

Gender-Specific Mental and Behavioral Outcomes Among Physically Abused High-Risk Seventh-Grade Youths

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SYNOPSIS

Objective. Research has shown that physical abuse during childhood (early PA) is associated with various mental and behavioral problems in adolescence. However, there is little research on the differences in these associations by gender among youths residing in high-risk communities. This study investigated gender differences in the relationship between early PA and various internalizing (e.g., thoughts of suicide or victimization) and externalizing (e.g., perpetration of violence) behaviors.

Methods. A cross-sectional study was conducted using survey data (collected in 2004) provided by 1,484 seventh-grade youths residing in a high-risk community (83% participated). Students were considered victims of early PA if they reported experiencing abuse prior to age 10 years. Prevalence ratios (PRs) were calculated to estimate the association between early PA and various outcomes (e.g., suicidality, victimization, violence, and illegal drug use), adjusting for race/ethnicity and other forms of abuse. Poisson regression with robust variance estimates was used to estimate the PRs and test for early PA-gender interaction.

Results. Early PA was positively associated with suicidality, illegal drug use, and victimization with no significant differences by gender. The association between early PA and criminal behavior was significantly higher for females; the association between early PA and peer violence perpetration was significantly higher for males (interaction term PA*gender was significant at the $p \leq 0.005$ level).

Conclusions. Young high-risk adolescents who experienced early PA may need counseling or other services (e.g., home visitation) to help prevent suicidality, victimization, violence perpetration, criminal behavior, and illegal drug use. Furthermore, male victims may need more attention in the area of violence prevention; female victims may need particular attention with regard to preventing criminal behavior.

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Early physical abuse (PA) is a significant public health problem. The National Longitudinal Study of Adolescent Health, conducted from 2001 to 2002, indicated that 28.4% of young adults aged 18 to 26 years in the United States reported PA before the sixth grade.¹ Early PA has been linked to many mental and behavioral problems in adolescence and adulthood, such as delinquency, conduct disorder, depression, suicidality, illegal substance use, and peer victimization.²⁻⁷ In 1993, the National Research Council's Panel on Child Abuse and Neglect recommended that research be conducted to determine whether there are differential consequences of child abuse for boys and girls.^{8,9} Since then, numerous studies have assessed the interaction between gender and early PA on medical health, mental health, and behavior.

In general, studies found that female victims of early PA reported internalizing types of responses to abuse (e.g., depressed mood, suicide ideation, hopelessness, and low self-esteem).^{5,9,10} Additionally, Thompson et al.⁹ found that adult women who were physically abused in early childhood were more likely than their male counterparts to have perceptions of unfavorable health. Lansford and colleagues⁵ conducted a prospective longitudinal study of children, who were followed from ages 5 to 21 years, that examined the potential health and behavioral effects of early PA. They found, based on the mothers' ratings, that the effects were stronger for females than males at grade 11 with regard to posttraumatic stress disorder, social problems, thought problems, social withdrawal, anxiety, and depression. This study also showed a stronger association between early PA and aggression among females than males; however, in a follow-up study that evaluated data from the same children when they were either age 18 or 21 years, there were no gender differences in the association between early PA and aggression, violent delinquency, and nonviolent delinquency.¹¹ This finding suggests that differential consequences might be most apparent during developmental periods closest to the timing of the abuse; therefore, studies focusing on the preadolescent or adolescent periods might reveal more significant interaction.

To add to the literature in this area of research, we investigated early PA and gender interaction on mental and behavioral health among youths living in high-risk communities (e.g., communities with high levels of crime and poverty). We focused on youths living in a high-risk community because these youths might be vulnerable to mental or behavioral problems. For example, if behavior such as illegal drug use is common in a community, then this behavior may be perceived as an appropriate coping mechanism for dealing with

the stress of abuse.¹² To date, few studies have evaluated multiple health and behavioral outcomes related to early PA, by gender, among youths residing in a high-risk community. One study by Mersky and Reynolds¹³ investigated the interaction between gender/early PA and neglect on violent behavior (i.e., having an official delinquency petition for violent offenses) among a minority youth population and found no significant differences between males and females. However, these findings should be viewed cautiously because the study sample had a low rate of violent petitions, which might have limited the power to detect interaction. More research in this area that captures a broad scope of mental and behavioral problems related to early PA and gender differences in this domain among high-risk children might help people to appropriately apply preventive efforts in school, medical, and psychiatric settings.

Focusing on a population of seventh-grade youths residing in a high-risk community, this study investigated gender differences in the relationship between early PA and various internalizing (e.g., thoughts of suicide or victimization) and externalizing (e.g., perpetration of violence) behaviors.

