



Prenatal, Perinatal And Postnatal Risk Factors For Attention Deficit Hyperactivity Disorder in India- A Retrospective Analysis

KEYWORDS

ADHD, Risk factors

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ABSTRACT Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common behavioral and neurodevelopmental disorders characterized by hyperactivity, impulsivity and inattention in children and adolescents. Prenatal, Perinatal and Postnatal risk factors for ADHD are studied extensively, but there is a lacuna of information with regard to the Indian population. The aim of this study was to explore the impact of familial and psychosocial prenatal, perinatal, postnatal risk factors of ADHD. Data collected from nearly 200 children from a tertiary care hospital was analyzed. Information was obtained through detailed interviews with caregivers and from medical records. In this study, early risk factors for Attention Deficit Hyperactivity Disorder among Indian children include poor maternal health, maternal stress and speech delay. The results of this study therefore significantly contribute to understand various familial and environmental risk factors of ADHD in the Indian setting.

INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common behavioral and neurodevelopmental disorders which is characterized by hyperactivity, impulsivity and inattention in children and adolescents [1]. Prevalence of ADHD among school-age children in different studies varies between 5% and 12% [1,2], whereas the prevalence of this disorder declines with increasing age [3]. Malhi and Singhi (2000) report that the prevalence of ADHD in Indian school-aged children is estimated at 10% to 20% [4]. It is estimated that symptoms of ADHD persist into adolescence and adulthood in 50% of afflicted children [5]. Although the specific causes of ADHD are not clearly known, a few primary and secondary factors are implicated in ADHD pathogenesis. Catecholamine metabolism and genetic factors contribute to the primary roles [6]. The secondary roles involve various environmental factors [7,22]. Research by Arpino et al.,(2005) [8] and Amiri et al., (2012) [9] highlight some of the pregnancy and birth related risk factors associated with ADHD during the prenatal, perinatal and postnatal periods. These include maternal abuse of substances, prenatal and postnatal viral infections, prematurity, low birth weight, head injury during childhood and several sociodemographic factors such as maternal education, family income, gender, maternal age at pregnancy and emotional stress during pregnancy. In contrast to the high heritability estimates (60 - 90%) [10], the effects of specific genes are small. Genes may interact with each other and with environmental factors to increase the risk of developing ADHD. Familial risk factors would include both genetic and psychosocial factors. Psychosocial factors, such as parental marital discord and family dysfunction leading to neglect and abuse of children also appear as postnatal risk factors of ADHD [11].

Prenatal, Perinatal and Postnatal risk factors for ADHD are studied extensively, but there is a lacuna of information with regard to the Indian population. The aim of this study was to explore the impact of familial and psychosocial prenatal, perinatal, postnatal risk factors of ADHD in India. The results of this study therefore significantly contribute to understand various familial and environmental risk factors of ADHD in the Indian setting.

METHODOLOGY

The design of this study was predisposed to be causal comparative and is descriptive in nature. The survey method, including detailed interviews, was employed for data collection.

The sample selected for the present study included children with Attention Deficit Hyperactivity Disorder residing in Tamil Nadu (India), using purposive sampling technique. Diagnosis of children was carried out by a professional team of a clinical neuropsychologist, pediatrician and psychiatrist. This involved obtaining a detailed case history and observation of the child, followed by psychological assessment. Details regarding the birth history, developmental history, educational history, family history and clinical history were obtained. Parents and caregivers were the informants. Information from medical records was also used. All consecutive cases diagnosed with ADHD were included in the sample. The DSM-IV-TR criteria were used for diagnosis. The data obtained was analyzed using descriptive statistics.

RESULTS AND DISCUSSION

Results are based on two hundred and two (202) children included in this study. The following discussion is based on the prenatal, perinatal and postnatal information that was obtained during detailed caregiver interviews and from medical records.

Buitelaar (2008) reported that pregnancy and delivery complications increase the risk for Attention Deficit Hyperactivity Disorder [12]. It was reported that the specific complications implicated included toxemia, poor maternal health, maternal age, long duration of labor, fetal distress and low birth weight. In this study, the investigator observed that around 30% of children had a history of distress on the above mentioned domains, thus increasing the child's risk of developing Attention Deficit Hyperactivity Disorder. Presence of thyroid imbalance, hypertension and gestational diabetes was reported among 30% of mothers. 96% of mothers reported full term pregnancies, but 60% of children were delivered via Cesarean section. This may be attributed to the presence of fetal distress. Around 6.5% of children in this study were reported to have a delayed

birth cry that could implicate asphyxia. The average birth weight of children studied was 2.90 kilograms, which is in the normal range according to WHO statistics.

