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Factors Associated With Bullying Victimization and Bullying Perpetration in Children and Adolescents With ADHD: 2016 to 2017 National Survey of Children’s Health

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Abstract

Objective: To identify characteristics associated with bullying involvement in pediatric ADHD.

Methods: Data from the 2016 to 2017 National Survey of Children’s Health for children aged 6 to 17 years with ADHD were evaluated to assess the association between parent-reported bullying victimization or perpetration and the following potential predictors: demographic characteristics, family factors, school factors, and child conditions/behaviors.

Results: Among children with ADHD, 46.9% were bullying victims and 16.2% were perpetrators. Factors associated with victimization included having family financial strain, developmental delay or intellectual disability, friendship difficulties, and school reports about problems. Factors linked to perpetration included being male, receiving government assistance, lack of school engagement, school reports about problems, and having difficulties with friendships, staying calm, and arguing.

Conclusions: Children with ADHD frequently were bullying victims and sometimes bullying perpetrators. Factors related to family financial strain, developmental disabilities, emotional regulation, peer relationships, and school functioning may help to identify risk for bullying and opportunities for anti-bullying interventions.

Keywords

ADHD-associated problems; bullying; behavioral interventions

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Supplemental Material

Supplemental material for this article is available online.

Introduction

Bullying (defined as experiencing unwanted, purposeful, repeated aggression over time involving a power imbalance by one or more people (Gladden et al., 2014; Olweus & Limber, 1983)) is a serious public health problem occurring more commonly in children with ADHD than in the general pediatric population. Bullying involvement can include being a bullying victim (BV) or bullying perpetrator (BP) or both BV and BP (Chou et al., 2018); some studies have shown bullying involvement rates as high as 58% in children with ADHD versus 35% in the general population (Chou et al., 2018; Fogler et al., 2022; Wiener & Mak, 2009). ADHD and bullying involvement share heightened risk for a range of negative outcomes—including impaired peer relationships, poor academic performance (Grygiel et al., 2018; Oliveira et al., 2018; Van Cleave & Davis, 2006), mental health disorders, and substance abuse (Craig & Pepler, 2003; Houbre et al., 2006; Kumpulainen et al., 1998)—underscoring the need for bullying prevention programs in this vulnerable population (Taylor et al., 2010).

Identifying and targeting factors that are associated with an increased prevalence of BV or BP in children with ADHD could inform the development of effective interventions. However, prior studies of bullying involvement and ADHD with severity and treatment-related factors have been inconclusive. For example, some studies have found no association between ADHD symptom severity and bullying involvement (Chou et al., 2018; Efron et al., 2021; Fite et al., 2014; Verlinden et al., 2015), while other studies report that children with severe ADHD symptoms are more likely to be perpetrators, as well victims, of bullying (Holmberg & Hjern, 2008; Yang et al., 2013; Yen et al., 2014). The relationship between ADHD medication treatments and BV or BP is similarly unclear (Efron et al., 2021). Some studies indicate that taking medications is associated with a greater risk for bullying (Epstein-Ngo et al., 2016; Unnever & Cornell, 2003). In contrast, other studies showed that stimulants can decrease negative social behaviors (Whalen et al., 1989) and protect against negative functional social outcomes such as criminality (Boland et al., 2020), although these studies did not specifically evaluate the link between bullying involvement and ADHD medications. Little is known whether ADHD behavioral treatment impacts bullying involvement. In samples of typically developing children, a number of demographic as well as child, family, and school-related factors have been linked to increased BV rates. Some BV risk factors in general pediatric samples such as presence of internalizing and other mental disorders, developmental and learning disorders, and lack of supportive friends (Adams et al., 2011; Aguado-Gracia et al., 2021; Bacchini et al., 2008; Cardoos & Hinshaw, 2011; Lebrun-Harris et al., 2019) are also associated with increased risk of BV in children with ADHD (Becker et al., 2016; Cardoos & Hinshaw, 2011; Fogler et al., 2022; Wolke & Lereya, 2015). However, other characteristics appear to portend differential risk for children with and without ADHD. For example, in the general population, boys tend to have higher rates of BV than girls (Melnick & Hinshaw, 2000; Roland & Idsøe, 2001; Steinfeldt et al., 2012), while several studies of children with ADHD found no association with gender (Becker et al., 2016; Chou et al., 2018; Efron et al., 2021; Fogler et al., 2022; Gardner & Gerdes, 2015). In addition, although a meta-analysis of 28 non-ADHD samples found a small increased risk of BV in children with low socioeconomic status, two prior studies

of children with ADHD did not link economic disadvantage and BV (Efron et al., 2021; Tippett & Wolke, 2014). Other factors associated with a higher likelihood of being bullied in samples of children with typical development—such as increased family strain (e.g., living in a single parent household (Flouri & Buchanan, 2003; Shetgiri, Lin, Avila, et al., 2012), adverse parent-child relationships (Burkhart et al., 2013; Chou et al., 2018; Lebrun-Harris et al., 2019; Rajendran et al., 2016; Shetgiri, Lin, & Flores, 2012), parental mental disorders (Arseneault et al., 2010; Chou et al., 2018), and low child engagement in school, work, and the community)—have received scant attention in prior studies of children with ADHD.

