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Research Article

Risk Factors for Attention-Deficit/Hyperactivity Disorder among Iraqi Children

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Abstract

Background: Attention-deficit/hyperactivity disorder (ADHD) is a prevalent neurodevelopmental disorder of unknown etiology. In addition to genetic susceptibility, various exogenic risk factors have been linked to ADHD. ***Objective***: The current study was conducted to identify and assess factors associated with an increased risk of ADHD in children. ***Methods***: A case-control study included 185 ADHD children aged 6-15 years with age- and sex-matched controls recruited from the outpatient clinics of the same tertiary hospital, Baghdad, Iraq. Data were collected using a caregiver-administered structured questionnaire covering sociodemographic and clinical characteristics, perinatal factors, environmental exposure, and lifestyle factors. Variables showing significant univariate associations with ADHD were included in multivariate binary logistic regression to determine independent adjusted odds ratios. ***Results***: The children included in the study had a mean age of 9 years, and males predominated. Four sociodemographic factors significantly relate to ADHD: first-born children, small household size, employed mothers, and young paternal age. Among perinatal factors, cesarean delivery, lower paternal age, maternal vaginal infections, and antibiotic use during pregnancy were significant in univariate analysis. However, multivariate analysis revealed four independent risk factors for ADHD, including antibiotic use during pregnancy, maternal employment, younger paternal age at time of delivery, and early exposure to screens. ***Conclusions***: ADHD is influenced by a combination of sociodemographic and early life factors. Maternal employment, antibiotics use during pregnancy, younger paternal age, and early screen exposure were identified as independent risk factors for ADHD in children.

Keywords: ADHD; Prenatal risk factors; Screen exposure.

عوامل الخطر لاضطراب نقص الانتباه وفرط النشاط لدى الأطفال العراقيين

الخلاصة

الخلفية: اضطراب نقص الانتباه مع فرط النشاط (ADHD) حالة شائعة مرتبطة بنمو الدماغ، ذات أسباب غير معروفة. بالإضافة إلى الاستعداد الوراثي، ترتبط عوامل خطر خارجية متعددة بهذا الاضطراب. **الهدف**: تحديد وتقييم العوامل المرتبطة بزيادة خطر الإصابة بـADHD لدى الأطفال. **الطرائق**: شملت دراسة الحالات والشواهد 185 طفلاً مصاباً ب ADHD، تتراوح أعمارهم بين 6 و15 عاماً، مع مجموعة ضابطة متطابقة في العمر والجنس، تم اختيارهم من العيادات الخارجية في المستشفى الجامعي، بغداد، العراق. جُمعت البيانات باستخدام استبيان مُهيكل يُديره مقدمو الرعاية، ويغطي الخصائص الاجتماعية والديموغرافية والسريرية، وعوامل ما حول الولادة، والتعرض البيئي، وعوامل نمط الحياة. أُدخلت العوامل التي وُجد أنها مرتبطة ارتباطاً وثيقاً ب ADHD في التحليل الأحادي المتغير، في تحليل الانحدار اللوجستي الثنائي لتحديد نسبة الأرجحية لكل عامل. **النتائج**: بلغ متوسط عمر الأطفال المشاركين في الدراسة 9 سنوات، وكان الذكور هم الغالبية. أربعة عوامل اجتماعية ديموغرافية ترتبط ارتباطاً وثيقًا ب SDHD: كون الطفل مولودًا أولًا، وصغر حجم الأسرة، وعمل الأم، وصغر سن الأب. أما العوامل المحيطة بالولادة، فقد كانت الولادة القيصرية، وصغر سن الأب، والتهابات المهبل لدى الأم، واستخدام المضادات الحيوية أثناء الحمل، عوامل مؤثرة في التحليل الأحادي المتغير. ومع ذلك، كشف التحليل متعدد المتغيرات عن أربعة عوامل تنبؤية مستقلة ل ADHD: استخدام المضادات الحيوية أثناء الحمل، وعمل الأم، وصغر سن الأب عند الولادة، والتعرض المبكر للشاشات. **الأستنتاجات**: يتأثر ADHD بمجموعة من العوامل الاجتماعية الديموغرافية وعوامل الحياة المبكرة. وقد تم تحديد عمل الأم، واستخدام المضادات الحيوية أثناء الحمل، وصغر سن الأب، والتعرض المبكر للشاشات كعوامل تنبؤية مستقلة ل ADHD لدى الأطفال.

