RESEARCH ARTICLE

Sociodemographic association between attention-deficit hyperactivity disorder (ADHD) and autism spectrum disorders (ASD): a cross-sectional study from Baghdad

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ABSTRACT

INTRODUCTION: Studies showed a relative frequency of co-occurrence between autism spectrum disorders (ASD) and ADHD. This overlap may have a poor impact on patients' lives. It's important to pay attention to ADHD in autistic patients from early childhood to provide appropriate interventions that may lead to improve outcomes.

OBJECTIVE: This study aimed to identify the co-occurrence of ADHD among patients with ASD and find the association of this co-occurrence with some socio-demographic features in a group of patients in Baghdad.

METHODS: A descriptive study, including 257 patients with autism, was performed at the Autism Centre of the Welfare Teaching Hospital in Baghdad from October 2022 to February 2023. We reported the degree of association of socio-demographic factors with the above conditions. Data was entered and tested by SPSS V16 through the Pearson chi-square correlation test. A p-value of <0.05 was considered statistically significant.

RESULTS: Most of the patients with ASD have concomitantly ADHD in 109 out of 257 (42 %). ADHD was more common in males than females without statistical significance. Also, ADHD is commonly presented in patients 2-5 years old, a statistically significant relation.

CONCLUSION: ADHD was found in a relatively high percentage of autistic patients, suggesting a strong co-occurrence that may reveal potential effects of genetic, racial and/or socio-cultural factors. So, further national studies are needed to generalize the results.

Key words: Autism Spectrum Disorder, (ASD), Attention deficit hyperactivity disorder,(ADHD).

INTRODUCTION

Autism spectrum disorder (ASD) is chronic difficulties in social interaction and communication (e.g., poor social-emotional reciprocity, nonverbal communication deficiencies, relationship development deficits) and limiting, repetitive patterns of behaviour or interests. [1] It is estimated that worldwide, about 1 in 100 children has autism. This estimate represents an average figure, and reported prevalence varies substantially across studies. However, Some well-controlled studies have reported substantially higher figures. The prevalence of autism in many low- and middle-income countries is unknown.[2]

According to the American Psychiatric Association, attention-deficit hyperactivity disorder (ADHD) is one of the most common psychiatric disorders affecting children and adolescents. It is estimated that 8.4% of children and 2.5% of adults have the disorder, which is twice as common in males as in females.[3] Symptoms of ADHD include inattention (not being able to keep focus), hyperactivity (excess movement that is not fitting to the setting) and impulsivity (hasty acts that occur in the moment without thought).[4] Clinical and genetic studies suggest that ADHD and ASD often co-occur and share genetic susceptibility.[5]

Language Disorder can also co occur with-ASD. It is defined by difficulties in the acquisition and use of language due to deficits in the

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production or comprehension of vocabulary and sentence structure which are apparent in spoken and written communication or sign language. It can either be in receptive and/or expressive skills. A language disorder differs from a speech disorder, which involves problems with the articulation and fluency of speech sounds.[6]

Evidence showed a significant co-occurrence between ASD and ADHD; 20–50% of children with ADHD fulfilled ASD criteria, and the reverse was found in 30–80%.[5] Over 40% of preschoolers and over 50% of school-aged children with ASD fulfilled the criteria for a DSM-IV subtype of ADHD.[6,7] Furthermore, most children identified with both disorders had more severe issues than those diagnosed with one. Moreover, studies have shown that the comorbidity of ASD and ADHD significantly negatively affects children's social skills and overall functioning in childhood and adulthood.[8]

While working at the autism centre of the Welfare Teaching Hospital in Baghdad, many patients with autism who have some common features for ADHD were noticed. This study was designed to find the prevalence of ADHD in patients with ASD, identify their demographic features, and find an association between these features and the presence of ADHD.

METHODS

Study design and the setting: a descriptive cross-sectional study was performed at the Autism Centre of the Welfare Teaching Hospital in Baghdad between October 2022 and February 2023.

Ethical consideration: The ethics research committee of the Medical City has approved the study protocol. The official agreement was taken from the hospital administration, and verbal informed consent of patients' relatives was taken for all patients enrolled in this study.

Definition of the cases enrolled: In this study, we included patients under 18 years old who visited the Autism Centre of the Welfare Teaching Hospital during the studied period who were diagnosed with autism. An experienced paediatrician has confirmed the diagnosis of autism. Patients recently diagnosed with other neurodevelopmental disorders were excluded from this study.

Sampling: A convenient sample of (257) autistic children enrolled in this study (192 male and 65 female) who fulfilled the enrollment criteria.