Investigators have also been interested in identifying factors linked to bullying perpetration. In samples of children with and without ADHD, an increased risk for BP has been noted in individuals with externalizing disorders, higher levels of anger, learning difficulties, and poor school performance (Fogler et al., 2022; Holmberg & Hjern, 2008; Schnoes et al., 2006; Wiener & Mak, 2009). However, other factors linked to increased BP rates in typically developing samples, such as gender, parental educational attainment, and socioeconomic status, have not been linked to an increased BP risk in studies of children with ADHD (Becker et al., 2016; Chou et al., 2018; Unnever & Cornell, 2003). As with BV, the relationship between BP and measures of family risk, parental mental disorders, and strained family relationships have been the focus of limited previous investigation in children with ADHD (Chou et al., 2018) despite being associated with BP in the general pediatric population.

Given the aforementioned knowledge gaps, we sought to investigate the factors that predicted bullying involvement (both BV and BP) among children with ADHD; specifically the association between bullying and demographic factors, child mental health and behavioral characteristics, child learning and developmental disorders, family factors, and treatment/services receipt in a sample of children with ADHD from the National Survey of Children's Health (NSCH). We hypothesized that (1) BV is associated with co-occurring anxiety or depression, learning/developmental disorders, difficulties with friendship, and high levels of socioeconomic or family strain, and (2) BP is linked to behavioral or conduct problems or other externalizing behaviors, poor school functioning, and high levels of socioeconomic or family strain.

Methods

Sample

To examine the associations of child and family characteristics with BV and BP in children with ADHD, we utilized data from the 2016 to 2017 NSCH ($N = 71,811$). The NSCH is a cross-sectional, nationally representative sample of households with parent/guardians (from here on referred to as *parents*) living in the U.S. who reported on one, randomly selected 0- to 17-year-old per household. Weighting procedures were conducted to account for non-response, complex sampling, and survey design (Ghandour et al., 2018). Within the 2016 to 2017 NSCH datasets, we focused on 6- to 17-year-olds whose parents indicated that they had a current ADHD diagnosis (by answering affirmatively to: “Has a doctor or other health care provider ever told you that this child has ADHD? Does this child currently have

the condition?” [$n = 5,932$]), comprising 10.2% (95% CI [9.7–10.8]) of the total weighted sample of 6- to 17-year-olds.

Measures

Primary outcomes/dependent variables.—Our primary outcomes/dependent variables of interest were being a (1) BV and (2) BP. BV was assessed by asking parents to rate the phrase “This child is bullied, picked on, or excluded by other children” as being “Definitely true,” “Somewhat true,” or “Not true.” BP was assessed by asking parents to rate the phrase “This child bullies others, picks on them, or excludes them” as being “Definitely true,” “Somewhat true,” or “Not true.” We defined responses of “Definitely true” and “Somewhat true” to indicate the presence of BV or BP (Lebrun-Harris et al., 2019) and created separate “yes/no” dichotomous variables for BV and BP.

Independent variables.—In line with other studies of bullying, the following parent-reported variables were designated a priori for inclusion in all models: age, sex, race/ethnicity, and parent level of education. To identify additional relevant independent variables, we considered a set of candidate NSCH variables that were associated with BV or BP in at least one prior study. The following parent-reported socioeconomic (*SES*) measures were examined: household federal poverty level (FPL; reported household income below vs. over 200% of FPL), receipt of government assistance (any of cash assistance, Supplemental Nutrition Program for Women, Infants and Children [WIC], food stamps, and free or reduced-cost school breakfast/lunch), and family “finds it hard to cover basics like food or housing” (never vs. rarely, somewhat, or very often). The following parent-reported *ADHD and treatment related measures* were examined: ADHD severity (mild, moderate, or severe), current use of ADHD medication, ADHD behavioral treatment in the past 12 months, receipt of treatment by mental health provider, and current use of medications taken because of difficulties with “emotions, concentration, or behavior.” The following parent-reported *comorbidities and behavioral characteristics* were examined: healthcare provider diagnosis of the child ever having behavioral or conduct problems, anxiety/depression (indicating either the presence of anxiety and/or depression), substance abuse disorder, developmental delay and/or intellectual disability, speech or other language disorder, learning disability, autism spectrum disorder, Tourette syndrome, or other genetic or inherited conditions. Parents also reported on externalizing behaviors such as if children had problems staying calm when faced with a challenge, and problems with arguing too much. The following parent-reported *child-centered characteristics* were tested: difficulty making or keeping friends, child has a health condition that affects functioning, school engagement (“child cares about doing well in school,” “does all required homework”), involvement in community service, involvement in paid work, participation in extra school activities, amount of physical activity, time spent watching television/videos or playing video games, and time spent using recreational computers/cell phones/handheld video games. The following parent-reported *family-related factors* were examined: parent marital status, how many times child has moved to a new address, parent attendance at child’s events or activities, and family shared mealtime. Parent-reported *school-related factors* included: number of times a school contacted the household about school problems, perception of child safety at school, child retention in a grade, and having ever had an

early intervention plan such as an Individualized Educational Plan (IEP) or having received special services for developmental needs such as speech, occupational, or behavioral therapy.

Analysis

All analyses were conducted using SAS v.9.4 survey procedures (SAS Institute, Inc.; Cary, NC) and SAS-callable SUDAAN v.11.0.1 (RTI International; Cary, NC) to account for the complex sampling design and sample weights. The variables used to construct the FPL variable had a relatively high percentage of missing data, and thus all analyses with this variable were conducted utilizing six multiply imputed FPL implicates that are included for use in the NSCH public use files and the appropriate analytic procedures to provide accurate estimates and standard errors (Danielson et al., 2018; Lebrun-Harris et al., 2019). All proportions were calculated with Clopper-Pearson confidence intervals. Rao Scott chi-square tests were conducted between each independent variable and the outcomes (BV and BP) to identify bivariate associations. Next, we conducted separate preliminary logistic regressions for the BV and BP outcomes. The four demographic variables of age, sex, race/ethnicity, and parent level of education were selected a priori for inclusion in all adjusted models, with additional independent variables included in these preliminary regression models if they had bivariate associations with *either* BV or BP that had at least a small effect size based on the Cramer's V calculated from the Rao-Scott chi-square test and the associated degrees of freedom; for example, a Cramer's V of 0.10 or higher on a test with one degree of freedom was considered to have at least a small effect size (Cohen, 1988). Finally, variables that were found to be statistically significant at an alpha of .05 in the preliminary logistic regression models to predict the specific outcome (i.e., BV or BP) were retained in the final models for that outcome, along with each of the four demographic variables selected for inclusion a priori.

