

Co-occurrence of Attention Deficit Hyperactivity Disorder in children with Autism Spectrum Disorder- A Hospital Based Study

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ABSTRACT

Introduction: Autism spectrum disorder (ASD) is a Neuro-developmental disorder characterized by impaired social interaction, verbal and non-verbal communication, restricted and repetitive behaviors. The symptoms of ASD and Attention Deficit Hyperactivity Disorder(ADHD) often co-occur. The DSM-V, in its revised ADHD diagnostic criteria, recognizes the frequency of this co-occurrence and allows, for the first time, a co-morbid diagnosis of ADHD with ASD. This allows more efficient clinical management of these children. **Aim:** To describe the profile of children with ASD enrolled in the Multimodal therapy unit of a tertiary care hospital and to estimate the co-occurrence of ADHD among these children. **Methods:** This cross-sectional study was carried out among 50 children with ASD enrolled in the Multimodal therapy unit of a tertiary care hospital in Tirunelveli in 2018after obtaining informed consent from the parent. Children were classified into the 3 levels based on the support they need. The diagnosis on the co-occurrence of ADHD was made based on DSM –V criteria. **Results:** Among the children ,78% were males and 22% were females. The mean age of diagnosis of ASD was 2 years. 38% were in level 1, 46% in level 2 and 16% in level 3 based on the support they need. Co-occurrence of ASD with ADHDwas28% (10% attention deficit and 18% hyperactivity). **Conclusion:** The co-occurrence of ASD and ADHD is high. The study stresses the need for a very detailed examination for ADHD features among children with ASD for better management.

Key Words: Autism Spectrum Disorder, Attention deficit, hyperactivity, children

INTRODUCTION

Autism spectrum disorder (ASD) represents a group of neurodevelopment disorders(NDD) characterized by impairment in reciprocal social interaction and communication, along with restricted and repetitive behaviors including sensory issues(hyper/ hypo-reactivity to stimuli (lights, sounds, tastes, touch, etc.) or unusual interests in stimuli (staring at lights, spinning objects, etc.) that are both unique to the individual.(1) The severity of the problem is classified , based on the level of daily support they require into three levels by DSM –V as: Level 1: requiring support, Level 2: substantial support and Level 3: very substantial support.

It is estimated that worldwide 1 in 160 children has an ASD. This estimate represents an average figure, and reported prevalence varies substantially across studies.(2) The prevalence is estimated to be one in 100 children in India with a range between 0.6 to 3.2 in children aged 6-9 years of age.(3)ASDs begin in childhood and tend to persist into adolescence and adulthood. In most cases the conditions are apparent during the first 5 years of life withsubstantial physical and mental health problems across the lifespan(4,5) which places a large financial, social and personal burden on individuals, families and society.(6)

There are no single known causes of ASD; it is believed to be caused by a complicated interplay between genetic, epigenetic and environmental factors. (7).The factors associated with ASD risk in the meta-analysis were advanced paternal age at birth, maternal prenatal medication use, gestational diabetes, order of birth. (8) Although the estimated 60-92% concordance rate in monozygotic twins as compared to 0-10% in dizygotic twins underscores the importance of genetic influences, the incomplete concordance in monozygotic twins also indicates a role of environmental factors. (9,10).

Hyper-systemizing predisposes individuals to show talent, and review evidence that hyper-systemizing is part of the cognitive style of people with autism spectrum conditions.(11) Researchers have found that hypo-responsiveness and hyper-responsiveness co-occurred in autism spectrum disorders.(12)Nocturnal enuresis is particularly prevalent in children who have autism spectrum disorders.(13)

A few studies suggest that symptoms can be detected before the first birthday in some children.(14)Many children with ASD exhibit recognizable problems in social interactions in their first year of life.(15) Hand flapping, toe

walking, and sustained odd play were associated with a decrease in the age of diagnosis, whereas oversensitivity to pain and hearing impairment were associated with an increase.(16)

Co-occurring disorders are common in ASD and will affect daily life. Attention deficit hyperactivity disorder (ADHD) is a psychiatric disorder of neurodevelopment type. It is characterized by problems paying attention, excessive activity, or difficulty controlling behavior which is not appropriate for a person's age. ADHD includes three subtypes: primarily inattentive (e.g., distracted, poor organization and follow-through); primarily hyperactive-impulsive (e.g., fidgety, overly active, interrupts); and combined. (1)

Symptoms of attention deficit hyperactivity disorder (ADHD) and autistic spectrum disorder (ASD) often co-occur. The core symptoms of ADHD (attention deficit, impulsivity, and hyperactivity) are part of ASD, and ASD and ADHD have similar underlying neuropsychological deficits. Autistic symptoms are not common in ADHD. Because of the high frequency of ADHD symptoms in ASD, children with ASD may initially be misdiagnosed with ADHD.(17) Studies show that between 30 and 50% of individuals with ASD manifest ADHD symptoms (particularly at pre-school age), and similarly, estimates suggest two-thirds of individuals with ADHD show features of ASD.(18) Co-occurrence of ADHD and ASD is associated with a lower quality of life and poorer adaptive functioning than in any one of these conditions.(19) Both disorders often include difficulties in attention, communication with peers, impulsivity, and various degrees of restlessness or hyperactivity. Both are more common in boys than in girls, and present, at least partially, at pre-school age. Both disorders have a known genetic pre-disposition, with co-morbidity within the same individual and across family members, and both syndromes cause significant behavioral, academic, emotional, and adaptive problems in school, at home, and elsewhere. (20)

