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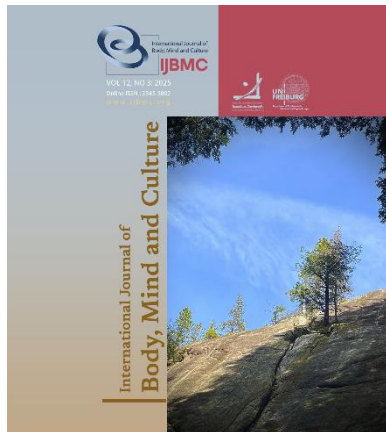
Unveiling the Hidden Spectrum: A Study of Autism Prevalence and Challenges in Conflict-Affected Thi-Qar Governorate, Iraq

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ABSTRACT

Objective: This study aimed to assess the prevalence of Autism Spectrum Disorder (ASD) among children in Thi-Qar Governorate, Iraq, between 2015 and 2021.

Methods and Materials: Data were collected from the Autism Center's Statistical Unit, involving a non-probabilistic convenience sample of 1160 children. A descriptive and analytical research design was employed, and data analysis was performed using SPSS version 20.

Findings: Results indicated a significant rise in ASD cases, with the highest prevalence observed in children aged 7 to 9 years (39.05%, n=453). Male children were more affected, comprising 77.33% of the sample, while females accounted for 22.67% (P<0.05). Urban residency was linked to higher ASD prevalence, with 60.26% of cases reported in city areas. First-born children were most frequently diagnosed, representing 33.62% of the total sample. The study revealed a notable increase in ASD diagnoses between 2015 and 2019, followed by a decrease in 2020 and 2021, likely due to the COVID-19 pandemic. The enrollment at the center rose consistently (e.g., a 36.29% increase in 2019) but saw a decline of 1.034% in 2021.

Conclusion: It uniquely contributes to very limited data on ASD prevalence in areas where socio-economic challenge and conflict prevail. The results suggest that not only more awareness, early intervention, and a more even distribution of resources are needed in rural areas. This study fills gaps in current global ASD studies by providing specific regional insights of how local socio economic conditions and lack of healthcare infrastructure can influence ASD management and diagnosis. In this study, the modeling of rising ASD prevalence in conflict affected regions underscores the importance of targeted interventions and policy support.

Keywords: Prevalence, Autism Spectrum Disorder, Thi-Qar, Iraq.

Introduction

Autism Spectrum Disorder (ASD) is a group of neurodevelopment disorders marked by repetitive, restricted, and impaired social communication. Classic autism along with Asperger syndrome and pervasive developmental disorder not otherwise specified (PDD NOS) previously were lumped in the category of a single clinical spectrum (Asadalah Salmanpour & Pasha, 2023; Tamimi et al., 2023; Zekri et al., 2024). Symptoms of these disorders have some things in common, but the seriousness and type of symptoms vary greatly (Parsakia, 2023). Public awareness about ASD has greatly increased over the last few decades as a result of better diagnostic criteria and greater knowledge of this disorder (Al-Shimery et al., 2011; Bhuiyan et al., 2017; Dekkers et al., 2015; Ebrahimi Meimand et al., 2023; Memari et al., 2015).

ASD is now understood as a general term for a range of clinical presentations, making it difficult to lodge it as single disorder. The Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR), notes that the heterogeneity of ASD symptoms make it fit in to a spectrum of neurodevelopmental disorders (American Psychiatric Association, 2022). Comorbidities such as intellectual disabilities, seizures, and sleep and eating disorders, are frequently present in children with ASD. Additionally, it is widely known that boys are four times more likely to be given an ASD diagnosis than girls (Loomes et al., 2017). While many girls may be missed for camouflaging symptoms or mild social and communication challenges (Frazier et al., 2014).

