Research Article

Mapping ADHD and its predictors : Perspicacity from a Population-Based Study in Northern Kerala ,India

Aswini Navaratna Sashi[1], Kanniyan Binub[2], Krishnaraj J.S[3],Pratibha Dabas[4], Prasily Prabhakaran[5], Swathi C[6],Shakhy Vati[7], Rakesh Ramachandran[8]

[1]Senior resident, Department of Community Medicine,Malabar Medical College Hospital & Research Center, Ulliyeri , Kozhikode, Kerala,India
[2]Professor, Department of Community Medicine,Malabar Medical College Hospital & Research Center, Ulliyeri , Kozhikode, Kerala,India
[3]Associate Professor, Department of Community Medicine,Malabar Medical College Hospital & Research Center, Ulliyeri , Kozhikode, Kerala,India speaktodrkrishnaraj@gmail.com
[4]Ex- Professor, Department of Community Medicine,Malabar Medical College Hospital & Research Center, Ulliyeri , Kozhikode, Kerala,India
[5]Assistant Professor, Department of Community Medicine,Malabar Medical College Hospital & Research Center, Ulliyeri , Kozhikode, Kerala,India
[6]Assistant Professor, Department of Community Medicine,Malabar Medical College Hospital & Research Center, Ulliyeri , Kozhikode, Kerala,India
[7]Assistant Professor, Department of Community Medicine,Malabar Medical College Hospital & Research Center, Ulliyeri , Kozhikode, Kerala,India
[8]Assistant Professor, Department of Community Medicine,Malabar Medical College Hospital & Research Center, Ulliyeri , Kozhikode, Kerala,India

Abstract

Background: Attention-Deficit/Hyperactivity Disorder (ADHD) is a prevalent neurodevelopmental condition that typically manifests during early childhood and may persist to adolescence and adulthood.Childhood ADHD can predispose affected individuals to a spectrum of difficulties including impaired social functioning, academic underachievement and diminished self-worth.The study aims to determine the prevalence and associated risk factors of ADHD among school going children in Kozhikode District. Methodology: A school based cross sectional study was conducted in three government schools in Kozhikode district from 8th August 2023-11th August 2025 among 266 school going children aged between 6 to 12 years. Results: In the current study, the overall prevalence of Attention-Deficit/Hyperactivity Disorder (ADHD) was identified as 7.1%. Among the subtypes, the inattentive type emerged as the most dominant (53%). This was followed by the hyperactive subtype, representing 26%, while the combined form constituted the remaining 21% of cases. Boys (57.8%) exhibited a slightly higher prevalence of ADHD compared to girls, and younger age groups (6-8) years were more commonly affected. High screen time emerged as a significant risk factor for ADHD, increasing the likelihood by 2.23 times. Prevalence in the first school studied was 6.6%, second school was 14.5%, and in the third school was found to be 4.3%. Among the study subjects 0.8% had not completed their immunization up to their age. Conclusion: The prevalence of ADHD was 7.1% in the present study. Policy makers should emphasize on implementation of uniform screening program for ADHD in every school and massive periodic public awareness program should be attempted for children to have a healthy future. The results of this study underscore the critical necessity for implementing targeted interventions aimed at mitigating risk factors associated with ADHD

Keywords: Attention Deficit Hyperactivity Disorder; Prevalence; School going children; Vanderbilt scale.

1. Introduction

Positive mental health is a vital cornerstone of overall well-being, empowering individuals to unlock their full potential, navigate life's challenges with resilience, pursue learning with enthusiasm, engage meaningfully in work, and contribute richly to the fabric of their communities. They are bound to have additional social and academic responsibilities[2]. One of the most common mental illnesses affecting children globally is attention deficit hyperactivity disorder (ADHD)[3]. Before the 1980s, ADHD was known as hyperkinetic reaction of childhood; from 1980 to 1987, it was formally classified as attention deficit disorder (ADD)[4]. Boys are diagnosed with ADHD about twice as frequently as girls[5] and 1.6 times more frequently in men than in women[6]. It occurs in three types: combined, hyperactive, and predominantly inattentive. ADHD is a neurodevelopmental disorder characterized by delays or abnormalities in the development of social, behavioral, physical, and cognitive skills. It is prevalent in children and frequently persists into adulthood[7].