METHODS

Study design

Data for the present analyses were drawn from the Youth Violence Survey: Linkages among Different Forms of Violence (which we will hereafter refer to as the Linkages study), a cross-sectional survey of adolescents living in a high-risk community. Linkages was developed by the Centers for Disease Control and Prevention (CDC) and implemented by contractors at ORC Macro International in Calverton, Maryland, a research/consulting firm. Further details on the Linkages study have been reported by Swahn et al.¹⁴

Study population and setting

In the Linkages study, a high-risk community is defined as one with high rates of poverty, unemployment, single-parent households, and serious crimes, which are often considered familial and community risk factors for youth delinquency and mental distress.^{15,16} To select the community for this study, 50 sites were ranked based on these four variables. A list of the 20 sites with the highest sum of ranks for these variables was reviewed with the U.S. Department of Education, which recommended six sites for consideration. A study site was selected based on commitment to the study and the feasibility of conducting a suitable census of students in targeted grades. The selected

site, which cannot be identified for reasons of confidentiality, was a racially and ethnically diverse school district residing in a community with a population of less than 250,000.

The survey instrument was administered to all English-speaking public school students enrolled in grades 7, 9, 11, and 12; however, this study focused only on the seventh-grade population for two reasons. First, because children are required by law to attend middle school, the seventh-grade student population was a more representative sample of pre-/early adolescent youths (approximately 12 years of age) in this community. This community had a relatively high rate of students dropping out of high school, and, therefore, a sample of public high school students may not have captured some of the most delinquent youths. Second, by characterizing the mental distress and behaviors of pre-/early adolescents, this study may help focus efforts to better prevent further behavioral problems from manifesting in later adolescence and adulthood. For this survey, there were 10 schools in this district with seventh-grade youths, and all schools participated.

Prior to data collection, active, signed, written parental permission and student assent were obtained from all students. To accommodate non-English-speaking parents or caregivers, permission forms were also provided in Spanish and other school-requested languages. The study received Institutional Review Board approval from CDC and ORC Macro International.

Data collection for this study occurred in April 2004. Students voluntarily completed the anonymous self-administered 174-item questionnaire. Among the 1,796 seventh-grade English-speaking students eligible, 1,484 (83%) students received parental consent and participated. Students received a \$5 gift card for returning the parental permission form and another \$5 gift card after completing the survey.

Measures

All variables included in these analyses were self-reported. Details of how these variables were coded from the survey are shown in the Figure.

Exposure variable. The main exposure variable for this study, early PA, was dichotomized: (did/did not) experience PA before the age of 10 years. PA was defined as having injuries, such as bruises, cuts, or broken bones, as a result of being spanked, struck, or shoved by parents, guardians, or their partners.

Outcome variables. Ten outcome variables were used for this study to address various domains of mental distress and behavior, which included suicidality, peer and date victimization, peer and date violence perpetration,

criminal activity, friendships with those engaging in criminal activity, and illegal drug use. Specifically, the outcome variables included:

1. Had thoughts of suicide in the past 12 months;
2. Had planned suicide in the past 12 months;
3. Had attempted suicide in the past 12 months;
4. Had been victimized by a date in the past 12 months;
5. Had been victimized by a peer in the past 12 months;
6. Had perpetrated dating violence in the past 12 months;
7. Had perpetrated peer violence in the past 12 months;
8. Had ever engaged in criminal activities;
9. Had friends who engaged in criminal activity in the past 12 months; and
10. Had used illegal drugs two to three days or more per month in the past 12 months.

All outcome variables were dichotomized. For the outcome variables that pertained to peer and date victimization and violence perpetration, we initially separated these outcome variables by physical vs. emotional/psychological abuse; however, preliminary analyses (not reported) revealed no significant differences in the findings between the two forms of abuse for each of these variables. Therefore, physical and emotional/psychological abuse were combined for date/peer victimization and date/peer violence perpetration.

Statistical analysis

To describe the population, the sample was first divided by gender and then by the independent variable of primary interest, early PA. For both females and males, unadjusted prevalence ratios (PRs) were used to compare each characteristic between those who were vs. those who were not early PA victims; PRs are easier to interpret than odds ratios in cross-sectional prevalence studies with non-rare (e.g., >10%) binary outcomes.¹⁷ The sample was described by 15 characteristics—age, race/ethnicity, three other forms of maltreatment (i.e., having witnessed neighborhood violence; having witnessed violence between caregivers prior to age 10 years; and having experienced sexual abuse prior to age 10 years), and the 10 outcome variables previously described. Therefore, 30 unadjusted PRs were reported—15 for females and 15 for males. To maintain an overall probability of Type I error ≤ 0.05 , only unadjusted PRs with $p \leq 0.002$ ($0.05/30$, which, by

Bonferroni adjustment, maintains an overall level of 0.05) were deemed statistically significant.

