

Research Article

The Relationship Between Psychological Trauma, Parenting Attitude, and Attention-Deficit Hyperactivity Disorder Symptoms in Korean Children

Park S^{1*}, Nam YY¹, Bae JH²¹Department of Psychiatry, Seoul National University Hospital, South Korea²Department of Psychiatry, Bongseng Memorial Hospital, South Korea***Corresponding author:** Park S, Department of Psychiatry, Seoul National Hospital, Neungdong-ro, Gwangjin-gu, Seoul 143-711, South Korea**Received:** February 02, 2015; **Accepted:** April 15, 2015;**Published:** April 16, 2015**Abstract****Objectives:** We examined the association between exposure to psychological trauma, parenting attitude, and attention-deficit hyperactivity disorder symptoms in Korean children.**Methods:** Fifty eight school-aged children (mean age 10.3±3.13 years) were recruited from community. They were asked about an experience of psychological trauma using an Early Trauma Inventory-Short Form (ETI-SF). Parenting attitude of their mothers was assessed by the Maternal Behavior Research Instrument (MBRI) and Attention-Deficit Hyperactivity Disorder (ADHD) symptoms of children were assessed by the parent version of the ADHD-Rating Scale.**Results:** Compared with the children without psychological trauma, the children with psychological trauma showed higher scores on the ADHD-Rating Scale. The mothers of the children in the trauma group were more likely to have experienced childhood trauma and showed less affective and more rejecting parenting attitudes compared with the mothers of the children in the non-trauma group. After adjusting for child sex and age, maternal education level, and family socio-economic status, we found that the children's exposure to trauma and the mothers' rejecting attitude had a significant interaction effect on children's hyperactive-impulsive symptoms ($F=2.89, p=0.025$).**Conclusion:** Our results suggest that adequate parenting is important for preventing behavioral problems, such as ADHD symptoms, in children who have experienced psychological trauma. Further work using a larger sample and a prospective design is needed to confirm the results of this study.**Keywords:** Early trauma; Parenting; Child; Attention-deficit hyperactivity disorder**Abbreviations**

ADHD: Attention-Deficit Hyperactivity Disorder; ETI-SF: Early Trauma Inventory-Short Form; MBRI: Maternal Behavior Research Instrument; ADHD-RS: ADHD-Rating Scale; ANCOVA: Analysis of Covariance

Introduction

Attention-Deficit Hyperactivity Disorder (ADHD) is a disorder primarily characterized by inattention, impulsivity, and hyperactivity. ADHD affects 6% to 8% of school-aged children [1]. Extant evidence indicates that dysregulation of the central dopaminergic and noradrenergic system may be involved in its pathophysiology [2,3]. ADHD has an estimated heritability of approximately 76%; therefore, it is generally regarded as having a genetic basis [4]. However, the remaining phenotypic variance (25%) in ADHD has been largely attributed to environmental factors, such as perinatal stress, postnatal childhood adversity, and poor parenting [5].

Early exposure to psychological trauma strongly predicts ADHD. Children's brains are shaped irrevocably by their early life experiences

[6], and the effects of these experiences persist into adulthood [7]. Children exposed to early violence are 'hard-wired' to be anxious, distractible, highly aroused and impulsively aggressive in situations of conflict; thus, it is easy to see how they might fulfill the criteria for a diagnosis of ADHD [8]. The results of studies examining the association between brain size and trauma have also suggested that traumatic stress is associated with disproportionately negative consequences if it occurs in early childhood and that childhood maltreatment has global and adverse effects on brain development that might be cumulative [9]. Maltreated children (e.g. those who have been exposed to physical and sexual abuse and neglect) exhibit higher levels of ADHD compared with non-maltreated youth [10,11]. Early chronic stress disrupts the functioning of the hypothalamic-pituitary-thalamic axis, which regulates stress reactivity, mental health, and dopamine neurotransmission [12].

Previous animal and human studies suggest that poor maternal care is associated with dysregulation of the central dopamine system, which may lead to ADHD symptomatology. Prolonged maternal neglect and separation were inversely associated with dopamine transporter binding in rat pups [13], and poor maternal care during

childhood significantly increased the release of dopamine in the ventral striatum of young adult humans [14]. Low behavioral control and less maternal affection were related to the development of externalizing behavioral problems in children [15,16]. Extreme early privation [17] and institutional care during early development [18] can lead to high rates of hyperactivity and inattention. A longitudinal study has also shown that the quality of the parenting children receive during infancy predicts subsequent hyperactivity [19]. A recent review that focused on the family characteristics associated with ADHD [20] reported that ADHD is associated with problematic family functioning, including higher rates of parental psychopathology and conflicted parent-child relationships.