The etiology ADHD is multifactorial, involving a complex interplay between genetic predispositions and environmental influences. There are several gene variants that each marginally raise a person's risk of developing the disorder. Children with a parent diagnosed with ADHD have over a 50% chance of developing the disorder themselves. Both low birth weight and preterm birth have been associated with an elevated risk of developing attention-deficit/hyperactivity disorder (ADHD)[8]. Siblings of children diagnosed with ADHD face a markedly higher risk of also developing the disorder—approximately three to four times greater compared to siblings of children without ADHD[9]. ADHD is 30% more likely to develop in children whose mothers have gestational or pre-gestational diabetes[10], and mothers who

smoked during pregnancy had a 22% chance of having a child with ADHD[11]

Children who experience psychosocial stressors, such as family illness or financial hardship, are more likely to develop ADHD[12]. Those from low-income families have a 14-fold higher risk compared to other factors such as gestational diabetes, according to evidence reviews on ADHD risk factors[13]. Teenagers who use digital media frequently are also more likely to exhibit ADHD symptoms, with the risk increasing by approximately 10% for each additional high-frequency activity[14]. Pregnancy-related alcohol consumption can result in foetal alcohol Spectrum disorders, which may include ADHD or similar symptoms, have also been reported[15]. Acetaminophen exposure during pregnancy has been linked to a 25% higher risk of ADHD in children[16]. Similarly, exposure to certain hazardous compounds, such as lead or polychlorinated biphenyls, may result in symptoms resembling ADHD[17], as lead has a detrimental impact on children's behaviours and cognitive development.

It is estimated that 5.29% of the global population is affected by ADHD[15]. Approximately 10.5% (6.5 million) of children in the United States are currently diagnosed with the disorder[18]. Based on DSM-IV criteria, 6–7% of individuals aged 18 years and under are estimated to have ADHD[15]. Children in North America appear to have a higher prevalence compared to those in Africa and the Middle East[19].

Individuals with Attention-Deficit/Hyperactivity Disorder (ADHD) often face under-recognition and under-treatment, resulting in academic, social, and emotional challenges. In Kerala, research on ADHD among school-going children remains limited. This study aims to address this gap, providing insights to guide educators and healthcare professionals in implementing early screening and tailored interventions to improve educational and social outcomes.

Materials and methods

This cross-sectional study was conducted in the rural field practice area of a tertiary care hospital over a period from 8 August 2023 to 11 August 2025. The study population comprised school-going children aged 6–12 years enrolled in three designated government schools in Kozhikode district. The sample size was calculated using the standard formula $n = Z^2pq/d^2$, where Z = 1.96 for a 95% confidence level, p = 11.32%, q = 88.7% (100 – p), and d = 5% absolute precision. The minimum required sample size was estimated to be 154; however, a total of 266 children were ultimately enrolled in the study. Stratified random sampling was employed, wherein stratified proportional allocation determined the number of participants from each school, followed by simple random sampling for selection of students.

Children aged 6–12 years studying in the selected schools, for whom permission was obtained from the principal and class teachers, informed consent from parents, and assent from the child were included in the study. Children who were absent at the time of the school visit were excluded. Following approval from the Institutional Ethics Committee and prior appointments with school authorities, data collection was undertaken in all three schools using a semi-structured questionnaire capturing socio-demographic characteristics, nutritional factors, and morbidity-related variables. Attention-Deficit/Hyperactivity Disorder (ADHD) assessment was carried out using the NICHQ Vanderbilt Assessment Scales, administered separately to both teachers and parents, and scoring was performed according to standard instructions. The collected data were entered and analyzed using SPSS version 20.

Results

A major proportion of study participants were boys (164, 61.7%) which constituted a larger proportion compared to girls (102, 38.3%).