The DSM-V, in its revised ADHD diagnostic criteria, recognizes the frequency of this co-occurrence and allows, for the first time, a co-morbid diagnosis of ADHD with autism spectrum disorder. This will not only allow for more efficient clinical management of these children, but will also clear the way for a more precise scientific understanding of the overlap of these two disorders.(1)

ASD behaviors contribute both to difficulties these families experience raising a child with autism and to the stigma processes associated with those behaviors. Research comparing individuals with both diagnoses to individuals with a single diagnosis suggest that co-occurring symptoms are associated with greater impairment than a single diagnosis. Both parent and teacher reports children with ADHD and ASD experience more difficulty in daily life. Furthermore, these co-occurring conditions may be less responsive to standard treatments for either disorder.(21) Increasing social interaction by teaching new skills may lead to reductions in problem behavior, such as motor

stereotypes. (22).To provide adequate support and intervention for the child and the family, the child's profile as well as coexisting medical disorders needs to be considered.(23). Thus, this study aims to describe the profile of children with Autism Spectrum Disorder enrolled in the Neurodevelopment clinic of a tertiary care hospital and to estimate the co-occurrence of Attention Deficit Hyperactive Disorder among these children with ASD

MATERIAL AND METHODS

This cross-sectional study was carried out at the Multimodal therapy unit attached to the Dept. of Psychiatry in a tertiary care hospital of Tirunelveli in 2018. The study was initiated after obtaining approval from the institutional ethics committee and 50 children diagnosed with Autism Spectrum Disorders according to DSM- V criteria and enrolled in the Unit were included in the study after obtaining informed consent from the parent. Non-consenters and Children with intellectual disability, poor academics (dyslexia), conduct traits, childhood mood disorders, oppositional deficit disorders (as per diagnosis made by psychiatrist) are excluded from the study. Data on basic sociodemographic characteristics were collected. Children were classified into the 3 levels based on the support they need as - Level 1 autism (mild symptoms and may not require much support), level 2 or 3 autism have moderate and severe symptoms and require more substantial support. The diagnosis on the co-occurrence of ADHD was made based on the presence of a sufficient number of core symptoms and functional impairment as per DSM -V criteria. The data obtained were tabulated and analyzed for mean, proportion. Chi-Square test was used to calculate statistical association.

RESULTS

SOCIODEMOGRAPHIC CHARACTERISTICS:

The study included 50 children with ASD, of which 39(78%) were males' and 11(22%) were females. Almost 50% of the children belonged to age group 0-5 years. (Table:1) With the exception of a set of twin, none of the siblings of other 49 children had ASD. The mean age of mothers at the time of birth of the ASD child was 27.8 years. 2 mothers were >35 years of age during their child birth. The mean age of fathers at the time of birth of the child with ASD was 31.5 years. There were 2 fathers above the age of 40 years during the child birth. Among the mothers, one was illiterate and 20% were professionals

PROFILE OF CHILDREN WITH ASD

On the basis of need for support, it was found that that 19 children were in level 1 (28% males & 10% females), 23 in level 2 (38% males & 8% females) and 8 in level three (12% males & 4% females). But the higher incidence of severity among male children than female was found to be statistically insignificant ($p > 0.05$). The mean age of

diagnosis of ASD among these 50 children was 2 years . Only in 36% of children, ASD was diagnosed before their 2nd birthday and in 6%, it was diagnosed only after 8 years of age.(Table 2). It is found that children who had delayed diagnosis of ASD had severe form of the disorder needing more support and this association was found to be statistically significant (p<0.05).

Table 1: Distribution of children based on Age and Sex

Age(yrs)	No of Males	No of Females	Total
0-5	16	7	23
06-10	18	2	20
11-15	5	2	7
Total	39	11	50

Table 2: Age at diagnosis and Level of ASD(p< 0.05)

Age at diagnosis	Level of ASD			Total
	Level 1	Level 2	Level 3	
<=2yr	13	4	1	18
3-5yr	6	16	0	22
6-8yr	0	3	4	7
>8yr	0	0	3	3
Total	19	23	8	50

Table 3: Mother’s Education versus Age at Diagnosis

Mother's education	Age at the time diagnosis			
	<2yr	3-5yr	6-8 Yr	>8yr
Illiterate	0	0	0	1
Primary school	0	1	1	0
Middle school	4	5	2	0
High school	1	5	1	1
Post high school	2	1	2	1
Graduate	7	5	0	0
Professional	4	5	1	0
Total	18	22	7	3

