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Do Attention Deficit Hyperactivity Disorder and Oppositional Defiant Disorder Influence Preschool Unintentional Injury Risk?

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Abstract

Purpose—This study explores the relationship between preschool attention deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), injury risk-taking behavior, and unintentional injury.

Method—Emergency department case control study of parent reported child behavior.

Findings—Children with ODD and ADHD had significantly more injury risk-taking behaviors (OR=7.68, 95% CI 2.25–26.25, OR 4.87, 95% CI 1.17–20.28 respectively) and injured children had a 17-fold increase in high risk-taking behaviors (OR 17.2, 95% CI 2.14–138.0). No significant association existed between ODD or ADHD and ED-treated unintentional injury.

Implications—Disruptive behavior disorders are not major contributors to ED-treated unintentional injury in preschool children.

Keywords

ADHD; ODD; Behavior; Preschool; Injury

Introduction

Unintentional injury is a significant cause of childhood morbidity and mortality. In 2001, almost 2,700 children under the age of five years died from unintentional injury, and almost 2.4 million children sustained a nonfatal unintentional injury; a finding roughly equivalent to 46,000 child nonfatal injuries every week or 6,600 injuries each day (Vyrostek, Annett, & Ryan, 2004). Unintentional injury results in more preschool deaths than the next five leading causes combined (Anderson, Minino, Fingerhut, Warner, & Heinen, 2004). The Centers for Disease Control and Prevention (CDC) estimate that in 2000, more than 5.7 billion dollars were spent on injury related medical expenditures for children under 10 years-old (Finkelstein, Fiebelkorn, Corso, & Binder, 2004). Injury research involving preschoolers is important because children from this age group have unique cognitive and physical abilities that result in decreased capacity to identify and modify injury risk. In addition, children under the age of

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five years experience higher injury rates and are more likely to suffer serious injury outcomes than their older peers (Ballesteros, Schieber, Gilchrist, Holmgreen, & Annest, 2003).

There are a number of risk factors for home injury in toddlers and preschoolers. Gender accounts for the greatest injury risk attributable to child characteristics. After the age of two years, males have higher injury rates, and are more likely to sustain serious injury (Morrongiello, Ondejko & Littlejohn, 2006). Low socioeconomic status has frequently been associated with increased injury rates in children (Anderson, Minino, Fingerhut, Warner, & Heinen, 2004; Vyrostek, Annest, & Ryan, 2004), however, according to Berger (1985), socioeconomic status may actually be translated into differences in the neighborhood, home, and social environments in addition to the personal impact of poverty.

Many consider children with disruptive behavior and attention problems vulnerable to unintentional injury because increased risk-taking behavior results in increased exposure to hazardous situations (Bijttebier, Vertommen, & Florentie, 2003; Farmer, & Peterson, 1995; Rowe, Maughan, & Goodman, 2004). This risk is believed to be attributable to the cognitive and behavioral changes that result from these disorders that negatively impact the child's ability to appraise the likelihood of injury and to take appropriate steps to avoid injury hazards (Farmer & Peterson). Childhood unintentional injury studies reveal inconsistent findings of the influence of attention deficit/hyperactivity disorder (ADHD) and oppositional defiant disorder (ODD) as specific behavior disorders on injury outcomes (DiScala, Lescohier, Barthel, & Li, 1988; Katrivanou, Lekka, & Beratis, 2004; Rowe et al.; Schwebel, Speltz, Jones, & Bardina, 2002). Research about ADHD and ODD as injury risk contributors is more likely to find a significant relationship in retrospective, clinic-based studies, and in children receiving treatment with psychopharmacologic medications. This risk difference is not noted in prospective and community studies or in milder cases that do not require medical attention or pharmacologic management (Wazana, 1997). School age and adolescent children with ADHD are more likely to sustain a head injury, to be disabled, to injure multiple body regions, and to require intensive care treatment when injured than their non-ADHD affected peers (DiScala et al.; Guevara, Lozano, Wickizier, Mell, & Gephardt, 2001; Leibson, Kaustic, Barbaresi, Ransom, & O'Brien, 2001).

The relationship between disruptive behavioral problems and injury in preschool children is even more inconsistent, as most studies sample school age and adolescent children. A recent study of 48 preschoolers established that preschool children with ADHD have increased injury risk-taking compared to their non-affected peers ($X^2 = 17.04$ (1df), $p < 0.001$) (Byrne, Bawden, Beattie, & DeWolfe, 2003). But the increase in injury risk-taking did not translate into increased rate of ED treated injury or more serious injury than in comparison children (Byrne et al., 2003). This study is a significant contribution to the understanding of preschool injury, but is limited by a small sample size with a predominantly high or high-average sociodemographic profile (48%), and the exclusion of children with ODD symptoms, a common co-morbidity with ADHD.

