

Original Article

Previous medical history of diseases in children with attention deficit hyperactivity disorder and their parents

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Abstract

Introduction: The etiology of Attention deficit hyperactivity disorder (ADHD) is complex and most likely includes genetic and environmental factors. This study was conducted to evaluate the role of previous medical history of diseases in ADHD children and their parents during the earlier years of the ADHD children's lives.

Methods: In this case-control study, 164 ADHD children attending to Child and Adolescent Psychiatric Clinics of Tabriz University of Medical Sciences, Iran, compared with 166 normal children selected in a random-cluster method from primary and guidance schools. ADHD rating scale (Parents version) and clinical interview based on schedule for Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS) were used to diagnose ADHD cases and to select the control group. Two groups were compared for the existence of previous medical history of diseases in children and parents. Fisher's exact test and logistic regression model were used for data analysis.

Results: The frequency of maternal history of medical disorders (28.7% vs. 12.0%; $P = 0.001$) was significantly higher in children with ADHD compared with the control group. The frequency of jaundice, dysentery, epilepsy, asthma, allergy, and head trauma in the medical history of children were not significantly differed between the two groups.

Conclusion: According to this preliminary study, it may be concluded that the maternal history of medical disorders is one of contributing risk factors for ADHD.

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Introduction

Attention deficit hyperactivity disorder (ADHD) is one of the most common psychiatric disorders among school-age children. It is the cause for half of attending to child psychiatric clinics.¹ In a study in Brazil, the prevalence of ADHD in children of 4 primary schools was 13% with a higher rate among boys in comparison to the girls.² In another study in United States from 2001 to 2004, the prevalence of ADHD was reported to be 8.7% among 15-18 years old children with a more than two-fold frequency in the poor children compared with

the privileged ones.³ The prevalence of ADHD in primary school children in Tabriz, Iran has been reported to be 9.7%.⁴

Regarding to the high prevalence of ADHD and its psychosocial outcomes such as social isolation and stigma,⁵ negative attributions by the peers,⁶ and substance abuse and occupational problems the importance of preventive and therapeutic interventions is revealed.¹ However, as the etiology of ADHD is complex and most likely includes genetic and environmental factors, preventive and therapeutic

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interventions may not be sufficient unless we could discover much more factors involved in developing ADHD. Hence, considering the etiological factors with different approaches is of importance.

Several studies have shown the association for the history of some medical disorders in parents and children with the risk of ADHD in children. Among these, some studies have shown the role of childhood trauma or postpartum events in development of ADHD.⁷ Findings of a study about association of epilepsy and ADHD showed that at least 20% of children with epilepsy have ADHD compared with three to seven percent in psychiatric patients. In addition to this finding, the children with ADHD have more abnormality in electroencephalography.⁶ Furthermore, the impact of allergy and food intoxications on nervous system development and ADHD through neurochemical and hormonal changes has been demonstrated in different studies.⁸ In a study conducted by Hauser et al., the association between thyroid hormone and ADHD has been shown.⁹ In this era, other study also have emphasized on the association between the subtypes of ADHD and thyroid hormone.¹⁰

In general, there are scarce studies with some controversial results about association of different childhood diseases and ADHD. On the other hand in psycho-educational sessions for mothers of children with ADHD, held in our department, we faced with many questions about causes of ADHD regarding previous history of diseases in ADHD children and their mothers. As the literature lacked to give us the definite answers to their questions, so this matter was the main motive for us to design a research to study the probable role of some previous medical history of diseases in children and their parents as risk factors for ADHD.

Methods

This case-control study was performed in 2009. 164 children with ADHD were selected with a nonrandom convenient method from

among referrals to child and adolescent psychiatric clinics of Tabriz University of Medical Sciences. Furthermore, 166 healthy students were selected as control groups.

Regarding the age range of the case group, the control group was selected with a random cluster sampling method among primary and guidance schools' students in Tabriz, Iran.

Based on the approval of the project by the Medical Ethics Committee of the university, data collection was performed via an interview with and history taking from mothers by psychiatrist, using a checklist including previous medical history of diseases in children and their parents. The mothers were asked to confirm or not the presence of the items included in the check list during the earlier years of their children's lives. The items considered in the check list were as follows: the parental history of medical disorders and children's medical disorders including: jaundice, dysentery, epilepsy, asthma, allergy, and head trauma.

In the related fields the medical documents were reviewed to confirm the presence of the event. Then the frequencies of these events were compared between case and control groups.

Inclusive criteria were clinical diagnosis of ADHD according to Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) in case group, and parental written consent. The children with major psychiatric comorbidities were excluded.

The ADHD rating scale includes 18 items that each one shows one ADHD symptom according to DSM-IV-TR criteria. It may be used for age range of 5-18 years and is useful for differentiation of ADHD and healthy children and differentiate attention deficit symptoms from hyperactivity and impulsivity symptoms. The validity of ADHD rating scale is approved by Dupaul and its reliability is reported to be high.¹¹

Schedule for Affective disorders and Schizophrenia for School-Aged Children (K-SADS)

This is a diagnostic semi-structural interview

designed according to DSM-III-R and DSM-IV and was filled via an interview with parents and children by a psychiatrist. The reliability of the Persian version of Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS) diagnostic interview was reported to be 0.81 in test-retest method and 0.69 in inter-rater reliability by Ghanizadeh et al. reported a high sensitivity and specificity for the Farsi version of K-SADS instrument.¹² We used this tool for diagnosis of ADHD and psychiatric comorbidity in ADHD group and checking for healthy psychiatric status in control group.

