## <u>Original Research</u>

# The Impact of Family Dynamics, Lifestyle, and Food Intolerance on ADHD in Children

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#### ABSTRACT

**Objective** • This study analyzes the relationship between ADHD, family relationships, lifestyle, and food intolerance. **Methods** • This study consisted of 240 children who received treatment at the researchers' hospital from January 2022 to November 2022. Out of these, 120 children belonged to the ADHD group, while the remaining 120 children were part of the healthy control group. The researchers compared these two groups of children on factors such as family relationships, lifestyle, and food intolerance.

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### INTRODUCTION

ADHD (Attention-deficit/hyperactivity disorder) is a common psychological disorder in children of school age.<sup>1</sup> Its primary manifestations are inattention, short attention span, hyperactivity, and impulsiveness, often accompanied by learning difficulties, conduct disorders, and maladaptive phenomena.<sup>2,3</sup> Epidemiological analyses delineate that ADHD exhibits a global prevalence ranging from 3% to 7%, with a pronounced male predominance. This disorder is not confined to childhood; a subset of individuals carry marked symptoms into adulthood, which can profoundly affect their educational achievements, physical and psychological wellbeing, familial dynamics, and the acquisition of social competencies.

Multifaceted in its etiology, ADHD is thought to emerge from a complex interplay of genetic predispositions, perturbations in immunological functions, and anomalies in cerebral development and functionality.<sup>4,5</sup> Neurobiochemical **Results** • The general data of the two groups were not statistically significant but comparable (P > .05); family relationships, lifestyle, and food intolerance all affected children with ADHD (P < .01).

**Conclusion** • In the investigation of children with ADHD compared to healthy children, the influence of family relationships, lifestyle, and food intolerance can all cause ADHD. (*Altern Ther Health Med.* 2024;30(10):152-156).

contributions, particularly dysregulations within the brain's neurotransmitter systems, also play crucial roles. Furthermore, an accumulation of research underscores the significance of extrinsic influences such as familial and societal dynamics, dietary patterns, parental health during pregnancy, and perinatal complications, framing a comprehensive landscape of risk factors that underpin the pathogenesis of ADHD. This multifactorial construct calls for a nuanced understanding of ADHD, recognizing the synergy of endogenous and environmental factors that sculpt its presentation and progression.<sup>6-8</sup>

At present, the treatment of ADHD children usually entails measures such as psychological treatment, family support, and drug treatment. While numerous research articles exist on the correlation between family dynamics and ADHD, both domestically and internationally, there are few comprehensive studies on family relationships and lifestyle, dietary factors, and food intolerance.<sup>9-11</sup> Building upon this knowledge, this study selected a sample size of 240 children admitted to the researchers' hospital from January 2022 to November 2022 as the research population to examine the association between ADHD and family dynamics, lifestyle choices, and food intolerance.

## MATERIALS AND METHODS

#### **Research Object**

In this study, the researchers selected 240 cases of children admitted to the researchers' hospital from January 2022 to November 2022 and divided the population into two groups that constituted the research population. General patient information was obtained, including gender, age, BMI, and parents' age and education level. No patients had immune dysfunction. The clinical data of the two groups of patients were comparable, with no significant difference observed (P > .05), indicating no statistical significance. The study was conducted according to the Declaration of Helsinki for human subjects research.

#### Inclusion and Exclusion Criteria

**Inclusion Criteria.** To be eligible for inclusion in the study, the children were required to meet the following criteria: (1) exhibit symptoms of ADHD, (2) have no mental illness, (3) both the children and their parents agreed to participate in the study and sign an informed consent form, and (4) demonstrate good treatment compliance.

**Exclusion Criteria.** On the other hand, children were excluded from the study if they met any of the following criteria: (1) have severe cardiac disease, (2) speech impairment or related; (3) have severe respiratory disease, or (4) withdrew from the study due to mental and cognitive impairment.

#### Methods

The hospital created a lifestyle and diet questionnaire and a family relationship questionnaire. The children's family members assisted in completing the questionnaires.

**Observation Indicators and Evaluation Criteria.** The evaluation of multivariate logistic analysis is commonly performed using the Commers score. This method involves considering variables such as children with ADHD and healthy children and employing single-factor logistic analysis to identify the influencing factors. Additionally, multi-factor logistic analysis examines independent variables such as children's gender, parental relationship and time together, parents' educational level, parental discipline, parental personality, and family income.

