Original Article

Co-occurrence of Attention-Deficit/Hyperactivity Disorder in participants with Autism Spectrum Disorder in a Centre for Neurodevelopment and Autism in Children, Bangladesh

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Abstract:

Background: *The relationship between Autism spectrum disorder (ASD) and Attention-Deficit/Hyperactivity Disorder (ADHD), and in particular the prevalence of ADHD among the ASD population in our setting is scarcely studied.*

Aims: *The study aimed to determine the frequency of ADHD in a sample of Bangladeshi children and adolescents with ASD.*

Materials and Methods: *This study was conducted at Centre for Neurodevelopment and Autism in Children (CNAC), BMU, Dhaka, Bangladesh. One hundred children having the diagnosis of ASD were included in the study. ADHD signs and symptoms were established by interview and questionnaire by center's experts. ADHD symptoms were based on the individuals' behaviors that was present after the benefits of medications wore off or during drug holidays.*

Results: *The mean age of the studied children was 7.77 (±5.811) years and age ranged from 2 to 17 years, 75% were male, and most of the children were from middle and upper-middle class family (71.0%)]. The rate of clinically evaluated ADHD symptoms in ASD was 17% (95% confidence interval: 10.23%-25.82%).'Often has difficulty sustaining attention in tasks or play activities' and 'Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort' were the most (14.0%) found complaints of ADHD in children with ASD; followed by, 'Often fails to give close attention to details or makes careless mistakes in schoolwork, work or other activities' (13.0%) and 'Often has difficulty organizing tasks and activities' (12.0%).*

Conclusion: *Two out of every 10 children with ASD have ADHD.*

Keywords: *Autism spectrum disorder (ASD), ADHD (attention defificit and hyperactivity disorder).*

Introduction:

Autism spectrum disorder (ASD) is defined by persistent impairment in reciprocal social communication and interaction, and restricted, repetitive patterns of behaviour or interests.[1] Approximately one in 68 children is identified with ASD according to estimates from CDC's Autism and Developmental Disabilities Monitoring (ADDM) Network.[2] The prevalence of ASD ranged from 0.15–0.8% in Bangladesh.[3] Autism related reported cases are increasing due to increased rate of incidence, awareness among parents and capability to diagnose the problem.

ASD-specific behavior have been found to negatively impact various aspects of the lives of individuals with this disorder.[4] The highly heterogeneous nature of ASD is often reflected in the child's characteristics, including clinical variability in the severity of autism symptoms, cognitive ability, and language skills.[5] In addition, substantial individual differences are apparent regarding the occurrence of comorbidity such as attention-deficit/hyperactivity disorder (ADHD), anxiety in patients suffering from ASD.[6,7]

ADHD is a common neurodevelopmental disorder with a prevalence estimated at 7.2% in the general population.[8] ADHD is characterized by a persistent pattern of inattention and/or hyperactivity and impulsivity that is pervasive across settings and leads to various degrees of functional impairment.[9,10] Children and adolescents with ASD have shown high rates of ADHD symptoms (16–85%).[7,11] and overlap between ASD and ADHD symptoms has been

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described as well.[12] However, the recognition that the diagnoses of ADHD and ASD can occur together has been formalized only in the DSM-5.[13] Previous studies have examined the co-morbidity of ADHD in ASD and described more severe autism symptoms,[14] higher rates of cognitive impairment,[8] more deficits in adaptive skills[4,15] and lower quality of life[8] in individuals with ASD and ADHD in comparison to ASD alone.

However, the issue has gained little attention in the management children with ASD in our setting. In this regard, present study aimed to evaluate the frequency of ADHD symptoms in the participants diagnosed with ASD in a tertiary level hospital in Bangladesh.

Materials and Methods:

A descriptive cross-sectional study was conducted at CNAC of Bangladesh Medical University (BMU), Shahbag, Dhaka, during June 2014 to December 2014. This study was approved by the Institutional Review Board (IRB) of BMU. After getting written permission from the concerned authority of the selected institute the children were approached. Prior to participation every guardian had to undersign an informed written consent.

Children with ASD aged not more than 18 years were included in the study. Children with significant physical condition like heart failure, respiratory failure, renal failure, and children with the diagnoses of specific genetic syndromes and sensory impairments were excluded. Sample size was taken as 100.

Data regarding *e*pidemiological parameters of study population and clinical information on ASD were collected by using a structured case record form. ADHD and ASD was diagnosed by using DSM-IV. As there are overlapping symptoms like attention deficit, over activity and difficulty with social skills between two diseases[16] which can be overcome by using ADHD-RS as used by Du Paul et al 1998.[17]

At the CNAC, children were being referred from various corners of the country; during registration children primarily diagnosed as ASD were approached and were enrolled for the study if they fulfilled the inclusion and exclusion criteria. Enrolled children presented with multiple symptoms that overlapped between ADHD and ASD with ADHD. These symptoms were clinically separated by using ADHD-RS scale.[17] Thereafter final data about individual child regarding disease and its present severity were collected from center's expert.

Data were compiled by using SPSS windows version 20.0. Only descriptive statistics in the form of mean, range, frequency and proportion were used in the analysis.

Results:

A total of 100 children with ASD were included in this study. Table I shows more than half of the children (54%) belonged to 5-10 years of age (7.77±5.81) and most of them were male. Most of the children were from middle and upper middle class family. Only 12% belonged to family having monthly income Tk. less than 10,000.00. Most of the children under study borne when their mothers were between 30-40 years old (48%). Only 11 children borne when their mothers were above 40. This study shows 47% of the participants were first issue of their parents. It was found from the study that there is no significance difference in occurrence of ADHD in patients with ASD between home delivery group and hospital delivery group, even in normal delivery group and LSCS group. It also showed most of the children had normal birth weight, only 17 % of them had low birth weight.

