

Article

Self-Perceived Bullying Victimization in Pre-Adolescent Schoolchildren With ADHD

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ABSTRACT

Background: Bullying is highly prevalent among children and adolescents with Attention-Deficit/Hyperactivity Disorder (ADHD). This study investigates self-perceived bullying victimization and related sociodemographic, psychopathological, cognitive, and academic characteristics in pre-adolescents with ADHD compared to controls. **Method:** The participants were 424 pre-adolescents, 138 of whom had ADHD. Self-perceived bullying victimization was assessed with the Bullying and School Violence questionnaire. This study is part of a larger double-phase epidemiologic cross-sectional study. **Results:** A total of 35% of the ADHD pre-adolescents self-reported bullying victimization. ADHD-combined presentation showed the highest prevalence of co-occurring self-perceived bullying victimization. After the effects of socioeconomic level, gender, place of birth, intelligence quotient and autism had been controlled, we observed that presenting ADHD increased the likelihood of self-perceived bullying victimization almost 3-fold. Having ADHD and self-perceived bullying victimization were significantly associated with higher rates of the co-occurrence of internalizing and externalizing psychological problems. Comorbidity with ASD was higher in ADHD + bullying cases. Pre-adolescents with ADHD had lower cognitive scores and worse academic outcomes regardless of whether they were being bullied or not. **Conclusions:** In bullying prevention and intervention, special attention should be paid to ADHD as a vulnerability factor for self-perceived victimization, with negative consequences for emotional well-being and behavior.

Victimización por Acoso Autopercibida en Escolares Preadolescentes con TDAH

RESUMEN

Antecedentes: El acoso escolar es altamente prevalente entre niños/adolescentes con TDAH. Se estudió la victimización por acoso escolar autopercibida y las características sociodemográficas, psicopatológicas, cognitivas y académicas relacionadas en preadolescentes con TDAH en comparación con un grupo control. **Método:** Participaron 424 preadolescentes, 138 con TDAH. La victimización por acoso autopercibida se evaluó con el cuestionario de Acoso y Violencia Escolar. Este trabajo forma parte de un estudio epidemiológico transversal en doble fase más amplio. **Resultados:** El 35% de los preadolescentes con TDAH reportaron haber sido víctimas de acoso escolar. El TDAH-presentación combinada mostró la mayor coocurrencia de victimización por acoso autopercibida. Controlados los efectos del nivel socioeconómico, sexo, lugar de nacimiento, coeficiente intelectual y autismo, esta presentación aumentaba casi 3-veces la probabilidad de victimización por acoso autopercibida. El TDAH y la percepción de victimización se asociaron significativamente con altas tasas de coocurrencia de problemas psicológicos internalizantes/externalizantes. La comorbilidad con TEA fue mayor en el TDAH + acoso. Los preadolescentes TDAH tenían puntuaciones cognitivas más bajas y peores resultados académicos, independientemente de si estaban siendo acosados. **Conclusiones:** En prevención e intervención del *bullying* debe prestarse especial atención al TDAH como factor de vulnerabilidad, con consecuencias negativas para el bienestar emocional y comportamiento.

Palabras clave:

Acoso escolar
Violencia temprana
TDAH
Preadolescentes

Although there is no absolute consensus on its definition, bullying is considered an aggressive behavior that occurs between peers in the school context. It is characterized as the use of physical, verbal and/or social (e.g., social manipulation, or social exclusion) aggression toward peers to inflict harm, it occurs repeatedly and persistently over time and involves intentionality and power imbalance (Olweus, 1993; Weimer & Moreira, 2014). Bullying can also occur on the internet and via electronic devices (cyberbullying) (Olweus, 2012). Bullying includes three possible participants—the bully, the victim, and bystanders—all of whom play a crucial role by experiencing, engaging in, or reinforcing this behavior. The phenomenon is widely known to be an important public health problem and is considered a common form of early violence among children and adolescents associated with a wide range of psychosocial and developmental negative outcomes on those involved (Fogler et al., 2020). Bullying may be the cause of physical and psychiatric symptoms and can lead to serious interference in a person's life in terms of, for example, academic achievements, interpersonal relationships and overall quality of life. It has been linked to self-harm and suicide (Felix et al., 2019; Malhi & Bharti, 2022; Van Geel et al., 2014; Vergara-Hernandez, 2017). In this regard, more research is needed to gain further insight into this type of early violence. Several studies on the evolution of bullying have reported that its presence in early stages of development predicts future violent behaviors and delinquency, both in cases of aggressors and in cases of victims or bully-victims who bullied others while also being victimized by their peers (Walters, 2021).

The UNESCO reports an overall bullying rate of 32% in 11-year-old pre-adolescents (UNESCO, 2019). Recently, Biswas et al. (2020) presented data from the Global School-based Student Health Survey of pre-adolescents and adolescents aged between 12 and 17 from 83 low- and middle-income-to-high-income countries in the six World Health Organization (WHO) regions. Their results showed that the pooled prevalence of bullying victimization on one or more days in the previous 30 days was 30.5%. The highest prevalence was observed in the Eastern Mediterranean (45.1%) and Africa (43.5%), while the lowest prevalence was found in Europe. In Spain, Babarro et al. (2020) studied 858 11-year-old pre-adolescents and showed that 9.3% of them were victims, 1.4% were bullies, and nearly 2% were bully-victims. Another study conducted with a larger sample of 4,646 Spanish children with a mean age of 10.2 years showed that roughly 37% of participants were bullying victims and 4.4% were cybervictims (Sidera et al., 2020). At this point, it is important to note that the prevalence rates reported in the literature depend greatly on the definition of bullying used in the studies (e.g. whether the study includes cyberbullying and direct or indirect forms of violence) or the life stage during which the study was conducted (e.g. childhood or adolescence), among other variables (Smith, 2016). Nevertheless, the data are concerning.