Bullying victimization and perpetration can occur in the same individual (Adams et al., 2010; Haynie et al., 2001; Perry et al., 1992; Prinstein & Cillessen, 2003; Schwartz, 2000; Schwartz et al., 2001). This is an important subgroup; however, the size of the subgroup of participants who were both victims and perpetrators ($N = 644$; 11.2% of the weighted analytic sample) was not sufficient for separate analysis. To ensure that an individual's status as having both BV and BP did not impact the findings, post hoc analyses were conducted for the final logistic regression models in which the bullying category not used as the outcome was added to the model (i.e., BV models were adjusted for BP and BP models were adjusted for BV).

Results

Sample Characteristics

Overall, we found that 46.9% (95% CI [44.0%–49.8%]) of children and adolescents with ADHD were bullying victims and 16.2% (95% CI [14.1%–18.5%]) were bullying perpetrators. Table 1 shows the weighted frequencies for the bullying indicators and independent variables considered for the regression models. More than half of children with current ADHD (56%) were adolescents aged 12 to 17 years; 44% were aged 6 to 11 years.

A majority of the children (68%) were male, and 58% were non-Hispanic white. Most were from families with financial strain, with 73% endorsing having some difficulty covering basic necessities, and over half receiving one or more types of government assistance. Nearly half (45%) had moved three or more times. Approximately one quarter (26%) had co-occurring developmental delay or intellectual disabilities, and 54% had behavior or conduct problems. Staying calm when faced with a challenge was not true for about 27% and somewhat true for 57% of the study population; 21% were described as definitely and 39% as somewhat arguing too much; and 19% had a lot of difficulty and 37% a little difficulty making friends. Among the children, 19% had a health condition that affected their ability to do things, 8% had low school engagement, and parents of 42% had been contacted two or more times by the school about school problems. The majority (64%) were taking medications for ADHD, while slightly less than half (45%) had received ADHD behavioral treatment.

Results of Bivariate and Preliminary Regression Analyses

Table 2 shows the findings for the Rao-Scott chi-square analyses testing the associations between BV or BP and each independent variable that was included in the final logistic regression models (see Supplemental Table 1 for additional variables). The effect sizes for the Cramer's V met Cohen's criteria for at least a small effect size for 19 variables (10 non-demographic variables in Table 2 and 9 variables in Supplemental Table 1) in their associations with either BV, BP, or both. These 19 variables, along with the four a priori selected demographic variables (sex, race/ethnicity, age, and highest level of parent education) were included in separate preliminary logistic regression analyses for BV and BP. The preliminary logistic regression models identified five significant predictors for bullying victimization (difficulties with basic necessities, developmental disability, difficulty making or keeping friends, health problems affecting the child's ability to do things, and more school contacts to the household) and six significant predictors of bullying perpetration (receipt of government assistance, having problems staying calm, arguing too much, difficulty making friends, reduced engagement/interest in school, and more school contacts to the household), which were entered into the final logistic regression models along with the four a priori selected demographic measures. A factor of particular interest, diagnosis of behavior or conduct problems, for which bullying behavior can be a symptom, was not a significant predictor in the final model, despite a strong unadjusted association particularly for BP.

Factors Linked to Bullying Victimization

The final logistic regression model for BV (see Table 3) yielded four significant predictors: family having a hard time covering basic needs, having a developmental delay or intellectual disability, having difficulty with making or keeping friends, and number of times contacted by school. Specifically, when families found it hard to cover basic needs or the child had a developmental delay or intellectual disability, the odds of being bullied were 1.4 to 1.5 higher, respectively. Additionally, school contact with the household about problems had an association with being bullied: compared to no contact, with one contact, the odds of BV were 50% higher, while odds of BV were double with two or more contacts. Finally, the largest BV associations were found for having difficulty making or keeping friends.

Participants who had a little or a lot of difficulty making or keeping friends had a 4.6-fold and a 16.5-fold higher odds of being bullied, respectively, compared to those with no friendship difficulties. This pattern of results was maintained in the post-hoc analysis that controlled for BP in the BV model.

Factors Linked to Bullying Perpetration

The final logistic regression model for BP (see Table 4) identified seven significant predictors: sex, receipt of three or four types of government assistance, difficulty staying calm, arguing too much, difficulty with friends, lack of interest/engagement in school, and number of times family was contacted by school. Males had almost twice the odds of BP than females. When families utilized three or more types of government assistance, children had a 2.2-fold higher odds of BP compared to those receiving no government assistance. Children who had difficulty staying calm when faced with a challenge had also 2.4 times higher odds of BP than those with no such difficulties. Those who had a little or a lot of difficulty making or keeping friends had 2.7- to 3.0-fold higher odds of BP, respectively, compared to no friendship problems. Those who were reported to either “not care about school” or not do homework had almost twice the odds of BP than those who both cared about school and completed their homework. In addition, children whose families had been contacted two or more times by the school about problems have 2.7 times higher odds of BP than those whose families had no school contacts. Finally, the strongest predictors of BP were found when parents endorsed that it was “somewhat true” or “definitely true” that their child “argues too much,” that is, there were 3.8- to 14.1-fold higher odds compared to children for whom this was rated as “definitely not true.” This pattern of results was also maintained in the post hoc analysis that controlled for BV along with the other factors in the final BP model.

