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Research Article

Predictors of Severity in Autism Spectrum Disorders among Libyan Children: Cross-sectional analysis in Almarj

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ABSTRACT

Today, autism spectrum disorders (ASD) are among the most prevalent neurodevelopmental illnesses. Their varied degrees of severity influence and determine the necessary support and intervention. Risk elements of severity include the child's gender, parental age, and parental educational levels. In Libya, such factors are under-examined. This study aimed to identify predictors of autism severity in Libyan children diagnosed with ASD attending rehabilitation centers in Almarj. It adhered to ethical considerations by submitting a formal application to the centers and obtaining consent from participants. A cross-sectional study included 119 children diagnosed by the Childhood Autism Rating Scale(C.A.R.S) .Demographic information, including child gender, age, educational level, parental age, and education, was gathered through parent interviews. The 2 to 12 year-old sample comprised 73% males and 27% females, with a mean of 7.3 years. About 73.1% had their diagnosis after two years of age. The school achievement of the majority of them affected by Autism, as about 69% (N=82) were not at the appropriate school level for their age. Paternal age over 40 years was notably linked to affect autism severity (OR = 0.198, 95% CI: 0.059–0.661, p = 0.008). Child gender, maternal age, and parental education exhibited no significant connection. Although all registered children with ASD was included, the small sample size limit the ability to generalize the results. Early screening might help families with older fathers to get benefit from advantages of early Autism diagnosis in Libya. This study helps to optimize clinical management and improve regional outcomes for children with ASD.

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1. Introduction

Among the most common neurodevelopmental diseases, autism spectrum disorders (ASD) have different degrees of severity and functional impairments that affect the extent of support and rehabilitation needed[1,2]. Typically, severity is classified by deficiencies in two fundamental areas: social communication difficulties and restricted, repetitive behaviors, as outlined in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5).ASD severity, ranges from Level 1 (requiring assistance) to Level3 (requiring substantial support)[1]. The impact of ASD severity is affecting individuals with their families, schools, and communities[1,2].The prevalence of ASD has been rising worldwide. With estimates ranging from 1% to 5.3%, with a consistent predominance of males in the majority of literature[2,3,4,5] The male-female ratio varies widely and ranges from 3:1 to 17:1. This variability may stem from disparities in diagnostic practices, genetic reasons, or gender-related differences in symptom expression.[2,5] Enhancing early diagnosis and prompt management of ASD relies on the early screening, which should be prioritized in all aspects related to autism[6].While several screening methods are available, there is a remarkable lack of tools aimed specifically at detecting individuals at high risk of having a positive predictor variable especially at children under age five[6,7,8]. Addressing this gap through improvement of early identification tools can facilitate individualized care and early intervention, which are crucial for improving long-term outcomes for affected children[8,9] .

Studies reveal that some family features are important in predicting ASD severity since both genetic and non-genetic factors greatly help to explain variations in symptoms and their severity[10]. Elevated ASD severity in form of more marked behavioral and language deficits has been linked to a family history of psychiatric diseases such as depression and bipolar disorder[7,8,10,11].Furthermore, parental mental health problems, especially depression and anxiety are commonly related to greater repetitive activities and lower social communication abilities in children with ASD[7, 8, 11] .

Higher parental age -both maternal and paternal -is another important factor; reliably linked with increased risk and severity of ASD. Maternal age over 35 and paternal age over 40 are significant predictors commonly reported in literature[7,8,10,12]. Obstetric complications such as preterm birth and low birth weight have also been correlated with greater ASD severity, suggesting that prenatal factors play a significant role in neurodevelopmental sequels[12,13].

With regard to the criteria of familial social class, certain research suggested that children with autism predominantly originate from families of elevated socioeconomic status. This is not a definitive conclusion, as autism is not uniquely associated with the superior class, as some autistic children originate from families with lower socioeconomic status (SES)[14].

Although family elements are significant, environmental factors and individual genetic disparities also significantly influence the expression and severity of ASD[15]. Recognizing social and cultural elements linked with ASD can help to develop improved evaluation practices and successful management, reducing symptom severity and improving the quality of life of the affected individuals. [16] .

Although many international studies have looked at factors of ASD severity, data specific to Libya are still limited. This emphasizes how much research on the Libyan people is needed to better understand local traits of ASD and improve clinical management and resource allocation.

Objective:

To identify and analyze demographic and parental factors that predict the severity of autism spectrum disorders among Libyan children in Almarj City.