Since preschool children have higher injury rates than their older peers, and ADHD and ODD are some of the most common childhood-onset psychiatric disorders, it is important to clearly establish the role of disruptive behavior in injury occurrence as an important step in injury control. This present investigation serves to extend the understanding of the influence of disruptive behavior disorders (specifically ADHD and ODD) and injury risk-taking behavior on unintentional injury in a sample of 25 to 59-month-old children.

Methods

This case-control study explores the relationship between the presence of preschool symptoms and diagnosis of ADHD and ODD, frequency of risk-taking behavior, and unintentional injury.

Participants

Study participants were parents of 25 to 59 month-old children who presented to the Emergency Department (ED) at a Midwestern children's hospital between April and August 2004. This large, urban teaching hospital has more than 50,000 ED visits annually. Comparison children presented with an unintentional injury and controls presented with a non injury-related diagnosis such as an upper respiratory tract infection (see Table 1). Controls were excluded if they had a chronic medical condition that impaired mobility, or a medically attended unintentional injury in the previous six months. Children and parents with reported mental retardation or psychosis, parents who spoke English as a second language, and children who sustained intentional injuries or injuries that were suspicious of resulting from abuse were excluded. Controls were matched to the injured comparison children as shown in Table 1 with respect to age, race, and sex.

Procedures

Trained undergraduate students participating in a research course completed initial screenings of potential participants in the ED. Participation screening included obtaining parental informed consent to review medical records to determine study eligibility and to mail the study questionnaire. Within one week of the ED treatment, the investigators mailed the parents the study questionnaire, a follow-up informed consent form, and a pre-paid envelope addressed to the first author for the questionnaire's return. Parents were telephoned approximately five days after the mailing to address any questions about the protocol and the informed consent process. Follow-up questionnaires were sent three weeks after the initial mailings. There was no direct contact with the child. All sociodemographic data were obtained from the study questionnaire and not from the ED record review.

Emergency Department (ED) screenings were completed for 304 preschool children. One hundred twenty-four responses were received, resulting in a 41% response rate. In order to limit the confounding attributable to child case status (case versus comparison child), age, gender and race, these 124 children were case matched resulting in a final sample size of 93 children.

Human Subjects Protection—The Institutional Review Board (IRB) at the Washington University School of Medicine and the Research Board of St. Louis Children's Hospital approved this study. A Certificate of Confidentiality was obtained from the National Institute for Mental Health before data collection. All parents provided written, informed consent during the ED visit and again before study questionnaire completion. All data were collected and recorded using anonymous personal identifiers. All families were sent a small thank you gift valued at approximately \$3.50 with the first mailing.

Measures

Questionnaires were personalized with the first name of the child seen in the ED to limit the amount of parental confusion in case the parent had more than one child in the home. Parents completed the Injury Behavior Checklist (IBC) and the Strengths and Weaknesses of ADHD-symptoms and Normal-behavior Scale (SWAN) (Cornish et al., 2005; Speltz, Gonzales, Sulzbacher, & Quan, 1990; Swanson et al., 2005). Sociodemographic data were also collected.

Injury Behavior Checklist—The Injury Behavior Checklist (IBC) is a parental-report questionnaire containing 24 items describing behaviors that increase preschool injury risk (Speltz et al., 1990). Parents report how often their child engaged in risky behaviors or sustained minor injuries during the previous six months (for example, jumps down stairs). The descriptive statements on the five-point Likert scale are: (0) not at all, (1) very seldom- i.e., once or twice, (2) sometimes- i.e., once a month, (3) pretty often- i.e., once a week, and (4) very often- i.e., more than once a week. The IBC score is a summary score with scores ranging from 0 to 96. Higher scores indicate greater frequency of risk-taking behaviors. The IBC has established reliability in children over the age of two years (internal consistency = 0.87–0.91; one month test-retest correlation $K = 0.81$) (Bijttebier et al., 2003; Kennedy & Lipsitt, 1998; Kennedy & Rodriguez, 1999; Potts, Martinez, & Dedmon, 1995). The IBC has acceptable discriminate ability for children with two or more documented injuries compared to those with fewer injuries ($p = 0.001$) and its scores correlated with a past history of minor injury in two to five year-old children (Morrongiello & House, 2004; Speltz et al.).