The obtained data were analyzed by descriptive methods (mean, standard deviation; SD, frequency and percent) and Fisher's exact test. Besides, for determining the contributing factors for ADHD, the logistic regression analysis was used. Data were analyzed using SPSS for Windows (version 17; SPSS Inc., Chicago, IL, USA) and P-value less than 0.05 was considered statistically significant.

Results

Mean age of the children was 9.20 ± 2.23 years and 9.02 ± 1.53 years, in case and control groups, respectively. According to the table 1, maternal history of medical disorders was significantly more common in children with ADHD compared with the control group. But there was no significant difference between the paternal histories of medical disorders in two groups.

According to table 2, the frequency of jaundice, dysentery, epilepsy, asthma, allergy, and head trauma were not significantly different between the two groups.

The results obtained from the binary logistic regression test showed that maternal history of medical disorders during the earlier years of their children's lives ($P = 0.01$) was the predictor of ADHD in children.

Discussion

The results showed that maternal history of medical disorders were significantly more common among children with ADHD compared with the control group. But the

Table 1. Frequency distribution (percent) of history of medical disorders in parents of ADHD (Attention deficit hyperactivity disorder) and control groups

Variables	Group	Yes [n (%)]	No [n (%)]	OR (95%CI)	Fisher exact test	P
Maternal history of medical disorders	ADHD	47 (28.7)	117 (71.3)	2.93 (1.64-5.22)*	$\chi^2 = 14.06$	< 0.01
	Control	20 (12.0)	146 (88.0)			
Paternal history of medical disorders	ADHD	30 (18.3)	134 (81.7)	1.84 (0.98-3.45)	$\chi^2 = 3.68$	0.06
	Control	18 (10.8)	148 (89.2)			

* $P < 0.001$; CI: Confidence interval; ADHD: Attention deficit hyperactivity disorder; OR: Odds ratio

Table 2. Frequency distribution (percent) of history of different diseases in ADHD (Attention deficit hyperactivity disorder) and control groups*

Variables	Group	Yes [n (%)]	No [n (%)]	OR (95%CI)	Fisher exact test	P
Head trauma	ADHD	11 (6.7)	153 (93.3)	1.12 (0.46-2.71)	$\chi^2 = 0.06$	0.82
	Control	10 (6.0)	156 (94.0)			
Allergy	ADHD	14 (8.5)	150 (91.5)	1.19 (0.53-2.67)	$\chi^2 = 0.19$	0.69
	Control	12 (7.2)	154 (92.8)			
Asthma	ADHD	5 (3.0)	159 (97.0)	1.27 (0.33-4.82)	$\chi^2 = 0.13$	0.75
	Control	4 (2.4)	162 (97.6)			
Epilepsy	ADHD	7 (4.3)	157 (95.7)	1.80 (0.51-6.28)	$\chi^2 = 0.88$	0.37
	Control	4 (2.4)	162 (97.6)			
Dysentery	ADHD	3 (1.8)	161 (98.3)	0.60 (0.14-2.55)	$\chi^2 = 0.49$	0.72
	Control	5 (3.0)	161 (97.0)			
Jaundice	ADHD	45 (27.4)	119 (72.6)	1.52 (0.91-2.54)	$\chi^2 = 2.61$	0.12
	Control	33 (19.9)	133 (80.1)			

OR: Odds ratio; CI: Confidence interval; ADHD: Attention deficit hyperactivity disorder

frequencies of paternal history of medical disorders in the two groups were not significantly different. Bayati et al. showed that severe medical or psychiatric disorders in parents are effective in development of ADHD in children.¹³ In general; it seems that the maternal somatic disorders may disturb the nurturing role of parents and consequently result in undesirable conditions for family members.

The results of this study showed that history of epilepsy is not related to ADHD. This finding is not similar to those reported by Kaufmann et al. Since this finding is mainly reported in epileptic children, it seems that epilepsy is a risk factor for ADHD, but the children with ADHD are not necessarily the epileptic patients.⁶

The results of the present study showed that there was no association between the head trauma and ADHD. According to Willmott et al., there is no association between the traumatic brain injury and ADHD, necessarily, and the traumatic brain injury may be itself as a result of ADHD.¹⁴ Keenan et al. confirmed the lack of association between head injury and ADHD.¹⁵ Of course considering the severity and different types of trauma may be important in evaluation of cognitive function in traumatic patients, some studies show that more severe injuries have more association with ADHD compared with mild injuries.¹⁶ In the present study, we asked about the history of that type of head trauma in ADHD children which was clinically significant to be the focus of attention by the parents. So the exact severity of the head trauma was not clear for us.

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Another part of this study showed that jaundice, dysentery, asthma, and allergy were not related to ADHD. Most of the studies about the role of infectious factors in ADHD are related to the role of birth season and its related infectious diseases.¹⁷ Besides, allergy to food colorings is reported as a risk factor for ADHD.¹⁸

It seems that infectious diseases and problems such as allergy and asthma may not directly affect on ADHD and comorbidity of them may be due to effects of these disorders on nervous system in sensitive neuro-developmental phase. Hence more definite evaluation of association between ADHD and infectious diseases and asthma and allergy is required. However, according to our findings, these factors are not effective in the development of ADHD.

Conclusion

In conclusion, according to the findings in this preliminary study, we suggest that maternal history of medical disorders is considered as contributing risk factor for ADHD. Therefore, more attention is needed to assess the different aspects of history of maternal diseases and the possible role of it in the development of ADHD.

Conflict of Interests

Authors have no conflict of interest.

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