2. Methodology

An approach cross-sectional design , descriptive study was employed. It was carried out in four public and private rehabilitation facilities in Almarj City. Coordination with the administrators of each center took place, including multiple visits, the collection children's lists, and face-to-face interviews conducted with parents accessible on the visit day. The researcher collected all participants' data eligible with the inclusion criteria, which included Libyan nationality and providing consent for participation. One of the private centers rejected the direct interview technique for confidentiality reasons. Therefore, the questionnaire was translated into Arabic using a forward-backward translation method to ensure linguistic and conceptual similarity. This version was reviewed by bilingual expert members at the family and community medicine department to verify face and content validity, then presented to the administration of the private center, who coded these children to ensure anonymity, and the questionnaires were self-completed in the above-mentioned center.

From March to June 2018, the data gathering was carried out, including the pilot phase. Children of both genders from all centers that use the Childhood Autism Rating Scale (CARS), a widely validated tool for diagnosing and measuring ASD severity that was only used to verify the diagnosis inclusion criteria while the evaluation of severity in this study were judged by information of gender of the patient ,timing of diagnosis and the educational attainment of the affected child .

A convenience sample of 119 children, ranging in age from 1 to 12 years, was included. This research adhered to ethical guidelines by gaining permission from all parents included in the study and making a formal request for permission to perform the study to the appropriate administrative locations. Parents completed a questionnaire created for the purpose of this study, and data on the child's demographics, parental ages, education levels, and age at delivery were collected. SPSS version 20 was used to conduct an analysis of the data. Evaluating the relationship between these factors and ASD severity used descriptive statistics and logistic regression analysis. Statistical significance was set at $p < 0.05$.

3.Results

3.1.Demographic Characteristics

Out of the 119 children diagnosed with ASD, the male: female ratio was approximately 3:1. This figure is consistent with the global trends. The gender percentage is shown in Figure 1.

The age distribution ranged from 2 to 12 years, with a mean age of 7.3 years (SD = 2.12). Further age distribution description is shown in Table 1. In terms of birth order, 73.1% of the children were amongst the first three born in their families, and 33.6% were firstborn.

3.2.Educational status

The educational attainment for these children is shown in Table (1). A considerable fraction (68. 9%) of individuals were not enrolled in educational programs corresponding to their age group. While certain individuals were enrolled in preschool or primary education, the disparity between anticipated and realized educational attainment underscores the developmental issues linked to ASD and its level of severity.

3.3.Gender disparities and age at diagnosis

The age at diagnosis was assessed as an indicator of ASD severity. Statistical estimates showed no significant difference between males and females regarding the age at diagnosis ($\chi^2 = 1.2$, $df = 1$, $p = 0.271$), as shown in Table 2.

Additionally, variances in educational achievement across gender were not statistically significant ($\chi^2 = 1.8$, $df = 2$, $p = 0.402$), as presented inTable 3. These findings suggest that, within this sample, gender does not significantly affect the severity measured by these parameters.

3.4.Predicators of severity

Further analysis using logistic regression estimated whether gender, parental age, and parental education levels predicted ASD severity. The merely significant predictor was paternal age, where advanced paternal age was associated with higher odds of increased ASD severity. (Odds Ratio = 0.198, 95% CI: 0.059–0.661, p = 0.008). Other variables, including maternal age and parents' educational levels, showed no significant predictive value. Table 4.

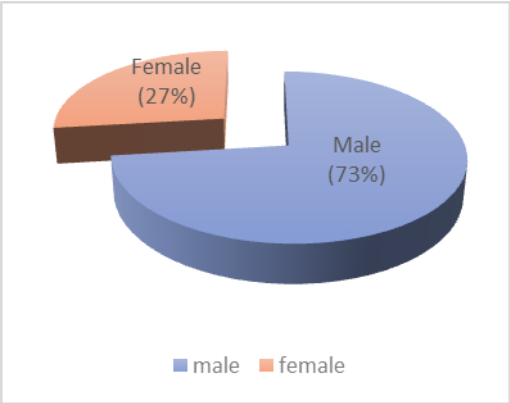

Figure 1. Distribution of ASDs in children according to Gender.

