

ASSESSMENT RATE OF BREASTFEEDING AND SOME RISK FACTORS IN NEONATAL AND PRENATAL PERIODS AMONG CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD)

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ABSTRACT

Introduction: Attention deficit hyperactivity disorder (ADHD) is a disorder related to neural development that affected more than 5% of the world's children. The aim of this study has been considered to evaluate the effect of breastfeeding in preventing the creation of ADHD. Materials and methods: This case-control study was conducted on patients with disorder of ADHD (6 to 12 years) admitted to the psychiatric ward of Ahvaz Golestan hospital between the years 2014 and 2015. The control group consisted of individuals with the same age group who were selected from the family members of patients. Then, a questionnaire was provided to collect information including educational, psychological, and health status of individuals, and also records of children and their mothers before and after the birth periods.

Finally, the comparison was conducted between the case and control groups by chi-square test and Fisher test. The significance level of P was considered less than 0.05. Results: There was no significant difference between the two groups in duration of breastfeeding ($p = 0.13$). However, the history of inflicting to jaundice in neonatal periods was significantly more in case group ($p > 0.01$). Also, incidence of infection during pregnancy had a significant increase in deliveries leading to the birth of the child with ADHD. Conclusion: Results of this study

show that incidence of infection during pregnancy and inflicting to jaundice, as the risk factors, can increase the possibility of inflicting to ADHD.

KEYWORDS: Attention deficit hyperactivity disorder, ADHD, Breastfeeding.

INTRODUCTION

Breastfeeding is the best choice for newborns. Breast milk contains substances that have more quality than the alternative ingredients such as powdered milk qualitatively and quantitatively.^[1] The impact of breastfeeding has been proved on increasing the health of children and reducing the incidence of many infectious diseases.^[2] In addition, recent studies have found evidence that it provided the relationship between breastfeeding and mental development of newborns as well as improving the cognitive performances of these individuals.^[3] As it is shown, infants who had the breastfeeding demonstrate the higher levels of development and growth of the cognitive factors compared to people who have used powdered milk.^[4] Also, a recent study has shown that even the brain development is associated with breastfeeding.^[5] The other benefit of using the breast milk is its impact on infants' IQ; so that infants who have breastfed, the average of their IQ is 3.44 score higher according to the last report.^[6] However, it is not clear that these effects are resulted from the special properties of human milk or related to the internal properties of relationship between mother and infant, or rooted in something else.

Attention deficit hyperactivity disorder (ADHD) is a developmental behavioral disorder which characterized by lack of concentration, hyperactivity, and impulsive behaviors. This disorder is the most prevalent psychical disorders which its prevalence is estimated approximately 7.2% around the world.^[7] According to the diagnostic criteria of DSM-5, patients may have at least six signs that indicate the lack of concentration (e.g. inability to keep the concentration when doing an activity, lack of listening when is directly spoken with him) or six signs that indicate hyperactivity (e.g. garrulity, restlessness of hands or feet).^[8] Although the exact cause of ADHD is not yet known, several risk factors have been reported for it. The most important risk factors include genetic factors, the structure of brain (morphological abnormalities in the brain), cigarette smoking during pregnancy, prematurity of infants or low weight, family history, and nutrition.^[9] The exact relationship between feeding and create and increase the severity of ADHD symptoms is still controversial. Nevertheless, it has been shown that some nutrients substances such as substances full of simple sugars, fatty acids, iron, zinc are associated with the incidence of ADHD.^[10,13]

Given the role of nutrition in creating the ADHD and also the effect of breastfeeding on cognitive development of infant, this presumption is produced that breastfeeding probably can be a risk factor in causing ADHD. So, we attempt to determine the relationship between the pattern of breastfeeding and the incidence of ADHD in this study by using the sisters and brothers of ADHD patients as a control group and thus eliminating the underlying factors such as genetic factors and factors related to the family.

MATERIALS AND METHODS

This case-control study was conducted on patients with disorder of ADHD (6 to 12 years old) admitted to the psychiatric ward of Ahvaz Golestan hospital between the years 2014 and 2015. Patients with a history of severe head trauma, brain infections, chromosomal abnormality, mental retardation, a history of hospitalization due to severe jaundice, people who was prematured in the time of delivery or underweight (less than 2.5 kg) were excluded from the study.

The control group consisted of individuals with the same age group who were selected from the family members of patients. These individuals were evaluated by a specialist in terms of having the ADHD. The number of 75 patients was put in each group. Then, a questionnaire was given to their mothers. This questionnaire collected the information related to educational, psychological, and health status of individuals, and also their records before and after the birth periods. The rate and duration of breastfeeding were compared in both groups. The SPSS16 software was used to perform the statistical analysis. A comparison was conducted between the case and control groups by chi-square test and Fisher test. The significance level of P was considered less than 0.05.

RESULTS

The average age of patients participating in the study was 8.3. There was not observed the significant difference between the case and control groups in the rate of using the breastfeeding (98% vs 100%). In addition, there was no significant difference between the two groups in duration of breastfeeding ($p = 0.13$). However, the history of using the medicinal supplements in case group had the significant difference with control group. Most of using these substances are related to multivitamin drugs. Also, the history of inflicting to jaundice in neonatal periods was significantly more ($p < 0.01$) in case group (Table 1).

