Association between academic performance and suspected ADHD in children from an elementary school within the AGEB of FMU 61.

Abstract:

Objective.To analyze the association between academic performance and suspected ADHD in children from a primary school belonging to the AGEB of the Family Medicine Unit (UMF) 61.

Material and methods. Cross-sectional, observational, and analytical study; it was carried out with teachers and parents of 258 children aged 6 to 11 years in a primary school in Córdoba, Veracruz. Data from report cards were collected, and a Conners questionnaire was applied to parents and teachers.

Results. An analysis was conducted that allowed comparing the performance of students with and without suspected ADHD using the chi-square statistic = 3.014 and a p = 0.222, observing that there is no association between suspected ADHD and low academic performance.

Conclusions. No evidence of an association between suspected ADHD and low academic performance was found in the studied population. Studies with larger samples and clinical diagnostic methods are required to confirm these findings.

Key words:-

suspected, attention déficit, hyperactivity, academic performance.

Introduction:-Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common neurobehavioral and neurodevelopmental disorders worldwide, affecting adults but primarily children[1]. Globally, ADHD affects 2% to 7% of children[2], with the most common age of onset being between 7 and 12 years[3]. Prevalence varies by geographic region, with reported rates of 9.4% in the United States, 7% in Western countries, and a range of 1.6% to 17.9% in India.[4]

In Latin America, the prevalence ranges from 3% to 7%, affecting approximately 36 million people [5]. In Mexico, reported prevalence rates are between 3% and 5%, representing 1.5 million children under the age of 14 [6]. It is more common in males than in females, as boys tend to exhibit more disruptive or externalizing symptoms, whereas girls show a higher prevalence of internalizing disorders, such as anxiety [7,8,9.]

A clear association has been demonstrated between ADHD symptoms and poor academic performance [10]; affected individuals are more likely to receive low grades, repeat a school year, or drop out of school. One study found that children with ADHD were one year behind in reading and mathematics compared to third-grade peers without the disorder [11,12.] Similarly, adolescents with ADHD lagged 2.5 years behind in reading and 3 years behind in mathematics compared to their classmates without the condition [13,14].

Therefore, this study aims to analyze the association between academic performance and suspected ADHD in children from an elementary school located within the AGEB of Family Medicine Unit (UMF) 61.

METHODS

Study design

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The study employs a cross-sectional, observational, and analytical design.

Participants

This study was conducted in the city of Córdoba, Veracruz, between June 1 and August 31, 2025.

The study population comprises parents and teachers of children aged 6 to 11 attending the Francisco González Mena morning primary school and the Delfino Valenzuela afternoon primary school in Córdoba, Veracruz—schools located within the Basic Geostatistical Area (AGEB) of Family Medicine Unit No. 61.

No sample size calculation was performed, as the entire student population of both schools—196 students at the Francisco González Mena morning primary school and 142 students at the Professor Delfino Valenzuela afternoon primary school—was included in order to screen for suspected ADHD.

Variables considered in this research included age, sex, grade level, and academic performance, with the aim of determining the prevalence of suspected ADHD, identifying the average age at which suspicion of the disorder arises, and classifying the grade level where it is most prevalent.

Inclusion criteria

Parents and teachers of children aged 6 to 11 attending primary schools within the UMF 61 AGEB (specifically the Francisco González Mena morning primary school and the Delfino Valenzuela afternoon primary school) who are in grades 1 through 6 and present on the days questionnaires were administered; and children who have a report card for the 2024–2025 academic period.

Exclusion criteria

Surveys regarding children with a diagnosis of ADHD, children receiving medication that alters anxiety and/or hyperactivity profiles, and children with neurological function impairments; surveys completed by teachers of children with a diagnosis of ADHD, children receiving medication that alters anxiety and/or hyperactivity profiles, and children with neurological function impairments.

Procedure

This study was conducted at the Francisco González Mena Morning Primary School and the Profesor Delfino Valenzuela Afternoon Primary School, with prior authorization from the principal of both schools. A Conners scale questionnaire was administered to all teachers and students' parents, subject to prior consent. Completion of each questionnaire took an average of approximately 15 minutes.

All study participants were administered the Conners' behavior questionnaire—one version for parents and another for teachers. This questionnaire consisted of 10 questions regarding the child's behavior, with response options of "not at all," "a little," "pretty much," or "very much," as appropriate. The International Mexican Neurology Association establishes that a score exceeding 17 points indicates suspected ADHD in boys, while a score exceeding 12 points indicates suspected ADHD in girls. To measure the level of agreement between parent and teacher evaluations, the Kappa index was calculated; the result was 0.60, indicating moderate agreement.

Academic performance was assessed using report cards from the 2024–2025 academic year, with the following average score classifications: 6 or lower (low performance), 7 to 8 (average performance), and 9 or higher (good performance).

