

RESEARCH ARTICLE

# Perinatal, Socio-Demographic, and Familial Risk Factors Associated with ADHD: A Cross-Sectional Analysis

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## Abstract

**Background:** Attention-Deficit/Hyperactivity Disorder (ADHD) is a prevalent neurodevelopmental disorder characterized by inattention, hyperactivity, and impulsivity. Perinatal, socio-demographic, and familial factors are thought to influence ADHD risk, but limited data exist in Bangladeshi populations.

**Objective:** To examine perinatal, socio-demographic, and familial risk factors associated with ADHD among children and adolescents attending a tertiary psychiatry outpatient department.

**Methods:** This descriptive cross-sectional study enrolled 47 children and adolescents (aged 5–19 years) with ADHD from May 2018 to September 2020 at BSMMU. Participants were selected through purposive and consecutive sampling. Socio-demographic, perinatal, and familial data were collected via face-to-face interviews. Psychiatric comorbidities were assessed using the Development and Well-Being Assessment (DAWBA), and ADHD diagnoses were confirmed according to DSM-5 criteria.

**Results:** The mean age of participants was  $12.8 \pm 3.1$  years; 25.5% were aged 5–9 years, and 40.4% were aged 10–14 years. Male-to-female ratio was 4.8:1. ADHD subtypes included combined type (68%), hyperactive/impulsive type (19.1%), and inattentive type (12.7%). A total of 57.4% had at least one psychiatric comorbidity; among them, 62.9% had a single comorbidity, while 37% had multiple. Common comorbidities were Oppositional Defiant Disorder (44.4%), Conduct Disorder (29.6%), obsessive-compulsive disorder (25.9%), Intellectual Disability (18.5%), and autism spectrum disorder (11.1%). Significant risk factors included male gender (64.1%), advanced maternal age ( $32.6 \pm 11.2$  years), low family income (57.4%), irregular antenatal care, multiparity (56%), history of maternal mental illness, birth complications such as asphyxia (25.5%) and injury (17%).

**Conclusion:** ADHD in this cohort was associated with male gender, perinatal complications, familial psychiatric history, and socio-demographic disadvantages. Early identification and management of these risk factors may aid in timely intervention.

**Keywords:** ADHD, Perinatal Factors, Socio-Demographic Factors, Familial Risk, Comorbidity.

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## 1. Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most prevalent neurodevelopmental disorders affecting children and adolescents globally. It is defined by persistent patterns of inattention, hyperactivity, and impulsivity that are inconsistent with developmental level and significantly impair social, academic, or occupational functioning [1]. The disorder often manifests in early childhood, with symptoms frequently continuing into adolescence and adulthood, leading to long-term functional impairment. Epidemiological studies indicate that ADHD affects approximately 5–10% of school-aged children, with a higher prevalence reported among males compared to females [2]. ADHD is widely recognized as a multifactorial disorder arising from complex interactions between genetic, environmental, and perinatal factors. Genetic studies have consistently demonstrated familial aggregation, suggesting a strong hereditary component. Children with a first-degree relative diagnosed with ADHD or other psychiatric disorders are at increased risk of developing the condition [3]. Environmental influences such as prenatal exposure to tobacco, alcohol, or other toxins, as well as perinatal complications including low birth weight, prematurity, and birth asphyxia, have also been implicated in the etiology of ADHD [4]. Additionally, socio-demographic factors, such as low socio-economic status, parental education, and maternal mental health, may contribute to the risk and severity of ADHD symptoms. Advanced maternal age and inadequate prenatal care have also been associated with increased vulnerability in offspring. Psychiatric comorbidities are frequently observed in children with ADHD, complicating diagnosis and management. Common comorbid conditions include Oppositional Defiant Disorder (ODD), Conduct Disorder (CD), anxiety disorders, depressive disorders, intellectual disability, and autism spectrum disorder (ASD) [5]. The presence of these comorbidities can exacerbate functional impairment, hinder academic achievement, and increase the risk of psychosocial difficulties in adolescence and adulthood. Consequently, early identification of risk factors is crucial for timely intervention, which may include behavioral therapies, parent training, educational support, and pharmacological treatment. In Bangladesh, despite the increasing recognition of ADHD, there is a relative paucity of research exploring the interplay of perinatal, socio-demographic, and familial factors in its development. Cultural, environmental, and healthcare-related differences may influence the