Many studies report high rates of bullying in children and adolescents with disabilities. In this regard, those with neurodevelopmental disorders such Attention-Deficit/Hyperactivity Disorder (ADHD) or Autism Spectrum Disorders (ASD) have been found to be particularly vulnerable to this form

of violence. There is a high rate of comorbidity among these disorders, and this comorbidity is also a vulnerability factor for suffering bullying victimization and is related to greater difficulty managing bullying victimization (Chou et al., 2018; McClemon et al., 2021; Schoeler et al., 2019).

In Spain, ADHD is a childhood-onset disorder the prevalence of which reaches 3.0% in pre-schoolers and 7.7% in school-age children, rates that are similar to those observed worldwide (Canals-Sans et al., 2021; Polanczyk et al., 2007; Polanczyk et al., 2015). Compared to the general population, the bullying victimization rates can increase to 43–65% in ADHD (Cuba Bustinza et al., 2022; Winters et al., 2020). Previous studies suggest that the vulnerability to bullying presented by children and adolescents with ADHD is related to their impulsive behavior and difficulties with emotion recognition, emotion regulation and social skills (Bong et al., 2021; Kawabata et al., 2012; Murray-Close et al., 2010). Children and adolescents with ADHD who are bullied also show associated low self-esteem and increased anxiety and depressive symptoms (Becker et al., 2017). In fact, children and adolescents with ADHD present higher levels of emotional and behavioral problems than their peers without ADHD, and such problems are particularly frequent in the case of combined ADHD presentation (Tengsujaritkul et al., 2020). Most studies do not have self-reported information about perceptions and experiences of bullying, because in neurodevelopmental disorders it is more common to ask parents even though this type of behavior does not take place in front of them (Hebron & Humphrey, 2013; McClemon et al., 2021). Likewise, most studies do not discuss different clinical presentations of ADHD, and the recent study by Cuba Bustinza et al. (2022) points out the need to study factors related to the presence of bullying in ADHD cases, so that early risk factors can be identified, bullying can be detected early and interventions improved.

School violence and ADHD are two highly prevalent conditions that can interfere in the lives of those affected in the short and long term. Children with ADHD are vulnerable to suffering bullying and, in turn, victimization due to bullying can have adverse consequences on mental health and well-being (Clark et al. 2022; Schoeler et al., 2019). Otherwise, the beginning of adolescence is also a stage that is particularly vulnerable to the development of mental health problems and especially emotional problems (Bacter et al., 2021). The overall aim of the study is, therefore, to investigate the self-reported bullying victimization rates in a sample of pre-adolescents with ADHD in comparison to peers without neurodevelopmental disorders and considering multiple related factors. Thus, our specific objectives were: 1) To describe the prevalence of self-perceived bullying victimization in pre-adolescents with ADHD compared to pre-adolescents without ADHD in terms of gender and clinical presentations of ADHD, severity levels of bullying, and the different manifestations of bullying that children may be subject to; 2) To determine the socio-demographic, psychopathological and cognitive profile of the pre-adolescents diagnosed with ADHD who self-perceived bullying victimization, as well as the comorbidity with ASD, parental health status, treatment, and academic characteristics (academic achievement and academic accommodations); and 3) To

determine the degree to which ADHD, and any of its three clinical presentations, increase the risk of suffering bullying, considering several confounding variables. On the basis of these objectives, we formulated the following hypotheses: 1) Participants with ADHD have higher co-occurrence rates of self-perceived bullying victimization and higher severities than those without ADHD. We also hypothesized that bullying victimization behaviors are more frequent in males with ADHD than in females, and that the ADHD combined presentation and the hyperactive-impulsive presentation show significantly higher rates of self-perceived bullying victimization than the inattentive presentation. Likewise, the bullying scales most strongly related to ADHD are those related to social skills problems, such as social manipulation or exclusion. 2) Participants with ADHD and self-perceived bullying victimization are likely to belong to lower socio-economic environments, have higher levels of psychopathological problems and cognitive difficulties, show high comorbidity rates with ASD, receive more treatments and present lower academic achievement. Their parents' health status is also worse. 3) The ADHD combined presentation and the hyperactive-impulsive presentation involve a greater risk of self-perceived bullying victimization because of the nature of their symptoms, which are much more related to impulsiveness and reactive aggression.

Method

Participants

This study is part of a larger two-phase cross-sectional project in which a sample of children of two age ranges was evaluated: pre-school-age children (3-5 years old) and primary school children (10-12 years old). The sample size required for the project was determined to be 1400 schoolchildren for each age group. This sample size was estimated on the basis of ASD and ADHD prevalence rates reported in previous studies, an alpha error of 5% and a beta error of 20%. We expected an attrition rate of 50%, so our final estimated sample was 2800 children per group. The potential sample consisted of 6,921 children (3,392 pre-schoolers and 3,529 at primary school) from 86 state and private schools that had been randomly selected, by area, from among all the mainstream schools in the province of Tarragona (España). Bullying victimization was only self-reported in the sample of primary school children. Thus, in the first phase, 3,520 school-age children took part. Of these, 54% obtained informed consent from their families to participate in the diagnostic phase (second phase), in which 485 children (with risk symptoms of ASD and/or ADHD and a control group) and their families were assessed individually. Finally, 424 primary school children with a mean age of 10.6 ($SD = .6$) participated in the present study. Of these, 138 were diagnosed with ADHD ($n = 59$ inattentive; $n = 11$ hyperactive/impulsive; $n = 68$ combined) and 286 were controls. In the sample of children with ADHD, 23.9%, 63.8% and 12.3% were from a low, medium and high socio-economic background, respectively. In the control sample, 14.3%, 63.3% and 22.4% were from a low, medium and high socio-economic background.