Once collected, the data were entered into a database. A cross-sectional, observational, analytical study was conducted on the population of children aged 6 to 11 years to analyze the association between academic

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performance—based on report cards issued by the SEP (Secretariat of Public Education)—and Conners' scale results for those identified as having suspected ADHD.

Statistical análisis

A descriptive analysis of the data (measures of dispersion and central tendency) was performed to compare the variables and characteristics of the Conners Scale (parent and teacher versions) between the two groups. The chi-square test was used to evaluate the association between academic performance and test results; a p-value < 0.05 was considered significant. All analyses were conducted using SPSS software (version 22), and data were plotted using GraphPad Prism 10 statistical software.

Ethical considerations

This research is based on good clinical practice and adheres to the recommendations of the Pan American Health Organization and the Declaration of Helsinki, as well as the General Health Law and regulations governing research.

In accordance with these principles, this study requires informed consent from the minors' parents and the teachers; patient data confidentiality will be guaranteed, and no personal data will be used.

RESULTS

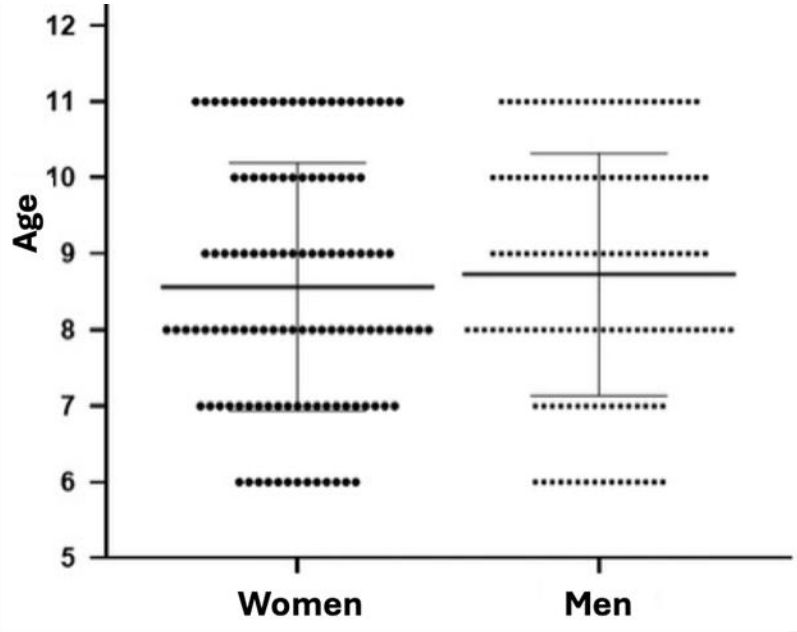
Surveys were administered to 16 teachers—9 from the morning shift and 7 from the afternoon shift—and to 258 parents who agreed to participate in the study protocol. Conners surveys were completed for teachers and parents associated with the Francisco González Mena Morning Elementary School and the Profesor Delfino Valenzuela Afternoon Elementary School; the sample included parents and teachers of children aged 6 (11.2%), 7 (14.3%), 8 (23.3%), 9 (17.8%), 10 (15.5%), and 11 (17.8%) years. The mean age was 8.66 years, the median was 9, the mode was 8, and the standard deviation (SD) was ±1.605.

Of the 258 children included in the study, 140 (54.3%) were male and 118 (45.7%) were female. For females, the mean age was 8.72 years, the median was 9 years, the mode was 8 years, and the SD was ±1.69. For males, the mean age was 8.77 years, the median was 9 years, the mode was 8 years, and the SD was ±1.58 years.**(Figure 1).**

Figure 1.

Graph by sex and age of the children.

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n: 258, $\bar{x}$: 8.72 years old, Median: 9 years old, Mode: 8 years old, SD ±: 1.69.

The sample included 41 parents and 3 teachers of first-grade students, 43 parents and 2 teachers of second-grade students, 68 parents and 3 teachers of third-grade students, 43 parents and 2 teachers of fourth-grade students, 33 parents and 2 teachers of fifth-grade students, and 53 parents and 4 teachers of sixth-grade students. The mean was 3.34, the median was 3, the mode was 3, and the SD was ± 1.583.

Based on the results of the Conners survey administered to parents and teachers, 27 children (7.9%) were identified as suspected of having ADHD, while 311 children (92.1%) showed no suspicion of ADHD. To measure the degree of agreement between parent and teacher evaluations, the Kappa index was calculated; the result was 0.60, indicating moderate agreement.

Academic performance was assessed using the grade point average from the 2024–2025 academic year, obtained from school enrollment and accreditation records (IAE). The findings showed that "average" performance was the most prevalent (74%), followed by "low" performance (18.2%) and, finally, "good" performance (7.8%).**(Table 1).**

Table 1

Academic performance classification.