To calculate adjusted PRs and test for significant differences in the PRs by gender, Poisson regression with robust variance estimates was used. A log-binomial model was initially considered, but failed to converge. Poisson regression with robust variance estimates provides a viable alternative for PR estimation.^{18,19} All models adjusted for clustering within schools. Also, because witnessing neighborhood violence, witnessing violence between caregivers, and experiencing early sexual abuse are forms of maltreatment that often co-occur with PA²⁰ and are associated with subsequent mental and behavioral problems,^{5,15,21,22} we controlled for these factors in the regression models to increase understanding of the direct association between PA and health and behavior.

Race/ethnicity was also included in the models to minimize potential confounding by socioeconomic influences. Age was not included in the statistical models due to the lack of age variation among this seventh-grade youth population. An interaction term for PA and gender was included to test for significant differences in the relationship of PA to the outcomes between males and females. Because 10 outcome variables were assessed in this analysis, only PRs and interaction terms with $p \leq 0.005$ (0.05/10, which, by Bonferroni adjustment, maintains an overall level of 0.05) were deemed significant.

To assess collinearity among the independent and control variables, variable inflation factor scores were estimated for the statistical models. These scores indicated that the explanatory variables were not strongly collinear (scores < 2.0).

All statistical analyses were conducted using Stata SE software.²³

RESULTS

Descriptive characteristics

Descriptive characteristics of the sample by early PA and gender appear in Table 1. Approximately 19% of females ($n=149$) and 18% of males ($n=132$) reported early PA. Age and race/ethnicity were not significantly associated with early PA at the $p \leq 0.002$ level for either females or males. The majority of this population reported witnessing violence in the community, but this characteristic was not significantly associated with early PA at the $p \leq 0.002$ level. However, based on the unadjusted PRs for both females and males, a higher proportion of those who reported early PA, vs. their counterparts, also reported witnessing family violence prior to age 10 years; experiencing sexual abuse prior

to age 10 years; having thoughts of suicide within 12 months prior to the survey; and having friends who engaged in criminal activity within 12 months prior to the survey (all significant at $p \leq 0.002$). Among females, a higher proportion of those who reported early PA, vs. their counterparts, also reported having planned suicide within 12 months prior to the survey; having attempted suicide within 12 months prior to the survey; and having engaged in criminal activities (e.g., robbery or drug dealing). For males, a higher proportion of those who reported early PA, vs. their counterparts, also reported having perpetrated peer violence within 12 months prior to the survey. Among males who reported that they had been on dates within the prior 12 months, a higher proportion of those who reported early PA, vs. their counterparts, also reported being victimized by a date and perpetrating date violence within 12 months prior to the survey.

Association between early child maltreatment and mental/behavioral problems

Table 2 shows the adjusted PRs for early PA, gender, and the early PA-gender interaction term. Of all outcome variables, suicidality was most strongly related to early PA. Youths reporting early PA had 2.47 ($p \leq 0.005$) times the prevalence of reporting at least one suicide attempt within the 12 months prior to the survey compared with those not reporting early PA. Youths with a history of early PA also had 2.60 ($p \leq 0.005$) times the prevalence of reporting suicidal ideation (“having thoughts of suicide”), and 2.13 ($p \leq 0.005$) times the prevalence of reporting “having planned suicide” compared with those not reporting early PA. We found no significant difference in the association between early PA and suicidality between female and male seventh-grade youths.

Victimization was also associated with early PA. Those who reported early PA had a 22% (PR=1.22, $p \leq 0.005$) greater prevalence of reporting peer victimization compared with those not reporting early PA. Similarly, among those who reported having a date within 12 months prior to the survey, those reporting early PA had a 31% (PR=1.31, $p \leq 0.005$) greater prevalence of reporting date victimization compared with those not reporting early PA. We found no significant difference in the association between early PA and victimization between female and male seventh-grade youths.

The association between early PA and perpetrating peer violence was not statistically significant when gender and the gender*PA interaction term was included in the regression model. However, based on the gender*PA interaction term, the difference in the PRs between males and females was statistically

Table 1. Characteristics of sample (percentages by gender and early PA)

