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Antila, Henna

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Bullying involvement in relation to personality disorders: a prospective follow-up of 508 inpatient adolescents

Henna Antila¹ · Riikka Arola¹ · Helinä Hakko² · Kaisa Riala³ · Pirkko Riipinen¹ · Liisa Kantojärvi²

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Abstract We examined the association of bullying behavior in adolescence to personality disorder (PD) diagnosed in early adulthood. The study sample consisted of 508 adolescents (300 girls, 208 boys) who were admitted to psychiatric inpatient treatment between April 2001 and March 2006. Data were based on semi-structured K-SAD-SPL-interviews and hospital treatments extracted from the Care Register for Health Care (CRHC). At the end of 2013, details of psychiatric diagnoses recorded on hospital discharges and outpatient visits were extracted from the CRHC. This study showed that female victims of bullying have an almost fourfold likelihood of developing a PD later in life compared to adolescents with no involvement in bullying behavior. Most of the females had Borderline PD. Female adolescents diagnosed with anxiety disorder during adolescence had an over threefold risk of developing a PD during late adolescence or early adulthood. Conversely, we found no associations between bullying involvement among men in adolescence and subsequent PDs. Bullying victimization may influence the development of PDs among females. Adolescent services should pay particular attention to female victims of bullying and those displaying symptoms of anxiety disorders.

Keywords Bully · Victim · Personality disorder · Adolescent · Anxiety

Introduction

Bullying in youth is defined as intentional negative behavior that typically occurs repeatedly and where there is an imbalance of power, with a more powerful person or group attacking a less powerful one [1, 2]. The aggressive behavior may be verbal (e.g., name-calling, threats), physical (e.g., hitting), or psychological (e.g., rumors, exclusion) [2].

Estimates of the prevalence of bullying involvement (either as a perpetrator or victim of bullying) differ widely. This may partly be explained by differences in the methods used to measure bullying involvement, but it probably also reflects national differences [3, 4]. In a cross-national study by Craig et al. [4] that included 202,000 adolescents in 40 countries, the prevalence of involvement in bullying among boys ranged from 9 to 45% and among girls from 5 to 36%. Further, 11% of adolescents reported bullying others, 13% reported being bullied and 4% reported being both a bully and a victim of bullying. In their study, adolescents in Baltic countries reported higher rates of bullying and victimization, whereas northern European countries reported the lowest rates. Boys reported higher rates of bullying than girls in all countries while, in most countries, victimization rates were higher for girls. [4].

Bullying behavior during childhood is associated with many psychiatric disorders including depression, conduct/oppositional disorder and attention deficit disorder [5–8]. Bullying involvement also has more longstanding consequences. Several studies have indicated that bullying involvement in childhood has various psychological

✉ Liisa Kantojärvi
liisa.kantojarvi@oulu.fi

¹ Research Unit of Clinical Neurosciences, Department of Psychiatry, University of Oulu, Oulu, Finland

² Department of Psychiatry, Oulu University Hospital, P.O. Box 26, 90029 Oulu, Finland

³ Department of Adolescent Psychiatry, Helsinki University Hospital, Helsinki, Finland

consequences later in life, but some of the results are controversial [6, 9–14]. Vaughn et al. [10] identified significant correlations between a lifetime history of bullying behavior and bipolar disorder, substance use disorders and conduct disorder. Studies have shown that being a victim of bullying increases the risk of anxiety disorder and being both a victim and perpetrator of bullying increases the risk of anxiety disorders, adult depression and panic disorder in early adulthood [11, 13]. Furthermore, bully victims have been found to have 1.5–5.4 risk of suicide attempts in the general population [15].