The procedure and outcomes: All members involved in this study underwent complete clinical evaluation by appropriate health professional experts for the presence of signs and symptoms of AHDH according to DSM-5 criteria.[1] To meet DSM-5 criteria for ADHD in childhood, a child must have at least six responses of "Often" or "Very Often" (scored 2 or 3) to either the nine inattentive items (1-9) or the nine hyperactive-impulsive items (10-18), or both. At least five symptoms are required for those 17 years old and above. The clinician may consider ADHD as a possible diagnosis if five or more symptoms are scored 2 or 3 in either one or both domains. These signs and symptoms must impair the child's functioning in at least two settings and must not be primarily due to other factors or conditions.

Statistical analysis: statistical analysis was performed via SPSS V16. Data were presented as frequencies and percentages. The Pearson chi-square correlation test and the likelihood

Table 1 | The Socio-demographic variables of patients with autism

Variables	Category	n	%
Gender	Female	65	25
	Male	192	75
Age groups	<2	4	2
	2-5	167	65
	6-12	75	29
	>12	11	4
Total		257	100

Table 2 | Co occurrence of ADHD with ASD

co occurrence of ADHD with ASD	Number	%
No co occuence (ASD alone)	148	58
Clinically Diagnosed ADHD with ASD	109	42
Total	257	100

Table 3 | Association between sex and age with children with autism with or without ADHD

Variable	Categories	ASD alone		ADHD with ASD		p-value *
		number	%	number	%	
Gender	Female	42	28	23	21	0.185
	Male	106	72	86	79	
Age groups (Yrs)	<2	4	3	0	0	0.000
	2-5	110	74	57	52	
	6-12	29	20	46	42	
	>12	5	3	6	6	
Total		148	100	109	100	

*p value < 0.05 was considered significant

ratio tested statistical differences among data. A p-value of < 0.05 was considered significant.

RESULTS

A total of 257 children with ASD were enrolled in this study; 65 (25%) were females, and 192 (75%) were males. Of this sample, 167 (65%) were between 2-5 years old, 75 (29%) between 6-12, 4 (2%) less than two years, and 11 (4%) older than 12 years, see table 1.

Out of the 257 children with ASD, we clinically diagnosed ADHD in 109 (42%), table 2. Table three shows that 86 (79%) were males and 23 (21%) were females; however, sex showed no significant statistical association (p=0.185). We found a statistically significant association between age group and having ADHD with a p-value of 0.000. ADHD was found in 57 (52%) children in the age group of 2-5 years, 46 (42%) in those of 6-12 years, and in 6 (6%) in those older than 12 years and none below the age of 2 years. See tables 3.

DISCUSSION

Our study showed that 109 children out of 257 (42%) with ASD have ADHD. This ratio is lower than that reported by Goldstein and Schwebach in 2009, who found that 59% of ASD patients fulfilled the criteria for ADHD,[9] while it is higher compared to the 25 % reported by a study conducted in Egypt in 2015.[10] A meta-analysis conducted by Yang et al. [11] on 56 studies found that the prevalence of ADHD in patients with ASD was 38.5%, which is nearly similar to ours. The difference in percentages might be due to the different diagnostic tools used to diagnose ADHD in patients with ASD and how accurate the application of the criteria in clinical practice.

We found that those with ADHD and ASD were more common in males, 86 (79%) than 23 (21%) females, with a ratio of 4:1; however, this difference was statistically non-significant. Our ratio is higher than the 1.5:1 reported by a study from Egypt.[10]

We found that ADHD is more common in the age group of 2-5 and 6-12 years. A systematic review on 12 studies suggested that ADHD is typically diagnosed earlier when ASD is present, and ASD is typically diagnosed later when ADHD is present. Data provided by the Centre for Disease Control and Prevention in 2014 states the average age for diagnosis of ADHD is seven years. The average age of ADHD diagnosis when children had co-occurring ASD ranged from 4.8 years to 8 years.[12]

However, it is important to note that descriptive cross-sectional studies have limitations, such as the inability to establish causality or determine the direction of association between variables. Therefore, further longitudinal studies are needed to confirm these findings and explore potential underlying mechanisms. The symptoms of ADHD and autism can often be confused, leading to misdiagnosis or a delayed diagnosis. It is important for healthcare professionals to carefully evaluate and differentiate between these conditions to provide appropriate treatment.

CONCLUSION

ADHD is commonly associated with children with ASD. This association is more common in males than in females, though without statistical significance. There is a statistically significant association between age and co-occurrence of ADHA and ASD; the association is more in children aged 2-6 years.

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Abbreviations list: Attention-deficit hyperactivity disorder (**ADHD**), Autism spectrum disorder (**ASD**), Diagnostic and Statistical Manual of Mental Disorders (**DSM-IV**), Statistical Package for the Social Sciences (**SPSS**).

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