Instruments

The Bullying and School Violence Questionnaire (*Acoso y violencia escolar*, AVE) (Piñuel & Oñate, 2006) is a self-report measure for assessing self-perceived bullying victimization. In the present study we specifically administered the 50 items with three response options (never, sometimes, and many times) related to the eight scales of bullying (harassment, intimidation, threats, coercion, social blocking, social exclusion, social manipulation, and aggressions). These make up the four factors (harassment, intimidation, exclusion, and aggression) that provide the two global indexes [Global Bullying Index (GBI) and Intensity]. The general standards validated in the Spanish population by gender were used to determine the cut-off scores for the reported bullying victimization (Piñuel & Oñate, 2006). The reliability of the bullying scales ranged from $\alpha = .67$ and $\alpha = .95$ (Piñuel & Oñate, 2006). The following four categories were defined within each index, scale and factor assessed: bullying not reported, bullying reported, bullying well reported, and bullying highly reported. In this way, the bullying variables were worked in dichotomous format, i.e., bullying not reported (0) vs. bullying reported (1), which includes any presence of bullying.

The AVE variables provided the following case definitions of bullying: GBI measures the level of bullying and harassment behaviors from the frequency with which the children report their occurrence (the sum of scores on all items). Intensity provides an overall severity indicator that establishes the level at which the children perceive the bullying situation. This scale scores only those behaviors that are reflected with a frequency of "many times". The combination of these two scales (GBI + Intensity) provides an overall picture of the specific bullying victimization situation self-reported by the children. In addition, prevalence was calculated from various levels of bullying severity on the GBI and Intensity indices, i.e., "mild" when bullying was reported, "moderate" when bullying was reported to take place sometimes, and "severe" when bullying was reported to take place often.

The Kiddie-Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS-PL) (Kaufman et al., 1997) is a semi-structured interview used to collect information from parents about ADHD core symptomatology according to DSM criteria. The ADHD scale has a sensitivity of 87.8% and a positive predictive value of 98.6% (Jarbin et al., 2017). The Spanish version of the scale showed high inter-rater reliability ($\kappa = 0.91$) (Ulloa et al., 2006). Since the interview was based on DSM-IV-TR criteria, diagnostic specifiers such as age of onset and severity classification were adapted to DSM-5 criteria by EPINED researchers. Information from teachers and from the children's observation and cognitive profiles complemented the diagnostic decision.

The Wechsler Intelligence Scales for Children (WISC-IV) (Corral et al., 2005; Wechsler, 2003) estimate the global intelligence quotient as well as specific scores for verbal comprehension, perceptual reasoning, working memory, and processing speed.

The Child Behavior Checklist (CBCL/6-18) (Achenbach & Rescorla, 2001) is a 113-item questionnaire reported by parents

of children and adolescents aged 6-18 years old that provides the following eight syndrome scales: anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, rule-breaking behaviors and aggressive behaviors. The first three of these scales make up the internalizing scale, while the rule-breaking behaviors and aggressive behaviors make up the externalizing scale, and they all make up the total problems scale (includes: internalizing, externalizing, social problems, thought problems, and attention problems). Only the internalizing, externalizing and total problems scores were used for this study. The reliability of the Spanish version ranged from $\alpha = .71$ to $\alpha = .87$ (Sardinero et al., 1997).

The Youth Self-Report (YSR/11-18) (Achenbach, 1991) is a 112-item self-reported questionnaire on emotional and behavioral problems and social skills for pre-adolescents and adolescents aged from 11 to 18 years. It provides the same scales as the parents' version (CBCL/6-18). The internalizing, externalizing, and total problems scales were used in the present study. The reliability of the Spanish version ranged from $\alpha = .81$ to $\alpha = .84$ (Abad et al., 2000).

The General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988) is a 12-item questionnaire that was completed separately by mothers and fathers in relation to their psychological problems. Total scores range from 0 to 36, with high scores indicating poor psychological health. The cut-off point we used was 12.

Sociodemographic information was collected in the first phase from an ad-hoc questionnaire completed by the parents, and contained questions about place of birth, age, and parents' educational level and employment. In the second phase, we collected more clinical information about family psychopathological antecedents, the presence of previous psychopathological or medical diagnoses/problems, psychopharmacological treatments, and the use of psychiatric, psychological, and educational services. Academic achievement was ascertained from school grade reports. The participants' performances were expressed using a 5-point Likert scale ranging from failure to excellent results in language, mathematics, history and science, music and arts, and physical education. Socioeconomic status was estimated using the Hollingshead Index (Hollingshead, 2011). In this index, the level of education is given a weight of 3 and employment a weight of 5. The level of education consists of four categories (1: no studies, 2: elementary education, 3: secondary education, 4: university education), and the employment is classified using the Catalan classification of occupations-2011. These data are combined to give an overall score, which is categorized as follows: 23 or lower = high SES; 24-51 = medium SES, and 52 or higher = low SES.

Procedure

The Neurodevelopmental Disorders Epidemiological Research Project (the acronym for which is EPINED) was a two-phase cross-sectional study that included a screening and diagnostic procedure conducted in school settings between 2014 and 2019 in the province of Tarragona (Spain). The main aim

of the project, which was validated by the Ethics Committee of Hospital Sant Joan de Reus (13-10-31/10proj5), was to obtain the prevalence of ASD and ADHD in a community sample of children and examine their psychological characteristics. For more information about the study design, sample characteristics and ADHD and ASD diagnoses, see Canals-Sans et al. (2021) and Morales-Hidalgo et al. (2021).