SWAN—The Strengths and Weaknesses of ADHD-symptoms and Normal-behavior scale (SWAN) contains 27 items that correlate with the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria for ADHD (predominantly inattentive, predominantly hyperactive and combined types) and ODD (American Psychiatric Association, 2000; Cornish et al., 2005; Swanson et al., 2005). On this measure, parents rate their child's behavior, in comparison to other children of the same age, on a 7-point scale (far below = 3, below = 2, a little below = 1, average = 0, a little above = -1, above = -2, far above = -3). The SWAN includes a 9-item subscale of inattentive ADHD symptoms, a 9-item subscale of hyperactive-impulsive ADHD symptoms, and a 9-item subscale of ODD symptoms. This instrument has established reliability and validity in preschoolers and is used in pediatric settings to screen for ADHD and in studies of genetic influences on ADHD (Swanson et al.). In this study, internal consistency is established by a Chronbach's alpha of 0.96.

Data Analysis

Statistical analyses were conducted with the SAS Version 9.0 software package. Children were considered to have a positive response on the SWAN items if the parents marked "a little below", "below", or "far below" (Swanson et al, 2005). Questionnaire-derived diagnosis of ODD was made if the child scored positive on four out of the nine ODD subscale items (American Psychiatric Association, 2000). Questionnaire-derived diagnosis of predominantly hyperactive-impulsive ADHD and predominantly inattentive ADHD was made if the child met six or more ADHD items on the appropriate subscale, but fewer than six on the other ADHD scale (American Psychiatric Association). Questionnaire-derived diagnosis of combined type ADHD was made if the child met six or more inattentive and six or more hyperactive-impulsive subscale items (American Psychiatric Association). Since less than five children were diagnosed with combined or inattentive ADHD, all the children with a questionnaire-derived ADHD diagnosis were reclassified into the any ADHD subgroup category. SWAN individual items and the questionnaire-derived diagnosis of hyperactive-impulsive ADHD, any ADHD subtype, and ODD were entered into univariate (unadjusted odds ratios) and multivariate (adjusted odds ratios) logistic regression to determine their association with injury status (Kelsey, Whittemore, & Thompson, 1996). Child age, sex, annual family income, parental marital status, child and parental race, insurance type, and parental level of education were analyzed as categorical variables. These categories are shown in Table 3.

Children were classified as high injury risk takers if they scored greater than one standard deviation above the mean score for the sample (IBC score ≥ 39). Analysis of variance and both adjusted and unadjusted logistic regressions were conducted to determine the association

between the ADHD and the ODD diagnoses, demographic characteristics, injury status, and injury risk-taking classification.

Because analysis of case control studies is particularly vulnerable to confounding from differences between control and comparison subjects, respondent injured and control children were pair matched. Pair matching was performed on the known demographic contributors to childhood injury: age, gender and race.

Results

Participants

Subject eligibility screenings were completed for 304 children. Of the 304 questionnaires sent to study eligible participants, 124 parents (41%) responded. Table 2 contains information about the demographic characteristics and injury status (i.e., injured comparison vs. control) of responders and non-responders. Non-responders were more likely to be African American and to have Medicaid than responders. Responders were more likely to be Anglo American, and to have private medical insurance than the general ED population (see Table 2).

In order to limit confounding due to the known injury risk factors of age, gender and race, the sample of 124 respondents were case matched on these variables resulting in a final sample size of 93 children (47 injured and 46 controls). All of the controls in this study were seen in the ED for conditions manageable in primary care settings (see Table 1). Falls were the most common injury mechanism and lacerations the most common injury type. Fifty-six percent of the injuries occurred in the child's primary residence, and 14% occurred at a daycare or sitter's home.

Table 3 includes sociodemographic characteristics of the matched comparison children and controls. The reporting parents were an average of 32 years old (median 32 years) with a range of 19 to 70 years. Approximately half of the parents were married (48%). There was no association between parental marital status and child injury risk. Forty-seven percent of the children and 52% of the parents were Anglo American. Forty-three percent of children and 43% of parents were African American. The most common annual family income reported was under \$20,000 (32%), and most parents (57%) reported having a high school education or a GED as their highest level of education. There was no association between parental education and family income and risk of being injured (see Table 3).