Table 1
Stress experienced by mothers during gestation

	Factors	
	Personal	N
Not Available	2	1.0
Emotional difficulty	72	35.6
No Difficulty	128	63.4
Total	202	100.0

Results from Table 1 indicate that in around 36% of children in the current study, mothers reported experiencing varying degrees of emotional problems and stress during gestation. Rodriguez et al (2004) reported that prenatal exposure to maternal stress was independently associated with later symptoms of Attention Deficit Hyperactivity Disorder, particularly for boys [13].

Mukhopadhyay (2006) [14] and Bener et al (2008) [15] reported that consanguinity had no impact on Attention Deficit Hyperactivity Disorder. Consistent with these results, it was noted by the investigator in this study that the parents of the maximum number of children with Attention Deficit Hyperactivity Disorder (74%) had a non-consanguineous marriage.

Goos et al (2007) [16] suggested heightened paternal transmission relative to maternal transmission in Attention Deficit Hyperactivity Disorder that is suggestive of the involvement of sex chromosomes or sex specific or hormonal factors. Around 3% of fathers and 1% of mothers reported features and symptoms of ADHD in their childhood. Therefore, paternal transmission of ADHD is more probable when compared to maternal transmission.

Results indicate that 1.5% of siblings of children with Attention Deficit Hyperactivity Disorder had similar features in addition to the co-morbid feature of Specific Learning Difficulty. Around 4% of siblings had only features of Specific Learning Difficulty, while 24.8% of the siblings had no difficulty. It is noted that 69.8% of children did not have siblings. Pliszka (2007) suggested that siblings of Attention Deficit Hyperactivity Disorder children have particular difficulties and are a particular risk for psychological impairment, depression, drug abuse and language difficulties [17]. This is noted in 5.5% of siblings in the present study.

Biederman and Faraone (2005) reported that the second degree relatives of Attention Deficit Hyperactivity Disorder probands were at increased risk for Attention Deficit Hyperactivity Disorder compared with second degree relatives of the normal control pro-band [5]. The results of this study show that symptoms of Attention Deficit Hyperactivity Disorder seen in nearly 6% of second degree relatives.

Table 2
Achievement of milestones in children with Attention Deficit Hyperactivity Disorder

	Milestone- Motor		Milestone- Speech	
	N	%	N	%
Mild delay	37	18.3	75	37.1
Moderate delay	1	.5	26	12.9
Normal	164	81.2	92	45.5
Severe delay	0	.0	9	4.5
Total	202	100.0	202	100.0

Results from Table 2 indicate that the motor milestones were achieved at the appropriate age for 81.2% of children studied. Mild delay in achieving motor milestones was observed in 18.3% of children and a moderate delay in 0.5% of children. It is seen that speech was severely delayed in 37.1% of children studied. 12.9% of children had a moderate speech delay and 4.5% of children had a severe speech delay. Only 45.5% of children studied spoke at the appropriate age. Ornoy et al (1993) [18] reported that Attention Deficit Hyperactivity Disorder is associated with speech delay and suggested that speech delay may be an early clinical sign of Attention Deficit Hyperactivity Disorder as seen in 80% of their sample. In the current study around 54.5% of children experienced speech delay and this may be attributed to the risk of developing Attention Deficit Hyperactivity Disorder. Barkley et al (1990) observed that the onset of major motor milestones may not be definitely delayed for children with Attention Deficit Hyperactivity Disorder as a group, as many as 52% of such children compared to up to 35% of typical children are characterized as having poor motor coordination [19]. As observed in this study, the achievement of motor milestones was normal in 81.2% of children in this study, indicating that only speech delay is frequently a precursor for the development of Attention Deficit Hyperactivity Disorder.

There was no significant factor noted with regard to parental education and occupation in this study. Although Kennedy (2000), of the Division of Human Development and Disability, National Center on Birth Defects and Developmental Disabilities [21], said that Attention Deficit Hyperactivity Disorder diagnosis was significantly more often in families with incomes below the poverty threshold than in families with incomes at or above the poverty threshold, Attention Deficit Hyperactivity Disorder was diagnosed across all strata of society in this study.

Therefore, the etiology of Attention Deficit Hyperactivity Disorder encompasses genetic and environmental factors. Prenatal, perinatal and postnatal stressors are environmental factors that play an important role in its etiology. Zappitelli (2001) reports that children with Attention Deficit Hyperactivity Disorder show higher percentages of prenatal, perinatal and postnatal insults when compared to unaffected children [20]. In this study, the prominent risk factors for Attention Deficit Hyperactivity Disorder among Indian children are identified as poor maternal health, maternal stress and speech delay.

CONCLUSIONS

Results from the current study draw light to a few of the prenatal, perinatal and postnatal risk factors associated with Attention Deficit Hyperactivity Disorder in India. Although most results are similar to studies conducted worldwide, it is interesting to note that early risk factors in India include maternal health factors, experience of maternal stress and presence of speech delay in children. It is therefore critical to reduce potential stressors in pregnant women and observe early clinical signs in children during their development.

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