Academic performance	Frecuency	Percentage
Low	47	18.2
Good	20	7.8
Average	191	74
Total	258	100

n=258, Predominated average academic performance 191 (74%).

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Of the 27 cases with suspected ADHD, males predominated with 16 cases (59.25%), compared to 11 females (40.74%). Suspected ADHD was most frequently observed at ages 7 and 8 (6 cases each), followed by ages 6 and 9 (5 cases each), age 10 (4 cases), and finally age 11 (1 case). The mean age of presentation was 8 years (SD ± 1.468).

The grade level with the highest prevalence of suspected ADHD was third grade (9 cases, 3.33%), followed by first grade (8 cases, 2.96%), fourth grade (5 cases, 1.85%), second grade (3 cases, 1.11%), and fifth and sixth grades (1 case each, 0.37%). The mean grade level was 2.67 (SD ± 1.387).

An analysis comparing the performance of students with and without suspected ADHD was conducted using the chi-square statistic; the result was 3.014 with a p-value of 0.222. No association was observed between suspected ADHD and low academic performance; however, a higher proportion of suspected ADHD cases was observed in the low-performance group compared to the group without suspected ADHD (30% vs. 17%).**(Table 2).**

Table 2

Prevalence of children with suspected ADHD.

Suspected ADHD	Frecuency	Percentage
Yes	27	7.9
No	311	92.1
Total	338	100

n=338, Predominated without suspicion of ADHD 311 (92.1%).

Academic performance was categorized as "low performance" and "not low performance." Upon dichotomizing these variables, students with suspected ADHD showed a higher prevalence of low academic performance (29.6% vs. 16.9%). The prevalence ratio was 1.75 (95% CI: 0.92–3.35) and the odds ratio was 2.07 (95% CI: 0.85–5.07). However, the observed differences did not reach statistical significance ($\chi^2 = 3.014$; $p = 0.222$).**(Table 3).**

Table 3

Academic performance variable with suspected ADHD.

Academic performance	Suspected ADHD				x^2	p
	Yes	%	No	%	3.014	0.222
Low	8	3.1	39	15.11		
Average	1	0.38	19	7.36		
Good	18	6.97	173	67.05		

N=258, n= 27, the chi-square analysis did not demonstrate any association.

DISCUSSION

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The results of this study revealed a 10.5% prevalence of suspected ADHD; this figure is higher than tht reported by Vázquez (2022), who conducted a descriptive prevalence study of pediatric ADHD across health centers in a specific health sector in Zaragoza as of May 8, 2020. That study reviewed cases of patients diagnosed by that date across the 13 health centers comprising the sector, analyzing a total of 1,012 patients with ADHD, the population was 68.5% male and 31.5% female, with a mean age at diagnosis of 7.46 ± 2.512 years, and reported an ADHD prevalence of 3.4%.[15]

In the present study, males accounted for the majority of cases (59.25%). This aligns with findings from other research—such as a study analyzing the grades and grade point averages of 344,152 Norwegian children born between 1997 and 2002—which used linear regression models to estimate the association between ADHD diagnosis and academic performance (specifically the ADHD-related deficit). That study calculated both bivariate and adjusted associations between ADHD and grade averages, incorporating covariates such as sex, parental education, birth year, parity, and birth month; it found that the prevalence was more than twice as high among boys (5.54%) as among girls (2.42%).[16]

The average age at which ADHD was suspected was 8 years, with the highest concentration of students being in the third grade of primary school; this pattern aligns with other studies noting that academic demands—such as reading—increase during the third grade. It was observed that when attempting to interpret a text, children with ADHD struggled to recode the text's core information; furthermore, research indicates that in the early years of primary school, symptoms of inattention directly impact word reading—meaning children with ADHD have less exposure to printed language than their peers, which disrupts the development of word recognition skills.[17]

Based on the results of this analysis, the alternative hypothesis is rejected, demonstrating that suspected ADHD is not associated with low academic performance, as our null hypothesis had suggested. However, a comparison with existing literature shows that the presence of hyperactivity-related symptoms is a determining factor that negatively impacts school performance. [18]

ADHD is a condition that begins in childhood; therefore, early detection is crucial to ensure timely treatment, thereby reducing educational lag and improving the child's quality of life. It is recommended that the future research could focus on how these assessments might influence school-based strategies for children with suspected ADHD.

Although schoolchildren with suspected ADHD showed a higher frequency of low academic performance, the observed differences did not reach statistical significance; however, the observed effect size (PR: 1.75 and OR: 2.07) suggests a possible association of moderate magnitude. Further studies with larger samples are recommended to confirm or rule out the observed association.

Conflict of interest statement

The authors declare no conflict of interest.