There is a close relationship between a child's exposure to psychological trauma and poor parenting by the mother, and both of these factors increase the risk of ADHD. In addition, mothers' own experiences of childhood trauma are associated with both their parenting attitude and their children's exposure to psychological trauma. For example, mothers who have experienced childhood maltreatment are likely to have a harsh parenting attitude [21,22] and use physical punishment [23], and their children have an increased risk of physical maltreatment [24].

Given these complex relationships, in this study, we investigated the relationship between exposure to psychological trauma, maternal parenting attitude, and ADHD symptoms in Korean children. We compared children who had experienced psychological trauma with those who had not in terms of ADHD symptoms and their mothers' history of childhood trauma and parenting attitudes. The interaction between psychological trauma and parenting attitude was also examined in relation to ADHD symptoms.

Materials and Methods

Participants

Fifty eight children were recruited from a primary school and a middle-school in Seoul, South Korea. Children were eligible to participate in the study if (1) their intelligence quotient score was above 70, (2) they were able to understand the contents of the questionnaires, and (3) their ages were between 6 and 15 years. To measure intelligence quotient, the children were administered the abbreviated form of the Korean Educational Development Institute's Wechsler Intelligence Scales for Children (KEDI-WISC) [25]. The exclusion criteria included the following: subjects (1) who had past or current neurological diseases, (2) who had been diagnosed with a pervasive developmental disorder or mental retardation, (3) who were taking psychotropic medications. The Institutional Review Board for human subjects at Seoul National University Hospital approved this study, and the parents of the participants provided written informed consent prior to enrollment.

Measurement

Psychological trauma

Children and mothers were asked about an experience of psychological trauma using an Early Trauma Inventory-Short Form (ETI-SF), a 27-item questionnaire used for the assessment of physical, emotional, and sexual abuse, and general traumatic experience that may have occurred before age 18. The measure has been shown to have excellent validity and internal consistency [26,27]. Each traumatic

experience was scored dichotomously (yes/no). Respondents who experienced any traumatic event were placed in the trauma group, and subjects who did not experience such a traumatic event were placed in the non-trauma group.

Mother's parenting attitude

Parenting attitude of their mothers was assessed by the Maternal Behavior Research Instrument (MBRI), a 48-item questionnaire used for the assessment of affective, rejecting, autonomic, and controlling attitude [28,29]. Each item is measured on 5-point Likert scale and subscale scores were calculated by summing scores on 12 items of each subscale. Higher scores on each subscale indicate that maternal parenting attitude corresponds to the sub factor.

ADHD symptoms

ADHD symptoms of children were assessed by the parent version of the ADHD-Rating Scale (ADHD-RS), a symptom severity scale composed of 18 items, according to DSM-IV criteria [30]. The Korean version of ADHD-RS was standardized by So et al. [31]. It consists of inattentive subscale and hyperactive-impulsive subscale, and higher scores indicate more severe symptoms.

Data analysis

We compared demographic characteristics, mother's childhood trauma history and parenting attitude, and ADHD symptoms between children with and without psychological trauma using independent t-test for continuous variables and chi-squared test or Fisher's exact test for categorical variables. Shapiro-Wilk test was used to test normality of the distribution. MBRI scores were normally distributed ($p > 0.05$), but ARS scores were not ($p < 0.05$). Therefore, ARS scores were log transformed using natural logs to achieve normal ARS scores distributions. We then performed binary logistic regression analyses to examine the association between mother's childhood trauma history and child's psychological trauma after adjusting for the child's sex, age, the maternal education level, socio-economic status, and each parenting attitude. Next, we conducted multivariate modeling to examine the relationships among the child's psychological trauma, parenting attitude, and the ADHD symptoms; the child's sex, the child's age, the maternal education level, and the socio-economic status were included as covariates. A child's trauma-by-parenting attitudes interaction term was also included in the model. SPSS (version 21.0; SPSS Inc, Chicago, IL) was used to perform all statistical analyses and a p-value less than 0.05 was considered to be significant.

