Original Article

Clinical and Demographic Characteristics of Autistic Children in Al-Hilla City

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Abstract

Background: An increase in the number of cases of autism spectrum disorder (ASD) has been reported around the world in the recent years, identifying the major risk factors and main associations helps increase our knowledge and planning for future studies. **Objective:** To identify the major risk factors for ASD and associated medical and psychiatric comorbidities in Al-Hilla city. **Materials and Methods:** This is a record review study done in five centers for behavioral therapy of autistic children in Al-Hilla city from January 15, 2023, to May 15, 2023, on 204 children with ASD, their ages ranged from 2 to 12 years old, full history and clinical examination was done for all children. **Results:** Out of 204 children studied, 70.58% were males and 29.4% were females with a male-to-female ratio of 2.4:1. Their ages ranged from 2 to 12 years old, and 62.7% presented between 4 and 6 years of age. About 62.7% presented with speech delay, 17.6% had a family history of similar problems, 19.6% had sleep disturbance, 41.2% had gastrointestinal problems, 13.7% had epilepsy, and 50.9% had hyperactivity. **Conclusion:** We found a higher male-to-female ratio, delayed presentation to medical attention, most children present with speech delay and most patients had associated medical and psychiatric problems.

Keywords: Al-Hilla city, autism spectrum disorder, clinical and demographic data

Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental disorder of early childhood the most important features are defects in socio-emotional reciprocity, inability to develop and maintain adequate social relationships with others, impaired verbal and non-verbal communication skills, often associated with stereotypic verbal and motor behaviors, restricted patterns of interest, insistence on sameness, and hypo- or hypersensitivity to sensory stimuli.[1]

The prevalence of ASD in the US is reported to be 16.9/1000 children. Population-based data are not available from Iraq. As in many other developing countries, ASD is a neglected health problem in Iraq and the level of public awareness and screening programs in the health system is low.[2]

Environmental risk exposures may affect brain development at different stages of development. Immune dysregulation, essential fatty acids, and certain nutrient deficiencies may play a pathogenic role. Furthermore, environmental factors interact with susceptibility genes playing a role in pathogenesis. Evidence that new changes to DNA (epigenetic mutations) are associated with ASD risk suggests that environmental exposure may cause a damage to the genetic material.[3]

Since environmental risk factors are modifiable, unlike the genetic risk factors which are irreversible, screening for environmental risk factors like advanced paternal age at conception, complications during pregnancy, maternal diet, and prenatal exposure to psychotropic drugs, may be a good approach for primary prevention of ASD.[4]

Since the improvements in neonatal care and increased the rates of survival of premature and very low birth weight babies had resulted in their survival with

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many complications, the rates of autism and other neurodevelopmental disorders had increased as a complication of prematurity.[5]

Many sleep disorders have been reported in autism like, insomnia (the most common), parasomnia, increased bedtime resistance, sleep-related breathing problems, early morning rise problems, and excessive daytime sleepiness. Sleep problems in ASD have been shown to affect the prognosis, communication skills deficits, stereotypic movements, and cognitive abilities. In addition to that, it has been shown that these sleep problems are associated with higher levels of parental stress.[6]

Many gastrointestinal (GI) problems are reported in subsets of autistic individuals, including chronic constipation, chronic diarrhea, and abdominal pain. Gastroesophageal reflux disease, hematochezia, repeated vomiting, and excessive flatulence are also common in autistic children.[7] Other common feeding problems in children with ASD include food selectivity, food refusal, and picky eating. Preference for carbohydrates and processed foods is the manifestation of food selectivity.[8]

The clinical overlap between ASD and epilepsy is well known, and many advances now search for the genetic causes of both disorders,[9] many clinical correlations between epilepsy and ASD of which the most common shown that treatment-resistant epilepsy is higher in children with ASD than in children without ASD which had a bad prognosis.[10]

ASD and attention-deficit/hyperactivity disorder (ADHD), had many associated symptoms like inattention, hyperactivity, and impulsivity. Children with both ASD and ADHD symptoms had a worse prognosis regarding social processing, adaptive functioning, and executive control.[11]

Materials and Methods

This is a record review study done in five centers that provide behavioral treatment for all developmentally delayed children in Al-Hilla city from January 15, 2023, to May 15, 2023 (the centers are Babylon Center for Behavioral Therapy, Alaataba Center for Behavioral Therapy, Sura Rasheed Center for Behavioral Therapy, Alrahma Center for Behavioral Therapy, Almazaya Center for Behavioral Therapy).