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References

1. Rusca-Jordán, F., & Cortez-Vergara, C. Attention deficit hyperactivity disorder (ADHD) in children and adolescents: A clinical review. Revista de Neuro Psiquiatría. 2020; 83(3), 148-156. http://dx.doi.org/10.20453/rnp.v83i3.3794

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2. Bosch R, Pagerols M, Rivas C, Sixto L, Bricollé L, Español-Martín G, et al. Neurodevelopmental disorders among Spanish school-age children: prevalence and sociodemographic correlates. Psychol Med. 2021; 52:3062–72. doi: 10.1017/S0033291720005115.

3. Marchan, M. Á., &Mera, O. E. Motor skills of students diagnosed with attention deficit hyperactivity disorder (ADHD) through physical education practices. RevistaCognosis, 2020; (5), 25-25. https://doi.org/10.33936/cognosis.v5i0.2462.

4. Khare S.K., Acharya U.R. An explainable and interpretable model for attention deficit hyperactivity disorder in children using EEG signals. Computers in Biology and Medicine 155 (2023) 106676.

5. Llanos Lizcano, LJ., García Ruiz, DJ., González Torres, HJ., & Puentes Rozo, P. Attention deficit hyperactivity disorder (ADHD) in school-aged children (6–17 years old). RevistaPediátricaAtención Primaria. 2019; 21(83), e101-e108.

6. Palacios-Cruz L, de la Peña F, Valderrama A, Patiño R, Calle Portugal SP, Ulloa RE. Knowledge, beliefs, and attitudes of Mexican parents regarding attention-deficit/hyperactivity disorder (ADHD). SaludMent. 2020;43(6): Available at: https://revistasaludmental.gob.mx/index.php/salud_mental/article/view/1404

7. De Rossi P, Pretelli I, Menghini D, D'Aiello B, Di Vara S, Vicari S. Gender-related clinical characteristics in children and adolescents with ADHD. J. Clin. Med. 2022, 11(2), 385. https://doi.org/10.3390/jcm11020385.

8. Molina-Torres, J. M., Amorós, M. O., & Barceló, M. S. (2022). ADHD in the preschool stage: A narrative review. *Revista de PsicologíaClínica con Niños y Adolescentes*, 9(3), 6. doi:10.21134/rpcna.2022.09.3.5

9. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 5th ed. Washington, DC: American Psychiatric Publishing. 2013.

10. Henning C, Summerfeldt L, Parker J. ADHD and Academic Success in University Students: The Important Role of Impaired Attention. *Journal of Attention Disorders*. 2022, Vol. 26(6) 893–901.

11. Resett, S. Relationship between attention and academic performance in children and adolescents. *RevistaCostarricense de Psicología*. 2021; 40(1), 3-22. https://www.scielo.sa.cr/scielo.php?script=sci_arttext&pid=S1659-29132021000100003.

12. Lawrence, D., Houghton, S., Dawson, V., Sawyer, M., & Carroll, A. Trajectories of academic achievement for students with attention-deficit/hyperactivity disorder. *British Journal of Educational Psychology*, 2021; 91(2), 755–774. https://doi.org/10.1111/bjep.12392.

13. Salazar H, Salas S, González M, Araya A. Executive functions in schoolchildren with and without ADHD according to parents and teachers. *Logos: Revista de Lingüística, filosofía y literatura*. 2021; 31(1) 138-155. Doi: org/10.15443/RL3108.

14. Macias JA, Núñez C, Rodríguez JM, Macias A, Mendoza L, Paniagua LL. Analysis of the attention deficit in ADHD in the school-age population. Elsevier Atención Primaria. 2025; https://doi.org/10.1016/j.aprim.2025.103278.

15. Vázquez Sánchez M, Castejón Ramírez S, AlcónGrases M, Pitarch R, Fernández Lozano C, López Campos M. ADHD in primary care: prevalence and referral to specialized care. Revista de PsiquiatríaInfanto-Juvenil. 2022; Vol. 39, 1, 3-9.

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16. Sunde H., Kleppesto T., Gustavson K., Nordmo M., Reme B. ADHD-related academic performance deficits by sex and parental education: a prospective sibling-comparison study of 344,152 Norwegian adolescents. National Library of Medicine. 2022; 2(1) doi: 10.1002/jcv2.12064.

17. Sánchez AJ, Albert J, López S, Calleja B, Fernández D, Jiménez de Domingo A, Fernández A, Fernández A. The impact of ADHD on reading. MEDICINA (Buenos Aires); 2023; Vol. 83 (Suppl. II): 22-2.

18. Slobodin, O.; Davidovitch, M. Gender Differences in Objective and Subjective Measures of ADHD Among Clinic-Referred Children. Front. Hum. Neurosci. 2019; 13, 441.

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