In the first phase, parents and teachers provided psychological and sociodemographic data about the children, and answered an ASD and ADHD screening questionnaire. The screening was considered positive for ADHD when the children obtained high or very high scores ($T \geq 65$) on the parent and teacher indexes of the 10-item Conners questionnaire. All screen-positive participants and those with a previous ADHD diagnosis – even if they obtained a negative screening – were contacted to request their participation in the individual assessment for the second phase. A representative group of children with $T \geq 65$ in only one context (parent or teacher criteria) were also invited to participate in the second phase to prevent false negative ADHD diagnoses. The screening for ASD was positive when parent [CAST; (Morales-Hidalgo, Roigé-Castellví et al., 2017; Scott et al., 2002)] or teacher [EduTEA; (Morales-Hidalgo, Hernández-Martínez et al., 2017)] scored above the cut-off points in the questionnaires. The control group consisted of children without risk scores in any screening questionnaire (parent and teacher criteria) matched by gender, age, and school. The second phase was administered in the schools by specially trained clinicians. The protocol for the second phase comprised administering the ADHD scale of the Kiddie-Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS-PL) to the parents to obtain DSM-5 ADHD diagnosis, and administering the Wechsler Intelligence Scales for Children (WISC-IV) to the children. DSM-5 diagnoses of ASD were made using ADOS-2 and ADI-R (Morales-Hidalgo et al., 2021). Moreover, the participants answered the Bullying and School Violence questionnaire (*Acoso y Violencia Escolar*; AVE) and the YSR/11-18 individually with the researchers present to answer any queries and check that the test was completed properly. The parents also answered the CBCL/6-18 and the GHQ-12, and provided data about the family's psychopathological antecedents, previous medical diagnoses/problems, the use of psychiatric, psychological, and educational services, psychopharmacological treatments, and their offspring's academic marks.

On completion of the study, a full report of the results was provided to parents and school psychologists. The K-SADS-PL results were examined by the clinicians to determine high agreement (>95%) in symptom numbers and severity impairment.

Data Analysis

To obtain the prevalence rates, we used the following AVE test scores: global indexes (Global Bullying Index-GBI and Intensity), bullying scales, and factors. Note also that prevalence was calculated by considering both these indexes together (i.e., GBI + Intensity). The Chi-square test was used to assess the relationship between males and females with respect to self-perceived bullying

victimization in the ADHD group and in the control group. Differences between the prevalence of the ADHD participants and the control groups were performed by Z-test analyses.

Sociodemographic, cognitive, psychopathological, and academic characteristics were compared between the following groups: pre-adolescents with ADHD + bullying, those with ADHD + no bullying, those with no ADHD + bullying, and those with no ADHD + no bullying. Multiple comparisons were performed for quantitative variables using t-test analysis and for proportions using Z-test analyses.

To examine the factors associated with the occurrence of bullying, we used logistic regression models. Specifically, three regression models were performed. For the first model, ADHD presentations were added as independent variables (ADHD-I, ADHD-HI, and ADHD-C), while for the second model ASD diagnosis was added, and for the third model the interaction between ADHD-C x ASD was added. All models were adjusted for the following covariates: socioeconomic level, gender, place of birth, and intelligence quotient. In all cases, the outcome variable was GBI + Intensity.

We used SPSS (version 28, SPSS Inc., Chicago, IL, USA) to conduct the Chi-square tests, t-tests and the logistic regression models, and Epidat 3.1 (Xunta de Galicia) to conduct the Z-test analyses.

Results

Prevalence of Co-Occurring Self-Perceived Bullying Victimization in Pre-Adolescents With ADHD

Pre-adolescents with ADHD reported significantly higher rates of self-perceived bullying victimization than their peer controls (see Table 1). In all AVE global indexes, scales and factors, participants with ADHD showed significantly higher scores than controls, though there were no differences in the threats or social blocking scales. The most prevalent bullying scale was social exclusion, followed by social manipulation and social blocking. No gender differences were found between boys and girls with ADHD or between boys and girls in the control group. On the other hand, boys with ADHD showed significantly higher rates of bullying than boys without ADHD (Cramer's V between 0.14 - 0.25), except in relation to threats and social blocking. No significant differences were found between girls with ADHD and girls in the control group.

In the ADHD group, the bullying prevalence rates by clinical presentation were 28.8% for inattentive presentation (ADHD-I), 27.3% for hyperactive-impulsive presentation (ADHD-HI), and 41.2% for combined presentation (ADHD-C) (these data are not included in Table 1).

With regard to bullying severity, participants with ADHD presented significantly higher rates of a severe level than those in the control group. Also, with regard to Intensity, participants with ADHD had significantly higher rates of a mild level of intensity than controls (see Table 1).

Sociodemographic, Psychopathological, and Cognitive Profile, Comorbidity With ASD, Parental Health, Treatment, and Academic Characteristics of Pre-Adolescents with ADHD and Bullying

Table 2 shows that there were no statistically significant differences in terms of socioeconomic level, gender, or place of birth between the groups. Participants with ADHD + bullying had significantly higher externalizing and total problems (referred by both informants) than those with ADHD without bullying (Cohen's *d* between 0.59 and 1.07). Also, pre-adolescents with ADHD + bullying self-reported more internalizing problems than those who only presented ADHD (Cohen's *d* = 0.98). Overall, as shown in the table, ADHD was related to higher levels of psychopathological problems regardless of bullying. The results in relation to the cognitive profile indicate that pre-adolescents with ADHD had the lowest cognitive scores regardless of whether they experienced bullying or not. Similarly, pre-adolescents with ADHD performed worse academically, had more academic accommodations, and received more treatments than those without ADHD regardless of whether they experienced bullying or not. Also, participants with ADHD + bullying presented higher comorbidity with ASD than those without ADHD or bullying.