It was performed on 204 children with ASD their ages ranged from 2 to 12 years old and their mean age was 7, full medical history and clinical examination was done after taking oral consent from families of children involved in the study.

Inclusion criteria: All children with ASD from 2 to 12 years old.

Exclusion criteria: All children with diagnoses other than ASD like ADHD, stuttering, dyslexia, hearing impairment, etc.

The checklist used for evaluation:

- Age, sex, and age of the child at the first presentation.
- Maternal age at the birth of the child.
- Paternal age at the birth of the child.
- Is there a family history of a similar condition? And what is the degree of kinship?
- Does the mother suffer from obesity?
- Is the child term or preterm at birth?
- Is there adequate spacing between pregnancies?

And what is the shortest time between two pregnancies?

- Did the mother suffer from any bacterial infection during pregnancy?
- Did the mother suffer from any mental or physical chronic diseases during pregnancy?
- Was the mother exposed to radiation during pregnancy?
- What are the main symptoms that led to the review?
- Repetitive involuntary movements?
- Not playing with the rest of the children?
- Speech regression? Poor eye contact?
- What other problems does the child suffer from?
- Feeding problems? Poor appetite?
- Sleep disturbance? Insomnia?
- Digestive problems? Chronic diarrhea? Chronic constipation?
- Overactive movement? Epileptic disorder?
- Other psychological issues? What are they?

Data analysis

Analytical description was performed for all variables using Microsoft Excel. Variables were represented as numbers and percentages and presented in organized Tables 1-5 with appropriate captions.

Table 1: Demographical data of patients

Characteristics	Number of patients	Percentage (%)
Gender		
Male	144	70.58
Female	60	29.4
Age (years)		
2–3	4	1.96
4–6	128	62.7
7–12	68	33.3

Table 2: Distribution of patients according to the age of presentation

Characteristics	Number of patients	Percentage (%)
The age at time of diagnosis (years)		
<2	8	3.9
2–4	116	56.8
5–9	80	39.2

Table 3: Distribution of patients according to the main presenting features

Characteristics	Number of patients	Percentage (%)
Chief complaint		
Delayed speech	128	62.7
Poor eye contact	72	35.2
Challenging behavior	84	41.1

Table 4: Distribution of patients according to the risk factors of developing autism

Characteristics	Number of patients	Percentage (%)
Family history of similar condition	36	17.6
History of prematurity	20	9.8
Maternal complications during pregnancy	60	29.4
Maternal hypertension	14	6.8
Maternal DM	10	4.9
TORCH infection	2	0.9
Bacterial infections	12	5.8
Obesity	14	6.8
Radiation exposure	3	1.4
Psychiatric illnesses	5	2.4
Improper spacing between pregnancies	18	8.8
No identifiable risk factors	70	34.3

Mean paternal age at childbirth was 34.6, mean maternal age at childbirth was 24.8

Table 5: Distribution of patients according to the associated clinical and psychological problems

Characteristics	Number of patients	Percentage (%)
Sleep disturbance	40	19.6
Picky eaters	76	37.2
Epilepsy	28	13.7
Hyperactivity	104	50.9
Chronic diarrhea	4	2
Chronic constipation	4	2

Ethical approval

This study was performed in accordance with the ethical principles that have their declaration of Helsinki. It was carried out with patients' oral and written approval before history and clinical examination was done. The study design and protocol and the children's information and the consent form were reviewed and approved by a local ethics committee according to document number (134 on January 5, 2023) to get this approval.

Results

The study was done on 204 children with ASD, the male-to-female ratio had been found to be 2.4:1.

Discussion

We found in the current study that the male-to-female ratio is 2.4:1 which was lower than most other studies which showed that the male-to-female ratio of 3:1.[12]

About 62.7% of children presented between the ages of 4 and 6 years, which is considered delayed as compared with most developed countries in which several studies have shown that the average age of presentation is between 2 and 6 year.[13] The average age at first presentation in our study is delayed because most parents in our society had lower knowledge about signs of developmental delay and they look for medical attention later hoping that their children will improve with time, or their children had only speech delay not autism, in addition, there are no screening programs for autism in our health center and the public awareness also is low, whereas only 3.9% presented below the age of 2 years who's families are highly educated and 39.2% presented after the age of 5 years because of their families neglect or decreased awareness for concerning symptoms.