In Table 2, the medical records of individuals' mothers participating in the study during pregnancy were shown. Incidence of infection during pregnancy had a significant increase in deliveries leading to the birth of the child with ADHD. As well as, the use of antibiotic drugs was significantly more in pregnancies leading to the birth of subjects with ADHD. However, the incidence of vaginal bleeding in the first trimester had no significant difference in both groups (Table 2).

Table1. Compare the rates of breastfeeding and other records of childhood between patients with ADHD and control group.

	Cases(75)		Control(75)	P value
Age	8.31+- 2.4		8.4+- 4	0.414
Breast-feeding	%98		100%	0.5
Breast-feeding duration	Under 3 months	6.7%	12%	0.136
	3 to 6 months	28%	16%	
	Higher than 6 months	68%	72%	
Complementary drug	97.3%		88%	0.028*
Drug	Iron	60%	56%	0.37
	Dried milk	70.7%	72%	0.5
	Multi vitamin	72%	52%	0.009*
Jundice	41%		17.3	0.001

Table 2. Compare the records of pregnancies leading to the birth of ADHD and healthy children.

	Cases (75)		Control (75)	P value
Infection	8%		none	0.014*
Drug consumption	Antibiotic	% 14.7	none	0.023*
	Iron	13.3%	none	0.001*
	Folic acid	13.3%	none	0.001*
Vaginal bleeding(first trimester)	9.3%		2.7%	0.083
Pregnancy loss minatory bleeding	4%		none	0.122

DISCUSSION

Attention deficit hyperactivity disorder is one of the most common disorders related to neurological development that can be seen in children. Even though this disorder does not create a serious risk for the child, it can lead to the disruption of his different performances in home, school, and society. Considering the 5% prevalence of this disease, this is estimated that it costs annually 36 to 52 billion dollars, or 12 to 17 thousand dollars for each person (14). Hence, it causes many socio-economic costs in families and generally in society. The exact cause of ADHD is still not well known and individuals' genetics has been introduced as the most influential factor in the creation of it so ever. However, examining the many genes

has shown that the disease apparently did not follow a specific gene inheritance model, and other factors such as environmental factors (lead, poly chlorinated biphenyls (PBCs) and etc.) and nutrition in addition to genetics are effective in creating it (15). More recently, several studies have shown the impact of breastfeeding in preventing the creation of ADHD. However, it remains unclear how breastfeeding may prevent ADHD.

The results of our study show that no breastfeeding and no duration of breastfeeding have significant difference between the patients with ADHD and control group (Table 1). These results have been conducted contrast to other studies. As Diane et al in a study done on 474 patients (7-13 years old) in front of 291 healthy individuals conclude that the duration of breastfeeding has a strong relationship with the prevention of inflicting to ADHD (16). Moreover, Kadiziela-olech et al, Shamberger et al, Mimouni-bloch and Sabuncuoglu et al have shown that the duration of breastfeeding is an important factor in preventing the ADHD (15, 17-19). Also in the study of Park et al became clear that not only does breastfeeding play a crucial role in the prevention of ADHD, but also reduces the other cognitive problems and increases IQ (20). The difference between the results of this study and other similar studies may be due to small sample size or lack of accuracy and honesty in responding to questions by the mothers of these patients. As well as, the nutritional, environmental, and genetic differences of Iranian patients may be the other reasons for different results with the other similar studies. Moreover, although the control sample was selected among the siblings of children with ADHD to reduce the environmental and genetic differences in this study, genetics of siblings is not entirely similar.

History of inflicting to jaundice in neonatal periods among patients with ADHD was significantly more than the control group. Wei et al in an extensive study showed that the incidence of ADHD is approximately 2.48 times higher in children with a history of jaundice (21). Also, Farhat et al have reported that jaundice is a risk factor for incidence of ADHD (22). While, unlike these results, there was not found any relationship between history of jaundice and incidence of ADHD in studies of Zienkiewicz et al and Golmirzaei et al (23, 24). Bilirubin is not a neurotoxin substance in itself, but if its concentration is more than the binding capacity of serum proteins, it will precipitate in neurons as crystals and may cause to nervous damage to individual. Neurological damage may interfere with network performance of frontoastriatal that ultimately leads to disorders in monoaminergic frontal system and hypothalamus-pituitary-adrenal axis which is almost similar to what seen in children with ADHD (21).

In the study conducted on records of mothers during pregnancy with ADHD and healthy children, it was found that infection during pregnancy can increase the risk of inflicting to ADHD. In supporting of these findings, Zhou has shown that infection during pregnancy can lead to neural growth disorder in fetus (25). Nevertheless, Weinberg et al, Amiri et al and Golmirzaei et al have not found a significant relationship between infection during pregnancy and incidence of ADHD (24, 26, 27). Because the comparison has been conducted in this study between the different cycles of pregnancy in a group of mothers to examine the relationship between a history of infection during pregnancy and the incidence of ADHD, many underlying factors have been eliminated. So, it may be the reason of difference between this study and other studies cited. It seems that in addition to the impact of infection on neural growth of fetus, the use of some prescribed medications for infectious patients during pregnancy may create the ADHD. As it has been shown, the use of acetaminophen during pregnancy can greatly increase the risk of developing ADHD (28, 29). Nevertheless, proving this finding needs to further studies.

The limitations of this study were low samples of the patients and lack of examining the genetic and environmental risk factors in patients. While, comparing the records of individuals during neonatal period and their mothers during pregnancy and also selecting a control group among brothers and sisters of patients were the strengths of this study.

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