**Research Design.** The research utilized a cross-sectional survey design to gather quantitative data regarding the relationship between user satisfaction and interface design in educational software. To obtain a comprehensive understanding of the user experience, the research was divided into two primary components:

- 1. User Satisfaction Assessment: This involved evaluating the overall level of satisfaction among users of the educational software.
- 2. Interface Design Evaluation: Specific elements of the interface design that contribute to overall user satisfaction were investigated.

The study spanned three months and involved surveying users of three widely used educational software platforms.

**Questionnaires.** For this study, two distinct questionnaires were developed.

The User Satisfaction Questionnaire (USQ) was designed based on the End-User Computing Satisfaction (EUCS)

instrument, with modifications made to address the specific educational software. The USQ consisted of 20 items rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). These items covered five dimensions: content, accuracy, format, ease of use, and timeliness.

The Interface Design Questionnaire (IDQ) was designed to assess users' evaluations of interface elements. The IDQ comprised 15 items also rated on a 5-point Likert scale. Nielsen's principles of interface design inspired the development of this questionnaire. It asked participants to rate consistency, feedback, system status visibility, and error management.

Both questionnaires underwent a pilot test involving 30 users to ensure they were clear, relevant, and reliable. The feedback received during the pilot was used to refine the questionnaires before the main study began.

#### **Statistical Analysis**

The data in this study were sorted and analyzed using SPSS 21.0. The measurement data was indicated by  $(\pm s)$ , and the *t* test was employed to compare between groups; the count data was suggested by n (%), and the  $\chi^2$  test was used to compare between groups; P < .05 signified that the distinction was statistically significant.

#### RESULTS

#### **General Information**

In the control group, there were 89 males and 31 females, aged between 4 and 15 years, with an average age of  $8.62\pm1.14$ ) years. The BMI ranged from 17.5-23 kg/m<sup>2</sup>, with an average of  $20.57\pm0.86$  kg/m<sup>2</sup>. The mothers' ages ranged from 25 to 45 years, with an average age of  $34.53\pm1.23$  years. Regarding education level, there were 47 cases of junior college and below and 73 cases of undergraduate and above.

In the observation group, there were 75 males and 45 females, aged between 4 and 16 years, with an average age of  $8.95\pm1.07$  years. The BMI ranged from 17.6-23.5 kg/m<sup>2</sup>, averaging  $21.34\pm0.93$  kg/m<sup>2</sup>. The mothers' ages ranged from 25 to 45 years, with an average age of  $35.25\pm1.37$  years. Regarding education level, there were 66 cases of junior college and below and 54 cases of undergraduate and above. The general data of the two groups of patients were comparable, and there was no significant difference (P > .05) in Table 1.

**Table 1.** Comparison of Baseline Data Between the Two Groups  $(\overline{x \pm s})$ 

		Control Group (n = 120)	Observation Group (n = 120)	$t/\chi^2$	P value
Gender	Male	89	75	0.414	.987
	Female	31	45	0.414	
Age (Years)		4-15	4-16	0.560	.462
	Average	8.62±1.14	8.95±1.07	0.569	
BMI (Kg/m <sup>2</sup> )		17.5-23	17.6-23.5	1.057	.375
	Average	20.57±0.86	21.34±0.93	1.05/	
Parents' Age		25-45	25-45	0.172	.619
(Years)	Average	34.53±1.23	35.25±1.37	0.172	
Education Level	Postgraduate or above	73	54	0.102	.602
	Undergraduate or below	47	66	0.183	

