-school programs, religious organizations, or sports [4]. Social learning theories stress the risk factor of association with people who use drugs, who both model the behavior and provide opportunities for and reinforcement of drug use [5]. Consistent with these theories, the alcohol, tobacco, and other drug (ATOD) behaviors of the peer group and, in particular, of close friends have been shown to predict the practices of the adolescent. [6-9]. This relationship persists even if the friends' ATOD use is perceived by the child but is not actually occurring [10]. In general, social factors are thought to be more important in the initiation of ATOD use, whereas individual factors, such as familial risk, have a stronger impact on the progression to Substance Abuse Disorders (SUDS) [10-12].

The American Medical Association (AMA) Guidelines for Adolescent Preventive Services emphasize evaluating peer use as an important social risk factor [6]. From a clinical perspective, young people may report friends' use of ATOD as a proxy admission of their own use, which they may be more hesitant to acknowledge

While not addressed by most clinical guidelines, retrospective and cross-sectional research suggests exposure to violence in preadolescence may be another potential focus for future prevention efforts. In retrospective studies, adolescents with histories of early and problematic substance use recall more exposure to violence (EV) than non-using peers [13-15]. In the United States, youth who recall witnessing two or more episodes of violence compared to those who have not, experience more than a two-fold risk of using alcohol, marijuana, and "other illicit drugs" [16]. Exposure to violence by adolescents is associated with depression, hopelessness, decreased life purpose, and other psychological and emotional symptoms, which may predispose them to ATOD use [4,17-21]. In a study of predominantly African-American middle school students living in and around public housing, DuRant et al [22] found that the level of exposure to violence was the strongest correlate, with a scale that measured students' intentions to use violence in hypothetical conflict situations, while frequency of marijuana, alcohol, cocaine, and cigarette use was associated in turn with increased intention to use violence.

Consistent with problem-behavior theory, other studies have also demonstrated a cross-sectional clustering between exposure to violence and engaging in other health risk behaviors [23,24], primarily in middle and late adolescence[25-28]. Little is known about the association of EV in elementary-school-aged children with other risks for early ATOD use.

In this study, we explore prospectively the role of EV in preadolescence with children's reports of their friends' and their own use of ATOD.

Methods

Description of sample

The sample for this study consisted of 104 children (90% African-American/Caribbean), mean age at first measurement of EV 8.5 years, (SD = .3 years), 53% (n = 55) males, 49% (n = 51) with IUCE. Current caregiver education was 12.3 years (SD = 2.0 years). Seventy-four percent of the children's caregivers at 8.5 years were birth mothers, 17% were kinship caregivers, and 9% were unrelated foster parents.

Study design

The study design is a secondary data analysis of an ongoing prospective longitudinal study of children with and without in-utero cocaine exposure (IUCE) and their caregivers who were followed 8-11 years after birth.

Protection of human subjects

The Human Studies Committee of Boston Medical Center and the Boston University School of Medicine Institutional Review Board approved this study. A Writ of Confidentiality was obtained from the federal government under Title 42 of Section 242A of the United States code to protect participants from having research data subpoenaed.

Recruitment and data collection

The sample was recruited soon after birth by trained interviewers who screened maternity and nursery records 7 days a week on the postpartum floor of a Boston teaching hospital from October 1990 to March 1993.

To be eligible for initial recruitment to the study, mother/infant dyads met the following criteria at delivery: (1) Infant gestational age greater than or equal to 36 weeks; (2) no requirement for level III (neonatal intensive care); (3) no obvious major congenital malformations; (4) no diagnosis of fetal alcohol syndrome in the neonatal record; (5) no history of HIV seropositivity noted in the mother's or infant's medical record; (6) mother's ability to communicate fluently in English; (7) no indication by toxic screen or medical record of mother's use of opiates, benzodiazepines, amphetamines, phencyclidines, barbiturates or hallucinogens during pregnancy; and (8) mother aged 18 years or older. These criteria were established to exclude infants with known major risk factors for developmental impairments that might confound or obscure the effects, if any, of in-utero cocaine exposure. Within the constraints of the schedule of the research assistants, new mothers who met these criteria were approached for recruitment into the sample.

Of the initial consented sample of 257, five were ultimately excluded because no biologic markers were available to confirm lack of IUCE, leaving a neonatal sample of 252 caregiver-dyads. Of these, 22 formally withdrew consent at some point during this follow-up cycle, 66 lost contact with the study but did not withdraw consent, 14 are in contact with the study but either noncompliant or geographically unavailable for recent assessments, and 150 (60%) of this high-risk mobile population have been retained for more than a decade and were tested in the 8.5-11-year assessments.