(p< 0.05) P=0.0347

The symptom that made the parents seek medical help was either delayed language milestones (29%) or non-response to call (16%). In 5% of the children the diagnosis had been made by chance. Among these children, repetitive behaviour that were noticed include repeating noises(32%), wheel spinning(24%), spinning objects(16%), lining of toys(8%), head banging(6%), scratching and watching moving objects (4%), and hand flapping, repeating words and snapping fingers were found in 2% each.(Fig:1) Among Sensory problems, 64% of the children showed altered sensitivity to sound. Under Motor abnormalities 22% of the ASD children manifest vestibular problems in

the form of tiptoe walking. Nocturnal enuresis was reported in 14% of the ASD children. 56% of the ASD children showed special areas of interest like music (42%), drawing and swimming. (Fig: 2)

Table 4: Mother’s education Versus Level of ASD

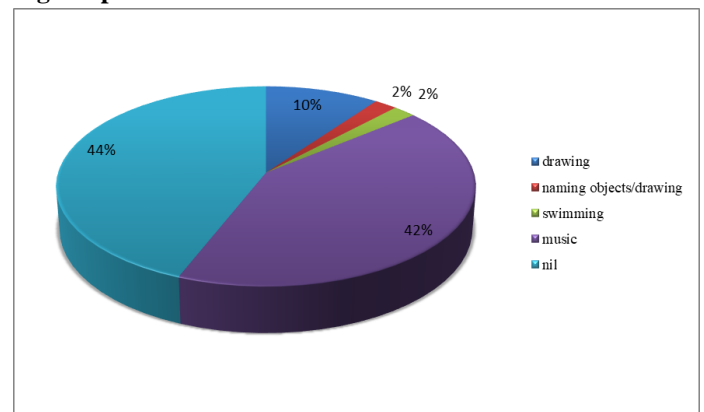
Mother's Education	LEVEL OF ASD		
	Level 1	Level 2	Level 3
Illiterate	0	2	1
Primary school	1	1	0
Middle school	2	6	3
High school	1	6	1
Post high school	2	1	3
Graduate	8	3	0
Profession	5	4	0
Total	19	23	8

(p< 0.05) P=0.0473

Table 5: Co occurrence of ADHD and Levels of ASD

Level of ASD	ADHD present		ADHD absent	
	Males	Females	Males	Females
Level 1	2	0	12	5
Level 2	7	0	12	4
Level 3	3	2	3	0
Total	12	2	27	9

Fig 2: Special Areas of Interest



It was found that mothers with higher educational qualification had been able to identify the symptoms earlier and had better health seeking behavior and this association was found to be statistically significant (p<0.05). (Table:3) . The association between the level of severity of ASD and the mother’s education was found to be statistically significant (p<0.05). (Table:4)

CO OCCURRENCE OF ADHD

The co-occurrence of Attention Deficit Hyperactivity Disorder (ADHD) was 14(28%) with 12 males and 2 females. Among the co occurred ADHD, 10% was attention deficit and 18% was hyperactivity features. The

co occurrence of ADHD was more among children in level 2 of ASD (50%) (Table:5)

DISCUSSION

This study showed an increased predisposition of ASD among males with a male-female sex ratio 3.3:1 which was similar to the study made by Mend-Chuan Lai et al which had a male-female sex ratio of 4-5:1 (24) and it was 3.67: 1 in the study by Kondekar A et al.(25). In this study , the average age of diagnosis was 2 years when compared to the study by David S.Mandell, where the average age of diagnosis was 3.1 years for children with autistic disorder and it was 19 months in the study by De Giacomina et al(26). Children with severe language deficits received a diagnosis on an average of 1.2 years earlier than other children (16).

In this study, the symptom that directed to the diagnosis of ASD was either delayed language milestones(29%) or non-response to call(16%). In the study by De Giacomina et al, the most common initial symptom recognized by parents was delayed speech development in 54.4% (26). Language delay was the commonest developmental concern in 83.03% in the study by Kondekar A et al (25)).Also Stereotypical movements, rocking, spinning, hand flapping movements were observed as common motor mannerism in almost 50% of study group. In this study repetitive behaviour noticed, include repeating noises(32%), wheel spinning(24%), spinning objects(16%), lining of toys(8%), head banging(6%), scratching and watching moving objects (4%), and hand flapping, repeating words and snapping fingers (2%) each. Nocturnal enuresis is reported in 14% of the ASD children in this study. In a study done by Von Gontard et al, children with ASD showed increased rates(30%) of nocturnal enuresis compared to controls(27)

In this study, 28% of the ASD children had co occurrence of.Co-morbidity between ASD and ADHD has been reported in 78% in the study by Lee Do et al (29) and 53% by Sinzig et al (30)

CONCLUSION:

The co-occurrence of ASD and ADHD is high and worsens the quality of life of autistic children. The study stresses the need for a very detailed examination for ADHD features, the type of predominant ADHD, sub-symptomatology among children with ASD to achieve better first-line treatments. The period between initial recognition of symptoms and immediate approach for health care is important in ASD and ADHD, because it allows immediate behavior-based and therapeutic intervention. Increased awareness for early recognition of symptoms among parents and Parent training may be initiated on how to manage these children becomes essential. Thus a holistic intervention will promote betterment in the quality of living among these children.

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