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Demographic Characteristics of Autism Spectrum Disorder in Kirkuk Children

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Abstract

Background: *Autism is a severe disability disorder in early childhood, characterized by prominent patterns of social disability, communication disorders, and rigorous ritual interest. An interesting hypothesis concerns the role of the gastrointestinal (GI) microflora in the pathophysiology of ASD.*

Materials and Methods: *This case-control study was designed to determine the association between 50 autism spectrum disorders (ASD) and selected demographic characteristics of children aged between 3 to 16 years old whom compared with 38 children who aged between 3 to 12 years as control. This study was conducted at Children' Hospital, Autism Consultation Unit at Kirkuk city, Iraq. Ascertainment of the ASD diagnosis was made according to criteria of the DSM-IV, 1994. The mothers were interviewed concerning the information relating to age of the subjects, gender, paternal education, maternal education and place of residence.*

Results: *The birth delivery was mostly vaginal for both groups. Male-to-female prevalence ratio was 4:1 concerning ASD. The present study revealed that 28% of the ASD cases were of the first-born children and the second turn of delivery was represented by 24%. Each of parental education was subdivided into ≤ 12 years group and > 12 years education group.*

Conclusions: *The mean age of control was 6.6 years and they mostly males of urban area. The birth delivery was mostly vaginal for both groups. Male-to-female prevalence ratio was 4:1 concerning ASD. Children with ASD showed a higher proportion of males and formula feeding compared with controls, while both groups exhibited similar distributions of residence and delivery mode. Chi-square analysis demonstrated no significant difference in birth-order distribution between autistic children and controls ($\chi^2 = 3.396$, $df = 7$, $P = 0.846$). These findings suggest that birth order was not associated with the occurrence of autism in the studied population. Birth-order patterns were comparable across educational categories, suggesting that parental education level was not a major determinant of birth-order distribution in the studied population.*

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Introduction

Autism is a severe disability disorder in early childhood, characterized by prominent patterns of social disability, communication disorders, and rigorous ritual interest [1]. An interesting hypothesis concerns the role of the gastrointestinal (GI) microflora in the pathophysiology of ASD [2-4]. A high prevalence (23-70%) of gastrointestinal complaints such as abdominal pain, gas, diarrhea and constipation has been reported in children with ASD [4-6]. This recognition of intestinal-brain interactions provides more explanation for some conditions, also known as functional disorders and for the discovery of new therapies for regulating the microbiota in the treatment of CNS disorders [4-7]. The term autism spectrum disorder was used regularly to refer to group of common symptoms, but the presence and severity of these symptoms vary greatly. People with autism mainly suffer from social communication1. Available twin studies have shown that environmental factors are more important than genetic predisposition. Among these factors, microbial dysbiosis is of increasing interest, with more and more reports in animal models andhuman epidemiological studies linking destructive changes in the intestinal flora with ASD symptoms [8-10].

Materials and Methods

Patients

This case-control study was designed to determine the association between 50 autism spectrum disorders (ASD) and selected demographic characteristics of children aged between 3 to 16 years old whom compared with 38 children who aged between 3 to 12 years as control. This study was conducted at Children' Hospital, Autism Consultation Unit at Kirkuk city, Iraq.

Ascertainment and Selection of Cases

Ascertainment of the ASD diagnosis was made according to criteria of the DSM-IV, 1994. All subjects diagnosed with ASD exhibited symptoms within the typical autistic traits. The families of these children with ASD were approached and their parents or attendants were agreed to have their children participate in this study [9].

Selection of Controls

Control participants were randomly selected for eligible inpatients or outpatients at the consultation unit of the Children Hospital. Eligible subjects were defined as children 3 to 12 years old who were not known to be autistic or to have any other neurodevelopmental or behavioral disturbances that might be related to or confused with ASD [10].

Excluded Group

Children with neurological disorders other than ASD were excluded.

Study Questionnaire

A questionnaire sheet was designed to meet the objective of this study. The mothers were interviewed concerning the information relating to age of the subjects, gender, paternal education, maternal education and place of residence. Information regarding delivery mode such as whether a caesarean section was performed was also obtained. The questionnaire also included the mode of subject's feeding [9,10].

Statistical Analyses

All statistical analyses were performed using IBM SPSS Sta¬tistics for Windows, Version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics such as means, standard deviations, and fre¬quency distributions were computed to summarize the data. A paired sample t test correlation coefficient (R) and

coefficient of determination (R2) were calculated. [11-13].