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INTRODUCTION

Attention deficit-hyperactivity disorder (ADHD) is a prevalent disorder affecting early brain development, characterized by persistent inattention, along with heightened impulsivity and hyperactivity [1]. Recent epidemiological studies indicate that ADHD remains a global health concern, with an estimated prevalence of 11% in the pediatric population [2,3]. It is associated with significant academic, social, and behavioral impairments, as well as a high burden of psychiatric comorbidities [4]. Despite extensive research, the exact etiology is still unclear, and it's believed to result from a complex interaction between genetic susceptibility and environmental exposure [5]. Available evidence about ADHD among Iraqi children is limited because relatively few epidemiological studies have been conducted compared to global literature. Prevalence reported in Iraq was in the range of 5.9%-10%, which makes the condition a notably underrecognized public health concern [6,7]. A combination of biological and exogenous determinants appears to increase ADHD, according to Iraqi studies. The prenatal factors include low birth weight, while family-related factors include large family size, low parental educational level, and adverse psychosocial environment [8,9]. Despite extensive international research on ADHD, evidence from Iraq remains limited, particularly regarding its associated risk factors. Most previous Iraqi studies have focused on estimating prevalence rather than identifying modifiable prenatal, perinatal, and

environmental determinants [8]. This represents a clear gap in understanding the local etiological profile of ADHD. Therefore, the present study was conducted to investigate potential risk factors associated with ADHD among Iraqi children, with the aim of providing evidence that may inform prevention strategies and early intervention programs.

METHODS

Study design and setting

This analytical case-control study was conducted to identify risk factors for ADHD in Iraqi children. The study was carried out at a psychiatric and general outpatient clinic in Central Child Teaching Hospital over a 10-month period from the 1st of April 2025 to the 31st of March 2026.

Sample selection

The study included children aged 6 to 15 years. Cases were defined as children diagnosed with ADHD based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria [10] by a board-certified psychiatrist. Controls were children who were assessed by the same psychiatrist and confirmed not to meet the diagnostic criteria for ADHD. They were frequency matched to cases by age and sex and were recruited from the pediatric outpatient clinic of the same hospital for non-psychiatric complaints.

Exclusion criteria

Included are adopted children, children with neurological disorders (autism spectrum, cerebral palsy, and epilepsy), intellectual disability, significant visual and hearing impairment, and children on medications that affect cognitive function.

Sample size estimation

The number of participants in each group was estimated by the equation below [11]:

$$n= (Z\ \alpha/2+Z\ \beta)^2\times[(P1(1-P1)+P0(1-P0)]/(P1-P0)^2$$

With P_0 indicating the prevalence of exposure in the control, P_1 prevalence of exposure in cases that were derived from previous studies, Z α/2 taken as 1.96 for 95% confidence, and Z β for 80% power = 0.84. The results showed that 177 participants are adequate samples in each group. However, to account for potential nonresponse and incomplete data, we did recruit 185 children for each of the cases and control groups with a total sample size of 370 children.

Data collection

A structured caregiver-administrated questionnaire was used to identify potential factors associated with ADHD. The questionnaire included the following: the sociodemographic and family characteristics (age, sex, number of siblings, household size defined by the total number of individuals living in the same residence as the child, birth order, parents' educational level and occupation, socioeconomic status, and parent relationship). Families were categorized as having poor, medium, and favorable socioeconomic status according to monthly household income, and this classification was adapted from indicators used in the Iraqi household socio-economic survey conducted by the Iraqi Ministry of Planning [12]. The perinatal and maternal factors included in the study are the type of delivery, gestational age in months, birth weight, admission to the neonatal intensive care unit, and any maternal diseases that occurred during pregnancy. Environmental exposure: residence (rural/urban), living in an old house (built before 1990), exposure to smoke, pesticides, paints, batteries, construction, electricity generators, and laboratory materials (possible animal allergens). Lifestyle factors in the first 6 years of life: consumption of sugary drinks and fast food, sleep patterns, and age of first screen exposure.

Ethical considerations

All parents of participants gave signed informed consent before inclusion in the study. The study was approved by the Ethics Committee of the College of Medicine, Mustansiriyah University, in April 2025 (IRB approval number: 8/2025).