Characteristic	Females						Males					
	Reported early PA (n=149)		Did not report early PA (n=149)		Early PA vs. no early PA (unadjusted PR)		Reported early PA (n=132)		Did not report early PA (n=587)		Early PA vs. no early PA (unadjusted PR)	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Demographic characteristics												
1. Age (in years)^a												
12	31	20.81	169	27.44	28	21.21	105	17.89	105	17.89	1.19	1.19
13	89	59.73	361	58.60	77	58.33	367	62.52	367	62.52	0.93	0.93
≥14	29	19.46	86	13.96	27	20.45	115	19.59	115	19.59	1.04	1.04
2. Race/ethnicity^a												
Hispanic	87	58.39	313	50.81	78	59.09	279	47.53	279	47.53	1.24	1.24
African American	36	24.16	159	25.81	37	28.03	155	26.41	155	26.41	1.05	1.05
White	17	11.41	106	17.21	14	10.61	113	19.25	113	19.25	0.55	0.55
Other	9	6.04	38	6.17	3	2.27	40	6.81	40	6.81	0.33	0.33
3. Witnessed violence in community	105	70.47	348	56.49	105	79.55	352	59.97	352	59.97	1.33	1.33
4. Witnessed family violence prior to age 10 years	88	59.06	145	23.54	60	45.45	87	14.82	87	14.82	3.07 ^b	3.07 ^b
5. Experienced sexual abuse prior to age 10 years	30	20.13	32	5.19	17	12.88	22	3.75	22	3.75	3.43 ^b	3.43 ^b
Outcomes												
6. Had thoughts of suicide in the past 12 months	71	47.65	90	14.61	24	18.18	38	6.47	38	6.47	2.81 ^b	2.81 ^b
7. Planned suicide in the past 12 months	53	35.57	69	11.20	17	12.88	37	6.30	37	6.30	2.04	2.04
8. Attempted suicide in the past 12 months	49	32.89	55	8.93	16	12.12	30	5.11	30	5.11	2.37	2.37
9. Victimized by a date in the past 12 months ^c	72	64.86	136	43.59	64	72.73	139	44.84	139	44.84	1.62 ^b	1.62 ^b
10. Victimized by a peer in the past 12 months	103	69.13	314	50.97	81	61.36	268	45.66	268	45.66	1.34	1.34
11. Perpetrated dating violence in the past 12 months ^c	66	59.46	127	40.71	48	54.55	96	30.97	96	30.97	1.76 ^b	1.76 ^b

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Table 1 (continued). Characteristics of sample (percentages by gender and early PA)

Characteristic	Females						Males					
	Reported early PA (n = 149)		Did not report early PA (n = 149)		Early PA vs. no early PA (unadjusted PR)		Reported early PA (n = 132)		Did not report early PA (n = 587)		Early PA vs. no early PA (unadjusted PR)	
	N	Percent	N	Percent	PR	N	Percent	N	Percent	N	Percent	PR
12. Perpetrated peer violence in the past 12 months	83	55.70	251	40.75	1.37	83	62.88	213	36.29			1.73 ^b
13. Engaged in criminal activities	88	59.06	221	35.88	1.65 ^b	75	56.82	269	45.83			1.24
14. Used illegal drugs on two to three days or more per month in the past 12 months	15	10.07	23	3.73	2.70	22	16.67	39	6.64			2.51 ^b
15. Had friends who engaged in criminal activity in the past 12 months	71	47.65	168	27.27	1.74 ^b	70	53.03	182	31.01			1.71 ^b

^aValue for the overall characteristic was not significant at $p \leq 0.002$ for either females or males. This level of significance was chosen to maintain an overall probability of Type 1 error ≤ 0.05 , which was calculated by dividing 0.05 by twice the number of characteristics (0.05/30). Because age and race/ethnicity are multilevel factors, they only accounted for two characteristics. There were 15 characteristics for both males and females and, therefore, 30 comparisons. This is commonly referred to as the Bonferroni adjustment for multiple comparisons.

^bValue was statistically significant at $p \leq 0.002$.

^cValues pertain to only those who reported having been on a date in the past 12 months (females reporting early PA = 111; females not reporting early PA = 312; males reporting early PA = 88; males not reporting early PA = 310).

PA = physical abuse

PR = prevalence ratio

significant ($PR=1.31$, $p\leq 0.005$); the PR was significantly higher for males than females. The PR for females was 1.15 ($p=0.03$) and the PR for males was 1.51 (i.e., $1.15*1.31$, $p\leq 0.005$).

Early PA was also positively and significantly associated with reports of engaging in criminal activity ($PR=1.27$, $p\leq 0.005$), using illegal drugs on two or more days per month ($PR=1.75$, $p\leq 0.005$), and having friends engaging in criminal activity ($PR=1.37$, $p\leq 0.005$). Furthermore, based on the gender*PA interaction term, the difference in the PRs between females and males for engaging in criminal activity was significant ($PR=0.78$, $p\leq 0.005$); the PR was significantly higher for females ($PR=1.27$, $p\leq 0.005$) than for males ($PR=0.99$ [$1.27*0.78$], $p<0.751$).

DISCUSSION

Consistent with previous research, we found that youths with a history of early PA reported a significantly higher prevalence of suicidality, dating and peer victimization, engaging in criminal behaviors, having friends who engaged in criminal behaviors, and regular use of illegal drugs than youths who were not physically abused.^{3,9,10,24} Four additional important findings emerged from this study. First, this study found that approximately 19% of this seventh-grade high-risk youth population reported early PA, which was lower than the national estimate of approximately 28% reported by Hussey et al. in 2006.¹ However, our study used a more severe measure of early PA than the one used by Hussey and colleagues, which may largely explain this difference.