Personality disorders (PDs) are common psychiatric disorders. It has been established that early life experiences, particularly when several adversities occur during childhood, and parental care associate with PDs later in life [16]. PD symptoms during the school years have been found to associate with disturbances in social relationships and poor school performance [17, 18]. Furthermore, it has been found that peer-group problems emerging in late childhood and adolescence are predictors of later PD features [19]. Additional studies have suggested that bullying involvement relates to certain types of personality disorders (PDs). Studies [11, 13] have shown that being a bully or a bully victim in childhood or in adolescence increases the risk of antisocial PD in early adulthood. Furthermore, significant associations between bullying and antisocial, paranoid and histrionic PDs have been shown [10]. According to the Diagnostic and Statistical Manual (DSM-IV-TR) [20], PD is an enduring pattern of inner experience and behavior that deviates significantly from the expectation of the individual's culture and is pervasive and inflexible. PD has an onset in adolescence or early adulthood, is stable over time, and leads to distress or impairment. DSM-IV-TR classification includes ten categories of PD, which can be divided into three clusters.

The aim of the present study is to examine whether bullying involvement in adolescence (either as a perpetrator or victim of bullying) is associated with PDs diagnosed in early adulthood (under the age of 30). This association was examined for men and women, separately. The study sample consisted of subjects who had required psychiatric inpatient treatment between the ages of 13–17.

Methods

This study is a part of a clinical follow-up project, STUDY-70, which has been described in more detail previously [21]. The STUDY-70 project was initiated to examine the association of various psychosocial risk factors to the outcomes of severe psychiatric and substance use disorders among adolescents, who were treated in a psychiatric

adolescent inpatient ward (Unit 70) at Oulu University Hospital. The catchment area of Unit 70 is Northern Finland, which includes the provinces of Oulu and Lapland. This area covers approximately 40% of Finland's land area. In this area, all young adolescents who require acute psychiatric hospitalization are treated in Unit 70. The study was approved by the Ethics Committee of the Faculty of Medicine, University of Oulu.

Participants and procedure

The study population consisted of 637 adolescents aged 13–17, who were admitted to Unit 70 between April 2001 and March 2006. Individuals aged over 18 years ($n = 1$) and adolescents with intellectual disability ($n = 26$) or organic brain disorder ($n = 3$) were excluded. In addition, individuals whose inpatient stay was so short that their interviews could not be completed ($n = 22$) were excluded from the study, as were adolescents who did not or whose guardians did not provide written informed consent to participate ($n = 77$). The final study sample consists of 508 adolescents: 300 girls, 208 boys, which was 83.7% of all eligible adolescents. The mean age of the participants was 15.5 years (SD 1.3). 98% of the adolescents were Caucasian. The follow-up time after index hospitalization at Unit 70 varied from 5.5 to 12 years. The STUDY-70 project was approved by the Ethics Committee of the Oulu University Hospital.

The adolescents were interviewed during hospitalization using the semi-structured Schedule for Affective Disorder and Schizophrenia for School-Age Children, Present and Life Time (K-SADS-PL) [22]. K-SADS-PL has been shown to be a reliable method for defining DSM-IV diagnoses [22, 23]. The parents were interviewed if any information was missing or remained unreliable after interviewing the adolescent. Information about each adolescent's school-related factors as well as their parents' employment status and substance-related problems were collected from the European Addiction Severity Index (EuropASI) [24]. Causes for hospitalization were based on the information gathered using the semi-structured admission form at admission to psychiatric unit 70.

Information on hospital discharges and outpatient visits were extracted from the Care Register for Health Care (CRHC) provided by the Finnish National Institute for Health Welfare (THL). Hospital discharges cover the lifetime inpatient treatments of adolescents. Outpatient visits consist of specialist level treatments since the year 1998. Psychiatric diagnoses in these registries were based on ICD-9 classification before year 1996 and, since then onwards, the ICD-10 classification [25]. In this study, information on registries was available until the end of the year 2012.