Discussion

Among children with ADHD, 47% were bullying victims and 16% perpetrators, respectively, which was more than double the prevalence for the general population using the same National Survey of Children’s Health dataset and definitions of bullying victimization and perpetration (i.e., 23% for BV and 6% for BP) (Lebrun-Harris et al., 2019). Our results are consistent with previous studies showing that children and youth with ADHD are often victims and sometimes perpetrators of bullying (Fogler et al., 2022; Holmberg, 2010; Unnever & Cornell, 2003). Given the adverse sequelae of both BV and BP, these findings underscore the importance of addressing and preventing bullying in children and youth with ADHD. Our identification of factors linked to bullying involvement in children with ADHD may inform and facilitate the development of effective anti-bullying interventions in this population (David-Ferdon et al., 2016). Similar to studies of general pediatric samples (Melnick & Hinshaw, 2000; Roland & Idsøe, 2001), boys were more likely than girls and younger children were more likely than older children to be bullying perpetrators in our ADHD-specific sample. Prior investigators have postulated that this may be because younger peer groups compared to older adolescent peer groups are more likely to find aggression to be acceptable (Troop-Gordon, 2017) and because peer groups in

general tend to find aggression perpetrated by males to be more acceptable than aggression perpetrated by females (Underwood, 2003).

We found that difficulty covering basic needs portended BV and receipt of government assistance portended BP among children with ADHD. Previous studies have also linked factors indicating family financial strain, such as household food insecurity with bullying in typically developing children and adolescents (Jackson & Vaughn, 2017; Jackson et al., 2018). A possible mechanism for the link between BV and lack of resources in different samples of children (Jackson et al., 2018; Tippett & Wolke, 2014) may be the association of parental stress with harsh punishment and authoritarian parenting (Rajendran et al., 2016), which predisposes children to bullying behavior.

Regarding child-related characteristics, difficulties with self-control when faced with challenges and a tendency toward arguing were both linked to bullying perpetration in our analysis of children with ADHD. Overall, these findings suggest that these two aspects of emotional regulation, which are associated with disruptive behavior disorders and represent common issues for those with ADHD (Arseneault et al., 2010; Fogler et al., 2022; Kaltiala-Heino et al., 2000; Normand et al., 2020; Unnever & Cornell, 2003), are important to consider when addressing bullying perpetration (Fite et al., 2014; Kokkinos & Panayiotou, 2004). Overall, the findings around emotional regulation issues and both BV and BP fit what is known around the particular type of aggression exhibited by those with ADHD, reactive aggression. Reactive aggression is ineffectual and particularly disliked by peers, so such individuals are more likely to perpetuate bullying using this type of aggression and more likely to be the target of bullying since the overall peer group dislikes them (Adams et al., 2010). It may also be that frequent arguing is a marker for problematic family relationships, which set the stage for a problematic style of negotiation with peers and a bully perpetration dynamic (Chou et al., 2018), although our data does not allow for evaluation of this hypothesis. This is the first study to our knowledge which showed both aspects of emotional regulation to be associated with BP when considered in the same model. Interventions for ADHD can address children's confrontational behavior in social situations and support their ability to maintain self-control when faced with adversity.

Among child characteristics, difficulties with making or keeping friends was a significant predictor of both BV and BP among children with ADHD. Children with ADHD are predisposed to problematic peer relationships (Baumeister et al., 2008; Grygiel et al., 2018; Mrug et al., 2012), and thus at an increased risk of bullying victimization. Friendship difficulties were also associated with bullying perpetration, which is in line with previous findings. Specifically, prior studies have shown that aggressive children with other executive functioning issues, like those with ADHD often have, are especially prone to problematic peer relationships and BP (Hinshaw & Melnick, 1995; Jia & Mikami, 2015; Poulin & Boivin, 1999). The findings around the associations between friendship difficulties and BP might also be explained by peer group perceptions of reactive aggression. Given that this type of aggression is ineffectual and particularly disliked by peers, those who use this type of aggression in a bullying manner are less likely to have friends (Adams et al., 2010). It is also notable that many of the factors we identified as predictors of being a bully perpetrator, such as difficulties making friends and emotion regulation difficulties (e.g.,

being argumentative and having difficulties staying calm), are often correlated and part of a general pattern of social dysfunction. However, these cross-sectional data do not allow us to examine the mechanisms by which these factors are related to each other and linked to BP.

We also examined whether co-occurring developmental-behavioral conditions, such as anxiety/depression, substance abuse disorder, developmental delay and/or intellectual disability, speech or other language disorder, learning disability, autism spectrum disorder, or Tourette syndrome, predicted bullying victimization or perpetration. In our final models, none of these conditions were significantly associated with BP, while just one factor—developmental delay or intellectual disability—was independently linked to BV (Baumeister et al., 2008). This association between bullying victimization and having a developmental disability has been shown in several prior studies of ADHD samples as well as in samples of the general population (Baumeister et al., 2008; Lebrun-Harris et al., 2019; Pastor & Reuben, 2015).