The majority of the study participants belonged to the lower middle class (80, 30.1%) whereas 67 (25.2%) belonged to the middle class followed by (53,19.9 %) in the lower class, (37, 13.9%) in the upper class and (29, 10.9%) in the upper middle class.

1.Distribution of ADHD children based on ADHD subtype

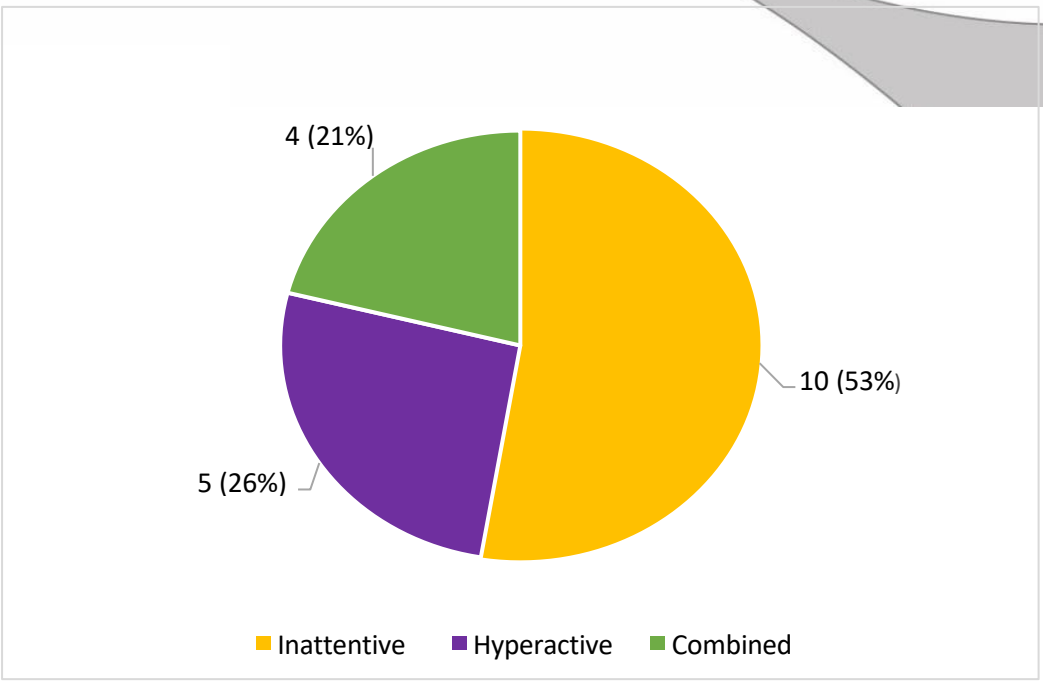

Fig. 1: Distribution of ADHD children based on ADHD subtype (n=19)

Figure 1 shows that (19, 7.1%) of study subjects who had ADHD, boys with ADHD (11, 57.8%) had higher prevalence than compared to girls (8, 42.1%). Among the children who had ADHD (19, 7.1%), majority (10, 53%) of the study subjects with ADHD belonged to inattentive subtype (10, 53%) followed by hyperactive subtype (5, 26%), and the combined subtype (4, 21%).

Table 1. Age group wise distribution of children with ADHD based on different subtypes of disorder (n=19)

Age group	ADHD subtype		
	Inattentive	Hyperactive	Combined
6 – 8	4 (40.0)	4 (80.0)	3 (75.0)
9 – 10	5 (50.0)	1 (20.0)	1 (25.0)
11 – 12	1(10.0)	0 (0.0)	0 (0.0)
Total	**10 (100)**	**5 (100)**	**4 (100)**

Table 1 shows that among the children who had ADHD (19, 7.1%), age group 9 – 10 (5, 50%) had more prevalence of inattentive subtype of ADHD than the other age groups, whereas age group 6 – 8 (4, 80%) had more prevalence of hyperactive subtype of ADHD comparing the other two groups and similarly age group 6 – 8 (3, 75%) had more prevalence of combined subtype.