Results

A total of 88 children was taken by the present study who were included 50 and 38 of autism spectrum disorders (ASD) and normal children respectively. The mean age of ASD group was 7.4 years and 80% of them were males of urban origin and mostly with artificial feeding (Table 1). The mean age of control was 6.6 years and they mostly males of urban area. The birth delivery was mostly vaginal for both groups. Male-to-female prevalence ratio was 4:1 concerning ASD. Bar chart showing the percentage distribution of gender, residence, mode of delivery, and feeding type among children with Autism Spectrum Disorder (ASD) and healthy controls. Values are expressed as percentages within each study group. Children with ASD showed a higher proportion of males and formula feeding compared with controls, while both groups exhibited similar distributions of residence and delivery mode. The ASD group also demonstrated a slightly higher mean age (Figure 1).

Table 1: Demographic Characteristics of Autistic Children

Characteristic		ASD (n=50)		Control (n=38)	
		No.	%	No.	%
Gender	Male	40	80	24	63.1
	Female	10	20	14	36.8
Residence	Rural	9	18	4	10.5
	Urban	41	82	34	89.4
Delivery mode	C-section	16	32	14	36.8
	Vaginal	34	68	23	60.5
Feeding	Breast	21	42	21	55.2
	Formula	29	58	17	44.7
Age (mean in years)		7.4		6.6	

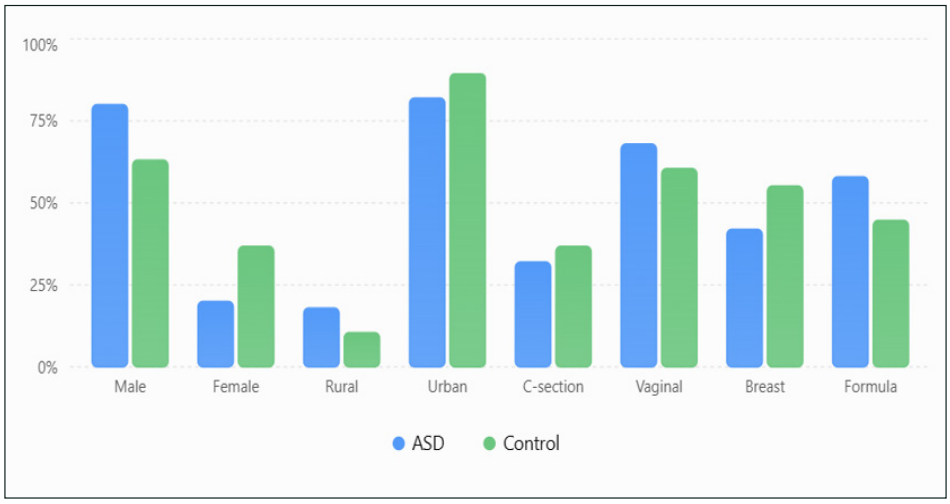

Figure 1: Percentage distribution of demographic characteristics in autism spectrum disorder (ASD) and control groups.

The present study revealed that 28% of the ASD cases were of the first-born children and the second turn of delivery was represented by 24% (Table 2). It was clear from the data collected that most cases of ASD were dominating first delivery of the families and frequency started decrease with delivery sequence. Chi-square analysis demonstrated no significant difference in birth-order distribution between autistic children and controls

($\chi^2 = 3.396$, df = 7, P = 0.846). These findings suggest that birth order was not associated with the occurrence of autism in the studied population (Figure 2).

Table 2: Children's Birth Order of Autistic Children

Birth order	Autistic		Control		Total	
	No.	%	No.	%	No.	%
First	14	28	10	26.3	24	27.3
Second	11	22	8	21.1	19	21.6
Third	12	24	9	33.6	21	23.9
Fourth	6	12	4	10.5	10	11.4
Fifth	4	8	2	5.2	6	6.8
Sixth	1	2	3	7.8	4	4.5
Seventh	2	4	1	2.6	3	3.4
Eighth	0	0	1	2.6	1	1.1
Total	50	56.8	38	43.2	88	100