presentation, prevalence, and risk profiles of ADHD in this population. Systematic investigation of these factors can provide insights for preventive strategies, early detection, and tailored management approaches. Understanding the local epidemiology of ADHD is essential for optimizing mental health services, guiding policy-making, and improving long-term outcomes for affected children and adolescents. This study aimed to examine perinatal, socio-demographic, and familial risk factors associated with ADHD among children and adolescents attending the Psychiatry outpatient department of Bangabandhu Sheikh Mujib Medical University (BSMMU). Identifying these risk factors may contribute to better awareness, early diagnosis, and comprehensive management strategies in the Bangladeshi context.

## 2. Materials and Methods

### 2.1 Study Design and Setting

This descriptive cross-sectional study was conducted at the Department of Psychiatry, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, from May 2018 to September 2020.

### 2.2 Participants

A total of 47 children and adolescents aged 5–19 years diagnosed with ADHD were enrolled using purposive and consecutive sampling. Inclusion criteria were a confirmed diagnosis of ADHD according to DSM-5. Exclusion criteria included severe sensory deficits or medical conditions preventing reliable assessment.

### 2.3 Data Collection

Socio-demographic, perinatal, and familial data were collected via structured face-to-face interviews with caregivers. Psychiatric comorbidities were assessed using the Development and Well-Being Assessment (DAWBA).

### 2.4 Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of BSMMU. Informed consent was obtained from parents/guardians, and assent from children aged  $\geq 7$  years.

### 2.5 Statistical Analysis

Data were analyzed using descriptive statistics. Frequencies and percentages were used for categorical variables, and mean  $\pm$  standard deviation (SD) for continuous variables. Associations between ADHD subtypes and risk factors were explored using chi-square or Fisher's exact tests where applicable.

### 3. Results

#### 3.1 Socio-Demographic Characteristics

**Table 1.** Socio-Demographic Characteristics of Participants ( $n = 47$ )

Variable	Frequency (n)	Percentage (%)
Age (years)		
5–9	12	25.5
10–14	19	40.4
15–19	16	34.1
Gender		
Male	38	80.9
Female	9	19.1
Family Income		
Low	27	57.4
Middle/High	20	42.6

The mean age of participants was  $12.8 \pm 3.1$  years. Most children (40.4%) were aged 10–14 years, followed by 15–19 years (34.1%) and 5–9 years (25.5%). Male

predominance was evident, with a male-to-female ratio of 4.8:1. Over half of the participants (57.4%) came from low-income families.

#### 3.2 ADHD Subtypes

**Table 2.** Distribution of ADHD Subtypes ( $n = 47$ )

ADHD Subtype	Frequency (n)	Percentage (%)
Combined	32	68.0
Hyperactive/Impulsive	9	19.1
Inattentive	6	12.7

The majority of participants (68%) were diagnosed with the combined subtype of ADHD. Hyperactive/

impulsive and inattentive subtypes were less common, accounting for 19.1% and 12.7%, respectively.

#### 3.3 Psychiatric Comorbidities

**Table 3.** Comorbid Psychiatric Disorders in Participants with ADHD ( $n = 27$ )

Comorbidity	Frequency (n)	Percentage (%)
Oppositional Defiant Disorder (ODD)	12	44.4
Conduct Disorder (CD)	8	29.6
Obsessive-Compulsive Disorder (OCD)	7	25.9
Intellectual Disability (ID)	5	18.5
Autism Spectrum Disorder (ASD)	3	11.1

Overall, 57.4% of participants had at least one psychiatric comorbidity. Among these, 62.9% had a single comorbidity while 37% had multiple comorbidities. The most common comorbidities were Oppositional Defiant Disorder (44.4%), Conduct

Disorder (29.6%), and obsessive-compulsive disorder (25.9%). Intellectual Disability and Autism Spectrum Disorder were present in 18.5% and 11.1% of participants, respectively.

