RELATIONSHIP BETWEEN SERUM FERRITIN LEVEL AND ATTENTION DEFICIT HYPERACTIVITY DISORDER IN CHILDREN ATTENDING ALEXANDRIA UNIVERSITY CHILDREN'S HOSPITAL

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Introduction

Attention-deficit / hyperactivity disorder (ADHD) is the most common neurobehavioral disorder in childhood. Its prevalence in children and adolescents is around 5.3% worldwide. ADHD is characterized by persistent patterns of inattention, hyperactivity and impulsivity that affects multiple domains of life cause significant functional impairment. ADHD imposes various kinds of pressures on families and communities. ADHD is attributed to the interplay of social, environmental, neurobiological, and genetic factors. Iron is essential for many important biological processes. It functions as a cofactor in the metabolism of many neurotransmitters like dopamine. Its deficiency plays a role in ADHD pathogenesis. Serum ferritin is a reliable indicator of iron storage in tissues such as the brain.

Aim of the work

We aimed to study serum ferritin levels in children with ADHD, and the relationship between it and the severity of the disease.

Subjects and Methods

This case-control study was conducted on (100) children aged from six to twelve years (50 children diagnosed with ADHD based on DSM-5 diagnostic criteria and were recruited from Pediatric Neurodevelopmental outpatient clinic of Alexandria University Children Hospital Smouha "group I" and 50 sex and age-matched siblings of group I who are not fulfilling the DSM-5 diagnostic criteria of ADHD as a controls " group II").

Children who had Conditions that affect serum ferritin level like chronic liver disease, non-iron deficiency anemia, acute and chronic inflammation, infections or on iron therapy for three months were excluded from our study.

The parent(s) of the children of both groups were subjected to complete history taking and Children of both groups were subjected to Complete clinical examination, Complete blood counts and measure of serum ferritin level. Children with ADHD were subjected to Psychometric studies (Arabic Version of Conner's Parent Rating Scale-Revised CPRS-R, The Arabic version of "Stanford Binet intelligence test - 4th edition for assessment of Intelligence Quotient)

Results

Table 1: Univariate and multivariate Linear regression analysis for the parameters affected by serum ferritin in cases group (n = 50)

	Univariate		#Multivariate	
	P	B (95%C.I)	p	B (95%C.I)
Total IQ	**<0.001***	0.443 (0.261–0.624)	**<0.001***	0.367 (0.212–0.523)
Hyperactivity	**<0.001***	-0.430 (-0.64– -0.22)	**0.622**	0.084 (-0.257–0.424)
ADHD index	**<0.001***	-0.683 (-0.95–-0.42)	**0.187**	-0.223 (-0.558–0.113)
Inattentive conner's scale severity	**<0.001***	-0.543 (-0.80– -0.29)	**0.675**	-0.108 (-0.625–0.409)
Total conner's scale severity	**<0.001***	-0.612 (-0.84– -0.39)	**0.056**	-0.548 (-1.111–0.016)
Opposition	**0.001***	-0.316 (-0.49– -0.14)	**0.917**	-0.013 (-0.257–0.232)
Cognitive problems	**0.001***	-0.441 (-0.70– -0.18)	**0.693**	0.071 (-0.292–0.434)
Presentations of ADHD	**0.002***	-5.709 (-9.12– -2.30)	**0.992**	-0.022 (-4.452–4.409)
Associated comorbidity	**0.004***	-9.935 (-16.47– -3.40)	**0.520**	-2.146 (-8.828–4.536)
Receiving ADHD drugs	**0.006***	-8.313 (-14.18– -2.44)	**0.396**	3.019 (-4.095–10.133)
Social problems	**0.021***	-0.205 (-0.38– -0.03)	**0.587**	0.053 (-0.143–0.249)
School performance	**0.066**	3.423 (-0.24–7.08)		
Age (years)	**0.071**	-1.280 (-2.67–0.12)		
Tension/shyness	**0.425**	-0.082 (-0.29– 0.12)		
Psychosomatic disorder	**0.569**	-0.054 (-0.25–0.14)		
Socioeconomic status	**0.658**	0.927 (-3.25–5.11)		
Gender	**0.756**	-1.048 (-7.79–5.69)		

IQ: intelligence quotion
B: Unstandardized Coefficients
C.I: Confidence interval
LL: Lower limit
UL: Upper Limit
#: All variables with p<0.05 was included in the multivariate
*: Statistically significant at p ≤ 0.05

Table 2: Correlation between serum ferritin and Conner's scale severity in cases group (n = 50)

Conner's Scale Severity	Serum ferritin	
	r_s	P
Opposition	-0.468*	0.001*
Cognitive problems	-0.423*	0.002*
Hyperactivity	-0.491*	<0.001*
Tension/shyness	-0.042	0.770
Social problems	-0.329*	0.020*
Psychosomatic disorder	-0.109	0.453
ADHD index	-0.605*	<0.001*
Inattentive	-0.532*	<0.001*
Hyperactive	-0.535*	<0.001*
Conner's scale severity total	-0.596*	<0.001*

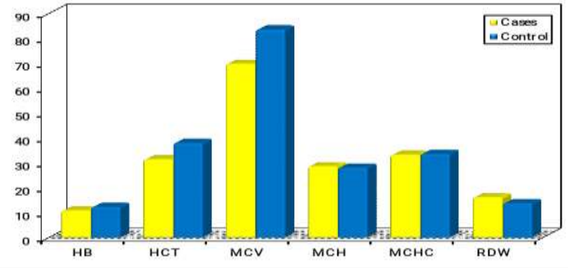

Figure: Comparison between the two studied groups according to CBC

Conclusion

the findings of the current study suggest that preventing iron deficiency by a balanced nutritional diet and may-be iron supplement might have a protective role not only against ADHD also for less severe core symptoms.

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