Measures

Bullying behavior

Information on bullying behavior was selected from two sections of K-SADS-PL. First, in the section covering school adaptation and social relations, participants were asked whether or not they have ever been bullied. Second, information on the bullying of others was obtained from the conduct disorder criteria. The adolescent were asked several questions: Has there ever been a time when any kids really got on your nerves? Did you sometimes do things to get back at them? Like what? Did you call them names? Threaten or beat them up? Push them? Trip them? Knock their books out of their hands? Come up from behind and slap them in the face? How often did you do these things? K-SADS-PL interview categorizes bullying as follows: 0, no information; 1, not present; 2, sub-threshold (bullied, threatened or intimidated another on only one or two occasions; 3, threshold/bullied, threatened or intimidated another on three or more occasions). Bullying was defined as present if a subject was categorized as having a threshold level of bullying. Using this information on bullying behavior, the adolescents were then categorized into four mutually exclusive subgroups: victims of bullying, bullies, those who have been both perpetrators and victims of bullying, and those with no involvement in bullying behavior. This categorization is widely used in the literature and is supported by the finding that bully victims constitute a clearly distinct subgroup from either bullies or victims [26]. In the current study, the subgroups for bully and bully victims were combined into one group to justify the statistical comparisons between the different groups of bullying behavior.

Personality disorders

Diagnoses for PD (ICD-9: 301, ICD-10: F60.0-0.9) were based on in- and outpatient information from the CRHC after index hospitalization period until the end of 2012. The PD validation process is described in an earlier publication [27]. ICD-diagnoses [25] were converted to research diagnoses based on DSM-IV-TR, because the DSM-5 was not in use in Finland at the time the study was conducted. According to the instructions for ICD-10, PDs tend to appear in late childhood or adolescence and continue to be manifest into adulthood. It is, therefore, unlikely that a diagnosis of PD will be appropriate before the age of 16 years. Furthermore, the ICD-10 and DSM-IV criteria of personality disorders states the deviation of personality cannot be explained as a manifestation or consequence of other adult mental disorders. Therefore, we excluded those subjects ($n = 15$) who were diagnosed with severe psychotic disorders, such as schizophrenia or schizoaffective

disorder. A total of 73 (32 males, 41 females) subjects had received a PD diagnosis. Those aged under 16 years with comorbid schizophrenia spectrum diagnosis or cyclothymia were excluded, leaving 57 (24 males, 33 females) subjects included in the study.

According to the DSM-IV criteria [20], the PDs were classified into three clusters. Cluster A consists of paranoid (ICD F60.0, DSM-IV 301.00), schizoid (F60.1, 301.20) and schizotypal (F21, 301.22) PD. Cluster B includes anti-social (F60.2, 301.70), borderline (F60.31, 301.83), histrionic (F60.4, 301.50) and narcissistic (F60.8, 301.81) PD. Avoidant (F60.6, 301.82), dependent (F60.7, 301.60) and obsessive–compulsive (F60.5, 301.40) PDs belong to cluster C. There is also a residual category, PD not otherwise specified (personality disorder NOS, F60.9, 301.90). This diagnosis may be given when the patient has a disorder of personality functioning that cannot be classified as a specific PD as defined in the DSM criteria [20]. In this study, four subjects fulfilled the criteria of cluster A (4 men, 0 women), 38 of cluster B (12 men, 26 women), four subjects of cluster C (1 man, 3 women) and 11 subjects (7 males, 4 females) of PD NOS.

Covariates

Covariates were obtained from the K-SADS-PL interview, except family- and school-related factors which were assessed using the EuropASI interview. Socio-demographic variables included gender (male/female), age at index hospitalization, family type (two biological parents, one biological parent, child welfare placement, other). Family- and school-related factors included: repeating a year at school (yes/no), special services at school (yes/no), close relationships with friends (yes/no) and mother or father unemployed (yes/no). Suicidality and impulsive behavior was determined by asking about suicidal ideation (yes/no), suicide attempts (yes/no), self-mutilation behavior (yes/no) and impulsivity (yes/no). Impulsivity was defined as being present if the patient often behaves impulsively (acts before thinking) and impulsivity has a moderate to severe effect on their functioning. Impulsivity was coded as follows: 0, no information; 1, not present; 2, sub-threshold; occasionally impulsive, problem has only minimal effect on functioning; 3, threshold: often impulsive, problem has moderate to severe effect on functioning. The adolescent was considered to have impulsivity if threshold (yes/no) criteria were fulfilled. Adverse life events included witnessing domestic violence (yes/no), physical maltreatment by parents (yes/no) and sexual abuse (yes/no). Psychiatric disorder diagnoses were set in the period of index hospitalization and were based on the K-SADS-PL interview. Psychiatric diagnoses were divided into five categories as follows: psychotic disorders (DSM-IV-TR: 295, 296.0, 296.4–0.9, 297.1–0.3,