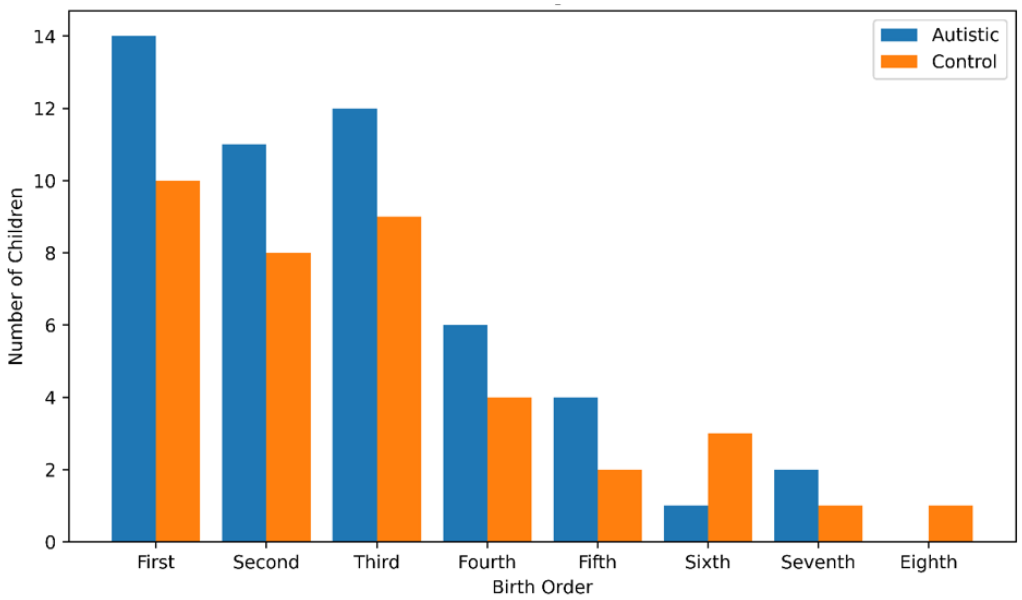

Figure 2: Distribution of birth order among autistic and control children.

It was concluded an association between parental education and child birth's order for both ASD and control children (Table 3), Each of parental education was subdivided into ≤ 12 years group and > 12 years education group. Chi-square analysis revealed no statistically significant association between birth order distribution and parental educational status among autistic and control children ($\chi^2 = 11.776$, df = 18, P = 0.859). Birth-order patterns were comparable across educational categories, suggesting that parental education level was not a major determinant of birth-order distribution in the studied population. Grouped bar chart illustrating the frequencies of birth-order categories stratified by maternal and paternal educational level in autistic and control children. First-, second-, and third-born children constituted the largest proportions across all educational groups, while higher birth orders were relatively uncommon. (Figure 3).

Table 3: Birth Order Versus Parental Education of Autistic Children

Parental education		Group	Birth order													
			1st		2nd		3rd		4th		5th		6th		6th	
			No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Maternal education	≥ 12 years	ASD	11	25.5	11	25.5	10	23.2	5	11.6	4	9.3	1	2.3	1	2.3
		Control	8	25.8	5	16.1	7	22.5	4	12.9	2	6.4	3	9.6	1	3.2
	≥ 12 years	ASD	3	42.8	0	0	2	28.5	1	14.2	0	0	0	0	1	3.2
		Control	3	42.8	2	28.5	2	28.5	0	0	0	0	0	0	0	0
Paternal education	≥ 12 years	ASD	9	30	8	26.6	7	23.3	3	10	1	3.3	1	3.3	1	3.3
		Control	8	42.19	3	15.7	4	21	2	10.5	0	0	2	10.5	0	0
	≥ 12 years	ASD	5	25	3	15	5	25	3	15	3	15	0	0	1	5
		Control	3	16.6	4	22.2	5	27.7	2	11.1	2	11.1	2	11.1	1	11.1

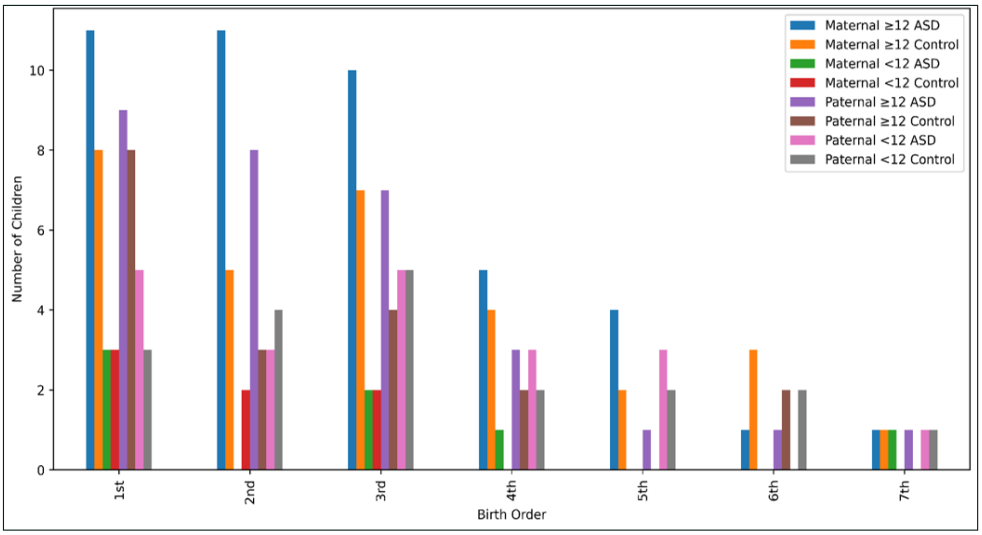

Figure 3: Distribution of birth order according to parental educational level among autistic and control children.