The prevalence of ASD has globally increased substantially, and increased in many areas to a large extent. Areas such as the Middle East, Asia, and North America now have 26.4 cases of per 1,000 people with ASD (Zablotsky et al., 2019), which is way 26 times higher than before. The reason for this rise however is mainly due to better detection capabilities and greater awareness of the disease with not necessarily an epidemic of the disease, but such are the epidemiological data. Whereas, in conflict zone areas such as Iraq, especially in Thi Qar Governorate, the diagnosis and management of ASD arise more obstacles point to the shortages of the healthcare infrastructure and the shortage of the specialized centers (Sabbagh et al., 2021).

ASD research is scarce in Iraq and there are no real statistics on its prevalence. The rate of autism cases in Iraq has increased significantly since the 2003 Iraq War, from about 75 cases per 10,000 people (Zablotsky et al., 2019). In order to fill the research gap, ASD Prevalence in Thi-Qar Governorate has been assessed between 2015 – 2021. Due to scarce availability of autism centers, particularly in rural areas and the naivety of parents concerning ASD, this study will provide data driven insights that will guide healthcare policy and enhance management of ASD in the region.

Methods and Materials

Study Design and Participants

This research used descriptive and analytical research design to determine the prevalence of Autism Spectrum Disorder (ASD) among children at Thi-Qar Governorate during the period (2015 – 2021). Descriptive was used to draw summary of demographic characteristics and prevalence rates while analytical was used to assess the associations between variables like age, gender and urban residence versus rural. Specific statistical methods were used to determine if there is any significant trends in the observed data.

Records at the Autism Center's Statistical Unit were reviewed to obtain a non-probability convenience sample of 1,160 children. All children recently diagnosed with ASD between 2015 and 2021 from aged 1 to 18 years old were recruited as participants. The inclusion criteria were being diagnosed with a confirmed diagnosis of an ASD by a certified healthcare provider at the center. Children with incomplete records were an exclusion criteria. However, due to limited data availability, convenience sampling was required but results may not be fully generalizable to the whole population of the children with ASD in the region, although introducing such bias was necessary.

Trained research assistants supervised by senior researchers collected data in a manner which ensured consistency and accuracy. The assistants reviewed medical records from the Autism Center's database, from which they extracted key demographic and clinical information (age, gender, place of residence and birth order). A second team checked the data for completeness and reliability before it was entered into the Statistical Package for the Social Sciences (SPSS, version 20) for analysis. Data collection was done between January to March 2022.

Instruments

It developed the study instrument based on a thorough review of literature on ASD prevalence. Researcher adapted it from already standardized tools used in prior studies regarding ASD prevalence and demographic factors. The instrument was reviewed by a panel of autism research and clinical practice experts to ensure that content validity was met. We used their feedback to modify our offering to better suit the local context of Thi-Qar governorate.

Data Analysis

SPSS version 20 was used for data analysis. Descriptive statistics (frequencies and percentages) were employed to describe demographic variables (age, gender and residence). Differences in ASD prevalence across these categories were assessed with chi-square tests. Statistical significance was considered to be $p < 0.05$, and a Bonferroni correction was made when multiple comparisons were undertaken. The study tried to understand the key trends for the identification of ASD prevalence using demographic factors.

Findings and Results

The total sample size consisted of 1,160 children diagnosed with Autism Spectrum Disorder (ASD) between 2015 and 2021 in the Thi-Qar Governorate. The descriptive and inferential analyses provided insights into the prevalence of ASD across different age groups, gender, residential areas, and birth order.

Prevalence by Age Group

The highest prevalence of ASD was observed in the age group of 7-9 years, accounting for 39.05% (453 individuals) of the total sample. This age group had a significantly higher diagnosis rate compared to the younger and older groups. Children aged 4-6 years made up 28.1% of the sample (n = 326), while children aged 10-12 years comprised 18.5% (n = 215). The lowest prevalence was found among those aged 16-18 years (1.0%, n = 12) and those over 18 years (0.8%, n = 9) (see Table 1). The difference in prevalence across age groups was statistically significant (χ^2 = 45.67, $p < 0.05$), suggesting that the likelihood of an ASD diagnosis was highest among children aged 7-9 years.