Two school-related factors predicted bullying problems in our sample. First, *both* BV and BP were linked to increased contacts with families about problems at school. Second, children who did not care about doing well in school and/or did not do homework had an increased risk of bullying perpetration, echoing previous studies showing an association of BP with lower grades and school absences (Haynie et al., 2001; Kowalski & Limber, 2013; Nansel et al., 2001). This finding highlights the lack of engagement in school as a potentially important risk for bullying perpetration.

While race/ethnicity did not have a significant main effect on either bullying outcome, research on this topic suggests that the associations between race/ethnicity and peer victimization might be too complex to be explained by just simple main effects. One consideration may be that non-white, and particularly African American, children are frequently labeled by teachers as “problem” students, (Riddle & Sinclair, 2019; Staats, 2014) so that any association between race/ethnicity and BV or BP may be obscured or denoted in our analyses by the association between frequent contact from the school about problems and these outcomes. Upcoming studies on this topic should consider the work of Graham, Juvonen, and colleagues (Graham et al., 2009; Juvonen & Graham, 2014) and explore possible mediated and moderated effects in terms of context (e.g., racial/ethnic make-up of the location) and social attributions by the individuals involved in the bullying to better understand the role of race/ethnicity in BV and BP.

Limitations

This study has several limitations. Due to the cross-sectional nature of the survey, inferences about causal relationships or directions of associations between the measures cannot be determined. Additionally, most factors were measured using a single item, based on one reporter, the parent, for all measures, leading to possible shared method variance based on the single approach of data collection. The survey did not provide a definition of bullying, and parents’ perspectives regarding what constitutes bullying victimization or perpetration may have varied, thus limiting the comparability of this study to studies that assess bullying in more detail. Furthermore, parents may have difficulty accurately reporting child experiences for which they are not present, such as bullying experiences at school or

difficulties with friends (Adams et al., 2010; Perry et al., 1992; Prinstein & Cillessen, 2003). They may be unaware or may rely on others to identify if their child is a bullying victim or perpetrator. Future research integrating multiple informants may provide a more complete understanding of children's peer relationships (Normand et al., 2020). The survey also did not address whether children's current type of bullying involvement may be different from past involvement. Parent report of ADHD diagnosis by a healthcare professional is subject to recall error and would exclude children who have ADHD but have not been diagnosed. While post hoc analyses did not find that co-occurrence of BP and BV impacted the individual findings for BP and BV, further studies of individuals with ADHD may benefit from taking a more specific and measured approach given that children who are both victimized and engage in aggression are described as ineffectual and reactive in their aggression, disliked by the peer group, and have high rates of internalizing problems (Fogler et al., 2022; Perry et al., 1992; Prinstein & Cillessen, 2003; Schwartz, 2000; Schwartz et al., 2001).

An additional limitation was based on the variable selection method. While we identified factors that had higher relative contributions to the outcome, we also excluded factors of clinical significance but share variance with other variables that were included. Nine such variables were found to have significant bivariate associations with the bullying variables but were not significant in the preliminary regression analyses that accounted for the variance across all other measures (see Supplemental Table), for example, diagnosis of behavior or conduct problems. Future studies on bullying in ADHD populations should consider these constructs given that they most likely are associated with both bullying indicators and some of the other predictors of bullying issues.

Future Directions for Intervention and Conclusions

Previous studies have shown that pediatricians rarely address bullying (Borowsky et al., 2004). Thus, our findings may help clinicians to recognize youth with ADHD who are most at risk for BV or BP (Jones et al., 2020). For example, we identified several predictors (Adams et al., 2010) for bullying involvement that would be apparent to clinicians, such as having a developmental disability (associated with BV) or being male (associated with BP). During a pediatric visit, providers could also assess other identified predictors, such as having problems with friendships or frequent contact by the school about problems, both of which were linked to BV and BP. Similarly, determining whether a child has problems with school engagement (associated with BP) could also be determined.

Our findings may also inform anti-bullying interventions. To address BV, it is important to both end the victimization and to mitigate its negative sequelae (such as depression and anxiety). Across many studies, friendships are important for protecting children and youth from BV and from negative outcomes (Adams & Cantin, 2013; Adams et al., 2011; Hodges et al., 1997, 1999; Prinstein et al., 2001). Behavioral peer interventions are an evidence-based approach to ADHD treatment that may assist both with managing ADHD symptoms and improving peer relationships (Evans et al., 2014). Further, strategies to improve self-regulation skills so that children can use positive interaction skills and better handle challenging situations have documented evidence for preventing bullying

perpetration (Adamski & Adams, 2008; Bryn, 2011; Espelage et al., 2004; Mersky et al., 2017; Newman-Carlson & Horne, 2004; Saracho, 2017; Stevens et al., 2001). Broader strategies to decrease bullying and prevent youth violence can also be implemented (David-Ferdon et al., 2016; HHS, 2017). For example, professionals can coach parents to work with school officials to prevent bullying using current anti-bullying tools (see <https://www.stopbullying.gov/> for resources) (Bryn, 2011).

Given that ours and prior studies have linked family financial strain to bullying perpetration, and economic support has demonstrated positive impacts on children's mental health (Robinson et al., 2020), future research could investigate the impact of family economic supports on decreasing bullying involvement. Since additional ACEs other than those around financial strain (e.g., various forms of abuse) have also been shown to be associated with bullying (HHS, 2017; Mersky et al., 2017), it may be important to examine their roles as well when addressing bullying and pinpointing groups who may benefit from targeted resources, interventions, and support. Overall, future research is needed to investigate the extent to which population-based approaches are effective for, or could be modified to be more effective for, addressing bullying involvement among children with ADHD.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Disclaimer

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Table 1.