Table 2. PA, gender, and their interaction on the mental and behavioral health of seventh-grade students (PRs with 95% CIs)

Outcome	Early PA ^a PR (95% CI) (0 = no, 1 = yes)	Gender PR (95% CI) (0 = female, 1 = male)	PA*gender interaction PR (95% CI)
1. Had thoughts of suicide in the past 12 months	2.60 ^b (2.26, 2.98)	0.46 ^b (0.26, 0.79)	0.91 (0.50, 1.64)
2. Planned suicide in the past 12 months	2.13 ^b (1.83, 2.48)	0.58 (0.36, 0.93)	0.72 (0.40, 1.30)
3. Attempted suicide in the past 12 months	2.47 ^b (1.85, 3.29)	0.59 (0.35, 0.99)	0.72 (0.54, 0.96)
4. Victimized by a date in the past 12 months ^c	1.31 ^b (1.11, 1.53)	1.07 (0.95, 1.21)	1.06 (0.79, 1.42)
5. Victimized by a peer in the past 12 months	1.22 ^b (1.13, 1.31)	0.90 ^b (0.84, 0.96)	1.00 (0.88, 1.15)
6. Perpetrated dating violence in the past 12 months ^c	1.26 (1.00, 1.60)	0.78 ^b (0.70, 0.89)	1.19 (0.88, 1.59)
7. Perpetrated peer violence in the past 12 months	1.15 (1.02, 1.30)	0.89 (0.73, 1.08)	1.31 ^b (1.18, 1.45)
8. Engaged in criminal activities	1.27 ^b (1.11, 1.47)	1.28 ^b (1.18, 1.40)	0.78 ^b (0.69, 0.88)
9. Used illegal drugs on two to three days or more per month in the past 12 months	1.75 ^b (1.32, 2.33)	2.08 ^b (1.38, 3.15)	0.90 (0.54, 1.53)
10. Had friends who engaged in criminal activity within 12 months prior to the study	1.37 ^b (1.14, 1.63)	1.13 (1.01, 1.28)	0.98 (0.80, 1.21)

^aValues were adjusted for gender and PA-gender interaction, age, race, witnessed neighborhood violence, witnessed family violence, and experienced sexual abuse prior to age 10 years.

^bValue was statistically significant at $p\leq 0.005$. This level of significance maintains an overall probability of Type 1 error ≤ 0.05 (Bonferroni adjustment = 0.05/10).

^cValues pertain to those who reported having a date in the past 12 months ($n=821$).

PA = physical abuse

PR = prevalence ratio

CI = confidence interval

Our study measured early PA as having injuries as a result of being spanked, struck, or shoved by a parent, guardian, or their partner, before the age of 10 years. Hussey and colleagues also defined early PA as having been struck by a guardian (i.e., slapped, hit, or kicked) in early childhood years (prior to the sixth grade); however, their measure did not state that the abuse had to have resulted in injury. Therefore, our study found that the prevalence of severe early PA may be quite high in this population.

Second, among these seventh-grade youths, both females and males who reported early PA also reported internalizing type responses (e.g., suicide ideation). Previous research has found that females are more likely than males to experience negative mental health consequences and hopelessness following PA.^{9,10} The lack of difference in suicidality by gender in this study might be attributed to this youth population living in a high-risk community. Youths living in high-risk communities are often considered prone to multiple victimizations.⁷ Turner et al.⁷ found that gender was not significantly associated with poor mental health, such as depression, when multiple victimization was considered.

Third, both females and males who reported early PA were more likely to report illegal drug use than their female and male counterparts who did not report early PA. The association of early PA and illegal drug use among these youths might be attributed to having family members in the household using illegal drugs. Felitti and colleagues¹² have shown that abused children are more likely than other children to have a family member in the household using illegal drugs, thereby increasing access to these drugs. Therefore, these youths may be more likely to learn to use illegal drugs as coping devices when stressed by PA.

Finally, our study found significant gender differences in the relationship of early PA to two of the outcome measures: criminal activity and perpetration of peer violence. Among these seventh-grade youths, the association between early PA and criminal activity was significantly higher for females than males. Female youths who did not report early PA were less likely than their male peers to engage in criminal activity; however, female youths reporting early PA were as likely to engage in criminal activities as males who reported early PA (Table 1). This finding is consistent with previous research with adults in which a history of PA in childhood increased the likelihood of arrest for both males and females in adulthood, with a more dramatic increase in the arrest rate for females than males.^{25,26} Furthermore, research with adolescent samples has

shown that girls with a history of PA are as likely as boys to engage in delinquent activities.^{27,28}

Conversely, the association between early PA and perpetrating peer violence was significantly higher for males than females. Males with a history of PA were more likely than both their male counterparts who did not report early PA and their female peers with a history of PA to engage in violent actions such as punching, hitting, kicking others, or throwing objects at others (Figure). This finding also supports previous research that found a relationship between childhood maltreatment and perpetrating violent delinquency (e.g., attacking someone with a weapon, physical fighting, or threatening someone with a weapon),²⁸ and might imply that males are more likely than females to externalize violent tendencies in response to early PA.