As expected in a matched sample, there were no injury risks associated with child age or race (see Table 3). The mean child age was 41.1 months (SD 10.1). Twenty-nine (62%) of the comparison children and 30 (64%) of the controls were male, and there was no injury risk associated with child sex (OR 1.16; 95% CI 0.05–2.71).

The influence of ADHD and ODD—Ten children met questionnaire-derived DSM-IV criteria for ADHD. Two children (1%) met predominantly inattentive subtype ADHD criteria. Two children (1%) met combined subtype ADHD criteria. Six children (6%) met hyperactive-impulsive ADHD diagnostic criteria. Male sex did not increase the likelihood of having any ADHD subtype (OR 1.50; 95% CI 0.50–4.48) or hyperactive-impulsive ADHD (OR 1.04; 95% CI 0.32–3.41).

Children who met criteria for any of the ADHD subtypes were nine times more likely to have questionnaire-derived ODD than their non-affected peers (OR 9.06; 95% CI 2.12–38.75). Children with hyperactive-impulsive ADHD and children with any of the ADHD subtypes (including hyperactive-impulsive ADHD) were no more likely to be injured than their non-affected peers (see Table 4).

Twenty-four children (26%) met questionnaire-derived DSM-IV ODD criteria. Logistic regression analysis revealed no significant association between ODD and risk of being in the injured group in univariate and multivariate analyses (see Table 4). None of the oppositional defiant subscale items were associated with increased risk of being injured.

Parents also reported their child's number of lifetime ED visits for injury-related reasons. There were no differences in lifetime ED injury treatment for children with any ADHD subtype or ODD compared to their non-affected peers (data not shown).

Injury behaviors—Observed IBC scores ranged from 0 to 69 with a mean score of 25 and a median score of 24 (SD 14.14). Using the cutoff of 39, 14 children were classified as high injury risk-taking. Only one child classified as high injury-risk taking was in the non-injured group; resulting in a 17-fold risk increase in injured children being classified as high injury risk-takers (OR 17.206; 95% CI 2.15–138).

Table 4 contains the results from the logistic regression analysis of the relationship between high risk-taking behavior, child sex, and ADHD/ODD diagnosis. Parental education, parental marital status, annual family income, and child/parent race did not significantly influence injury risk-taking. Children with ADHD and children with ODD had significant increases in the likelihood of being high risk-takers (see Table 4). Male sex had no independent effect on high risk-taking.

Discussion

Falls are the leading cause of ED-treated injuries for children younger than five years (CDC, 2004; Quinlan et al., 1999). Lacerations and superficial soft tissue injuries (such as contusions and abrasions) are the most common type of ED-treated injuries (Spady, Saunders, Schopflocher, & Svenson, 2004). For those under 14 years, the head and neck, followed by the upper arm/hand, are the most common locations of nonfatal injuries (CDC, 2004). The current results are consistent with these studies and indicate that the children in this sample reflect the general ED-treated injury population.

Previous studies demonstrate that school-age children with ADHD are more likely to sustain injuries to multiple body areas, to have more severe injuries that result in increased hospital stays, and to be at increased risk of disability following injury (DiScala et al., 1998). Results from this study show that there are definite associations between the frequency of injury risk-taking behaviors and ODD in preschool children. However, there were no significant relationships between preschool ADHD and ODD diagnosis/symptoms and both current and lifetime ED treated unintentional injury. This may be attributable, in part to the impulsivity, oppositionality and hyperactivity that occur developmentally in children from this age group. As such, these results suggest that the presence of excessive amounts of oppositionality, hyperactivity, and impulsivity that meet diagnostic thresholds do not confer additional injury risk beyond the developmentally expected spectrum of these behaviors. A recent study of preschool children with ADHD by Byrne et al. (2003) concurs with these findings. These authors demonstrated that children with ADHD had increased injury risk-taking (measured with the IBC) compared to their non-affected peers ($X^2 = 17.04$ (1df), $p < 0.001$), but the increase in injury risk-taking did not translate into increased rate of ED treated injury (Byrne et al, 2003).

Injury risk-taking behaviors resulted in a significantly greater risk of having an ED treated injury. This is an important finding in this age group because parents typically use active supervision to physically restrict their children during the first two years of life, and then transition into teaching children about injury risk and using more passive parenting strategies

by age three (Garling & Garling, 1995). Prior research establishes that preschool children remember approximately 40% of home safety rules, and parents tend to overestimate preschool children's knowledge of safety rules while relying on the child's ability to manage risky situations (Morrongiello, & Dawber, 1998; Morrongiello, Midgett, & Shields, 2001; Peterson, Mori, & Scissors, 1986; Rosen & Peterson, 1990; Spady et al., 2004). Decreased active parental supervision, the presence of injury risk-taking behaviors, and a child's inability to remember safety rules each result in increased likelihood of preschool injury, and may combine to augment injury risk.