Statistical analysis

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) software, version 27.0 (IBM Corp., Armonk, NY, USA). Normality was tested by the Shapiro-Wilk test. Scale data were summarized as means with standard deviations, whereas nominal and ordinal variables were described using frequencies and percentages. The association between potential risk factors and ADHD was examined using a chi-square test for nominal and ordinal variables, while an independent t-test was used for scale variables. Multivariable logistic regression analysis was applied to identify independent risk factors, with results reported as estimated odds ratios (ORs) along with 95% confidence intervals (CIs). Statistical significance differences were set at a p-value < 0.05.

RESULTS

A total of 370 children were included in the study, comprising 185 children with ADHD and 185 age- and sex-matched controls. The average age was 9 years, with male predominance (89.2%). ADHD cases showed a significantly higher association with being first-born and living in smaller households (≤4 members) compared to controls (p= 0.004 and 0.041, respectively). Maternal occupation was also significantly different between the two groups (p= 0.047), with a higher proportion of employed mothers

among ADHD cases. No significant differences were found regarding number of siblings, parental education, socioeconomic status, parent relationship, or family history of ADHD (Table 1).

Table 1: Sociodemographic and family characteristics of ADHD cases and controls (n=185 in each group)

Variables	Children with ADHD	Children without ADHD	*p*-value*
Age (year)	9.10±3.35	9.0±3.09	(matched) ††
Sex			
Male	165(89.2)	165(89.2)	(matched) ††
Female	20(10.8)	20(10.8)	
Birth order			
First born child	85(45.9)	30(16.2)	0.004
Others	100(54.1)	155(83.8)	
Number of siblings			
0 (only child)	15(8.1)	5(2.7)	
1-2	95(51.4)	80(43.2)	0.119
≥3	75(40.5)	100(54.1)	
Household size			
≤4	40(21.6)	19(10.3)	0.041
>4	145(78.4)	166(89.7)	
Mother occupation			
Housewife	155(83.8)	180(97.3)	0.047
Employed	30 (16.2)	5(2.7)	
Father occupation			
Free worker	130(70.3)	90(48.6)	0.058
Employed	55(29.7)	95(51.5)	
Mother's education			
No formal education	25(13.5)	25(13.5)	
Primary school	100(54.1)	130(70.3)	0.217
≥Secondary school	60(32.4)	30(16.2)	
Fathers' education			
No formal education	25(13.5)	10(5.4)	
Primary school	85(45.9)	120(64.9)	0.368
≥Secondary school	75(40.5)	70(37.8)	
Socioeconomic status			
Poor	45(24.3)	20(10.8)	
Medium	125(67.6)	160(86.5)	0.151
Good	15(8.1)	5(2.7)	
Parent relation			
Good	165(89.2)	165(89.2)	1.00
Not good/divorced	20(10.8)	20(10.8)	
Family history of ADHD			
Positive	30(16.2)	25(13.5)	0.169
Negative	155(83.8)	160(86.5)	

Values are presented as frequency, percentage, and mean±SD. * Chi-square test; ††: cases and controlled were matched for age and sex.

No statistically significant differences were observed between the two groups regarding place of residence, exposure to pesticides, living in old houses, exposure to paints, exposure to battery factories, exposure to smoke, or possible animal allergen exposure from pets. A higher proportion of ADHD cases reported exposure to electricity generators (35.1% *vs*. 13.5%) and construction factories (18.9% *vs*. 2.7%) compared to controls (p= 0.056 for both variables). Overall, none of the environmental risk factors studied showed a significant association with ADHD (Table 2).

Table 2: Environmental risk factors associated with ADHD among cases and controls (n=185 in each group)

Variables	Children with ADHD	Children without ADHD	*p*-value
Residence			
Urban	140(75.7)	160(86.5)	0.374
Rural	45(24.3)	25(13.5)	
Exposure to pesticides			
Yes	165(89.2)	160(86.5)	0.722
No	20(10.8)	25(13.5	
Residence in an old house			
Yes	80(43.2)	75(40.5)	0.814
No	105(56.8)	110(59.5)	
Exposure to paints			
Yes	0(0.0)	5(2.7)	1.00
No	185(100.0)	180(97.3)	
Exposure to electricity generators			
Yes	65(35.1)	25(13.5)	0.056
No	120(64.9)	160(86.5)	
Exposure to construction activities			
Yes	35(18.9)	5(2.7)	0.056
No	150(81.1)	180(97.3)	
Exposure to battery factories			
Yes	5(2.7)	10(5.4)	0.556
No	180(97.3)	175(94.6)	
Exposure to cigarette smoke			