298.8–0.9, 301.13, 301.22), anxiety disorders (300.00–0.02, 300.21–0.23, 300.29, 300.3, 308.3, 309.81), affective disorders (296.2–0.3, 300.4, 311), substance use disorders (303.9, 304.0–0.6, 304.8–0.9, 305.0, 305.2.7, 305.9) and conduct disorders (299.80, 312.8–0.9, 313.81, 314).

Statistical methods

Statistical significances of group differences in categorical variables were analyzed using Pearson's Chi-square test or Fisher's exact test and in continuous variables using Student's *t* test. A binary logistic regression analysis (method = enter) was used to examine the association of bullying behavior to PD (= outcome variable) in the male and female adolescents, separately, after adjusting for covariates presented in Table 1 except for causes of hospital admission. All statistical tests were two sided and the limit for statistical significance was set at $p < 0.05$. All statistical tests were performed using IPM SPSS statistics 22 software.

Results

Table 1 shows the background and clinical characteristics of the study subjects according the bullying behavior groups among patients with and without PD. The results showed that family type is associated with bullying involvement in the PD group ($p = 0.047$); bullies and bully victims were placed more often in child welfare institutions and victims of bullying lived more often with one biological parent. Bullies and bully victims with subsequent PD had experienced more physical maltreatment by parents ($p = 0.006$), were significantly more impulsive ($p \leq 0.001$) and all had conduct disorder as a diagnosis at index hospitalization. Victims of bullying with subsequent PD were less likely to have substance use disorder as their index hospitalization diagnosis ($p = 0.047$). Bullying behavior in adolescent boys was shown to decrease with age (<15 years vs. 15+ years: no bullying behavior, 28 vs. 50%; victim, 35 vs. 27%, and bully/bully victim: 37 vs. 23%; $p = 0.017$), while no significant difference was seen in adolescent girls.

Among females with PD, 61% had been victims of bullying in adolescence compared to 36% in the control group ($p = 0.018$). The results of a logistic regression analysis (Table 2) showed that female victims of bullying were almost four times more likely to have PD compared to adolescents with no involvement in bullying behavior. Special services at school, anxiety disorder and lack of close relationships with friends were also associated with PD among girls.

Among male adolescents there were no differences in the type of adolescent bullying behavior between those

with PDs and controls without PD ($p = 0.760$). Table 2 shows that boys who were placed in child welfare institutions had a more than 5 times higher risk for developing PD compared to boys who lived with two biological parents. PD was also associated with suicide ideation during index hospitalization among boys.

Table 3 shows the PD clusters of adolescents in relation to their gender and bullying behavior group. The majority of female (26, 78.8%) and male (12, 50%) subjects had cluster B PD diagnoses. A total of 16 (61.5%) of the females with cluster B PD had been victims of bullying, while the corresponding number in males was 4 (33.3%). Of all cluster B diagnoses, 33 (86.8%) had borderline PD, 25 (96.1%) being female and 8 (66.6%) male.

Discussion

The present study shows that being a victim of bullying during childhood and adolescence increases the risk of subsequent PDs by nearly fourfold among females. In our study, the vast majority of females with PD had borderline PD. To our knowledge, the gender-specific association of bully victimization and subsequent borderline PD only among females but not among males is a novel finding. No associations were found between any type of bullying involvement and subsequent PDs among men.