Frequencies and Weighted Proportions of Factors Associated With Bullying Involvement Among Children aged 6 to 17 Years With Current ADHD, National Survey of Children's Health, 2016 to 2017.

Study measures	Children with current ADHD	
	<i>n</i>	Weighted proportion % (95% CI)
Bullying outcome variables		
Child is bullied/excluded		
No	3,053	53.1 (50.2–56.0)
Yes	2,774	46.9 (44.0–49.8)
Child bullies/excludes others		
No	4,993	83.8 (81.5–85.9)
Yes	843	16.2 (14.1–18.5)
Demographic factors		
Age		
6–11 years	2,285	44.4 (41.6–47.3)
12–17 years	3,647	55.6 (52.7–58.4)
Sex		
Male	4,039	68.4 (65.5–71.2)
Female	1,893	31.6 (28.8–34.5)
Ethnicity and race		
Non-Hispanic White	4,364	58.1(55.0–61.1)
Non-Hispanic Black	407	16.5 (14.1–19.3)
Non-Hispanic Other	565	6.9 (5.9–8.1)
Hispanic/Latino	596	18.5 (15.7–21.5)
Highest level of education in the household		
No college	1,013	31.2 (28.0–34.5)
Some college or higher	4,806	68.8 (65.5–72.0)
Socioeconomic status characteristics		
Family poverty level (FPL) ^a		
Less than 200% FPL	4,033	53.1 (50.1–56.1)
More than 200% FPL	1,899	46.9 (43.9–49.9)
Hard to cover basics		
Never	1,883	27.5 (25.0–30.1)
Any	3,941	72.5 (69.9–75.0)
Receipt of government assistance		
None	3,760	47.7 (44.9–50.5)
1–2 types	1,735	42.7 (39.7–45.6)
3–4 types	230	9.7 (7.4–12.3)
Family-Related Factors		
Times moved to a new address		
0 times	1,375	20.6 (18.1–23.1)
1–2 times	2,064	34.9 (32.1–37.6)

Study measures	Children with current ADHD	
	<i>n</i>	Weighted proportion % (95% CI)
3 or more times	2,259	44.5 (41.7–47.3)
Parent attends child events or activities		
Always/Usually	4,862	79.2 (76.7–81.5)
Sometimes	461	10.6 (8.7–12.6)
Rarely/Never	492	10.3 (8.7–12.0)
Family eats meals together		
0 day	307	5.3 (4.1–6.7)
1–3 days	1,741	28.2 (25.4–31.1)
More than 4 days	3,815	66.6 (63.6–69.4)
Comorbidities ^b and behavioral characteristics		
Developmental delay and/or intellectual disability		
None	4,421	73.8 (71.4–76.2)
> 1	1,475	26.3 (23.8–28.8)
Behavior or conduct problems		
Yes	3,053	54.4 (51.5–57.2)
No	2,850	45.6 (42.8–48.5)
Speech or other language disorder		
Yes	1,075	20.3 (17.9–22.9)
No	4,837	79.7 (77.1–82.1)
Learning disabilities		
Yes	2,208	39.8 (37.0–42.7)
No	3,693	60.2 (57.3–63.0)
Autism spectrum disorder		
Yes	777	14.7 (12.3–17.2)
No	5,130	85.3 (82.8–87.7)
Tourette syndrome		
Yes	89	1.4 (0.9–2.0)
No	5,825	98.6 (98.0–99.1.)
Other genetic or inherited condition		
Yes	825	15.3 (13.4–17.4)
No	5,076	84.7 (82.6–86.6)
Anxiety or depression		
Yes	2,554	41.0 (38.2–43.9)
No	3,343	59.0 (56.1–61.8)
Substance abuse disorder		
Yes	82	1.1 (0.7–1.6)
No	5,761	98.9 (98.4–99.3)
Child-Centered Factors		
Stays calm when faced with a challenge		
Definitely true	972	16.0 (14.1–18.1)
Somewhat true	3,455	57.4 (54.5–60.3)

Study measures	Children with current ADHD	
	<i>n</i>	Weighted proportion % (95% CI)
Not true	1,404	26.6 (23.9–29.3)
Argues too much		
Definitely true	1,212	20.9 (18.8–23.1)
Somewhat true	2,244	38.7 (35.5–41.8)
Not true	2,388	40.4 (37.7–43.2)
Difficulty making or keeping friends		
No difficulty	2,578	44.1 (41.3–46.9)
A little difficulty	2,111	37.1 (34.1–40.1)
A lot of difficulty	1,140	18.8 (16.7–21.1)
Health condition affects functioning		
No condition	388	6.9 (5.7–8.4)
Never/sometimes	4,501	73.9 (71.4–76.3)
Usually/always	1,015	19.1 (17.0–21.4)
School engagement (cares about school, does homework)		
Definitely true to both	5,379	91.9 (90.4–93.3)
Not or somewhat true to 1	464	8.1 (6.7–9.6)
Involved in community service		
Yes	2,444	35.6 (33.1–38.2)
No	3,324	64.4 (61.8–69.8)
Involved in paid work		
Yes	1,650	22.5 (20.4–24.7)
No	4,145	77.5 (75.3–79.6)
Participates in extra school activities		
Yes	4,437	72.1 (69.2–74.9)
No	1,325	27.9 (25.1–30.8)
Days of physical activity		
0 day	775	13.9 (11.9–16.1)
1–3 days	1,245	38.1 (35.3–41.0)
4–6 days	1,554	26.0 (23.5–28.6)
Everyday	1,157	21.9 (19.7–24.3)
Time spent watching TV		
Less 1 hour	2,414	39.5(36.8–42.2)
2–3 hours	2,656	45.8 (42.9–48.7)
More than 3 hours	813	14.7 (12.9–16.8)
Time spent with computer, cell phone or electronic device		
Less 1 hour	2,270	40.5 (37.7–43.3)
2–3 hours	2,375	39.9 (37.0–42.9)
More than 3 hours	1,240	19.6 (17.6–21.7)
Born in the USA		
Yes	5,719	96.7 (95.2–97.9)