Yes	55(29.7)	70(37.8)	0.461
No	130(70.3)	115(62.2)	
Having pets at home			
Yes	35(18.9)	40(21.6)	0.772
No	150(81.1)	145(78.4)	

Values are presented as frequency and percentage.

Among the perinatal risk factors studied, four variables showed statistically significant differences between cases and controls. Delivery by caesarean section was significantly more frequent among ADHD cases (p= 0.032). In addition, paternal age at time of child delivery was lower in cases compared to controls (p= 0.046). A highly significant association was observed between ADHD cases and maternal vaginal infections during pregnancy (p< 0.001) and maternal antibiotic use (p= 0.006). None of the others studied perinatal risk factors, including maternal age, birth weight, delivery timing, maternal smoking, hypertension, diabetes, and anemia, showed statistical differences between the cases and controls (Table 3).

Table 3: Perinatal factors associated with ADHD (n=185 in each group)

Variables	Children with ADHD	Children without ADHD	*p*-value
Maternal age at delivery	32.54±5.64	34.22±6.64	0.246*
Paternal age at delivery	37.49±8.53	41.03±6.28	0.046*
Mode of delivery			
Vaginal	50(27)	95(51.4)	0.032†
Cesarean	135(73)	90(48.6)	
Birth weight, gram	2.87±0.45	2.96±0.8	0.552*
Delivery timing			
Preterm	15(8.1)	20(10.8)	
Term	150(81.1)	165(89.2)	0.117†
Post term	20(10.8)	0(0.0)	
NICU admission			
Yes	65(35.1)	30(16.2)	0.062†
No	120(64.9)	155(83.8)	
Mother smoking during pregnancy			
Yes	5(2.7)	0(0.0)	0.368†
No	180(97.3	185(100)	
Maternal hypertension			
Yes	25(13.5)	40(21.6)	0.477†
No	160(86.5)	145(78.4)	
Maternal diabetes			
Yes	30(16.2)	10(5.4)	0.261†
No	155(83.8)	175(94.6)	
Maternal vaginal infections			
Yes	70(37.8)	3(1.6)	<0.001†
No	115(62.2)	182(98.4)	
Maternal anemia			
Yes	55(29.7)	30(16.2)	0.167†
No	130(70.3)	155(83.8)	
Maternal antibiotics use			
Yes	50(27)	5(2.7)	
No	135(73)	180(97.3)	0.006†

Values are presented as frequency, percentage, and mean±SD. * Unpaired t-test at p<0.05;† Chi square test at p<0.05.

Regarding factors related to children's lifestyle, both early exposure to screening before the age of 2 years and daily consumption of sugary drinks were significantly associated with ADHD (p= 0.036 and <0.001, respectively). Neither daily fast-food consumption nor sleeping patterns showed a statistically significant association with ADHD (Table 4).

Table 4: Lifestyle factors during the first six years of life and risk of ADHD (n=185 in each group)

Variables	Children with ADHD	Children without ADHD	*p*-value*
Daily Fast-food intake			
Yes	50(27)	45(24.3)	0.790
No	135(73)	140(75.7)	
Daily sugar drink intake			
Yes	110(59.5)	65(35.1)	0.036
No	75(40.5)	120(64.9)	
Age at first Screen exposure			
<2 years	115(62.2)	20(10.8)	
2-5	45(24.3)	75(40.5)	<0.001
≥ 6 years	25(13.5)	90(48.6)	
Early sleeping and awake			
Yes	70(37.8)	90(48.6)	0.348
No	115(62.2)	95(51.4)	

Values are presented as frequency and percentage. * Chi square test at p<0.05.