Earlier studies [11, 13, 28, 29] have shown that bullying behavior in childhood or adolescence is a predictor of antisocial behavior and antisocial PD in adulthood. On the basis of previous studies [16, 30, 31], there is also an association between history of bullying victimization and borderline PD. However, earlier studies have not researched gender-specific associations. Our results show that bullying victimization and severe hospital-treated anxiety disorder in adolescence increased the likelihood for PD by over threefold among females, but similar association was not found among males. A Finnish follow-up study [11] showed that frequent bullying victimization in childhood among boys increased the risk of anxiety disorder by almost threefold in early adulthood. A prospective population-based study [13] established that victims of bullying in childhood and adolescence had a higher prevalence of anxiety in early adulthood in both genders. We propose that anxiety disorder may act as one mediating factor in the association between being a victim of bullying and developing a borderline PD. This hypothesis merits further studies using larger databases. Earlier studies have found that individuals with borderline PD were likely to have a comorbid lifetime anxiety disorder in adulthood [32–34]. In addition to bullying victimization, our study identifies the lack of close friends and the need for special services at school as other important explaining factors in the development of PD. One form

Table 1 Background and clinical characteristics of study subjects according to their personality disorder status

	Personality disorder (<i>n</i> = 57)				No personality disorder (<i>n</i> = 451)				<i>p</i> value		
	Bully ^a or bully victim ^{b,c} (<i>n</i> = 9)		Victim (<i>n</i> = 28)		No bullying behavior (<i>n</i> = 20)		Bully ^a or bully victim ^{b,c} (<i>n</i> = 91)			Victim (<i>n</i> = 148)	
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)		<i>n</i> (%)	<i>n</i> (%)
Socio-demographics											
Gender, male	5 (55.6)	8 (28.6)	11 (55.0)	0.126	51 (56.0)	53 (35.8)	80 (37.7)	0.004**			
Age at index hospitalization, mean (sd)	15.00	15.75	15.90	0.190	15.41	15.43	15.42	0.994			
Family type				0.047*				<0.001***			
Two biological	1 (11.1)	10 (35.7)	4 (20.0)		19 (20.9)	68 (45.9)	87 (41.0)				
One biological	2 (22.2)	12 (42.9)	5 (25.0)		24 (26.4)	42 (28.4)	70 (33.0)				
Child welfare placement	5 (55.6)	2 (7.1)	8 (40.0)		29 (31.9)	19 (12.8)	26 (12.3)				
Other	1 (11.1)	4 (14.3)	3 (15.0)		19 (20.9)	19 (12.8)	29 (13.7)				
Family- and school-related factors											
Repeat a year at school	4 (44.4)	3 (10.7)	6 (30.0)	0.071	26 (28.6)	13 (8.8)	25 (11.8)	<0.001***			
Special services at school	7 (77.8)	16 (57.1)	16 (80.0)	0.197	67 (73.6)	65 (43.9)	86 (40.6)	<0.001***			
No close friendships	1 (11.1)	7 (25.0)	8 (40.0)	0.244	18 (19.8)	24 (16.2)	26 (12.3)	0.220			
Mother and/or father unemployed	2 (22.2)	7 (25.0)	6 (30.0)	0.886	24 (26.4)	35 (23.6)	37 (17.5)	0.153			
Adverse life events											
Witnessed domestic violence	4 (44.4)	7 (25.0)	8 (40.0)	0.412	32 (35.2)	44 (29.7)	56 (26.4)	0.305			
Physical maltreatment by parents	3 (33.3)	6 (21.4)	5 (25.0)	0.006**	35 (38.5)	38 (25.7)	44 (20.8)	0.775			
Sexual abuse	2 (22.2)	9 (32.1)	3 (15.0)	0.420	11 (12.1)	20 (13.5)	30 (14.2)	0.891			