The health of fathers of children with ADHD was not significantly different with or without the presence of bullying. However, the mothers of pre-adolescents with ADHD and those of pre-adolescents with ADHD + bullying reported poorer health status than those of pre-adolescents without ADHD or bullying.

Association Between Clinical Presentations of ADHD and the Presence of Self-Perceived Bullying Victimization

Logistic regressions showed that ADHD-C presentation was significantly related to the presence of self-reported bullying victimization (Table 3). Moreover, when we added ASD diagnosis, our results showed that it was also significantly associated with self-reported bullying victimization. Finally, our results for the third model indicated that when we considered the interaction between ADHD-C and ASD, ADHD-C presentation was the only variable that significantly increased the likelihood of self-perceived bullying victimization regardless of ASD.

Table 1
Self-Perceived Bullying Victimization Prevalence's Rates (AVE's Scores in the: Global Indexes, Bullying Scales, and Factors) by Gender, Comparing Children with ADHD and Control Group

AVE scores	ADHD group			Comparison by gender		Control group			Comparison by gender		Comparison by diagnostic group		
	Total n = 138	Males n = 98	Females n = 40	p		Total n = 286	Males n = 169	Females n = 117	p		p total	p males	p females
Global indexes, % (n)													
Global Bullying Index (GBI)	49.3(68)	52.0(51)	42.5(17)	.407		34.6(99)	34.9(59)	34.2(40)	1.000		.004**	.006**	.345
Intensity	41.3(57)	43.9(43)	35.0(14)	.441		21.7(62)	20.1(34)	23.9(28)	.533		< .001***	< .001***	.172
GBI+Intensity	34.8(48)	36.7(36)	30.0(12)	.578		18.5(53)	17.8(30)	19.7(23)	.800		< .001***	< .001***	.256
GBI													
Mild	15.9(22)	15.3(15)	17.5(7)	.950		13.6(39)	16.6(28)	9.4(11)	.119		.526	.787	.165
Moderate	21.7(30)	24.5(24)	15.0(6)	.318		16.4(47)	15.4(26)	17.9(21)	.680		.184	.066	.670
Severe	11.6(16)	12.2(12)	10.0(4)	.936		4.5(13)	3.0(5)	6.8(8)	.208		.007**	.003**	.516
Intensity													
Mild	21.7(30)	22.4(22)	20.0(8)	.929		9.1(26)	8.3(14)	10.3(12)	.718		< .001***	< .001***	.111
Moderate	12.3(17)	14.3(14)	7.5(3)	.415		9.8(28)	10.1(17)	9.4(11)	.985		.428	.299	.716
Severe	7.2(10)	7.1(7)	7.5(3)	.773		2.8(8)	1.8(3)	4.3(5)	.371		.033*	.026*	.423
Bullying scales, % (n)													
Harassment	39.1(54)	43.9(43)	27.5(11)	.110		24.8(71)	22.5(38)	28.2(33)	.336		.002**	< .001***	.932
Intimidation	32.6(45)	35.7(35)	25.0(10)	.309		19.6(56)	23.1(39)	14.5(17)	.101		.003**	.026*	.130
Threats	18.8(26)	19.4(19)	17.5(7)	.986		13.3(38)	11.8(20)	15.4(18)	.489		.134	.092	.752
Coercion	34.1(47)	34.7(34)	32.5(13)	.961		16.4(47)	14.2(24)	19.7(23)	.288		< .001***	< .001***	.095
Social blocking	41.3(57)	40.8(40)	42.5(17)	.993		33.6(96)	30.8(52)	37.6(44)	.282		.120	.096	.584
Social exclusion	52.9(73)	53.1(52)	52.5(21)	.898		32.9(94)	30.2(51)	36.8(43)	.300		< .001***	< .001***	.080
Social manipulation	47.8(66)	51.0(50)	40.0(16)	.323		34.3(98)	31.4(53)	38.5(45)	.264		.007**	.001**	.863
Aggressions	18.1(25)	20.4(20)	12.5(5)	.395		10.5(30)	9.5(16)	12.0(14)	.630		.029*	.012*	.929
Factors, % (n)													
Harassment factor	39.1 (54)	43.9 (43)	27.5(11)	.110		24.8(71)	22.5(38)	28.2(33)	.336		.002**	< .001***	.932
Intimidation factor	42.8 (59)	44.9 (44)	37.5(15)	.544		30.1(86)	31.4(53)	28.2(33)	.659		.010*	.027*	.271
Exclusion factor	60.1 (83)	62.2 (61)	55.0(22)	.551		41.3(118)	39.4(66)	44.4(52)	.431		< .001***	< .001***	.248
Aggression factor	18.1 (25)	20.4 (20)	12.5(5)	.395		10.5(30)	9.5(16)	12.0(14)	.630		.029*	.012*	.929

* $p < .05$; ** $p < .01$; *** $p < .001$; ADHD: Attention deficit hyperactivity disorder; AVE: Bullying and school violence test.