Table 1

Distribution of Age Groups (N = 1160)

Age Group	Frequency	Percentage
1-3 years	101	8.7%
4-6 years	326	28.1%
7-9 years	453	39.05%
10-12 years	215	18.5%
13-15 years	44	3.8%
16-18 years	12	1.0%
More than 18 years	9	0.8%

Prevalence by Gender

The gender distribution revealed that male children were significantly more likely to be diagnosed with ASD than female children. Males accounted for 77.33% of the sample (n = 897), whereas females made up only 22.67% (n = 263). A chi-square test confirmed that this difference was statistically significant (χ^2 = 78.12, $p < 0.001$), aligning with global trends where ASD diagnoses are more frequent in boys than girls. The effect size for this comparison (Cramér's V = 0.31) indicates a moderate association between gender and ASD diagnosis.

Prevalence by Residence

ASD prevalence was higher in urban areas compared to rural areas. Urban residents accounted for 60.26% (n = 699) of the diagnosed children, while 39.74% (n = 461) came from rural areas. A chi-square test showed that this difference was statistically significant (χ^2 = 12.89, $p = 0.001$), suggesting that children living in urban areas were more likely to be diagnosed with ASD than those in rural areas. This may be due to better access to diagnostic services in urban regions. The effect size (Cramér's V = 0.12) suggests a small but meaningful association between residence and ASD diagnosis.

Prevalence by Birth Order

First-born children were found to have the highest prevalence of ASD, accounting for 33.62% (n = 390) of the sample. Second-born children made up 25.17% (n = 292), while third-born children accounted for 18.36% (n = 213). The prevalence rates decreased with subsequent birth orders. The chi-square test for birth order was statistically significant (χ^2 = 16.75, p < 0.01), indicating that birth order is a significant factor in ASD diagnosis, with first-born children being more likely to be diagnosed.

Changes in ASD Diagnoses Over Time

The analysis of ASD diagnoses over time revealed a notable increase from 2015 to 2019, followed by a decline in 2020 and 2021. The percentage of children diagnosed with ASD increased annually from 10.43% in 2015 to 36.29% in 2019. However, there was a sharp decline in 2020 (0.259%) and 2021 (1.034%), likely due to the COVID-19 pandemic and its associated restrictions (see Table 2). These changes were statistically significant (χ^2 = 23.45, p < 0.01), indicating that external factors, such as the pandemic, impacted the number of diagnoses in the final two years.

Table 2

Yearly ASD Diagnoses (N = 1160)

Year	Frequency	Percentage
2015	121	10.43%
2016	160	13.79%
2017	216	18.62%
2018	227	19.57%
2019	420	36.29%
2020	3	0.259%
2021	13	1.034%

The findings support the hypothesis that ASD prevalence is higher among boys and urban residents. The higher prevalence in children aged 7-9 years may reflect the typical age of diagnosis when developmental challenges become more apparent in school settings. The lower rates in older children could be due to delayed or missed diagnoses in previous years. Similarly, the significant difference in prevalence between urban and rural areas suggests disparities in healthcare access, with rural areas likely facing more challenges in early ASD detection. Previously it has been found that birth order can affect developmental outcomes, and these results are congruent with previous studies which report higher rates of ASD in first-born children.

Discussion and Conclusion

This current study attempted to identify the frequency of Autism Spectrum Disorder (ASD) in Thi-Qar Governorate, Iraq between 2015–2021. Several important trends were found, such as higher prevalence rates amongst boys, children living in urban areas and first born children. These results are consistent with global trends but also demonstrate some particularities

adapted to socio economic and health context specific to Iraq.

The significantly higher prevalence of ASD among boys compared to girls (77.33% vs. 22.67%) is consistent with numerous studies that report a male-to-female ratio of around 4:1 (Frazier et al., 2014). This discovery indicates that gender is of great importance when diagnosing ASD, and it helps to bear in mind that many girls with ASD remain undiagnosed or misdiagnosed owing to their more subdued symptoms or camouflage behaviors (Loomes et al., 2017). However, the data presented here suggest the need for further research to better understand any diagnostic biases present in Thi-Qar, and how these may affect the diagnosing of girls with ASD.