2. Association between socio-demographic variables and ADHD

Univariate analysis using Chi-square test and Fisher's exact test was performed to assess the association between ADHD and sociodemographic variables, including age (6–8, 9–10, 11–12 years), gender, socio-economic class (BG Prasad classification: upper, upper middle, middle, lower middle, lower), and parental occupation (unemployed, unskilled, semiskilled, skilled, white-collar, semi-professional, professional). No significant association was observed between any

of these variables and ADHD.

3.Association between other risk factors and ADHD

Table 2. Association between other risk factors and ADHD (n=266)

Risk factors	Category	ADHD		Total	χ^2/ fisher's exact value	P-value
		Present	Absent			
Screen time	High screen time	14 (9.3)	137 (90.7)	151 (100%)	5.388	**0.020**
	Low screen time	5 (4.4)	109 (95.6)	114 (100%)		
Physical activity	Active	18 (7%)	238 (93%)	256 (100%)	0.128	0.721
	Inactive	1 (10%)	9 (90%)	10 (100%)		
Diet	Adequate	13 (7.9%)	152 (92.1%)	165 (100%)	0.355	0.551
	Inadequate	6 (5.9%)	95 (94.1%)	101 (100%)		
Immunization status	Completed	19 (7.2%)	245 (92.8%)	264 (100%)	0.155	0.694
	Not completed	0 (0.0%)	2 (100%)	2 (100%)		
BMI	Severe thinness	1 (7.7%)	12 (92.3%)	13 (100%)	6.363*	0.137
	Thinness	5 (17.9%)	23 (82.1%)	28 (100%)		
	Normal	1 (2.0%)	49 (98.0%)	50 (100%)		
	Overweight	6 (7.5%)	74 (92.5%)	80 (100%)		
	Obesity	6 (6.3%)	89 (93.7%)	95 (100%)		

*****Represents Fisher's exact value

Table 2 shows the association between screen time, physical activity, dietary intake, immunization status, BMI, and ADHD. Screen time had a statistically significant association (p = 0.020), with children having high screen time being 2.23 times more likely to have ADHD than those with low screen time. No significant associations were observed for physical activity, diet, immunization status, or BMI.

Discussion

In the present study among school children aged 6–12 years, the prevalence of ADHD was 7.1%, comparable to findings by Jyothsna et al[21] (11.3%) and Catherine et al[22] (8.8%) in Tamil Nadu, as well as Sukanya et al[23] (6%) in Kottayam and Lola et al[25] (7.3%) in rural Ethiopia. Lower rates were reported by Gogate et al[24] in Maharashtra (1.5%) and Ramya et al[27] in Karnataka (1.3%). A meta-analysis by Ayano et al[26] found a pooled prevalence of 8.0% (95% CI 6.0–10%), closely matching our results, while Aljadani et al[28] in Saudi Arabia reported a higher pooled prevalence of 12.4%, and Polanczyk et al[29] highlighted global variability.

Gender-specific prevalence was higher among boys (57.9%) than girls (42.1%), consistent with Catherine et al[22] and Kiranmayi et al[30], supporting evidence that ADHD is more frequent in males. High screen time was reported by 57.1% of participants and showed a significant association with ADHD. Similar associations were observed by Meng et al[32], who noted increased ADHD risk with greater mobile phone and television use. However, Vaidyanathan et al[31] found a higher proportion (84%) of preschoolers with ADHD exceeding recommended screen exposure limits.

No significant association was found between dietary intake and ADHD was found in our study, contrasting with the findings of Ryu et al[31].who reported that increased vegetable protein intake correlated with lower ADHD scores in Korean school children. Their findings suggest potential benefits of dietary management, though such associations were not evident in our population

Conclusion

ADHD prevalence in the study population was 7.1%, with higher occurrence among boys, children aged 6–8 years, and those with high screen time. The inattentive subtype was most common, and significant association was observed only with increased screen exposure. Findings highlight the need for targeted screening of susceptible groups and consideration of integrating ADHD screening into school health programs under Kerala's Rashtriya Bal Swasthya Karyakram. Larger, more representative studies are warranted to enhance generalizability and address current study limitations.

