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Age-Varying Links Between Violence Exposure and Behavioral, Mental, and Physical Health

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A B S T R A C T

Purpose: To examine age-varying prevalence rates and health implications of weapon-related violence exposure (WRVE) from adolescence to young adulthood (ages 14–30) using time-varying effect modeling.
Methods: Data were from the Add Health study, a longitudinal study of adolescents in the United States (N = 5,103) followed into young adulthood across four assessment waves from age 14–30.
Results: WRVE rates varied with age, peaking during mid-to-late adolescence (ages 16–18). Rates were higher for males (vs. females) and African-American youth (vs. white) across nearly all ages. Rates were higher for Hispanic youth (vs. white) during adolescence. WRVE was positively associated with frequent heavy episodic drinking and negatively associated with self-reported general health; these associations were significant during adolescence and early adulthood (ages 15–24). WRVE was positively associated with depressive symptoms. This association remained stable over age and was stronger for females from ages 16–21. The association between violence exposure and decreased general physical health was stronger for white versus African-American youth from ages 15–17, with no significant association observed for African-American youth at any age.
Conclusions: Despite its severity, WRVE is prevalent among U.S. youth during adolescence and young adulthood, particularly among males and African-Americans during mid-to-late adolescence. The associations between WRVE and health were stronger during adolescence and differed by sex and race/ethnicity. This information may assist in the timing and targeting of intervention efforts aimed at interrupting the effects of violence exposure on youth behavioral, mental, and physical health.

IMPLICATIONS AND CONTRIBUTION

This study investigated weapon-related violence exposure (WRVE) across adolescence and young adulthood. WRVE was highest during adolescence and differed by sex and race/ethnicity. WRVE age-varying associations were stronger with depressive symptoms for females and with physical health for white versus African-American youth.

Weapon-related violence exposure (WRVE) is common among youth in the United States (US). From 12% to 26% of youth younger than 18 years have experienced WRVE in their lifetimes [1,2]; 7% of adolescents ages 14–17 report WRVE in the past year [3]. Rates among young adults are also high; 12% of adults aged 18–27 years have been exposed to past-year community violence, including weapon-related violent events such as seeing someone stabbed or shot, being threatened with a knife or gun,

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and being stabbed or shot themselves [4]. WRVE rates vary substantially by sex (higher in males) and race/ethnicity (higher in African-American and Hispanic youth), highlighting the unequal distribution of violent experiences among youth [3,4].

Much of the research on weapon-related violence has focused on weapon-carrying among youth and less on youth exposure to weapon-related violence [2]. Violence exposure is important to understand not only because it has direct links with morbidity and mortality but also because it is associated with myriad behavioral, mental, and physical health problems, including substance use [5,6], delinquency [7], post-traumatic stress disorder [8], depression and anxiety [9,10], sexual-risk behavior [6], and poor self-reported health [11]. Associations between violence exposure and poor outcomes have been documented in a number of developmental periods, including childhood, adolescence, and young adulthood [6,8,11,12]; however, few studies have examined how the manifestations and implications of violence exposures may vary across developmental periods within the same study. A developmental perspective such as this is essential because an individual's cognitive, emotional, and physical capacities influence how they respond to and to cope with violent events, and these capacities are changing with development [9,13]. Applying a developmental perspective to violence exposure requires that we examine its changing manifestations and its implications across developmental periods; that is, in the context of the changing lives of individuals [9]. Doing so will not only help to improve theory and research, but will aid in our ability to match intervention content to the needs of the person and their developmental stage [14].

The present study uses an innovative statistical approach, time-varying effect modeling (TVEM; [15–17]) to examine the age-varying prevalence rates of WRVE (witnessing violence, threat of violence, and violence victimization) and its age-varying associations with three key health outcomes (frequent heavy episodic drinking [HED], depressive symptoms, and general physical health). Using data from a large longitudinal study of U.S. youth followed from adolescence to young adulthood, we apply TVEM to estimate age-varying associations. Because exposure rates and effects of violence differ by sex and race/ethnicity [3,4,18–20], we explored these as moderators of age-varying prevalence rates and health implications of WRVE.