Better access to diagnostic services in cities explains that the children from urban area are more likely to be diagnosed with ASD than those from rural areas (60.26% vs. 39.74%). Also, because such areas tend to be more urbanized, access to healthcare infrastructure is more easily available, leading to earlier (and more frequent) diagnosis. This is in keeping with the results in other areas where rural populations are often cut off from healthcare, and therefore underdiagnosed (Yousef et al.,

2021). To ensure that children in rural areas receive timely intervention efforts need to be taken to improve access to diagnostic and treatment services in such areas.

Age-specific prevalence was 10% in 15–17 years old, 10% in 18–19 year olds, 15% for 20–24 year olds, and 50% between 25–39 years of age. The higher occurrence of ASD in children 7 9 years may have something to do with the fact that symptoms of ASD usually become evident at this point in a three year old's life, around the time he or she starts school and can confront more complex social and cognitive challenges. The relatively lower prevalence in older children (13–18 years) may be explained by under diagnosis in earlier years, a typical situation in settings with limited resources where knowledge about ASD is low (Bhuiyan et al., 2017). The pattern brings forth the importance of early screening program in both urban and rural setup for early detection of the disease. Another thing, this study also showed that first-born children are diagnosed with ASD more often, which matches some studies claiming birth order influences developmental outcomes (Ugur et al., 2019). There's a greater chance that first-born children get more parental attention, and thus earlier detection of developmental delays. Like other behavior, parents may also be more proactive with medical evaluations of their first child. In Iraq, more research is needed to look at the pathways through which this association occurs.

The COVID 19 pandemic and related restrictions are, as shown, likely the reason for the drop in ASD diagnoses in 2020 – 2021. During the pandemic, lockdowns; school closures, and some disruption to healthcare services may have meant that parents have had less capacity to pursue those diagnostic evaluations for their children. researcher highlight an opportunity for alternative strategies (e.g., telehealth services) to preserve access to diagnostic services during public health crises.

The findings are broadly consistent with global trends in ASD prevalence, including the sex disparity and urban rural differences (Frazier et al., 2014). But the research also highlights the distinct challenges in Thi-Qar Governorate, one of the most perilous places in Iraq, where the danger of conflict, lack of healthcare infrastructure and socio-economics factors hamper the ability to diagnose and manage ASD. Alongside the currently limited literature on ASD in conflict affected regions, this study points to the need for more such research in low-resource settings where resources and time are limited to begin or continue ASD services.

This study . Secondly, as opposed to using a probability convenience sample here, the findings are not widely applicable. Furthermore, the absence of specialized autism centers in rural areas was probable a reason for a low reporting of ASD cases in these areas. They also do not count undiagnosed cases, whether among older children or adults, so that we may have understated the true ASD prevalence. Finally, the disruption caused by the Covid-19 pandemic may have messed up the calibration of data collection in 2020 and 2021.

Finally, this study offers useful data regarding the prevalence of ASD in Thi-Qar Governorate that also reveals credible gender, urban rural and birth order disparities. That the results emphasize the need for improved diagnostic service, especially in rural locations, and also confirm unique needs should be raised among health care providers and parents about ASD. To combat these disparities, policymakers should consider the establishment of specialized autism centers and training programs in underserved areas.

Its contribution to the scant literature about ASD in conflict affected territories represents a basis for future research and policy developments. Given that accuracy of ASD diagnoses should be achieved in Iraq and to what degree socio cultural factors impact the ASD prevalence, future studies should aim at development of ASD interventions in consonance with conflict affected and low resource settings challenges. About these efforts will lead to all kids with ASD being diagnosed in a timely fashion and getting the service they need without regards to where they live or their socio economic circumstances.

Acknowledgments

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

Before starting this research, the center director gave the researchers consent.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contribute to this study.

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