Limitation

The study was confined to three rural schools in Kozhikode district due to feasibility constraints, limiting generalizability to other rural or urban settings. Resource and time limitations restricted the assessment to selected demographic and environmental risk factors, excluding genetic, perinatal, and psychosocial determinants. Reliance on teacher or parent reports may have introduced perception and recall biases. The absence of follow-up data precluded evaluation of symptom progression or long-term outcomes.

Conflict of Interest: None
Budget: Self

References

1. World Health Organization. Mental health [Internet]. [cited 2025 Jan 2]. Available from: https://www.who.int/news-room/fact-sheets/detail/mental- health-strengthening-our-response
2. The Importance of Children's Mental Health | Psychreg [Internet]. [cited 2025 Jan 2]. Available from: https://www.psychreg.org/importance-childrens-mental- health/
3. An Introduction to Attention Deficit Hyperactivity Disorder (ADHD) | South East Bay Paediatric Medical Group | Fremont, CA [Internet]. [cited 2025 Jan 7]. Available from: https://sebpmg.com/special-topics/introduction-to-adhd/
4. Faraone S V., Bellgrove MA, Brikell I, Cortese S, Hartman CA, Hollis C, et al. Attention-deficit/hyperactivity disorder. Nat Rev Dis Primers [Internet]. 2024 Feb 22 [cited 2025 Jan 7];10(1):11. Available from: https://www.nature.com/articles/s41572-024-00495-0
5. Willcutt EG. The Prevalence of DSM-IV Attention-Deficit/Hyperactivity Disorder: A Meta-Analytic Review. Neurotherapeutics [Internet]. 2012 Jul 1 [cited 2025 Jan 7];9(3):490–9. Available from: http://www.neurotherapeuticsjournal.org/article/S1878747923017245/fulltext
6. Young S, Adamo N, Ásgeirsdóttir BB, Branney P, Beckett M, Colley W, et al. Females with ADHD: An expert consensus statement taking a lifespan approach providing guidance for the identification and treatment of attention- deficit/ hyperactivity disorder in girls and women. BMC Psychiatry [Internet]. 2020 Aug 12 [cited 2025 Jan 7];20(1):1–27. Available from: https://bmcpsychiatry.biomedcentral.com/articles/10.1186/s12888-020-02707-9
7. Hamidzadeh A, Kharatha M, Bazghaleh M, Basirinejad H, Aghdam N, Ebrahimi H. The prevalence of attention-deficit hyperactivity disorder and its related risk factors among children at elementary school in Shahroud. J Educ Health Promot [Internet]. 2021 Sep 1 [cited 2025 Jan 7];10(1). Available from: https://www.researchgate.net/publication/360261706_The_prevalence_of_atten tion-

deficit hyperactivity disorder and its related risk factors among children at elementary school in Shahroud

8. Reddy KS, Hrishikesh M, Prasad G. Risk Factors of Attention Deficit Disorder Among Children: A Study in A Tertiary Care Unit. 2022 [cited 2025 Apr 12]; Available from: https://www.ijip.in

9. Faraone S V, Larsson • Henrik, Org S. Genetics of attention deficit hyperactivity disorder. Mol Psychiatry [Internet]. 2018 Apr 1 [cited 2025 Jan 7];24(4):562. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC6477889/

10. Common pregnancy complication linked to "increased risk of autism and ADHD in children", study suggests | The Sun [Internet]. [cited 2025 Apr 12]. Available from: https://www.thesun.co.uk/health/34331444/pregnancy- complication-diabetes-linked-autism-adhd/

11. Fotopoulos NH, Chaumette B, Devenyi GA, Karama S, Chakravarty M, Labbe A, et al. Maternal smoking during pregnancy and cortical structure in children with attention-deficit/hyperactivity disorder. Psychiatry Res. 2024 Apr 1;334:115791. Available from: https://pubmed.ncbi.nlm.nih.gov/38367455/