Table 2

Sociodemographic, Cognitive, Psychopathological, and Academic Characteristics of Children With ADHD and Co-Occurrent Self-Perceived Bullying Victimization, Compared to the Following Conditions: Children with ADHD and Without Self-Perceived Bullying Victimization, and With Controls With and Without Self-Perceived Bullying Victimization

	ADHD		No ADHD		pab	pac	pad	pbc	pbd	pcd
	Bullyinga	No bullyingb	Bullyinc	No bullyingd						
SOEIOEMOGAPHIC PROFILE, % (n)	<i>n</i> = 48	<i>n</i> = 90	<i>n</i> = 53	<i>n</i> = 233						
SES										
High	6.3(3)	15.6(14)	17.0(9)	23.6(55)	.189	.175	.012	.991	.152	.389
Medium	68.8(33)	61.1(55)	64.2(34)	63.1(147)	.482	.781	.563	.854	.841	.989
Low	25.0(12)	23.3(21)	18.9(10)	13.3(31)	.993	.614	.067	.678	.042	.409
Gender										
Boys	75.0(36)	68.9(62)	56.6(30)	59.7(139)	.578	.084	.067	.193	.160	.800
Girls	25.0(12)	31.1(28)	43.4(23)	40.3(94)						
Place of birth										
Autochthonous	85.4(41)	83.3(75)	86.8(46)	90.1(210)	.941	.930	.480	.754	.132	.640
Non-Autochthonous	14.6(7)	16.7(15)	13.2(7)	9.9(23)						
COGNITIVE PROFILE, mean (SD)	<i>n</i> = 47	<i>n</i> = 90	<i>n</i> = 53	<i>n</i> = 233						
Verbal Comprehension	100.6(12.9)	99.3(13.5)	104.0(11.7)	106.0(12.1)	.588	.170	.006	.037	< .001	.276
Perceptual Reasoning	100.9(13.1)	100.1(13.0)	105.5(15.6)	107.0(14.8)	.734	.116	.009	.028	< .001	.510
Working Memory	89.4(14.9)	87.8(12.8)	98.0(14.4)	99.2(13.9)	.513	.004	< .001	< .001	< .001	.574
Processing Speed	98.4(11.3)	98.7(13.7)	104.1(13.5)	103.2(12.0)	.898	.025	.012	.024	.004	.631
Total Intellectual Quotient	96.3(12.8)	95.1(12.7)	103.1(13.3)	104.8(13.5)	.601	.011	< .001	< .001	< .001	.407
PSYCHOLOGICAL PROBLEMS PROFILE, mean (SD)										
CBCL	<i>n</i> = 47	<i>n</i> = 88	<i>n</i> = 51	<i>n</i> = 229						
Externalized problems	64.7(8.4)	59.1(10.5)	52.4(8.9)	49.8(9.5)	.002	< .001	< .001	< .001	< .001	.075
Internalized problems	63.1(9.4)	61.2(9.7)	56.2(9.4)	53.5(9.5)	.275	< .001	< .001	< .004	< .001	.067
Total problems	67.0(7.5)	63.2(8.9)	56.0(8.3)	51.3(9.1)	.014	< .001	< .001	< .001	< .001	< .001
YSR	<i>n</i> = 48	<i>n</i> = 90	<i>n</i> = 53	<i>n</i> = 233						
Externalized problems	56.5(10.0)	47.1(10.2)	47.7(9.1)	43.1(8.5)	.001	< .001	< .001	.724	.001	< .001
Internalized problems	59.8(8.6)	50.6(10.1)	56.3(8.7)	47.1(8.9)	.001	.045	< .001	< .001	.003	< .001
Total problems	60.8(9.9)	49.9(10.4)	54.0(8.1)	44.5(8.8)	.001	< .003	< .001	.015	< .001	< .001
ASD diagnosis, % (n)	<i>n</i> = 43	<i>n</i> = 84	<i>n</i> = 53	<i>n</i> = 230						
	9.3(4)	3.6(3)	3.8(2)	.4(1)	.353	.491	< .001	.685	.104	.163
PARENTS GENERAL HEALTH STATUS % (n)	<i>n</i> = 36F/ <i>n</i> = 44M	<i>n</i> = 68F/ <i>n</i> = 87M	<i>n</i> = 43F/ <i>n</i> = 51M	<i>n</i> = 200F/ <i>n</i> = 227M						
GHQ-Fathers	33.3(12)	27.9(19)	23.3(10)	17.5(35)	.729	.457	.050	.745	.093	.506
GHQ-Mothers	43.2(19)	34.5(30)	31.4(16)	19.4(44)	.435	.329	.001	.852	.008	.091
TREATMENT PROFILE, % (n)	<i>n</i> = 48	<i>n</i> = 90	<i>n</i> = 53	<i>n</i> = 233						
Drugs for psychological problems	31.3(15)	31.1(28)	0.0(0)	0.4(1)	.860	< .001	< .001	< .001	< .001	.417
Psychological treatment	50.0(24)	43.3(39)	18.9(10)	9.9(23)	.569	.002	< .001	.005	< .001	.107
ACADEMIC CHARACTERISTICS	<i>n</i> = 44	<i>n</i> = 82	<i>n</i> = 48	<i>n</i> = 218						
Academic achievement, mean (SD)	2.3(9)	2.5(9)	3.0(1.0)	3.4(1.0)	.237	< .001	< .001	.004	< .001	.013
Academic accommodations, % (n)	<i>n</i> = 48	<i>n</i> = 90	<i>n</i> = 53	<i>n</i> = 233						
	29.2(14)	31.1(28)	11.3(6)	9.9(23)	.966	.046	< .001	.013	< .001	.949

ADHD: Attention deficit hyperactivity disorder; ASD: Autism spectrum disorder; CBCL: Child Behaviour Checklist; YSR: Youth Self-Report; SES: Socioeconomic level; GHQ: General Health Questionnaire; F: Fathers; M: Mothers.