Differences in parental supervision between younger and older children may also account for some of the injury risk differences between preschoolers and older children with ADHD and ODD. Whereas younger children may have adult supervision effect modification of injury risk caused by impulsivity, hyperactivity, or oppositionality, school-age children spend more time unsupervised. Therefore, older children with ADHD and ODD may be more likely to be injured because of the combination of their altered behavior and decreased parental supervision.

Limitations

These findings are based on parent-report, so self-selection biases that are inherent to mailed questionnaire study designs may exist. Parents with children who are high injury-risk takers may have been more motivated to complete and return the questionnaires. Parents who perceive their children not to be at risk of injury may have chosen not to participate.

Potential bias of social desirability may have resulted in under-reporting of child behaviors on the SWAN and IBC. These biases, if present, would lead to more conservative estimates of the influence of injury-risk taking and ADHD/ODD symptoms on injury outcomes. Given that the prevalence of ADHD and ODD in this study is similar to that reported in community samples, and given the high significance of the relationship between IBC scores and injury classification, these potential biases appear to have minimal impact on this study's results (American Psychiatric Association, 2000).

Low response rate may have introduced responder bias resulting in the potential of attenuating or exaggerating effect sizes. There were differences between responders and non-responders in this study. Comparison children were more likely to respond to the study questionnaires. Therefore, these findings may not reflect the full spectrum of ED-treated unintentional injury. However, race, insurance type, and other demographic characteristics were controlled for, at least in part, by matching of controls to injured children. The findings related to the types, locations, and mechanisms of injury from this sample are comparable to national ED-treated injury studies and indicate that this sample may be representative of the injured ED population.

Finally, this study is based on differences between injured and non-injured children who present for ED treatment. Therefore, the conclusions drawn from these results may not be applicable to injuries treated in other settings or to injuries that do not result in medical treatment. As injuries treated in EDs are typically more severe than those treated at home or in primary care settings, further studies are needed before these findings can be generalized to the full range of unintentional injury.

Clinical Implications

Disruptive behavior disorders alone do not appear to be significant predictors of ED-treated unintentional injury in this age group. In addition, further research is needed to test the hypothesis that a combination of parent factors (parent's psychopathology and decreased active supervision) and child factors (disruptive behavior disorders, injury risk-taking behaviors, and

the developmental ability to remember safety rules) may come together uniquely during early childhood to result in increased injury risk.

One of the strengths of the current study is that data regarding ADHD and ODD diagnosis are based on parent-reported symptoms and is consistent with DSM-IV criteria for these disorders despite being questionnaire-derived (American Psychiatric Association, 2000). Many of the published studies of ADHD/ODD and unintentional injury classified children with ADHD and ODD are based upon report of clinical diagnosis and/or stimulant medication use. Therefore, the conclusions from this study are not limited by use of a sample of children with severe enough behavioral symptoms to reach clinical attention or to require medication treatment.

In summary, the present report focuses on the contribution of ADHD/ODD and risk-taking behaviors to unintentional injury in children who present to an emergency department. The expected association between ADHD/ODD and increased risk-taking was found. However, this association did not translate into increased likelihood of injury. Although these are contributors to unintentional injury in the older children and adolescents, this study does not support ADHD and ODD as significant for increased unintentional injury risk during the preschool years.

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Table 1
Reasons for ED visit for Injured Children and Controls

ED Visit	Number	Percent
Diagnosis - Controls (n=46)		
Respiratory tract infections	13	28%
Infectious disease	10	22%
Gastrointestinal disorder	9	20%
Dermatological condition	8	17%
Other (3 categories combined)	6	13%
Diagnosis – Injured Children (n=47)		
Laceration	20	20%
Musculoskeletal trauma	4	4%
Fracture	7	7%
Burn	3	3%
Soft tissue swelling	3	3%
Foreign body	3	3%
Other (10 categories combined)	7	7%
Injury Mechanism – Injured Children (n=47)		
Fall	27	27%
Struck by/against object	4	4%
Pinched by/stuck in object	5	5%
Burn	3	3%
Dog bite	1	1%
Other (6 categories combined)	6	6%
Injury Location – Injured Children (n=47)		
Face/head	20	20%
Arms/hands	14	14%
Legs/feet	6	6%
Other (9 categories combined)	7	7%

Note. N=93.