12. Benti M, Bayeta AB, Abu H. Attention Deficit/Hyperactivity Disorder and Associated Factors Among Children Attending Pediatric Outpatient Departments of West Shewa Zone Public Hospitals, Central Ethiopia. Psychol Res Behav Manag [Internet]. 2021 [cited 2025 Apr 12];14:1077–90. Available from: https://pubmed.ncbi.nlm.nih.gov/34321936/

13. (UK) NGC. Evidence reviews for risk factors for ADHD. Evidence reviews for risk factors for ADHD: Attention deficit hyperactivity disorder: diagnosis and management: Evidence review A [Internet]. 2018 [cited 2025 Apr 12]; Available from: https://www.ncbi.nlm.nih.gov/books/NBK578094/

14. Ducharme J. Teen screen use may increase the risk of ADHD, study says [Internet]. TIME. 2018 Jul 18 [cited 2025 Apr 12]. Available from: https://time.com/5341707/screen-use-adhd-study/

15. Burger PH, Goecke TW, Fasching PA, Moll G, Heinrich H, Beckmann MW, et al. Einfluss des mütterlichen Alkoholkonsums während der Schwangerschaft auf die Entwicklung von ADHS beim Kind. Fortschritte der Neurologie Psychiatrie [Internet]. 2011 [cited 2025 Jan 7];79(9):500–6. Available from: http://www.thieme-connect.de/products/ejournals/html/10.1055/s-0031- 1273360

16. Gou X, Wang Y, Tang Y, Qu Y, Tang J, Shi J, et al. Association of maternal prenatal acetaminophen use with the risk of attention deficit/hyperactivity disorder in offspring: A meta-analysis. Australian and New Zealand Journal of Psychiatry. 2019 Mar 1;53(3):195–206. Available from: https://pubmed.ncbi.nlm.nih.gov/30654621/

17. Eubig PA, Aguiar A, Schantz SL. Lead and PCBs as Risk Factors for Attention Deficit/Hyperactivity Disorder. Environ Health Perspect [Internet]. 2010 Dec [cited 2025 Jan 7];118(12):1654–67. Available from: https://ehp.niehs.nih.gov/doi/10.1289/ehp.0901852

18. Danielson ML, Claussen AH, Bitsko RH, Katz SM, Newsome K, Blumberg SJ, et al. ADHD Prevalence Among U.S. Children and Adolescents in 2022: Diagnosis, Severity, Co-Occurring Disorders, and Treatment. J Clin Child Adolesc Psychol [Internet]. 2024 [cited 2025 Apr 11];53(3):343–60. Available from: https://pubmed.ncbi.nlm.nih.gov/38778436/

19. Ayano G, Demelash S, Gizachew Y, Tsegay L, Alati R. The global prevalence of attention deficit hyperactivity disorder in children and adolescents: An umbrella review of meta-analyses. J Affect Disord. 2023 Oct 15;339:860–6. Available from: https://www.sciencedirect.com/science/article/pii/S0165032723009230?via%3 Dihub

20. Venkata JA, Panicker AS. Prevalence of attention deficit hyperactivity disorder in primary school children. Indian J Psychiatry [Internet]. 2013 Oct [cited 2025 Feb 12];55(4):338–42. Available from: https://journals.lww.com/indianjpsychiatry/fulltext/2013/55040/prevalence_of_ attention_deficit_hyperactivity.7.aspx

21. American Academy of Pediatrics. Vanderbilt Assessment Scales Scoring Instructions, American Academy of Pediatrics ADHD [Internet]. [cited 2025 Jan 21]. Available from:

https://in.search.yahoo.com/search?fr=mcafee&type=E210IN885G0&p=Vande rbilt+Assessment+Scales+Scoring+Instructions%2C+american+academy+of+p aediatrics+ADHD

22. Catherine TG, Robert N, Mala KK, Kanniammal C, Arullapan J. Assessment of prevalence of attention deficit hyperactivity

disorder among schoolchildren in selected schools. Indian J Psychiatry [Internet]. 2019 May 1 [cited 2025 Feb 19];61(3):232–7. Available from: https://journals.lww.com/indianjpsychiatry/fulltext/2019/61030/assessment_of_prevalence_of_attention_deficit.4.aspx