Limitations

These results are subject to at least five limitations. First, all participants were students in a northeastern high-risk urban school district; thus, results may not be generalizable to youths living in other settings. Second, the measures of early PA and adverse outcomes were self-reported. Therefore, some students may not have reported early PA due to lack of recall or social desirability. This would misclassify these students as non-early PA victims. However, results from previous research indicate that the validity of self-reports is increased when data are collected anonymously, as was done in this study.²⁹ If this type of misclassification did occur, then the results of this study might have been biased toward the null (i.e., no differences in the outcomes between those who experienced early PA and those who did not). Therefore, these results might be conservative.

Third, this was a cross-sectional study design; therefore, causation cannot be inferred. It is also possible that the behavior problems began before the abuse; however, temporal associations between early PA and the outcomes cannot entirely be accounted for by this study design. Fourth, it is also possible that those who had many of the outcome variables might be more likely to recall early PA than other children, thereby potentially biasing the results away from the null. Finally, because this study had no measure of PA after age 10 years, this study was unable to control for the impact of PA after middle childhood. Therefore, these outcomes may actually be related to PA that occurred at other times, including immediately prior to the study. Future research should include measures of concurrent and lifetime maltreatment.

Figure. Variable definitions for maltreatment and the outcomes

Domain	Time frame	Question	Responses	Coded response
<i>Early maltreatment</i>				
Physical abuse	Before age 10	Did you ever have injuries, such as bruises, cuts, or broken bones, as a result of being spanked, struck, or shoved by your parents or guardians or their partners?	Yes, no	0 = no 1 = yes
Witnessed community violence	Ever	Please indicate how many times you have seen or heard each thing. • I have seen somebody being beaten up. • I have seen somebody get stabbed or shot.	Never, once or twice, a few times, many times	0 = never 1 = one or more times
	Before age 10	Did you ever see or hear one of your parents or guardians being hit, slapped, punched, shoved, kicked, or otherwise physically hurt by their spouse or partner?	Yes, no	0 = no 1 = yes
Sexual abuse	Before age 10	Did someone ever force you to have sex or to do something sexual that you did not want to?	Yes, no	0 = no 1 = yes
<i>Outcomes</i>				
Thoughts of suicide	Past 12 months	Did you seriously consider attempting suicide?	Yes, no	0 = no 1 = yes
Planned suicide	Past 12 months	Did you make a plan about how you would attempt suicide?	Yes, no	0 = no 1 = yes
Attempted suicide	Past 12 months	How many times did you actually attempt suicide?	Zero times, one time, two or three times, four or five times, six or more times	0 = none 1 = one or more times
Date victimization	Past 12 months	How often has someone you have been on a date with done the following things? • Damaged something that belongs to me. • Said things to hurt my feelings on purpose. • Threatened to hit or throw something at me. • Insulted me in front of others. • Scratched me. • Put down my looks. • Hit or slapped me. • Would not let me do things with other people. • Made me describe where I was every minute of the day. • Slammed me or held me against the wall. • Did something just to make me jealous. • Kicked me. • Pushed, grabbed, or shoved me. • Forced me to have sex or to do something sexual that I did not want to do. • Threw something at me that could hurt. • Punched or hit me with something that could hurt. • Threatened or injured me with a knife or gun. • Hurt me badly enough to need bandages or care from a doctor or nurse.	Never, one to three times, four to nine times, 10 or more times	For each item: 0 = never on all items 1 = one to three times or more for any item

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Figure (continued). Variable definitions for maltreatment and the outcomes