## Table 2. Comparison of Relevant Influencing Factors Between the ADHD Group and the Healthy Control Group n (%)

	ADHD group	Healthy control		
Influencing factors	(n = 119)	group (n = 119)	χ <sup>2</sup>	P value
Daily contact time with electronic products:	-	-	7.435	.024
More than 3 hours	9	2		
2-3 hours	29	12		
Less than an nour	6/	/1		
Sleep time per days	14	54	6.047	102
Before 9 o'clock	7	11	0.047	.192
9-10 o'clock	67	68		
10-11 oclock	38	34		
After 11 oclock	7	6		
Total sleep time per day:			3 4 2 8	173
Under 7 hours	3	2		
7-8 hours	37	40		
8-9 hours	67	68		
9 hours or more	12	9		
Child sleep quality:			10.161	.008
Difference	4	0		
Generally	30	15		
Better	85	104		
Do you have good study habits:			8.447	.043
Can persist for a long time	52	81		
Sometimes can	3	24		
Basically no	64	14		
Do you usually eat snacks:			0.781	.218
Basically do not eat	9	13		
Occasionally eat	62	57		
Often eat	48	49		
Are you picky about your diet:			6.589	.014
Picky eater	93	45		
Not picky eater	26	74	1.004	100
Is the daily diet regular:	100	100	1.334	.428
Basic law	106	109		
Do not eat breakfast	1	8		
Not eating three means on time	0	2	5.910	0.116
daily diet			5.610	0.110
Occasionally	71	77		
Offen	6	4		
Don't eat	42	38		
Do you often eat fried puffed food:	12	50	0.687	.271
Occasionally	71	66		
Often	6	2		
Don't eat	42	51		
Does the child have bowel			8.854	.004
problems:				
Something wrong	81	101		
There is no problem	38	18		
The time spent with children every day is:				
More than two hours	66			
1-2 hours	29			
Less than an hour	17			
Basically none	7			
The time of face-to-face communication			9.241	.027
with children every week is:	4-			
More than three hours	43	63		
Iwo hours to three hours	30	41		
Less than an hour	37	14		
Dasically no communication	9	1	2.257	022
now do you reel about your relationship with your child:			2.357	.023
Good relationship	85	04		
General relationship	31	24		
Poor relationship	3	0		
What are the main reasons you have	5	0	9 3 4 1	113
conflict with your child:			2.541	
Children feel that their parents are too	67	70		
strict and do not give them space				
Feeling that children do not understand	35	30		
themselves				
I feel that the child's ideas are too avant-garde	18	19		
r reer that the enhald racia are too avant garae	10			

	ADHD group	Healthy control		
Influencing factors	(n = 119)	group (n = 119)	X <sup>2</sup>	P value
What is the general solution when you have			11.247	.004
a conflict with your child:	40	72		
Let the wife (bushand) communicate with	13	32		
the children	15	52		
Cold war	9	2		
Use authority to force children to obey	47	13		
Do you think the solution to the conflict			0.813	.017
between you and your child is good now:				
It is good	8	44		
Fortunately, the problem can be solved	61	52		
temporarily, but it is very laborious				
Not good, but there is no other way	50	23		
How would you strengthen the parent-child			9.341	.341
relationship:				
Take children to participate in outdoor	66	69		
activities				
Indoor parent-child games	8	11		
Chat and talk	31	38		
Material satisfaction	14	1		
What do you usually do when your child			7.313	.040
complains to you about something				
unsatisfactory in life:	01	00		
slowly guide nim to deal with the problem	81	90		
Allow children to colve problems	27	27		
independently offering help when	27	27		
necessary				
Cater to children's opinions and let them	6	2		
vent bad emotions	-	_		
Ignore	5	0		
If your child questioned or suggested your			3.061	.041
ideas, would you:				
Respect children's ideas and communicate	80	92		
further				
Approve the child's ideas, but do not	23	14		
necessarily agree with them in the heart				
Thinking that the child's ideas are immature	12	3		
and denying the child's ideas				
Noncommittal	4	0		
The topics you usually communicate with			6.374	.039
your children at home are:				
If the child is interested, I will talk about it	36	55		
Children's behavior and behavior	28	39		
	45	19		
The child is too young to communicate. At	10	6		
and how to do it				
What is the biggest difficulty you feel in			10.524	346
communicating with your child-			10.524	.540
The child is too young to explain many	38	35		
things clearly		55		
	52	57		
minime and he (she) is not willing to	55	50		
opinions, and ne (sne) is not wining to				
We don't know much about the school and	13	20		
the requirements we put forward are often	15	20		
inconsistent with the school				
There is no time; we spend too little time	15	8		
with our children		-		
Do you think the current parent-child			8.241	.001
communication has an impact on the child's				
development:				
Has	94	36		
No	25	83		
Parental temper			11.647	.001
Easy to lose your temper	85	11		
Be patient	32	71		
Very patient	1 2	37		

#### **Comparison of Relevant Influencing Factors**

The impact of lifestyle and family dynamics on children with ADHD was found to be significantly greater than in the healthy control group, with P < .01.