Table 1. Distribution of ASDs children according to the age classes. (years)

Age category (years) (Mean = 7.26, S.D = 2.12.)		
	No.	**%**
2-4	14	11.8
5-7	44	37.0
8-10	55	46.2
11-13	6	5.0
Total	**119**	**100.0**
Child 's School Level	**No.**	**%**
Not corresponding to age	82	68.9
Preschool	33	27.7
Primary	4	3.4
Total	**119**	**100.0**

S.D: Standard deviation

Table 2. The relation between child gender and the time of autism diagnosis

Age at Diagnosis	Male (n,%)	Female (n,%)
≤ 2 years	62 (75%)	26 (29.5%)
> 2 years	25 (80.6%)	6 (19.4%)

($\chi^2 = 1.2$, $df = 1$, $p = 0.271$ — Not statistically significant)

Table 3. Differences in educational attainment relative to age and gender

Educational Level	Male (n,%)	Female (n,%)
Not age-appropriate	58 (70.7%)	24 (29.3%)
Preschool	25 (75.8%)	8 (24.2%)
Primary	4 (100%)	0 (0%)

($\chi^2 = 1.8$, $df = 2$, $p = 0.402$ — Not statistically significant)

Table 4. Binary logistic regression analysis of the predictors of severity of autistic condition among the population sample (summary with controlling for background variables.)

Variable	Odds ratio (95% CI)*	P-value
Gender	1.847 (0.621 - 5.494)	0.270
Mother's education (high vs. Low)	1.196 (0.484 - 2.954)	0.699
Father's education (high vs. Low)	1.227 (0.494 - 3.047)	0.659
Mother's age > 35 vs 1-35	1.000 (0.293 - 3.414)	1.000
Father's age > 40 vs 1-40	0.198 (0.059 - 0.661)	0.008

*CI,confidence interval

4- Discussion

Among Libyan children in Almarj, the analysis shows a strong link between older paternal age (more than 40) and high degree of ASD severity. These results fit with international conclusions indicating that genetic mutations accumulating with paternal age may help explain more serious forms of autism. In other words, the effect of paternal age might be linked to the expectancies of mutations in sperm that could lead to neurodevelopmental diseases. [17]. For instance, study by Kong et al. (2018) have consistently linked paternal age to increased autism risk and severity, likely due to age-related changes in sperm DNA integrity.[8]

In contrast to some earlier studies that suggest more serious behavioral symptoms in males, an absence of gender differences in the analysis of this study in severity contrast was reported; this may be explained by variability across groups and research methods. Furthermore, the findings indicate no statistically significant influence of a child's gender, maternal age, or parents' education level on severity[18].These findings are consistent with results from Lawson et al. (2018), who found limited predictive power for these variables in determining ASD severity across diverse populations.[19]. Moreover, there is no marked variation in age at diagnosis or educational completion between males and females. Likewise, Dehesh et al. (2024), in a meta-analysis and systematic review looking at

the impact of parental age on autism progress, found that although parental age assumes autism risk as assessed in our study, their results exposed that other variables like gender, maternal age, and parental education levels did not display a statistically significant power on autism severity determination. [20]. This could be attributed to the similarity of parental education levels and the somewhat small sample size.

Unlike certain other studies, maternal age and child gender in this study were of little predictive value among the sample.

Modifying early interventions and support programs-which are critical for enhancing long-term results-depends on an understanding of ASD severity predictors. This research underlines how crucial it is to factor paternal age into scientific evaluations and the provision of resources for ASD-affected children.

However, this survey has some limitations . The cross-sectional project eliminates causal suggestion. The convenience sampling and focus on a single geographic area (Almarj) may introduce regional bias and limit generalizability. Additionally, variability in data collection methods across centers-such as face-to-face interviews versus self-administered questionnaires-could have introduced measurement inconsistencies. The absence of genetic and environmental data further constrains the interpretation of severity predictors.

Still, the study offers insightful early analysis of components affecting ASD severity in Libya. Future research should incorporate larger, multi-regional samples, longitudinal tracking, and biomarker data to more comprehensively assess risk factors in autism.

5. Conclusions

Appropriate interventions and care for ASD affected children depend on the guidance provided by the identification of factors related to ASD severity. In this sample of Libyan children, advanced paternal age is a major predictor of ASD severity. These results point out the need to consider of paternal age in early screening and development evaluations as long as the need of more investigation into underlying processes and support targeted early intervention plans. It's also important to inform healthcare providers and families about these risks. Resources should be allocated to intervention programs based on risk severity to improve long-term outcomes. Further research is needed to better understand the factors involved and to create effective health policies.

Recommendations

•Early ASD screening programs should include variables related to parental age to identify children at risk.

•Encourage public awareness initiatives aimed at families with older fathers, as early detection and intervention could be achieved through these efforts.

•More extensive, long-term research using genetic analysis can help in clarifying the processes underlying the connection found by the study.

•Increased Libyan policymakers and healthcare professionals' responsiveness.

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Conflict of Interest

The authors did not disclose any conflicts of interest.

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