Results and Discussion

Among the 58 children included in our study, 30 had experienced psychological trauma and 28 had not (Table 1). Shows the group-specific demographic and clinical characteristics. The age, sex, maternal educational level, and socio-economic distributions were not significantly different between the trauma group and the non-trauma group. Compared with the children without psychological trauma, the children with psychological trauma showed higher inattention and hyperactivity-impulsivity scores on the ADHD Rating Scale. The mothers of the children in the trauma group were more likely to have experienced childhood trauma and showed less affective and more rejecting parenting attitudes compared with the mothers of the children in the non-trauma group.

Table 1: Comparison between children with and without childhood trauma.

	Children with trauma childhood trauma (N=30)	Children without trauma (N=28)	t/X ²	p
Sex, boys	19 (63.3)	17 (60.7)	0.04	0.837
Age, mean (SD)	10.83 (3.66)	9.71 (2.39)	1.37	0.176
Maternal education, N (%)			0.38	0.537
College degree or higher	18 (62.1)	14 (53.8)		
High school degree or lower	11 (37.9)	12 (46.2)		
Socio-economic status, N (%)				0.379
High	2 (6.9)	2 (7.7)		
Middle	12 (41.4)	15 (57.7)		
Low	15 (51.7)	9 (34.6)		
Maternal childhood trauma, N (%)	21 (70.0)	10 (35.7)	6.84	0.009
MBRI, Mean (SD)				
Affective attitude	42.37 (6.99)	46.39 (7.08)	-2.18	0.034
Rejecting attitude	35.13 (5.47)	31.18 (4.31)	3.04	0.004
Autonomic attitude	40.80 (6.56)	41.18 (6.02)	-0.23	0.820
Controlling attitude	41.43 (6.96)	40.39 (7.90)	0.53	0.596
ADHD-RS ^a				
Inattentive	5.08 (2.54)	2.17 (2.45)	3.43	0.001
Hyperactive-impulsive	2.52 (2.79)	1.41 (1.79)	3.36	0.002

Abbreviations: MBRI: Maternal Behavior Research Instrument; ADHD-RS: Attention-Deficit Hyperactivity Disorder Rating Scale

^aPresented as log_e-transformed scores

Bold type: p < 0.05

Table 2: Association between maternal childhood trauma, parenting attitude, and child's trauma.

	Dependent variables	Child's trauma	
		AOR (95% CI)	p Value
Model 1	Maternal trauma	5.09 (1.24-20.98)	0.024
Model 2	Maternal trauma	4.72 (1.12-19.83)	0.034
	Affective attitude	0.95 (0.85-1.06)	0.358
Model 3	Maternal trauma	3.68 (0.83-16.36)	0.087
	Rejecting attitude	1.16 (1.01-1.34)	0.04
Model 4	Maternal trauma	5.16 (1.25-21.36)	0.024
	Autonomic attitude	1.01 (0.92-1.12)	0.817
Model 5	Maternal trauma	5.92 (1.37-25.61)	0.017
	Controlling attitude	1.08 (0.97-1.16)	0.194

Binary logistic regression analyses: adjusted for child's age, child's sex, maternal education, and socio-economic status.

Bold type: p < 0.05

(Table 2) shows the association between a mother's history of childhood trauma and her child's exposure to psychological trauma. After adjusting for child's sex and age, maternal education level, and family socio-economic status, maternal exposure to childhood trauma was associated with the children's exposure to psychological trauma. This association remained significant even after controlling for the mothers' affective, autonomic, or controlling attitudes, but it was weakened after controlling for the mothers' rejecting attitude.

To examine the independent effects of the child's exposure to psychological trauma and maternal parenting attitude and the interaction effect between these two factors on children's ADHD

symptoms, we conducted Analysis of Covariance (ANCOVA). After adjusting for child's sex and age, maternal education level, and family socio-economic status, a child's psychological trauma was significantly associated with inattentive symptoms (F=6.76, p=0.012) and hyperactive-impulsive symptoms (F=6.13, p=0.017) (Model 1), but the mother's rejecting attitude was not (Model 2). When we included the interaction between the children's exposure to trauma and the mothers' rejecting attitude in the model (Model 3), we found that these variables had a significant interaction effect on children's hyperactive-impulsive symptoms (F=2.89, p=0.025). After adjusting for child's sex and age, maternal education level, and family socio-economic status, the mothers' affective attitude was associated with hyperactive-impulsive symptoms (F=2.57, p=0.010) (Model 2). When the interaction term between child trauma and maternal affective attitude was included in the model (Model 3), we found no significant interaction between these variables in relation to the children's inattentive or hyperactive-impulsive symptoms (Table 3).