Discussion

A total of 88 children was taken by the present study who were included 50 and 38 of autism spectrum disorders (ASD) and normal children respectively. The mean age of ASD group was 7.4 years and 80% of them were males of urban origin and mostly with artificial feeding (Table 1). The mean age of control was 6.6 years and they mostly males of urban area. The birth delivery was mostly vaginal for both groups. Male-to-female prevalence ratio was 4:1 concerning ASD. The analysis made by Salehi et al. revealed a significantly higher frequency of ASD in the adolescent (11–17 years) age group, which almost similar to the existing literature indicating that ASD diagnoses become more stable and reliable with age [14,15]. A longitudinal study carried out by Lord et al. found that diagnostic stability increased from 84% at age 2 to 94% at age 9 [15].

This indicated accuracy in older children and adolescents is mostly due to the more pronounced manifestation of ASD symptoms over time and the availability of longer developmental histories [16,17]. Furthermore, Sicimoğlu et al. found that 26% of participants demonstrated experiencing more than moderate levels of depres¬sive symptoms [18]. This finding was consistent with previous meta-analyses, which were reported prevalence rates of depression in autistic adults ranging from 11% to 23% [19-21]. As expected, older age and lower income were associ¬ated with higher levels of depressive symptoms. Unexpect¬edly, other demographic factors

like gender, IQ, living situation, relationship status were not associated with higher levels of depression. Moreover, The present study revealed that 28% of the ASD cases were of the first-born children and the second turn of delivery was represented by 24% (Table 2). It was clear from the data collected that most cases of ASD were dominating first delivery of the families and frequency started decrease with delivery sequence. Chi-square analysis demonstrated no significant difference in birth-order distribution between autistic children and controls ($\chi^2 = 3.396$, df = 7, P = 0.846). However, It was found by Srivastav a significant impact of sibling relationships on the development of communication skills in autistic individuals [20]. The results indicated that both birth order and quality of the sibling interaction can play a crucial part in development of communication skills. It was noticed that older siblings take on a more mentoring role [22]. They engage and practicing in role-play games more as compared to younger siblings, creating more and more opportunities for their autistic sibling to practice social behavior. Older siblings were mostly more understanding of the situation. Conversely, as younger siblings require more attention, they developed feelings of neglect and jealousy when their needs were not properly met, explaining less socialization scores in this group. Moreover, It was concluded by the present study that an association between parental education and child birth's order for both ASD and control children (Table 3), Each of parental education was subdivided into ≤ 12 years group and > 12 years education group. Chi-square analysis revealed no statistically significant association between birth order distribution and parental educational status among autistic and control children ($\chi^2 = 11.776$, df = 18, P = 0.859). Wang et al. concluded that around 10% of school children receive special education (SE), and a little about what characterizes these children [23]. Wang et al. examined the relationships between parental and child factors in children with SE. It was based on the Norwegian mother, father and child cohort study. The sample included 1,424 SE children and 35,161typically developing 8-year-old children. A network analysis was constructed for SE children and non-SE children. Compared to non-SE children, the SE group exhibited lower communication skills, higher language difficulties and more attention-deficit/hyperactivity disorder ADHD symptoms. Communication skills and ADHD symptoms were the two most interacted factors in the SE network. Language abilities in SE children were less influenced by their behavioral and parental factors. Language skills were interrelated to ADHD symptoms in both groups. However, autism is a severe disability disorder in early childhood, characterized by prominent patterns of social disability, communication disorders, and rigorous ritual interest [1,24-26].

Conclusions

The mean age of control was 6.6 years and they mostly males of urban area. The birth delivery was mostly vaginal for both groups. Male-to-female prevalence ratio was 4:1 concerning ASD. Children with ASD showed a higher proportion of males and formula feeding compared with controls, while both groups exhibited similar distributions of residence and delivery mode. Chi-square analysis demonstrated no significant difference in birth-order distribution between autistic children and controls ($\chi^2 = 3.396$, df = 7, P = 0.846). These findings suggest that birth order was not associated with the occurrence of autism in the studied population. Birth-order patterns were comparable across educational categories, suggesting that parental education level was not a major determinant of birth-order distribution in the studied population.

Limitations and Considerations

Limited number of cases was obtained for the present study. Future more comprehensive covering study is highly recommended to explore ASD as a real problem particularly in urban population.

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