Most of our children present to medical care for their families with concerns about speech delay or regression and about 62.7% presented with that presentation, those with poor eye contact constitute 35.2% of patients and those with challenging behavior like stereotyping movements and poor social communication constitute 41.1% of cases, while most families did not recognize the early signs of autism, because most parents in our society had lower knowledge about signs of developmental delay and they look for medical attention later hoping that their children will improve with time, or their children had only speech delay not autism.

Most studies show that the family history in ASD is the strongest risk factor for recurrence of ASD. Most twin studies show that the heritability of ASD is the 60%–90% range and the concordance rates among monozygotic twins were higher.[14] In this study, we found only 17.6% of patients had a family history of similar conditions, it has been also shown that family history of other mental or neurological disorders may be highly associated with ASD.[15]

We find that 9.8% of children in our study are survivors of prematurity. Several studies show that premature and autistic children had increased prevalence of GI, cardiovascular, cognitive, and behavioral symptoms suggesting an incomplete maturation of the gut-blood barrier, abnormalities in vagal regulation of the heart, abnormal development of specific areas in the brain which will affect the early development even the gut will get mature.[16]

In addition, the stress of prematurity on a developing baby's brain may work together with a "biological

vulnerability" to increase the likelihood of autism in some children.[17]

Prematurity is a major risk factor for developing cerebral palsy, so we should differentiate between CP and autism, whereas cerebral palsy primarily affects the part of the brain that corresponds with motor functioning, autism affects social interactions, language, and behavior.

Maternal complications of pregnancy have been studied and show a positive correlation with abnormalities of behavior and development of autism like in Cordero *et al.*,[18] Zerbo *et al.,*[19] and Langridge *et al.*,[20] like that in our study we find that maternal complications present in 29.4% of children.

Some studies show that improper spacing of pregnancies may increase the risk of developing ASD and other developmental disorders but lacks sufficient evidence,[21] in our study, we find that 8.8% of patients had improper spacing of pregnancies.

In our study, there are 34.3% of cases had no identifiable risk factors for developing autism which may be due to genetic causes or idiopathic cases.[22,23]

Although advanced paternal and maternal age are known risk factors for developing autism, we find that mean paternal age at child conception was 34.6 and maternal age was 24.8, so More mechanistic studies are needed to further explain this positive association.

It has been shown in many studies that sleep disorders are prominent feature in ASD and that it has a large effect on the social interaction, daily life activities, school achievement, and it was well correlated with increased maternal and parental stress and sleep disruption[24]

In our study, we found that 19.6% of children had sleep problems and the most common of which were insomnia and frequent night awakenings.

Many studies show clear association between ASD and GI problems like Mazefsky *et al.*[25] and Coury *et al.*[26]

In our study, we found that 37.2% were picky eaters, 2% had chronic diarrhea, and 2% had chronic constipation. Many theories about the causes like polymorphism of the MET tyrosine receptor kinase is associated with both ASD and GI dysfunction in family samples, elucidating a potential genetic connection between the two pathologies.[27] Other theory states that the diet may impact behavior and/or GI function is based on its ability to alter the intestinal microbiota. Diet rapidly alters gut microbiota composition and specific microbiota environments have been associated with changes in behavior, mood, cognition, and GI problems, in both preclinical and clinical studies.[28]

There was a large overlap in the symptoms of ADHD and ASD. Although both ASD and ADHD were sharing many similar phenotyping manifestations, but each one had distinct diagnostic criteria.[29] In our study, we found that 50.9% of children had hyperactivity but only 6.8% met the criteria for ADHD diagnosis.

The association of epilepsy and ASD is well documented and many studies show that there is high evidence of EEG abnormalities in children with ASD whether epileptiform or not epileptiform EEG abnormalities. The correlation between epilepsy and ASD may be determined by many structural abnormalities, genetic alterations, or metabolic dysfunctions, known to play a role in the occurrence of both epilepsy and autism.[30] In our study, we found that 13.7% had both autism and epilepsy.

Conclusions

1 We found THE higher male-to-female ratio.
2 There is delayed presentation to medical attention.
3 Most children present to medical attention because of speech delay.
4 Most patients had associated medical and psychiatric problems.

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Conflicts of interest

There are no conflicts of interest.

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