Table 1 continued

	Personality disorder (<i>n</i> = 57)				No personality disorder (<i>n</i> = 451)				<i>p</i> value		
	Bully ^a or bully victim ^{b,c} (<i>n</i> = 9)		Victim (<i>n</i> = 28)		No bullying behavior (<i>n</i> = 20)		Bully ^a or bully victim ^{b,c} (<i>n</i> = 91)			Victim (<i>n</i> = 148)	
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)		<i>n</i> (%)	<i>n</i> (%)
Causes for index hospitalization											
Depressive mood	2 (22.2)	9 (32.1)	7 (35.0)	0.862	80 (37.7)	53 (35.8)	80 (37.7)	0.222			
Suicidality	4 (44.4)	10 (35.7)	9 (45.0)	0.762	73 (37.4)	54 (36.5)	79 (37.3)	0.992			
Self-mutilating behavior	1 (11.1)	2 (7.1)	2 (10.0)	1.00	5 (5.5)	3 (2.0)	6 (2.8)	0.311			
Psychotic symptoms	0 (0)	4 (14.3)	4 (20.0)	0.451	4 (4.4)	21 (14.2)	31 (14.6)	0.035			
Anxiety	2 (22.2)	4 (14.3)	5 (25.0)	0.660	19 (20.9)	32 (21.6)	24 (11.3)	0.017			
Substance use	2 (10.0)	3 (10.7)	1 (10.0)	1.000	19 (9.0)	11 (7.4)	19 (9.0)	0.629			
Behavioral problems	0 (0.0)	3 (10.7)	1 (5.0)	0.525	24 (26.4)	15 (10.1)	28 (13.2)	0.002**			
Aggressive behavior	2 (10.0)	2 (7.1)	2 (10.0)	0.022	25 (27.5)	14 (9.5)	23 (10.8)	<0.001*			
Suicidality and impulsive behavior											
Suicide ideation	5 (55.6)	13 (46.4)	8 (40.0)	0.772	38 (41.8)	68 (45.9)	72 (34.0)	0.064			
Suicide attempts	2 (22.2)	8 (28.6)	4 (20.0)	0.914	20 (22.0)	40 (27.0)	30 (14.2)	0.009**			
Self-mutilation behavior	4 (44.4)	8 (28.6)	6 (30.0)	0.660	29 (31.9)	46 (31.1)	51 (24.1)	0.222			
Psychiatric disorders at index hospitalization											
Psychotic disorder	0 (0.0)	4 (14.3)	2 (10.0)	0.846	6 (6.6)	26 (17.6)	32 (15.1)	0.054			
Anxiety disorder	3 (33.3)	14 (50.0)	6 (30.0)	0.340	15 (16.5)	42 (28.4)	37 (17.5)	0.022*			
Affective disorder	6 (66.7)	15 (53.6)	13 (65.0)	0.653	34 (37.4)	79 (53.4)	8 (40.0)	0.052			
Substance use disorder	6 (66.7)	7 (25.0)	10 (50.0)	0.047*	55 (60.4)	38 (25.1)	79 (37.3)	<0.001***			

Table 1 continued

	Personality disorder (<i>n</i> = 57)			No personality disorder (<i>n</i> = 451)			<i>p</i> value
	Bully ^a or bully victim ^{b,c} (<i>n</i> = 9)	Victim (<i>n</i> = 28)	No bullying behavior (<i>n</i> = 20)	Bully ^a or bully victim ^{b,c} (<i>n</i> = 91)	Victim (<i>n</i> = 148)	No bullying behavior (<i>n</i> = 212)	
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	
Conduct disorder	9 (100.0)	9 (32.1)	8 (40.0)	79 (86.8)	45 (30.4)	75 (35.4)	<0.001***
Impulsivity	8 (88.9)	5 (17.9)	6 (30.0)	57 (62.6)	13 (8.8)	29 (13.7)	<0.001***

Note: *n* and % indicates positive answers (yes), if not otherwise specified

**p* < 0.05

***p* < 0.01

****p* < 0.001

^a Includes 6 bullies and 3 bully victims

^b Includes 66 bullies and 25 bully victims

^c Bully victim is a person who is a perpetrator and also victim of bullying

of bullying, particularly seen among girls, is exclusion and isolation from peer groups [35]. It is easy to see how this isolation could lead to anxiety and an unwillingness to attend school, leading to a consequent need for special service intervention.