A multivariate logistic regression test was conducted to identify independent risk factors for ADHD. The analysis revealed that age of screen exposure, maternal occupation, paternal age, and maternal antibiotic use during pregnancy were significant independent factors. Early exposure to screens before the age of 2 showed significantly increased odds of ADHD (OR= 2.23, $p< 0.012$). Children of employed mothers had significantly higher odds of ADHD compared to those of housewives (OR= 15.153, $p= 0.032$). Mothers who reported antibiotic use during pregnancy had higher odds of having children with ADHD (OR= 19.153, $p= 0.039$). In contrast, younger paternal age at the time of delivery was associated with increased odds of ADHD; for every one-year increase in paternal age, the odds decrease by approximately 9.3% (OR= 0.907, $p= 0.035$). Other variables, including birth order, mode of delivery, daily consumption of sugar drinks, and maternal vaginal infection during pregnancy, were not significantly associated with ADHD after adjustment (Table 5).

Table 5: Logistic regression analysis for risk factors of ADHD in children

Variables	B	OR	95% CI for OR	*p*-value
First-born child	-0.429	0.651	0.143-2.966	0.579
Maternal vaginal infections	1.359	3.892	0.561-27.029	0.169
Antibiotic use during pregnancy	2.952	19.153	1.160-316.339	0.039
Cesarean delivery	0.911	2.488	0.732-8.460	0.144
Small family size (<4)	-1.018	0.471	0.056-1.610	0.129
Employed mother	2.718	15.153	1.256-182.807	0.032
Paternal age	-0.098	0.907	0.830-0.990	0.035
Early screen exposure	1.465	2.231	1.111-4.481	0.012
Daily sugar drink intake	0.686	1.985	0.669-5.890	0.217

OR: odd ratio.

DISCUSSION

This case control study evaluated the association of perinatal, sociodemographic, and environmental factors with ADHD among Iraqi children. Study findings support the multifactorial nature of ADHD and suggest that maternal antibiotic use during pregnancy, younger paternal age, maternal employment, and early screen exposure may contribute to an increased risk of ADHD. These findings point out the possible influence of both prenatal and early-life environmental factors in the development of ADHD. Various perinatal factors have been linked in previous studies to ADHD, including maternal age, birth weight, delivery timing, mode of delivery, maternal smoking during pregnancy, and maternal health conditions, including diabetes, hypertension, and anemia [13]. In contrast, only four perinatal factors, including young paternal age, cesarean delivery, maternal vaginal infections, and antibiotic use, carried significant associations with ADHD in the current study. These findings could be attributed to different population characteristics and a small sample of a study. After multivariate analysis, young paternal age (OR: 0.907; 95% CI: 0.830-0.990, $p= 0.035$) and maternal antibiotic use (OR: 19.153; 95% CI: 1.16-316.34, $p= 0.039$) were independent risk factors for ADHD. The antibiotics used during pregnancy have been linked to alterations in the maternal microbiome, potentially influencing the gut-brain axis and neurodevelopment in the developing fetus [14,15]. Zhu *et al*. attribute the potential increased odds of ADHD in offspring delivered to mothers with recurrent vaginal infections to potential confounding, as pooled data from siblings of other pregnancies reveal no significant association between maternal vaginal infections and ADHD risks [16]. Therefore, we should interpret these findings with caution and conduct further studies to disentangle the independent effects of maternal antibiotic use during pregnancy. The association of paternal age with the risk of ADHD is inconsistent, as some previous studies reported an association between advanced paternal age and neurodevelopmental disorders in offspring due to increased genetic mutations [17]. However, recent studies and meta-analyses showed an association of young paternal age and risk of ADHD [18]. The association of young parental age and increased risk of ADHD can be attributed to a disturbed family environment and increased exposure to harmful substances like smoke and drugs, as well as disturbed parenting skills that are encountered in young parents [19]. Although the severity of ADHD symptoms was not assessed in the present study, the literature indicated increased severity in children with ADHD born to young parents, which highlights the potential role of paternal age in ADHD. Household size in the current study was categorized into two groups: small (4 members) and medium/large (>4 members) based on previous maternal-child health studies [20]. Family size was significantly associated with ADHD in univariate analysis, but after adjusting for confounders in the multivariate model, small household size was not a statistically significant predictor (OR= 0.471, $p= 0.129$). Previous studies linked chaotic home environments with increased odds for ADHD symptoms in children. One possible explanation is that children who thrive in small family sizes may experience different parental attention and social interaction compared to those in larger households, where sibling interaction may contribute to the development of social and self-regulatory skills [21]. An increasing number of studies suggest that the presence of siblings is a protective factor by enhancing socialization and adaptive behaviors [22]. Differences in cultural context, socioeconomic conditions, and family dynamics may explain the discrepancies across studies. Given that the association in the current study did not reach statistical significance, the results should be interpreted with caution. The lack of significance may be related to