Table I: Distribution of the ASD children by their maternal age and parity during of conception, mode of delivery, place of delivery, and birth weight (n=100)

Maternal age	Frequency	Percent (%)
≤30 years	41	41.0
30-40 years	48	48.0
> 40 years	11	11.0
Parity		
primi	47	47.0
2nd	30	30.0
3rd	19	19.0
4th	4	4.0
Place of delivery		
Home	18	18.0
Hospital	72	72.0
Mode of delivery		
Vaginal	46	46.0
Cesarean	54	54.0

Table II indicates that, 'Often has difficulty sustaining attention in tasks or play activities' and 'Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort' were the most (14.0%) found complaints of ADHD in children with ASD; followed by, 'Often fails to give close attention to details or makes careless mistakes in schoolwork, work or other activities' (13.0%) and 'Often has difficulty organizing tasks and activities' (12.0%).

Discussion:

The current study found an increased frequency of ADHD symptoms (17%) as reported by the parents in a large, well-characterized group diagnosed with ASD. Both clinically elevated 'inattention' symptoms and 'hyperactivity/impulsivity' symptoms were documented at high rates in the ASD group. The current study supported previous studies that reported higher ADHD symptom frequencies (16–85%) in children having features of ASD.[7,11,18]

Table II: Distribution of the children by their presenting complaints (N=100)

Presenting complaints		Present	Absent
Inattention	1. Often fails to give close attention to details or Makes careless mistakes in school work, work or other activities	13	87
	2. Often has difficulty sustaining attention in tasks or play activities	14	86
	3. Often does not seem to listen when spoken to directly.	10	90
	4. Often does not follow through on instructions And fails to finish work.	7	93
	5. Often has difficulty organizing tasks and Activities	12	88
	6. Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort	14	86
	7. Often loses things necessary for tasks or Activities	9	91
	8. Is often easily distracted by extraneous stimuli	5	95
	9. Is often forgetful in daily activities	0	100
Hyperactivity	1. Often fidgets with hands or feet or squirms in seat	9	91
	2. Often runs about or climbs excessively in Situations in which it is inappropriate	10	90
	3. Often has difficulty playing or engaging in Leisure activities quietly	9	91
	4. Is often "on the go" or often acts as if "driven by a motor"	1	99
	5. Often talks excessively	3	97
Impulsivity	1. Often blurts out answer before questions have been completed	5	95
	2. Often has difficulty awaiting turn	8	92
	3. Often interrupts or intrudes on others	4	96
	Included multiple responses		

Figure 1 indicates that, out of 100 children with ASD only 17 (17.0%) presented with various symptoms of ADHD and diagnosed as ASD with ADHD. So, the frequency of ADHD stands to be 17.0% (95% confidence interval: 10.23%-25.82%).

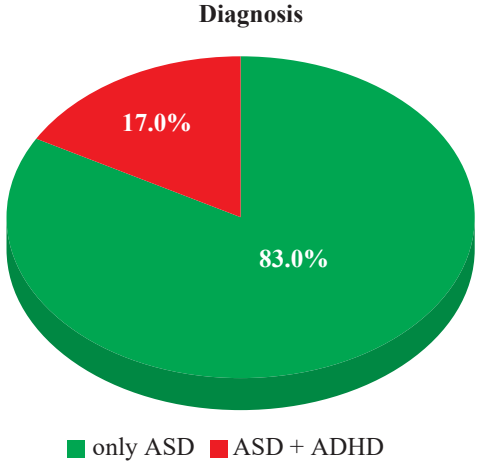

Figure 1: Distribution of the children according to the diagnosis

Children with ASD and ADHD had greater treatment needs (that is either unmet need or treatment usage) when compared to their peers with ASD, but not ADHD.[19] Previous literature found high rates of service needs, particularly among children diagnosed with co-occurring conditions. A large majority of children diagnosed with ASD and ADHD had a treatment need for in-school and out-of-school services. For both types of services, children with ADHD and ASD had a greater treatment need than children with ADHD, but not ASD.[19,20]

This study has theoretical significance. The high frequency of ADHD symptoms in one fifth of the ASD group suggests that some of the symptoms of both disorders may overlap. ASD and ADHD are described with similar brain abnormalities in specific regions, including the medial frontal and prefrontal cortex, which play an important role in executive functions,[21] and reduced activation in the striato-thalamic region, prefrontal, and parietal cortex.[22] Present study finding of the significant co-occurrence of ADHD symptoms in ASD in both disorders, implies a common neurobiological origin. In light of the finding that ADHD symptoms are related to poorer adaptive behaviors and to more severe autism symptoms as perceived by the parents, it is highly important during the ASD diagnostic process to assess ADHD and anxiety symptomatology. Since having ADHD symptoms with ASD is associated with parents' negative perceptions of their child's functioning, parents should be provided with support and guidance.

Limitations: This study was conducted in a tertiary care hospital in Dhaka. Therefore the study findings may not

reflect the exact scenario of all around the country regarding ADHD. The current study was conducted among 100 children, not a large study to draw a

definite conclusion. In Bangladesh, study of ADHD in the perspective of the objective of current study is rare. So, difficulty was faced to compare the findings to other research findings.

Conclusion:

In conclusion, approximately 2-in-10 children currently diagnosed with ASD were also diagnosed with ADHD. It will be important to diagnose co-morbid ADHD early in children with ASD, and to explore effective medical and behavioral interventions to reduce the impact of this comorbidity, thereby hopefully leading to improved functioning. The growth and complexity of this observed population of children warrants additional research.

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