#### 3.4 Perinatal and Familial Risk Factors

**Table 4.** Perinatal and Familial Risk Factors Among Participants ( $n = 47$ )

Risk Factor	Frequency (n)	Percentage (%)
Male Gender	38	64.1
Advanced Maternal Age (mean $\pm$ SD)	$32.6 \pm 11.2$	—
Multiparity	26	56.0
Irregular Antenatal Care	27	57.4
Maternal Mental Illness	10	21.3
Birth Asphyxia	12	25.5
Birth Injury	8	17.0

Among the participants, male gender was a predominant risk factor (64.1%). The mean maternal age was  $32.6 \pm 11.2$  years. More than half of the participants were born to multiparous mothers (56%) and had irregular antenatal care (57.4%). Maternal mental illness was reported in 21.3% of cases. Perinatal complications, including birth asphyxia (25.5%) and injury (17%), were also observed.

#### 4. Discussion

This study examined the association of perinatal, socio-demographic, and familial factors with attention-deficit/hyperactivity disorder (ADHD) in a Bangladeshi cohort. Our findings demonstrate a clear male predominance, with a male-to-female ratio of 4.8:1, which is consistent with global literature reporting ratios ranging from 3:1 to 5:1 [6]. This male bias may be partially explained by genetic and hormonal influences, as well as differences in symptom expression, with boys more often displaying hyperactive-impulsive behaviors that prompt clinical attention, whereas girls frequently present with inattentive symptoms that may go unrecognized [12]. Regarding ADHD subtypes, the majority of participants (68%) were classified as combined-type ADHD, which aligns with prior studies highlighting the predominance of this subtype in clinical populations [7]. The prominence of combined-type ADHD underscores the complexity of symptom presentation, combining both inattentive and hyperactive-impulsive features, which may contribute to higher functional impairment. Additionally, psychiatric comorbidities were common in our cohort. Oppositional defiant disorder (ODD) and conduct disorder (CD) were the most frequently observed comorbidities, reflecting a well-documented overlap between ADHD and disruptive behavior disorders [8]. This co-occurrence has important clinical implications, as comorbidities often exacerbate symptom severity, impair social functioning, and complicate treatment planning. Perinatal factors emerged as significant contributors to ADHD risk in this cohort. Advanced maternal age and multiparity were associated with higher ADHD prevalence, supporting evidence that maternal biological factors may influence neurodevelopment [9]. Irregular antenatal care and birth complications, including perinatal asphyxia and neonatal injuries, were also notable among affected children. These findings are in line with previous studies suggesting that perinatal adversity, through mechanisms such as hypoxia, inflammation, or early neurodevelopmental disruption, increases the likelihood of ADHD [13]. These results highlight the importance of optimizing

prenatal and perinatal care as potential preventive measures. Familial and genetic influences also appeared prominent. A positive familial psychiatric history, particularly maternal mental illness, was significantly associated with ADHD. Genetic predisposition likely plays a central role, given evidence from twin and family studies indicating heritability rates up to 76% [10]. Environmental factors, including maternal stress, parenting style, and early family environment, may interact with genetic susceptibility, further contributing to the development and severity of ADHD symptoms. Socio-demographic factors, notably low family income, were found to exacerbate ADHD symptomatology. Families with limited resources may experience higher psychosocial stress, reduced access to quality healthcare, and limited educational support for affected children [11]. These stressors can hinder symptom management and educational attainment, highlighting the need for targeted social and policy interventions to support vulnerable populations. This study has several strengths. To our knowledge, it is the first study in Bangladesh to systematically examine ADHD using validated diagnostic tools such as the DAWBA and DSM-5 criteria while incorporating detailed perinatal, familial, and socio-demographic assessments. This comprehensive approach enhances the reliability of our findings and provides a foundation for context-specific intervention strategies. However, several limitations should be acknowledged. The relatively small sample size and single-center design may limit generalizability. Additionally, the cross-sectional nature of the study precludes causal inference, making it impossible to determine whether observed risk factors directly cause ADHD. Future multicenter, longitudinal studies with larger, more diverse populations are needed to confirm these associations and explore potential mechanisms underlying ADHD development in the Bangladeshi context. In this study, underscoring the multifactorial etiology of ADHD, highlighting contributions from perinatal, familial, and socio-demographic factors. Early identification of at-risk children, coupled with interventions targeting both biological and psychosocial determinants, may help mitigate the burden of ADHD and improve long-term outcomes in affected individuals.

#### 5. Conclusion

ADHD in this cohort is associated with male gender, perinatal complications, familial psychiatric history, and socio-demographic disadvantages. Early recognition and targeted interventions addressing these risk factors may improve outcomes in affected children and adolescents.

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