limited sample size or residual confounding factors not accounted for in the analysis. Nevertheless, the results suggest continued research to better characterize the multifaceted link between family size and ADHD, particularly within different sociocultural settings. Among the key observations notable in this study is the significant association between maternal employment and increased odds of ADHD in children (OR= 15.15, 95% CI: 1.256-182.807, p= 0.032). This contrasts with existing literature, which does not indicate a direct causal relationship between maternal employment and ADHD. Previous studies suggest maternal employment influences child behaviors indirectly through mediating factors such as maternal stress and altering maternal-child interaction. The association may stem from occupational stress, limited childcare support, or work-life imbalance, rather than employment status itself [23]. Many environmental risk factors have been investigated as potential predictors for AHDH. Childhood lead exposure through living in old houses has been correlated with increased symptoms of ADHD [24, 25]. Living in rural areas, especially those in farming communities, increases the odds of childhood exposure to pesticides, including organophosphorus, that in turn proves to adversely affect the central nervous system function and increase neurobehavioral impairments [26]. Large epidemiological studies have linked second-hand smoke exposure to increased ADHD risks. Even after controlling prenatal risks and other demographic characteristics, smoke exposure at home carried 1.5 increased odds for ADHD in children [27]. Data in the current study did not show any correlation between ADHD and environmental factors, including rural residence, living in old houses, domestic smoke exposure, and exposure to chemicals, including paints. These results should not be interpreted as definitive evidence that environmental factors play no role in ADHD, as they may reflect methodological limitations, including confounding, insufficient statistical power, and failure to account for gene-environmental interactions. Although exposure to electrical generators and construction-related environments did not reach statistical significance in the current study (p=0.056), both variables demonstrated a trend to association with ADHD. These findings may be clinically relevant in the Iraqi urban context, where widespread use of electricity generators and ongoing construction activities may increase children's exposure to environmental pollutants, including particulate matter, heavy metals, hydrocarbons, and chronic noise exposure. Previous studies have suggested that environmental pollution and neurotoxin exposure may adversely affect neurodevelopmental outcomes in children [28]. Therefore, we should not dismiss these findings, and a larger prospective study should investigate them further. Media screen exposure at an early age was significantly associated with ADHD in the present study, which agrees with a recent meta-analysis that proves a direct link between early and increasing screen time exposure and ADHD symptoms in children [29]. However, a bidirectional relationship was suggested between screen exposure and ADHD, as children with underlying neurodevelopmental disorders may be more inclined towards increased screening rather than screen exposure being a primary event for the disorder [30,31].

Study Limitations

This study had several strengths, including the matched case-control design and assessment of various risk factors. However, some limitations need to be declared. First recall bias may affect the accuracy of reported exposures, particularly for perinatal and environmental factors. In addition, the relatively small sample size may have limited the ability to detect significant associations for some variables. The wide confidence intervals observed in some risk factors, particularly maternal antibiotic use and maternal employment, suggest limited precision of the estimated effect sizes, which may be attributed to a small number of participants within some exposure categories. This phenomenon is shown clearly in the wide confidence intervals for maternal employment and antibiotic use during pregnancy, which reflect limited precision in the estimated effect sizes. However, the association remains statistically significant, suggesting a real effect that warrants further investigation. Finally, the study did not include a detailed subclassification of ADHD presentation, which limited subtype-specific analysis. A future large-scale study derived from multi-center settings could substantially enhance our knowledge of risk factors associated with ADHD in Iraq.

Conclusion

This study indicates that specific perinatal, familial, and lifestyle-related factors, notably antibiotic use during pregnancy, maternal employment, younger paternal age at delivery, and early screen exposure, may function as independent risk factors for ADHD in children. Further prospective studies are required to confirm this association and explore underlying mechanisms.

Conflict of interests

The authors declared no conflict of interest.

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Data sharing statement

The data that supports the findings of this study are available from the corresponding author upon a reasonable request.

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