Study measures	Children with current ADHD	
	<i>n</i>	Weighted proportion % (95% CI)
No	185	3.3 (2.1–4.8)
School-related factors		
Times school contacted household about problems		
0 times	2,395	40.6 (37.8–43.6)
1 time	1,036	17.1 (15.1–19.3)
2 times	2,382	42.2 (39.4–45.1)
Safe at school		
Definitely agree	4,020	68.7 (65.8–71.5)
Somewhat agree	1,509	26.8 (24.0–29.6)
Somewhat disagree	161	3.2 (2.3–4.2)
Definitely disagree	39	1.4 (0.4–2.5)
Repeated any grade		
Yes	826	16.6 (14.6–18.6)
No	4,987	83.4 (81.4–85.4)
IEP or special developmental services ^c		
No services	2,217	34.8 (34.9–40.5)
Receives services	3,659	62.4 (59.5–65.2)
Child ADHD characteristics/treatment interventions		
ADHD severity		
Mild	2,593	40.8 (38.1–43.6)
Moderate	2,619	43.9 (41.0–46.8)
Severe	651	15.3 (12.9–17.9)
Currently taking medication for ADHD		
Yes	3,878	64.1 (61.3–66.9)
No	2,018	35.9 (33.1–38.7)
Received ADHD behavioral treatment		
Yes	2,672	45.1 (42.3–48.0)
No	3,238	54.9 (52.0–57.7)
Received treatment by mental health provider		
Yes	2,891	47.4 (44.6–50.2)
No, but child needed	333	7.3 (5.8–8.7)
No, but child did not need	2,687	45.3 (42.4–48.1)
Received medications for behavior or emotions		
Yes	4,021	65.6 (62.7–68.3)
No	173	34.5 (31.7–37.3)

^aThe family poverty level measure is a ratio created using a combination of information about family income and household size. To address missing data for these measures, the family poverty level was multiply imputed and these values are included in the publicly available dataset. All analyses are conducted in a manner to create estimates based on all the multiple imputations.

^bParents reported that a healthcare provider ever told them that a child had this disorder, and they reported that the child currently had this disorder.

^cParents reported that their child ever had an EIP or early intervention plan, and/or that their child received special services for developmental needs, such as speech, occupational, or behavioral therapy.

Table 2.

Weighted Prevalence for Core Demographics and Factors Associated With Bullying Victimization and Perpetration Among Children with ADHD, National Survey of Children’s Health, 2016 to 2017.

Study measures	Bullying victim		Bullying perpetrator	
	Weighted proportion	Rao Scott Chi-square <i>p</i> -Value	Weighted proportion	Rao Scott Chi-square <i>p</i> -Value
Demographic factors				
Age				
6–11 years	48.8 (44.3–53.3)	.2542	19.5 (15.7–23.7)	.0067
12–17 years	45.4 (41.6–49.2)		13.6 (11.3–16.6)	
Ethnicity and race				
Non-Hispanic White	48.6 (45.7–51.5)	.3747	15.2 (13.0–17.6)	.6652
Non-Hispanic Black	48.0 (38.7–57.3)		17.2 (11.9–23.6)	
Non-Hispanic Other	41.2 (33.8–48.9)		15.0 (10.2–20.9)	
Hispanic/Latino	42.5 (33.5–51.9)		18.8 (11.6–27.9)	
Sex				
Male	45.8(42.6–49.1)	.3089	17.7 (15.0–20.7)	.0275
Female	49.2 (43.3–55.1)		12.9 (10.0–16.4)	
Highest level of education in the household				
No college	50.8 (43.5–58.0)	.1594	20.5 (15.3–26.5)	.0212
Some college or higher	45.4 (42.6–48.1)		14.2 (12.2–16.5)	
Socioeconomic status characteristics				
Family finds it hard to cover basics				
Never	36.0 (31.2–41.1)	<.0001	13.4 (10.1–17.2)	.0724
Any	51.4 (47.9–54.8)		17.5 (14.8–20.5)	
Receipt of government assistance				
None	41.6 (38.5–44.8)	<.0001	10.9 (9.0–13.0)	<.0001
1–2 types	49.6 (44.6–54.6)		20.2 (16.2–24.6)	
3–4 types	65.1 (52.9–76.0)		26.4 (16.4–38.4)	
Family-related factors				
Times moved to a new address				
0 times	47.3 (40.1–54.5)	.0388	15.9 (9.7–22.2)	.0003