Our study showed that bullies and those who have been both perpetrators and victims of bullying with a subsequent PD have more often experienced physical maltreatment by parents compared to victims of bullying and those with no involvement in bullying behavior who have subsequently developed PDs. Earlier studies [33–36] have shown that early trauma experiences are associated with subsequent PDs. Early traumatic experiences such as emotional, physical and sexual abuse, violence in the family, major illness and separation from parents in childhood in particular are associated with an increase the risk of subsequent borderline PD [19, 36, 37]. Bullying victimization may be one of the most significant traumatic experiences in childhood [14, 19, 39–42], but there are still too few studies that explore the association of bullying victimization with subsequent PDs.

Our results showed that in adolescents with later PD, those who had a history of being a bully or bully victim were notably younger at the index hospitalization than those without a history of bullying behavior. Thus, it should be noted that these adolescents may have potential risks for the development of PD later in life. Magallón-Neri et al. [42] have reported that adolescents with comorbid PD access more psychiatric hospital services than adolescent patients without PD. Unfortunately, our data do not include sufficient information to allow us to assess whether bullying precedes psychiatric symptoms in adolescent patients or pre-existent psychiatric symptoms preceded bullying. However, PDs tend to appear in late childhood or adolescence and continue to be manifest into adulthood [25], and there are several factors that can effect the developmental course of PDs [19]. Without a healthy control group, as was the case in our study, any firm judgments about the causal direction of the associations may not be justifiable. A Swedish study [43] of adolescents’ perception of bullying noted that the most common reason for being bullied was a different appearance. Further, adolescents believed that those who bullied suffered from low self-esteem. They also found that those adolescents who were not involved in bullying during their school years had a stronger belief that victims can stand up for themselves than victims themselves. Thus, bullying behavior may be a potential marker of vulnerability for developing PD later in life. In addition, some subjects with certain PDs may be more sensitive to or more likely to develop a perception of victimization, particularly when they are suspicious or have paranoid ideations [20], e.g., paranoid PD. Further, passive-aggressive personality traits have been found to expose to victimization [44].

Table 2 The association of bullying behavior to personality disorder among adolescent psychiatric patients

	Likelihood for personality disorder ^a		
	OR	95% CI	<i>p</i> value
Girls			
Bullying behavior groups			0.009
Victim	3.80	1.40–10.30	0.009
Bully or bully victim	0.55	0.11–2.83	0.476
Covariates:			
Special services at school	4.80	1.89–12.20	0.001
No close friendships	4.82	1.50–15.54	0.008
Anxiety disorder at index hospitalization	3.06	1.23–7.60	0.016
Boys			
Bullying behavior groups			0.252
Victim	1.17	0.36–3.82	0.800
Bully or bully victim	0.31	0.07–1.40	0.127
Covariates:			
Family type: child welfare placement versus two biological parents	5.50	1.13–26.80	0.035
Suicide ideation	3.91	1.11–13.77	0.034

Only the statistically significant results of covariates are presented in the table

^a Odds ratio (OR), 95% confidence interval (95% CI) and *p* value from logistic regression model after adjusting for covariates

Table 3 Bullying behavior in relation to different personality disorder clusters

	Bully or bully victim (<i>n</i> = 9) <i>n</i> (%)	Victim (<i>n</i> = 28) <i>n</i> (%)	No bullying behavior (<i>n</i> = 20) <i>n</i> (%)	<i>p</i> value
Girls (<i>n</i> = 33)				0.925
Cluster A	0 (0.0)	0 (0.0)	0 (0.0)	
Cluster B	3 (11.5)	16 (61.5)	7 (26.9)	
Cluster C	0 (0.0)	2 (66.7)	1 (33.3)	
Personality disorder NOS	1 (25.0)	2 (50.0)	1 (25.0)	
Boys (<i>n</i> = 25)				0.501
Cluster A	0 (0.0)	3 (75.0)	1 (25.0)	
Cluster B	2 (16.7)	4 (33.3)	6 (50.0)	
Cluster C	1 (100.0)	0 (0.0)	0 (0.0)	
Personality disorder NOS	2 (28.6)	1 (14.3)	4 (57.1)	

While subjects with masochistic features, so-called self-defeating personalities, may act manipulatively with the intent to get hurt in their social relationships [20].