The major findings of this study are that (1) a mother's history of childhood trauma is associated with her child's exposure to psychological trauma, and a maternal rejecting attitude may mediate this association, and that (2) children who have experienced psychological trauma have more ADHD symptoms compared with children who have not, and the child's exposure to psychological trauma and the mother's rejecting attitude have an interaction effect on the child's ADHD symptoms.

The results of the present study are consistent with the results of earlier studies, which reported that females who are abused are likely to have more negative perceptions of the transition to parenthood [32,33], exhibit less skillful maternal functioning [33], use more

Table 3: Association between child's trauma, parenting attitude, and attention-deficit hyperactivity disorder symptoms.

Independent variables	<i>Inattentive symptoms</i>		<i>Hyperactive-impulsive symptoms</i>	
	<i>F</i>	<i>p Value</i>	<i>F</i>	<i>p Value</i>
Model 1				
Psychological trauma	6.76	0.012	6.13	0.017
Model 2				
Maternal rejecting attitude	1.43	0.183	1.11	0.394
Model 3				
Psychological trauma	1.06	0.316	1.28	0.272
Maternal rejecting attitude	1.31	0.278	1.6	0.155
Psychological trauma x Maternal rejecting attitude	1.40	0.256	2.89	0.025
Model 2'				
Maternal affective attitude	1.67	0.105	2.57	0.01
Model 3'				
Psychological trauma	2.27	0.15	1.7	0.21
Maternal affective attitude	1.29	0.299	2.63	0.024
Psychological trauma x Maternal affective attitude	0.82	0.168	0.91	0.543

Analysis of Covariance: adjusted for child's age, child's sex, maternal education, and socio-economic status.

Bold type: $p < 0.05$

physical punishment strategies [23], and have a harsher parenting approach [21,22] compared with females who have not experienced maltreatment.

In particular, a maternal rejecting attitude appeared to mediate the relationship between a mother's history of childhood trauma and her child's exposure to psychological trauma. A rejecting parenting style can increase the risk of child abuse and can have a negative effect on the emotional development of the child. The results of this study are consistent with previous reports that childhood abuse trauma is passed from generation to generation, resulting in a vicious cycle of abuse [24,34].

Our results are consistent with previous studies that reported an association between early trauma exposure [10,11] and poor maternal care and the diagnosis or symptoms of ADHD [15,16,20]. Mothers with more rejecting and less affective parenting attitudes can hinder their children's development of behavioral control and impulse control by not providing their children with adequate care or discipline. Because the trauma-exposed children differed from the non-trauma-exposed children in terms of their mothers' parenting attitudes, we investigated whether maternal rejecting or affective attitudes affect the relationship between trauma and ADHD symptoms in children. As a result, we found that the child's trauma exposure and the mother's rejecting attitude had a significant interaction effect on child's hyperactive-impulsive symptoms. This finding indicates that hyperactive-impulsive symptoms in children are intensified when their mothers exhibit a rejecting attitude and have a history of traumatic experience, and it suggests the importance of maternal acceptance and positive parenting for traumatized children. By contrast, less-affective maternal attitudes did not have an interaction effect with childhood trauma; however, they were associated with hyperactive-impulsive symptoms in children.

This study had several limitations that should be considered. First, the sample included fewer than 58 patients, which may make

the results difficult to generalize. Second, this study did not account for errors in the multiple comparisons used to determine the statistical significance level. Third, when measuring childhood trauma experiences, as we did in the present study, self-reported retrospective methods may be affected by such problems as deflection or hidden memory, and autobiographical memories may affect the study results because they can be erroneously reconstructed [35,36]. Fourth, data about the family history of ADHD were lacking. Thus, we could not exclude a possibility that the association between parenting attitude and child's ADHD symptoms may be due to shared correlation with parental ADHD symptoms. Fifth, although cross-sectional studies can reveal associations among variables, they cannot establish causative relationships. Finally, ADHD symptoms were drawn from parental reports, without teachers' reports regarding classroom performance. Further research using the teacher-report and a prospective design, with information about family history of ADHD is needed.

Conclusion

The results suggest that parental education is important for providing adequate parenting and thus preventing behavioral problems, such as ADHD symptoms, in children who have experienced psychological trauma. Further work using a larger sample and a prospective design is needed to confirm the results of this study.

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