Statistically significant values are marked in bold

Table 3
Association Between Clinical Presentations of ADHD and Self-Perceived Bullying Victimization Obtained With Logistic Regression Models

	Model 1				Model 2				Model 3					
	B	Exp (B)	95%CI	<i>p</i>	B	Exp (B)	95%CI	<i>p</i>	B	Exp (B)	95%CI	<i>p</i>		
ADHD-I	.532	1.702	.887 - 3.304	.116	ADHD-I	.350	1.419	.702 – 2.868	.329	ADHD-I	.361	1.435	.710 – 2.900	.314
ADHD-HI	.416	1.515	.383 - 5.993	.554	ADHD-HI	.396	1.486	.375 – 5.894	.573	ADHD-HI	.393	1.482	.374 – 5.879	.576
ADHD-C	1.033	2.809	1.539 - 5.127	< .001	ADHD-C	.919	2.507	1.326 – 4.737	.005	ADHD-C	.891	2.438	1.272 – 4.675	.007
					ASD	1.521	4.577	1.203 – 17.410	.026	ASD	1.312	3.714	.707 – 19.496	.121
										ADHD-C x ASD	.608	1.837	.103 – 32.919	.679
R2 Nagelkerke*100 = 6.0 χ^2 423.7 = 17.261 <i>p</i> = .016				R2 Nagelkerke*100 = 7.4 χ^2 409.8 = 20.529 <i>p</i> = .009				R2 Nagelkerke*100 = 7.5 χ^2 409.9 = 20.706 <i>p</i> = .014						

Models adjusted for socioeconomic level (score), gender (1: boy; 2: girl), place of birth (1: autochthonous; 2: non-autochthonous); and intelligence quotient (score)

OUTCOME: Global Bullying Index+Intensity.

ADHD-I: Attention deficit hyperactivity disorder-inattentive; ADHD-HI: Attention deficit hyperactivity disorder-hyperactivity impulsivity; ADHD-C: Attention deficit hyperactivity disorder-combined; ASD: Autism spectrum disorder; CBCL: Child Behaviour Checklist; YSR: Youth Self-Report.

Statistically significant values are marked in bold

Discussion

Numerous studies have investigated the risk of bullying in typically developing children. However, far fewer studies have examined this issue for children with disabilities. Given the evidence that children with ADHD may be vulnerable to bullying victimization, our results suggest that pre-adolescents with ADHD are exposed to a significantly elevated pattern of school violence. In particular, the ADHD-C was significantly related to the presence of bullying. Moreover, the joint presence of ADHD and self-perceived bullying victimization was associated with a greater number of externalizing and total problems (both self-reported by the children and informed by their parents), as well as significantly higher levels of self-reported internalizing problems, than the presence of only ADHD. Compared to participants without ADHD and with no experience of bullying (controls), those with both ADHD and bullying presented significant levels of co-occurring ASD and, in addition, their mothers' health status was worse.

Overall, in line with previous literature, the results show that the prevalence of self-perceived bullying victimization in pre-adolescents is high (Biswas et al., 2020; Sidera et al., 2020). Also in line with previous literature, and as we hypothesized, the rate of self-perceived bullying victimization was significantly higher in participants with ADHD than in controls (Blake et al., 2016; Winters et al., 2020). Moreover, participants with ADHD had high rates of a severe form of self-perceived bullying victimization. Like other studies (Chou et al., 2018; Schoeler et al., 2019), therefore, our results demonstrate that ADHD is a vulnerability factor for the presence of bullying victimization. Specifically, our findings indicated that pre-adolescents with ADHD-C were more than twice as likely to suffer bullying victimization and showed a higher prevalence of self-perceived bullying victimization than those with the other two presentations, which partially confirms our hypothesis. Children and adolescents with ADHD-C simultaneously show symptoms of inattention, hyperactivity, and impulsivity and, as was reported in previous studies, this presentation is most frequent in school-age children (Canals-Sans et al., 2021; Peñuelas-Calvo et al., 2021). As has been stated in the literature, ADHD symptoms are related to socialization problems, which can lead to difficulties in building friendships with peers. ADHD symptoms, especially hyperactivity and impulsivity, are considered provocative and aggressive behaviors that violate societal expectations. These children have low emotional and social skills, including an inability to correctly interpret social cues, which can lead peers to react aggressively (Bong et al., 2021; Holmberg & Hjern, 2008). In view of these considerations, the present results also showed that social exclusion, social manipulation and social blocking were the most prevalent bullying factors in ADHD participants, which confirms that these pre-adolescents have significant socialization problems that require intervention. Even though the effect size was small-moderate, the sample of boys with ADHD showed significantly higher rates of victimization than their control peers on all AVE questionnaire scores except 'threats' and 'social blocking'. These results were not observed in the sample of girls, which suggests that, together with a diagnosis of ADHD, and particularly of ADHD-C, boys are more likely to suffer bullying than girls, thus confirming

our hypothesis. This finding is consistent with results both from previous studies and from the WHO, which reported that 11-, 13- and 15-year-old boys were at two-to-three times more risk of being bullied (Inchley & Currie, 2016; Lung et al., 2019). It is also known that gender differences exist in the behavioral expression of ADHD-related difficulties. Overall, boys have higher ADHD prevalence and severity rates and are more likely to be more impulsive and hyperactive than girls (Canals-Sans et al., 2021; Loyer-Carbonneau et al., 2021). This, together with the social interference generated by hyperactive-impulsive symptoms, may explain why boys with ADHD are more vulnerable to suffering bullying victimization than girls with ADHD.