To the best of our knowledge, this is the first follow-up study researching bullying behavior in adolescence and its association to subsequent PDs. The main strength of this study is that, due to our use of the semi-structured diagnostic interview, it was possible to make valid and reliable psychiatric DSM-IV diagnoses. Data were gathered from representative national health care registries from outpatient and institutional care [45]. Earlier studies have examined bullying behavior among boys or boys and girls together, but our study was able to analyze boys and girls separately.

In addition, the catchment area was geographically large and the study subjects formed a homogenous group of adolescent patients from Northern Finland.

A limitation of the study is the small number of the cases of PDs, which may have caused a lack of statistical power in analyses. In clinical practice PD diagnoses are made with caution and, therefore, their prevalence is often underestimated [46]. Furthermore, cluster C PDs are rare in clinical samples [47, 48], because those affected do not generally actively seek treatment. Unfortunately the small number of bully and bully victim cases in PD groups did not allow us to analyze these bullying groups separately. Furthermore, the generalization of the findings

to all general population adolescents is limited, because our sample consisted of hospitalized inpatients and there was no ‘healthy’ control group. A limitation in our study was that our measure of adolescent impulsivity was based on a single item of the K-SADS-PL interview. Mental health specialists often find it difficult to measure and evaluate impulsivity. A more comprehensive assessment of impulsivity would have been provided using the specific ADHD questionnaires. Although K-SADS-PL has been shown to be a reliable tool for obtaining DSM-IV-based psychiatric diagnoses for adolescents [22, 23], the determination of an adolescent’s bullying behavior is not necessarily unambiguous. The questions in the K-SADS-PL interview do not allow for a proper exploration of victimization. The adolescents were simply asked whether or not they had ever been bullied. No structured information for victimization is gathered because such a protocol for data collection was not included in the K-SADS-PL.

In addition, the questions in the K-SADS-PL interview concerning bullying behavior do not report the severity, frequency, type, or place and time of the bullying behavior. The age range of adolescents at index hospitalization was five years (from 13 to 17 years, mean age 15.5 years) and, therefore, the recall period for experiences of bullying behavior differs between individuals. This might affect the results because bullying behavior is known to decline with increasing age [43, 49]. It also has been suggested in previous study [50] that those subjects who are still involved in bullying behavior at an older age are more disturbed than those who engage in bullying behaviour when younger and when bullying is more normative. Unfortunately, the exact ages at which the adolescents had been involved in bullying behavior remain unknown, as the only age recorded for each subject in our study was their age at the time of the interview performed at their index hospitalization. Bullying behavior would have been more accurately defined if specific valid instruments for bullying behavior were used [51].

Conclusions

This study is an important addition to previous literature, because very few previous studies have investigated bullying behavior in adolescence in relation to the subsequent development PD later in life. Bullying victimization may have an influence on the development of PD in females, especially in the development of borderline PD. Given that bullying victimization in adolescence may have potentially serious consequences later in life, prevention and early intervention are extremely important. Teachers, school nurses and health care professionals should pay particular attention to all victims of bullying and actively

ask adolescents about their experiences of bullying. Adolescent services should pay particular attention to girls who are victims of bullying, who have problems at school or who show signs of anxiety. Further studies are needed using larger study populations to investigate other forms of maltreatment such as workplace bullying, bullying among siblings, dating maltreatment and cyberbullying as other potential covariates which may contribute to the development of PDs.

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Compliance with ethical standards

All human and animal studies have been approved by the appropriate ethics committee and have, therefore, been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. All patients and their parents or their guardians gave their informed consent prior to their inclusion in the study. The identity of the patients under study cannot be revealed from the results.

Conflict of interest The authors declare that they have no conflicts of interest.

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