Classification of IUCE

The dose was further classified as "heavier": top quartile concentration of cocaine metabolites in infant meconium concentration or of maternal self reported days of use (≥ 60 days). "Lighter" referred to all other cocaine users; and "no exposure" was no report of cocaine use, and negative meconium or urine assays. By sample definition, at least half of these children were at increased familial risk for substance use [29].

Measures

Trained interviewers masked to the child's prenatal exposure and current placement (birth, kinship, or unrelated foster mother) administered study instruments to the children at age 8.5 years, 9.5 years, and 11 years.

Child measures

Children's self-report of exposure to violence was evaluated using the Violence Exposure Scale for Children-Revised [VEX-R] [30]. The VEX-R is a cartoon measure, designed for children 6-16-years-old, using an analogue scale for respondents to indicate how often they have witnessed violent events ranging from mild [yell, push, spanking] to severe [threaten with a weapon, shoot, stab], as the cartoon protagonist "Chris" experiences [31]. Scores range from 0 to 66.

Children's self-report of their own and their friends' ATOD use by age 11 years were assessed with the Substance Exposure Assessment (SXA), a study-specific measure adapted from the work of Black, MD (oral communication, 1999). The SXA measures child-report of their own and their friends' ATOD use with the questions, "Have you tried . . ." and "Have any of your friends tried . . ."

Statistical methods

In this age range (8.5-11 years), reporting of any substance use or having peers who are substance users is of concern. Therefore, we looked at the entire age range as a single outcome. Descriptive statistics were generated to provide a profile of the sample, as well as to assess the distributions of the analytic variables of interest. In light of these descriptive findings, survival analyses evaluated the association of VEX total score at 8.5 years of age with time to first report of friends' use of ATOD from 8.5 years through 11 years of age. We performed this analysis using Kaplan-Meier estimation and log rank testing, along with Cox proportional hazards regression with dummy variables representing the VEX quartile [32]. From this analysis, to simplify interpretation and to detect potential non-linearity in the association with the VEX score, we contrasted those in each quartile of VEX scores with those in the lowest quartile who had the least EV. Potential confounders of the association of the VEX total score with own use and friends' use of ATOD were selected a priori based on the literature reviewed [4]. In addition to the VEX total score at 8.5 years, we estimated a Cox proportional hazards regression model including the child's gender, IUCE, and whether the caregiver was the biologic mother, a kin caregiver, or an unrelated foster parent at 8.5 years. To estimate these models, we used PROC PHREG in SAS version 8.2 [33]. Our preliminary multivariable model included VEX quartiles in dummy variable form. Based on results of this preliminary model, our final model included only the dummy variable for the highest quartile of VEX score contrasted with those in the lowest through third quartiles.

Results

There were 104 children with data about drug use of self and/or peers at 8.5 years and 127 with data at 10.5 years; however, we restricted the analysis sample to the 104 children who provided data about exposure to violence at 8.5 years and data about association with substance-using friends between 8.5 and 11 years.

This subset was representative of the recruitment sample from the larger study in terms of birth mother's age, education level, ethnicity, parity, and prenatal use of cocaine, marijuana, cigarettes, and alcohol, as well as on infant gender, birth weight, length, head circumference, and gestational age. This sample was also representative of the sample that provided data within the school-age period from 8.5 to 11 years in terms of composite scores of the caretakers on the Addiction Severity Index [34] and caretaker type. The analysis sample, however, had significantly higher mean WISC total scores (90.5 vs. 81.9, $p = .001$) than children in the school-aged sample who did not complete the SXA or VEX batteries. When children with lower IQ could not give interpretable answers on the VEX or SXA at 8.5 years, they were omitted.

By age 11, 28% of children reported “own use” of any ATOD, while 45% reported friends’ use. The percentages of children who reported friends’ use were higher than for their own use except for alcohol: 25% versus 26%, respectively (Figure 1). To enhance power, all substances were considered together as a single category of ATOD. The percentage of children who reported substance-using friends was 12% (12/104) at 8.5 years, 25% (26/104) by 9.5 years, and 45% (47/104) by 11 years. As seen in Table 1 in bivariate survival analyses, children in the highest fourth quartile of children’s VEX-R total score at 8.5 years of age were at significantly greater risk of having reported friends’ use of ATOD compared to those in the lowest three quartiles ($p = .03$). Quartiles of the VEX score, however, were not significantly associated with children’s acknowledgment of their own use ($p = .85$). These findings of a significant association of VEX score with friends’ substance use were not changed substantially in multivariate analysis via Cox proportional hazards regression. As seen in Table 2, in multivariate analyses children in the fourth quartile of the VEX-R total score (score of 29 or higher) compared to those with lower scores, had two times the risk of reporting having a friend who used ATOD (hazard ratio = 2.2; 95% CI = 1.14, 4.23; $p = .02$).