Domain	Time frame	Question	Responses	Coded response
Peer victimization	Past 12 months	How often has someone about your age and of the same sex done any of the following to you? Same items as above with exception of: <ul style="list-style-type: none"> • Would not let me do things with other people. • Made me describe where I was every minute of the day. • Did something just to make me jealous. 	Never, one to three times, four to nine times, 10 or more times	For each item: 0 = never on all items 1 = one to three times or more for any item
Date perpetration	Past 12 months	How often have you done any of the following things to someone whom you have been on a date with? <ul style="list-style-type: none"> • Same items for date victimization, but asks whether the respondent did the listed items 	Never, one to three times, four to nine times, 10 or more times	For each item: 0 = never on all items 1 = one to three times or more for any item
Peer perpetration	Past 12 months	How often have you done any of the following things to someone besides a date? <ul style="list-style-type: none"> • Same items for peer victimization, but asks whether the respondent did the listed items 	Never, one to three times, four to nine times, 10 or more times	For each item: 0 = never on all items 1 = one to three times or more for any item
Criminal activity	Ever	How often did you hurt someone badly enough to need bandages or care from a doctor or nurse? How often did you use or threaten to use a weapon to get something from someone? How often did you sell marijuana or other drugs? How often did you take part in a fight where a group of your friends was against another group?	Never, one or two times, three or four times, five or more times	0 = never on all items 1 = one or more times on any item
Drug use	Past 12 months	On how many days did you use inhalants (glue or solvents) or illegal drugs such as marijuana, cocaine, or heroin?	Every day or almost every day, three to five days a week, one to two days a week, two or three days a month, once a month or less (three to 12 times per year), one or two days in the past 12 months, never	0 = once a month or less 1 = two or three days a month or more
Friends engaging in criminal activity	Past 12 months	How many of your friends have: <ul style="list-style-type: none"> • Hit someone with the idea of really hurting that person? • Sold marijuana or other drugs? • Fought as part of a group against another group? • Used a weapon to threaten or injure someone? • Hit or slapped a boyfriend/girlfriend? 	None of them, very few of them, some of them, most of them, all of them	0 = none of them on all questions 1 = very few of them or more on any question

CONCLUSIONS

This study found that many negative outcomes related to self-reported early PA are in evidence by seventh grade. Primary prevention efforts that focus on pre-adolescents living in high-risk communities are needed. Efforts are underway to develop a guide to inform schools, providers, and members of the community about preventive services. Prevention research has shown that home visitations are promising strategies to prevent child abuse, that cognitive behavioral therapies can reduce the consequences of child abuse for both females and males, and that school-based curricula can reduce violent behavior in high-risk populations.^{30,31} This study could help these programs and therapies to be more effective. For example, in light of the current finding that both males and females who reported early PA had a similar elevated prevalence of suicide attempt when compared with their peers who did not report early PA, interventions to prevent suicide for high-risk maltreated youths may not need to be gender specific. On the other hand, delinquency prevention programs for high-risk maltreated youths may need to be gender specific. For example, for seventh-grade male PA victims, more attention to preventing peer violence may be required; for seventh-grade female victims, counseling to prevent criminal antisocial behavior may need to be emphasized. However, due to the variability in the findings from previous studies with regard to differential consequences of early PA between females and males, it still might be premature to make recommendations to address these differences until more research is conducted.

Another area worth exploring to improve intervention strategies for this high-risk population is in the realm of dating. While this study focused on date violence victimization and date violence perpetration as outcome variables, we should be aware that more than half of this seventh-grade population considered itself to be dating, which might not be normative for most seventh-grade populations. Dating at such an early age might place the youth at risk for succeeding risky sexual behavior; therefore, dating might be treated as an outcome variable in and of itself. Further analysis on this population did reveal that children who experienced early PA were significantly more likely to report going on dates compared with children who did not experience early PA (70.8% vs. 51.7%, $p < 0.001$) (data not shown). Delaying dating or developing interventions that teach youths how to respect dating partners in pre-adolescence might prevent subsequent dating violence and victimization in later adolescence and adulthood.