Participants with ADHD and bullying had significantly high levels of associated psychopathological problems as we had predicted. Specifically, when the parents were the informants, they indicated a higher presence of externalized and total symptoms, while when the children self-reported it, they also indicated a significantly high presence of internalized problems. All educational agents, clinicians, educators, and families should therefore pay attention to this issue, since these boys and girls may be experiencing severe suffering at a time of great vulnerability to their mental health such as early adolescence. In accordance with these findings, in a study conducted with 131 participants aged between 11 and 15 and diagnosed with ADHD, Becker et al. (2017) suggested that the presence of peer victimization in this population was strongly related to a greater presence of anxiety and depressive symptoms and to low levels of self-esteem. Special attention should therefore also be paid to this issue given the strong relationship between peer victimization and suicidal spectrum behaviors in adolescents (Koyanagi et al., 2019).

It is also known that cognitive performance is impaired in individuals with ADHD (Claesdotter et al., 2018). Indeed, previous studies have reported that deficits in cognitive abilities may have significant risk implications for peer victimization (Zendarski et al., 2021). Contrary to what we had hypothesized, our results did not show more cognitive deficits in participants with ADHD and bullying than in those who only presented ADHD. Deficits in cognitive performance, therefore, seem unrelated to whether one experiences bullying or not. Previous research has suggested that effective working memory and perceptual reasoning are related to suitable social functioning and interpretation of social cues as well as better conflict management and resolution, and are less likely to lead to peer victimization (Huepe et al., 2011; Kofler et al., 2019; Liu et al., 2017). Since cognitive performance is often impaired in ADHD, and in agreement with previous studies, this may be another reason why high rates of self-perceived bullying victimization are observed in children and adolescents with ADHD.

Regarding educational outcomes, both ADHD and bullying are two conditions that have previously been linked to each other and to academic problems. Indeed, in many cases children and adolescents with ADHD require educational interventions (Flores et al., 2022; Samara et al., 2021). As was the case with cognitive functioning, our findings indicate that participants with ADHD presented significantly lower academic achievement levels, had more academic accommodations, and received more treatments regardless of whether they were experiencing bullying. However, the results of a previous study conducted with ADHD participants suggested that suffering peer victimization and failing to manage

victimization was associated with a low perception of academic competence and generally low academic outcomes (Zendarski et al., 2021). There is therefore a greater need to provide children with ADHD with the skills to identify and manage situations such as school violence and thus avoid further academic difficulties.

As far as co-occurrence with other disorders is concerned, ADHD has been observed to co-occur at high rates with ASD (Rong et al., 2021). Both these disorders are classified as neurodevelopmental disorders and present similar characteristics in certain areas. As expected, the present results show high rates of co-occurrence between ASD diagnoses and ADHD + bullying. The difficulties with social communication and social relationship skills inherent to ASD may explain these findings, thus confirming that bullying is a highly frequent phenomenon that is related to neurodevelopmental disorders (McClellmont et al., 2021). However, our study supports previous research that ADHD is related to a greater risk of bullying, and that ADHD-C may have a moderating effect on ASD so children with only ASD are not at greater risk (McClellmont et al., 2021; Montes & Halterman, 2007; Winters et al., 2020).

In addition to the impact of ADHD and/or bullying on a personal, social, and academic level, the family environment is also severely affected. Previous research has shown that behavior disturbances related to hyperactivity and impulsivity symptoms or social stigma associated with ADHD cause great stress and therefore lead to health problems for the parents of these children (Canals et al., 2018; Leitch et al., 2019). Given parents' perspectives on their offspring, peer victimization is associated with high levels of distress since they often feel powerless to help their children (Harcourt et al., 2014, 2015). In this context, our results show that only mothers of participants with ADHD + bullying had a worse health status than participants without ADHD and without bullying, which suggests that experiencing bullying in addition to ADHD has worse consequences for maternal health. As reported recently by Obeid et al. (2022), parental support can protect against the negative effects of bullying. It is therefore also important to support parents' psychological health and provide them with psychoeducation to help them feel better and enable them to help their offspring to manage this problem.

Since bullying is a complex and highly prevalent social phenomenon, and there are few studies on children and adolescents with ADHD, and considering the clinical presentations of ADHD, we believe this study addresses a highly important issue. However, it also has certain limitations. For example, it is cross-sectional. It is impossible to know how the experience of bullying affects the prognosis of ADHD. Moreover, as Hu et al. (2021) reported, several sources of information are needed when assessing the experience of bullying involvement at school in children with ADHD since low levels of agreement between informants are sometimes observed. In the present study, information on bullying was obtained only from the pre-adolescents themselves and it would have been enriching to have information also from parents and educators so that this issue could be explored further and possible cases of serious harassment identified. However, it is important to have self-reported information, as this type of behavior is usually not witnessed by adults and may go unnoticed, and in this regard, studies using self-reported instruments are scarce.

The present study provides greater insight into the relationship between ADHD and bullying in a school sample in which we have been able to study psychopathological, cognitive, and socio-

family variables. The data allow us to conclude that ADHD, in addition to being a disorder with considerable personal and socio-family impact, can be regarded as an important vulnerability factor for school violence and its emotional consequences. In bullying prevention, educational and clinical professionals should pay special attention to cases of ADHD for early detection and intervention. Our findings indicate that ADHD should be specially considered in the design of anti-bullying interventions, to ensure that they can benefit from interventions in the same way as their peers without neurodevelopmental disorders.

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