Method

Procedures and participants

Data are from the public-use sample of the National Longitudinal Study of Adolescent to Adult Health (Add Health; [21]) a sample of adolescents recruited in grades seven through 12 in the United States (N = 6,504). The sample comprised 80 high schools and feeder middle schools stratified with respect to region, urbanicity, school type and size, and ethnicity. Participants completed surveys in 1994–1995 (Wave I), 1995–1996 (Wave II), 2001–2002 (Wave III), and 2007–2008 (Wave IV). Because TVEM can handle unbalanced number and spacing of measurement occasions, we included all available person-waves of data. However, we restricted our analyses to the age range of 14–30 due to data sparseness outside these ages. Our analytic sample included 17,300 person-waves of data across 5,103 adolescents (49% male; 64% non-Hispanic white, 19% non-Hispanic Black or African-American, 12% Hispanic/Latino, 4% Asian, <1% Native American, and <1% other). Of the 5,103 adolescents at Wave I, 86% (n = 4,373), 89% (n = 4,556), and 64% (n = 3,268) were followed up at Waves II, II, and IV respectively. Data collection was approved by the Public Institutional Review Board at the University of North Carolina.

Measures

All study measures were assessed during in-home interviews at each wave.

WRVE over the past year included (1) *witnessing weapon-related violence* ("You saw someone shoot or stab another person," 8.6% of occasions); (2) *threat of weapon-related violence* ("Someone pulled a knife or gun on you," 9.3% of occasions); and (3) *weapon-related violence victimization* ("Someone shot, cut, or stabbed you," 3.7% of occasions). WRVEs were highly interrelated at each wave (α = .57–.82) as in previous research [22,23]. Thus, we combined exposures into a WRVE composite ranging from zero to three (mean = .22, standard deviation = .60).

Frequent heavy episodic drinking (HED) was assessed using the item "During the past 12 months, on how many days did you drink five or more drinks in a row?" at Waves I–III and "… five or more (if male) or four or more (if female) drinks in a row?" at Wave IV. As in previous research [24], we considered HED to be frequent if it occurred at least twice a month. Frequent HED was reported on 17.8% of occasions.

Depressive symptoms during the past week were assessed using eight items from the Center for Epidemiological Studies Depression Scale (CES-D; [25]). A sample item is "You felt sad;" responses included 0 = *never or rarely*, 1 = *sometimes*, 2 = *a lot of the time*, 3 = *most or all of the time* (α = .78–.81 across waves).

General physical health was assessed using the item: "In general, how is your health?" Responses included excellent, very good, good, fair, or poor. Consistent with previous research [11], we dichotomized the responses and coded 1 = good or better (excellent, very good, or good health) and 0 = fair or poor health. Physical health was good in this sample, reflecting the developmental period; good or better health was reported on 93.3% of occasions.

Covariates included the following, in addition to sex and race/ethnicity. *Family disadvantage* before age 18 years was coded at each of the four waves following methods of Add Health investigators [26]. Family disadvantage was indicated if (1) the parent reported that family income fell below $16,000 at Wave I (less than or equal to poverty level in 1994) and (2) family welfare receipt before age 18 years was reported from either family information (Waves I–II) or participant retrospective report (Waves III–IV); 30% of respondents experienced family disadvantage. *Violence perpetration* was assessed using two items at each of the four waves. Respondents were asked whether they "pulled a knife or gun on someone" or "shot or stabbed someone" in the past year; a score of 1 was assigned if either was reported (0 if neither). Violence perpetration was reported on 3.8% of occasions.

Statistical analyses

The TVEM SAS Macro (Methodology Center, Pennsylvania State University, University Park, PA, USA; available for download at methodology.psu.edu) was used for all analyses. TVEM is a direct extension of multiple regression allowing intercept and slope coefficients to be estimated as nonparametric functions of continuous age [17,24]. These functions are nonparametric because TVEM, in contrast to multiple regression and multilevel modeling, requires no constraints on the shapes of the intercept