23. Sukanya SR, Vikraman N. Prevalence of attention deficit hyperactivity disorder (ADHD) among preschoolers in Kottayam district of Kerala. J Res ANGRAU. 2021;49(3):58–63. Available from: https://www.researchgate.net/publication/365476325_PREVALENCE_OF_ATTENTION_DEFICIT_HYPERACTIVITY_DISORDER_ADHD_AMONG_PRESCHOOLERS_IN_KOTTAYAM_DISTRICT_OF_KERALA

24. Gogate S, Kurane A, Nanaware SS, Padma K. Prevalence of attention deficit hyperactivity disorder in school-going children in rural Konkan region of Maharashtra. J Family Med Prim Care [Internet]. 2024 Jul [cited 2025 Mar 26];13(7):2628. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC11271988/

25. Lola HM, Belete H, Gebeyehu A, Zerihun A, Yimer S, Leta K. Attention Deficit Hyperactivity Disorder (ADHD) among Children Aged 6 to 17 Years Old Living in Girja District, Rural Ethiopia. Behavioural Neurology [Internet]. 2019 [cited 2025 Mar 26];2019:1753580. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC6487158/

26. Ayano G, Demelash S, Gizachew Y, Tsegay L, Alati R. The global prevalence of attention deficit hyperactivity disorder in children and adolescents: An umbrella review of meta-analyses. J Affect Disord [Internet]. 2023 Oct 15 [cited 2025 Mar 26];339:860–6. Available from: https://pubmed.ncbi.nlm.nih.gov/37495084/

27. Aljadani AH, Alshammari TS, Sadaqir RI, Alrashede NOE, Aldajani BM, Almehmadi SA, et al. Prevalence and Risk Factors of Attention Deficit- Hyperactivity Disorder in the Saudi Population: A Systematic Review and Meta.analysis. Saudi J Med Med Sci [Internet]. 2023 May 1 [cited 2025 Feb 13];11(2):126–34. Available from: https://journals.lww.com/sjmm/fulltext/2023/11020/prevalence_and_risk_factors_of_attention.2.aspx

28. Kiranmayi K, Hemalatha S, Bhagyalakshmi M. A Study to Assess the Prevalence of Attention Deficit Hyperactivity Disorder among School Children Attending Primary Schools in Tirupati, Andhra Pradesh, India. International Journal of Health Sciences & Research (www.ijhsr.org) [Internet]. 2018 [cited 2025 Feb 15];8:11. Available from: https://www.ijhsr.org/IJHSR_Vol.8_Issue.11_Nov2018/21.pdf

29. Vaidyanathan S, Manohar H, Chandrasekaran V, Kandasamy P. Screen Time Exposure in Preschool Children with ADHD: A Cross-Sectional Exploratory Study from South India. Indian J Psychol Med. 2021 Mar 1;43(2):125–9. Available from: https://pubmed.ncbi.nlm.nih.gov/34376887/

30. Meng Z, Ao B, Wang W, Niu T, Chen Y, Ma X, et al. Relationships between screen time and childhood attention deficit hyperactivity disorder: a Mendelian randomization study OPEN ACCESS EDITED BY. Psychiatry [Internet]. 2024 [cited 2025 Feb 13];15:1441191. Available from: https://pgc.unc.edu/for-

31. Ryu SA;, Choi YJ;, An H;, Kwon HJ;, Ha M;, Hong YC;, et al. Citation: Associations between Dietary Intake and Attention Deficit Hyperactivity Disorder (ADHD) Scores by Repeated Measurements in School-Age Children. 2022 [cited 2025 Mar 15]; Available from:https://doi.org/10.3390/nu14142919

32. Meng Z, Ao B, Wang W, Niu T, Chen Y, Ma X, et al. Relationships between screen time and childhood attention deficit hyperactivity disorder: a Mendelian randomization study OPEN ACCESS EDITED BY. Psychiatry [Internet]. 2024 [cited 2025 Feb 13];15:1441191. Available from: https://pgc.unc.edu/for-