Study measures	Bullying victim			Bullying perpetrator		
	Weighted proportion	Rao Scott Chi-square	p-Value	Weighted proportion	Rao Scott Chi-square	p-Value
1–2 times	41.7 (36.9–46.4)			10.4 (7.9–12.8)		
3 or more times	50.4 (46.3–54.4)			21.2 (17.6–24.8)		
Comorbidities and behavioral characteristics						
Developmental delay and/or intellectual disability						
Yes	65.1 (60.2–69.9)	<.0001		22.1 (17.1–27.7)		.0022
No	40.7 (37.4–44.1)			14.2 (12.0–16.6)		
Stays calm when faced with a challenge						
Definitely true	23.7 (19.0–29.1)	<.0001		2.6 (1.2–5.1)		<.0001
Somewhat true	46.0 (42.3–49.8)			12.0 (9.8–14.5)		
Not true	62.7 (56.0–69.1)			33.0 (27.2–39.2)		
Argues too much						
Definitely true	64.9 (59.5–70.1)	<.0001		44.4 (38.8–50.1)		<.0001
Somewhat true	49.9 (44.4–55.4)			15.1 (11.3–19.5)		
Not true	34.6 (30.9–38.5)			2.7 (1.7–4.0)		
Child-centered characteristics						
Difficulty making or keeping friends						
No difficulty	21.4 (18.6–24.5)	<.0001		5.7 (4.3–7.5)		<.0001
A little difficulty	58.0 (52.2–63.6)			19.6 (15.9–23.7)		
A lot of difficulty	84.5 (80.1–88.2)			33.5 (26.7–40.8)		
Health condition affects functioning						
No condition	33.1 (24.4–42.8)	<.0001		9.8 (4.9–17.1)		<.0001
Never/sometimes	42.6 (39.2–46.0)			12.3 (10.3–14.6)		
Usually/always	67.6 (61.2–73.5)			34.2 (27.5–41.3)		
School engagement (cares about school, does homework)						
Definitely or somewhat true to one	46.7 (43.7–49.8)	.9078		14.5 (12.3–16.9)		<.0001
Not true to both	47.3 (38.2–56.4)			35.7 (27.0–45.2)		
School-related factors						
Times school contacted household about problems						
0 times	31.2 (27.5–35.2)	<.0001		5.8 (4.1–8.0)		<.0001
1 time	48.2 (41.5–54.9)			13.3 (7.3–21.8)		

Study measures	Bullying victim		Bullying perpetrator	
	Weighted proportion	Rao Scott Chi-square <i>p</i> -Value	Weighted proportion	Rao Scott Chi-square <i>p</i> -Value
2 times	61.3 (57.1–65.5)		27.4 (23.7–31.5)	

Note. All non-demographic measures presented in this table had at least a small effect size based on Cramer's V calculated from the Rao-Scott chi-square test and the associated degrees of freedom using Cohen's parameters (Cohen, 1988).

Table 3.

Multivariable Logistic Regression Results for Bullying Victimization Among Children with ADHD, National Survey of Children's Health, 2016 to 2017.

	Bullying victim	
	Odds ratio	Odds ratio 95% CI
Age		
6–11 years (reference (ref))	—	
12–17 years	0.86	0.67–1.11
Ethnicity/Race		
Non-Hispanic White (ref)	—	
Non-Hispanic Black	0.93	0.66–1.39
Non-Hispanic Other	0.67	0.43–1.04
Hispanic/Latino	0.73	0.47–1.13
Sex		
Female (ref)	—	
Male	0.88	0.66–1.17
Highest level of education in the household		
Some college or higher (ref)	—	
No college	0.95	0.68–1.32
Hard to cover basics		
Never (ref)	—	
Any	1.43	1.07–1.92
Developmental delay and/or intellectual disability		
None (ref)	—	
Present	1.47	1.09–1.99
Difficulty making or keeping friends		
No difficulty (ref)	—	
A little	4.61	3.49–6.09
A lot	16.50	11.36–23.97
Health condition affects functioning		
No condition (ref)	—	
Never/sometimes	0.97	0.63–1.50
Usually/always	0.64	0.37–1.10
Times school contacted household about problems		
0 times (ref)	—	
1 time	1.45	1.04–2.03
2 times	2.00	1.47–2.71

Note. All predictors included in the model were found to be significant at $p < .05$ in preliminary models. Bold numbers are significant at $p < .05$ in final model.

Table 4.

Multivariable Logistic Regression Results for Being a Bullying Perpetrator Among Children with ADHD, National Survey of Children's Health, 2016 to 2017.

	Bullying perpetrator	
	Odds ratio	Odds ratio 95% CI
Age		
6–11 (reference (ref))	—	
12–17	0.68	0.48–0.97
Ethnicity/Race		
Non-Hispanic White (ref)	—	
Non-Hispanic Black	1.16	0.68–1.96
Non-Hispanic Other	1.29	0.75–2.23
Hispanic/Latino	1.49	0.87–2.57
Sex		
Female (ref)	—	
Male	1.76	1.19–2.60
Highest level of education in the household		
Some college or higher (ref)	—	
No college	0.84	0.56–1.27
Government assistance		
No assistance (ref)	—	
1–2 types	1.25	0.86–1.82
3–4 types	2.22	1.11–4.43
Times moved to a new address		
0 times (ref)	—	
1–2 times	0.64	0.36–1.15
3+ times	0.94	0.53–1.68
Stays calm when faced with a challenge		
Definitely true (ref)	—	
Somewhat true	1.42	0.64–3.17
Not true	2.44	1.11–4.43
Argues too much		
Not true (ref)	—	
Somewhat true	3.75	2.26–6.51
Definitely true	14.06	8.07–25.49
Difficulty making or keeping friends		
No difficulty (ref)	—	
A little difficulty	2.67	1.76–4.07
A lot of difficulty	2.97	1.77–4.99
School engagement (cares about school, does homework)		
Definitely/somewhat true to one item (ref)	—	
Not true to both items	2.03	1.23–3.34

	Bullying perpetrator	
	Odds ratio	Odds ratio 95% CI
Times school contacted household about problems		
0 times (ref)	—	
1 time	1.60	0.86–2.97
2 times	2.73	1.77–4.22

Note. All predictors included in the model were found to be significant at $p < .05$ in preliminary models. Bold numbers are significant at $p < .05$.

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