Table 2
Demographic Characteristics of Responders and Non-responders

Demographic characteristics	Responders (n=124)	Non-responders (n=178)	Responders vs. Non-responders
Child's sex			
Female	75 (60%)	82 (46%)	$X^2 = 1.08$ (1df); $p=0.30$
Male	49 (40%)	98 (54%)	
Child's age (in months)			
25–35 months	47 (38%)	58 (32%)	$X^2 = 2.12$ (2df); $p=0.35$
36–47 months	39 (31%)	71 (40%)	
48–59 months	38 (30%)	51 (28%)	
Child's race			
African American	51 (41%)	129 (72%)	$X^2 = 26.9$ (1f); $p<0.001$
Anglo American	62 (50%)	42 (23%)	
Insurance type			
Private	56 (45%)	45 (25%)	$X^2 = 21.28$ (1df); $p<0.001$
Medicaid	55 (44%)	127 (71%)	
Injury classification			
Control	50 (40%)	89 (50%)	$X^2 2.46$ (1df); $p=0.12$
Comparison (injured)	74 (60%)	91 (50%)	

Note. Percentages do not equal 100% because of missing values.

Table 3

Demographic Characteristics of Matched Sample (n=93)

Demographic Characteristics	Injured children (n=47)	Controls (n=46)	Odds Ratio [†]	95% CI
Child's age (in months)	(Mean=41.1, Median=41.0, SD=10.1)			
	25-35	19 (40%)	Reference	
	36-47	13 (28%)	1.23	(0.43-3.51)
	48-59	15 (32%)	0.79	(0.31-2.02)
Child's race				
	African American	25 (54%)	Reference	
	Anglo American	20 (43.5%)	1.94	(0.83-4.71)
	Other	1 (0.02%)	3.00	(0.65-13.76)
Child's sex				
	Male	29 (62%)	1.16	(0.05-2.71)
	Female	18 (38%)	Reference	
Parent's race				
	African American	23 (49%)	Reference	
	Anglo American	21 (45%)	1.74	(0.75-4.06)
	Other	3 (10.1%)	2.03	(0.31-13.5)
Insurance Type				
	Private	22 (47%)	Reference	
	Medicaid	23 (49%)	0.83	(0.36-1.92)
	Other	1 (0.02%)	0.86	(0.05-14.77)
Parent's highest completed level of education				
	Middle school	3 (0.07%)	Reference	
	High school/GED	27 (57%)	3.12	(0.30-31.9)
	College degree	13 (28%)	4.33	(0.39-48.61)
	Graduate school	6 (13%)	3.0	(0.24-37.67)
Annual family income				
	Under \$20,000	15 (32%)	Reference	
	\$20K-\$39,999	8 (17%)	2.4	(0.61-9.49)
	\$40K-\$59,999	7 (15%)	1.75	(0.45-6.77)
	\$60K-\$79,999	5 (11%)	1.07	(0.26-4.34)
	\$80K-\$99,999	5 (11%)	1.88	(0.40-8.74)
	Over \$100,000	5 (11%)	3.75	(0.61-23.25)

Note. Percentages do not equal 100% because of missing values. N=93.

[†]Odds of being in the injured class.

Table 4
Association Between ADHD, ODD, High Injury Risk-Taking & ED-Treated Unintentional Injury

Groups	Injured Children (n=47)	Controls (n=46)	Odds Ratio	95%CI
		Behavioral Group [*]		
Hyperactive-Impulsive ADHD	4 (9%)	2 (4%)	2.05	(0.36–11.76)
Any ADHD Subtype	6 (13%)	4 (9%)	1.54	(0.40–5.85)
Oppositional Defiant Disorder	15 (32%)	9 (20%)	1.93	(0.74–5.0)
High Injury Risk- taking	13 (28%)	1 (2%)	17.2	(2.15–128) [†]
		High Injury Risk-Taking [*]		
Hyperactive-Impulsive ADHD	2 (4%)	0 (0%)	3.13	(0.52–18.97)
Any ADHD Subtype	4 (8%)	0 (0%)	4.87	(1.17–20.3) [#]
Oppositional Defiant Disorder	8 (17%)	1 (2%)	7.68	(2.25–26.25) [†]
Male Sex	7 (15%)	1 (2%)	0.73	(0.23–2.32)

^{*} Note. Odds of being in the injured class

[†] $p \leq 0.007$

[#] $p \leq 0.03$