Of the other covariates, only male gender emerged as an independent risk factor for friends’ use of ATOD (hazard ratio = 2.05; 95% CI = 1.10, 3.83; $p = .02$). Neither placement with or away from birth mother nor IUCE (even at the higher levels) was associated with friends’ use of ATOD. None of the variables controlled in assessing the association between VEX and friends’ ATOD use were associated with children’s report of their own use.

Discussion

This is the first prospective study of which we are aware to show that 8.5-year-olds recall of exposure to violence is associated with their report at elementary school age of friends’ ATOD use, an established risk factor for the child’s own early initiation of ATOD. However, the findings in our study are consistent with other cross-sectional and retrospective studies noted among young adolescents and among older youth [21,35,36].

The study has several limitations. The findings are derived from a small sample. Because children cannot be randomly assigned whether or not they are exposed to violence, it is impossible to infer causality. Moreover, although much of the data are prospective, the temporal direction of effects is not entirely clear. We cannot determine whether distress associated with EV increases likelihood that children will seek out deviant substance using friends or whether associating with substance-using friends increases the risk of EV, because 25% of the sample already reported substance-using friends at the first assessment age. Results cannot be generalized beyond an inner-city, largely minority, term sample, with a large proportion of children having prenatal cocaine exposure. Moreover, the least cognitively competent children could not complete these study measures; therefore, results can only be generalized to inner-city children with near-average intelligence.

With these limitations, we cannot fully explain the lack of association between exposure to violence and the child’s own substance use in our sample. Because we did not collect laboratory indices of substance use from the study children, we cannot accurately ascertain to what extent report of peer use also reflects the children’s own use, which the children may have been more reluctant to acknowledge.

Implications

In spite of these limitations, these preliminary findings have potential clinical, public health, and research implications. It is striking that this study sample was comprised only of preadolescents less than 11 years of age, well before current AAP guidelines suggest screening for and counseling about ATOD use [1]. Our findings suggest that the prevention of initiation

of substance use needs to be addressed clinically before some children enter middle school. Only if clinicians routinely ascertain preadolescent risk factors for early initiation of ATOD use can these be addressed before the onset of problematic substance use.

The American Academy of Pediatrics defines developmental stages in the following manner: early childhood (1-4 years), middle childhood (4-10 years), and adolescence (11-21 years) [37]. However, the actual age at which physicians implement adolescent recommendation in primary care probably varies from setting to setting. Our data suggest that in order to minimize later adolescent substance use in violence endemic areas, such as inner cities, clinical screening for violence and substance-using friends should be incorporated into pediatric visits by early elementary school age (e.g., age 8), which is before the AAP definition of onset of adolescence. Screening children for EV is indicated whether or not the children are currently or were prenatally affected by parental substance abuse. Public health campaigns to prevent ATOD use in early adolescence should also address the impact of childhood exposure to violence. Successful school based cognitive-behavioral interventions for school-age children after exposure to violence have been reported [38].

From a research perspective, larger prospective surveys in more diverse samples are needed to elucidate the possible pathways leading from EV of varying types and severity to early initiation of ATOD.

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Figure 1.
Use of ATOD, overall and broken down by substance (n = 104) at ages 8.5-11 years.

Table 1

Kaplan-Meier analysis: Time to first friends' use of ATOD (8.5, 9.5, or 11 years of age) (n = 104) *

VEX at 8.5 quartile	Any friends' use (%)	Hazard ratio (95% CI) **
1 (score: 0-8; n = 23)	39	1.00 (--)
2 (score: 9-16; n = 26)	35	1.03 (.41, 2.61)
3 (score: 17-28; n = 28)	36	1.22 (.50, 3.02)
4 (score: 29-66; n = 27)	70	2.41 (1.08, 5.34)
Overall (n = 104)	45	

Log rank test for four-group comparison, $p = .053$.Quartile 4 vs. Quartile 1 in proportional hazards model, $p = .03$.

* Sample with complete information on covariates in multivariable model.

** Computed from proportional hazards model unadjusted for covariates.

Table 2

Cox proportional hazards regression for time to first report of friends' use of ATOD adjusted for covariates (n = 104)

Variable	Hazard ratio (95% CI)	<i>p</i> -value
VEX score 29 or higher (4th quartile) vs. less than 29	2.20 (1.14-4.23)	.02
Caregiver kinship vs. birth mother	1.93 (.82-4.55)	.13
Caregiver non-kinship vs. birth mother	1.14 (.37-3.53)	.82
Cocaine level heavier vs. unexposed	0.97 (.41-2.32)	.94
Cocaine level lighter vs. unexposed	0.65 (.27-1.53)	.32
Gender male vs. female	2.05 (1.10-3.83)	.02

Model *p*-value = .02.