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REFERENCES

1. Hussey JM, Chang JJ, Kotch JB. Child maltreatment in the United States: prevalence, risk factors, and adolescent health consequences. *Pediatrics* 2006;118:933-42.
2. Cohen P, Brown J, Smailes E. Child abuse and neglect and the development of mental disorders in the general population. *Dev Psychopathol* 2001;13:981-99.
3. Schaaf KK, McCaune TR. Relationship of childhood sexual, physical, and combined sexual and physical abuse to adult victimization and posttraumatic stress disorder. *Child Abuse Negl* 1998;22:1119-33.
4. Silverman AB, Reinherz HZ, Giaconia RM. The long-term sequelae of child and adolescent abuse: a longitudinal community study. *Child Abuse Negl* 1996;20:709-23.
5. Lansford JE, Dodge KA, Pettit GS, Bates JE, Crozier J, Kaplow J. A 12-year prospective study of the long-term effects of early child physical maltreatment on psychological, behavioral, and academic problems in adolescence. *Arch Pediatr Adolesc Med* 2002;156:824-30.
6. Dodge KA, Pettit GS, Bates JE. How the experience of early physical abuse leads children to become chronically aggressive. In: Cicchetti D, Toth SL, editors. *Developmental perspectives on trauma: theory, research, & intervention*. Rochester (NY): University of Rochester Press; 1997. p. 263-88.
7. Turner HA, Finkelhor D, Ormrod R. The effect of lifetime victimization on the mental health of children and adolescents. *Soc Sci Med* 2006;62:13-27.
8. National Research Council, Commission on Behavioral and Social Sciences and Education, Panel on Research on Child Abuse and Neglect. *Understanding child abuse and neglect*. Washington: National Academy Press; 1993. Also available from: URL: <http://www.nap.edu/openbook.php?isbn=0309048893> [cited 2008 Apr 4].
9. Thompson MP, Kingree JB, Desai S. Gender differences in long-term health consequences of physical abuse of children: data from a nationally representative survey. *Am J Public Health* 2004;94:599-604.
10. Haatainen KM, Tanskanen A, Kylma J, Honkalampi K, Koivumaa-Honkanen H, Hintikka J, et al. Gender differences in the association of adult hopelessness with adverse childhood experiences. *Soc Psychiatry Psychiatr Epidemiol* 2003;38:12-7.
11. Lansford JE, Miller-Johnson S, Berlin LJ, Dodge KA, Bates JE, Pettit GS. Early physical abuse and later violent delinquency: a prospective longitudinal study. *Child Maltreat* 2007;12:233-45.
12. Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *Am J Prev Med* 1998;14:245-58.
13. Mersky JP, Reynolds AJ. Child maltreatment and violent delinquency: disentangling main effects and subgroup effects. *Child Maltreat* 2007;12:246-58.
14. Swahn MH, Simon TR, Arias I, Bossarte RM. Measuring sex differences in violence victimization and perpetration within date and same-sex peer relationships. *J Interpers Violence* 2008;23:1120-38.
15. Loeber R, Farrington DP. Young children who commit crime: epidemiology, developmental origins, risk factors, early interventions, and policy implications. *Dev Psychopathol* 2000;12:737-62.
16. Farrington DP, Loeber R. Epidemiology of juvenile violence. *Child Adolesc Psychiatr Clin N Am* 2000;9:733-48.
17. McNutt L, Holcomb JP, Carlson BE. Logistic regression analysis: when the odds ratio does not work, an example using intimate partner violence data. *J Interpers Violence* 2000;15:1050-9.
18. Barros AJ, Hiraakata VN. Alternatives for logistic regression in cross-sectional studies: an empirical comparison of models that directly estimate the prevalence ratio. *BMC Med Res Methodol* 2003;3:21.

- Also available from: URL: <http://www.biomedcentral.com/1471-2288/3/21> [cited 2006 Sep 15].
19. Spiegelman D, Hertzmark E. Easy SAS calculations for risk or prevalence ratios and differences. *Am J Epidemiol* 2005;162:199-200.
 20. Lau AS, Leeb RT, English D, Graham JC, Briggs EC, Brody KE, et al. What's in a name? A comparison of methods for classifying predominant type of maltreatment. *Child Abuse Negl* 2005;29:533-51.
 21. Stouthamer-Loeber M, Wei EH, Homish DL, Loeber R. Which family and demographic factors are related to both maltreatment and persistent serious juvenile delinquency? *Children's Services Soc Pol Res Pract* 2002;5:261-72.
 22. Singer MI, Anglin TM, Song LY, Lunghofer L. Adolescents' exposure to violence and associated symptoms of psychological trauma. *JAMA* 1995;273:477-82.
 23. StataCorp. *Stata SE for Windows: Version 8.0*. College Station (TX): StataCorp; 2003.
 24. Harrison PA, Fulkerson JA, Beebe TJ. Multiple substance use among adolescent physical and sexual abuse victims. *Child Abuse Negl* 1997;21:529-39.
 25. Widom CS. Child abuse, neglect, and violent criminal behavior. *Criminology* 1989;27:251-71.
 26. Widom CS, Maxfield MG. A prospective examination of risk for violence among abused and neglected children. In: Ferris CF, Grisso T, editors. *Understanding aggressive behavior in children*. New York: New York Academy of Sciences; 1996. p. 224-37.
 27. Herrera VM, McCloskey LA. Gender differences in the risk for delinquency among youth exposed to family violence. *Child Abuse Negl* 2001;25:1037-51.
 28. Smith C, Thornberry TP. The relationship between childhood maltreatment and adolescent involvement in delinquency. *Criminology* 1995;33:451-81.
 29. Brener ND, Collins JL, Kann L, Warren CW, Williams BI. Reliability of the Youth Risk Behavior Survey questionnaire. *Am J Epidemiol* 1995;141:575-80.
 30. Bilukha O, Hahn RA, Crosby A, Fullilove MT, Liberman A, Moscicki E, et al. The effectiveness of early childhood home visitation in preventing violence: a systematic review. *Am J Prev Med* 2005;28(2 Suppl 1):11-39.
 31. Hahn R, Fuqua-Whitley D, Wethington H, Lowy J, Liberman A, Crosby A, et al. The effectiveness of universal school-based programs for the prevention of violent and aggressive behavior: a report on recommendations of the Task Force on Community Preventive Services. *MMWR Recomm Rep* 2007;56(RR-7):1-12.