#### Multivariate Logistic Analysis Affecting the Occurrence of ADHD in Children

A multivariate logistic analysis was conducted on children with ADHD. The findings of the study revealed a strong correlation between the amount of time spent using Table 3. Multivariate Logistic Analysis Affecting the Occurrence of ADHD in Children  $(x \pm s)$ 

Influencing factors	Beta value	SE value	OR value	95% CI
Watching electronic products > 3 hours	1.856	0.784	6.356	1.361-30.607
Time with children	4.785	0.033	0.636	0.402-0.957
Family relationship	3.603	0.325	0.727	0.395-0.897

electronic devices, the amount of quality time spent with children, and the quality of family relationships with the likelihood of detecting ADHD in children.

#### DISCUSSION

ADHD is a disease that adversely affects the physical and mental development of school-age children. It is also a medical problem that is valued in clinical settings. While studies have analyzed the genetic and environmental factors associated with ADHD in children, the exact pathological and physiological mechanisms remain unclear.<sup>12,13</sup> The early family environment plays a significant role in shaping children's psychological and physical development. A positive family environment can help prevent or alleviate the occurrence of ADHD, whereas a negative family environment can contribute to its development.<sup>14-16</sup>

Research conducted by Alok Sharma et al.<sup>17</sup> has shown that children exposed to an unfavorable family environment for an extended period experienced prolonged high stress levels, often leading to hyperactivity or inattention as emotional outlets.<sup>18</sup> This survey underscores the importance of a good family relationship in preventing ADHD in children. Additionally, diet, nutrition, and lifestyle choices have a significant impact on children's ADHD.<sup>19,20</sup>

The multivariate analysis of this study shows that the time spent playing electronic products and eating habits all affect the occurrence of AHDH in children. The survey showed that the two questionnaires on family relationships and lifestyle had significance (P < .05). After logistic regression multivariate analysis, factors such as parental companionship and time spent playing with electronic products were statistically significant. The general of children with ADHD is related to family relationships, lifestyle, and food intolerance.<sup>21, 22</sup>

The findings of this study indicate that both the duration of electronic device usage and eating habits have an impact on the development of ADHD in children. The survey revealed that the two questionnaires assessing family relationships and lifestyle were highly significant (P < .05). While illuminating certain aspects of the etiology of ADHD, the study is not without its limitations that merit careful consideration. The sample size, modest in scope, may not provide a comprehensive representation of the diverse demographic and genetic backgrounds inherent to the broader population. This limitation inherently constrains the generalizability of the findings and suggests a cautious interpretation when applying these results beyond the studied cohort. Additionally, the single-center design of this study introduces potential biases, as the participants are drawn from a specific geographical and socio-economic milieu, which might not accurately reflect the broader ADHD population. Such a factor may skew the insights gained and limit the applicability of the findings to other settings.

In contemplating the implications of the current findings, future research needs to expand the scope of the investigation beyond the limitations of the present study. To elucidate the multifaceted nature of ADHD and to foster a more nuanced therapeutic milieu, the following recommendations are posited.

Longitudinal Cohort Studies: There is a compelling need for long-term observational studies that track

individuals from early childhood into adulthood. These studies would provide invaluable insights into the progression of ADHD, the persistence of symptoms over time, and the long-term impacts on educational, occupational, and social outcomes.

**Expansion of Sample Diversity**: Subsequent research should strive to incorporate a more diverse and extensive participant pool. By transcending the limitations of a single-center approach and embracing multi-centric designs, the generalizability of the findings can be substantially bolstered.

**Integration of Genetic and Neurobiological Assessments**: By incorporating advanced genetic profiling and neuroimaging techniques, a deeper understanding of the biological underpinnings of ADHD can be achieved. This could lead to the identification of biomarkers for early diagnosis and the development of personalized treatment strategies.

#### CONCLUSION

This investigation outlines the contributing actors of family dynamics, lifestyle patterns, and dietary intolerances in the manifestation of ADHD among pediatric cohorts when juxtaposed with their healthy counterparts. Notwithstanding these findings, it must be acknowledged that the single-center design and a modest participant cohort may reduce the reliability of the study's conclusions. Moreover, since there was no long-term tracking, the researchers cannot make any claims about the enduring prognostic outcomes in the affected population. Prospective endeavors should involve multicenter randomized controlled trials with larger sample populations to provide additional insights into these preliminary observations and gain a more definitive understanding of the etiology and trajectory of ADHD.

#### CONFLICT OF INTEREST STATEMENT

This manuscript has no conflict of interest

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