Screening of ADHD among School Children using Conner's Abbreviated Rating Scale: A Pilot Study in Kakching District, Manipur

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ABSTRACT

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorders worldwide. Proper diagnosis of children with ADHD is needed for timely interventions for which different tools are employed. The objectives of the present study are a) To check the reliability and validity of Conner's Abbreviated Rating Scale (CARS) for screening of ADHD among children; b) To screen school children for ADHD using CARS; and c) To identify association of gender, birth order and screen time with ADHD. 250 students were randomly selected from Class 1 to 8 from a school in Kakching district and were handed CARS along with a format of consent letter for response by their parents. CARS was found to be reliable and valid as inferred from Cronbach's coefficient, α (0.87) and Pearson's correlation values of the inter-items (majority ranging from 0.3 to 0.8) for use as a screening tool of the target population. 4.9 percent of children were found positive out of which 6.4 percent were males and 3.6 percent were females. The study indicates significant association of screen time with ADHD among school children of Kakching district ($P<0.05$). CARS can be used for preliminary screening of children for ADHD in Kakching district.

Keywords: ADHD, CARS, school children, screen time, birth order

INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorders with a reported prevalence of 5 percent among children and 2.5 percent among adults (American Psychiatric Association, 2013). This disorder is characterized by inattention and/or hyperactivity-impulsivity. Majority of the children with ADHD had poor academic performance in different domains (Suthar et al., 2018). ADHD can cause substantial impairment in functioning, interfering with the normal growth and performance of those affected and making it a public health concern (Naik, Patel & Biswas, 2016). In addition to causing low self-esteem in children, poor academic performance of children leads to considerable stress among parents. It affects 5.7 percent of school going children (Suthar et.al. 2018). In a worldwide systematic review and meta-regression analysis by Polanczyk, et al. the ADHD worldwide pooled prevalence among individuals below 18 years of age was found to be 5.29 percent (Polanczyk et al., 2007). Another systematic review and meta-analysis by Joseph and Devu concluded that the pooled prevalence of ADHD among children and adolescents is 7.1 percent which is consistent with other review findings (Joseph & Devu, 2019). A vast number of children with ADHD have difficulty executing age-related tasks and are easily distracted (Joseph & Devu, 2019). Academic difficulties were noted by 47.8 percent of ADHD children, including repeating the same class and failing one or more school courses with behavioral issues of aggression, destructiveness, temper tantrums, and bedwetting (Mannapur et al., 2019). Because the affected child exhibits various sorts of behavioral issues, the parents and caregivers of the affected children are considerably more likely to experience stress and discord (Ghosh et al., 2018). It is understood that the negative impacts of ADHD are a considerable burden among

school children, parents, and society. In India, there is no ample literature on studies in ADHD among school children. It alarms the need for intervention and continuous study.

On the other hand, the diagnosis of ADHD is considered challenging due to the difficulty in distinguishing cardinal signs of ADHD from temperamental traits and routine activities of schoolchildren. There is always the risk of over- or under-diagnosis. (Mannapur, et al., 2019). The diagnostic criteria have changed over time and this had an impact on the prevalence rates that range from 1 percent to 14 percent (Szatmari et al., 1989). There are also studies that indicate the association of gender (Bener et al., 2006), birth order (Catherine et al., 2019) and screen time (Tan & Zhou, 2022) of children with ADHD prevalence among children. However, consistency of the results needs to be established. Among the diagnostic tools, the Conner's Abbreviated Rating Scale (CARS) is one of the widely used measures. The aim of the present study is to screen ADHD among students in a selected area of Kakching district with the aid of CARS and in the process analyse the reliability and validity of the scale for the selected population. The study will also analyse the significance of gender, birth order and screen time with the prevalence of ADHD.

MATERIALS AND METHOD

This pilot study was conducted in the month of September 2023 in a randomly selected school of Kakching District, Manipur in NE India. After acquiring permission from the principal, 250 students from class 1 to class 8 were randomly selected through lottery method using their roll numbers and class. The students were given a copy of the CARS along with parental consent letter. The scale has 10 items rated on four-point Likert scales (ranging from "0" for "not at all" to "3" for "very much"). Children who scored above 15 out of total 30 maximum possible score were considered positive cases. The parents were informed to complete the questionnaire after signing the consent letter. The gender, birth order and screen time of children were obtained along with the questionnaire. Out of 250, a total of 215 questionnaires were returned and only 204 were complete and eligible for analysis. The data was analysed using EXCEL and SPSS 24.0 Customer ID: 228003.

RESULTS AND DISCUSSION

Characteristics of the sample

The sample consists of 46.1 percent males and 53.9 percent females (Table 1). The sample comprises of first born (52 percent), second born (40.2 percent) and third born child (7.8 percent). Among 204 children, 67.6 percent reported screen time less than 2 hr while 32.7 percent reported screen time 2 hr or more.

Table 1 Characteristics of the sample

Particulars		No.
Gender	Male	94 (46.1)
	Female	110 (53.9)
Birth order	1st	106 (52.0)
	2nd	82 (40.2)
	3rd	16 (7.8)
Screen time	Less than 2 hr	138 (67.6)
	2 hr or more	66 (32.7)
Total		204 (100.0)
Figures in parentheses indicate percentage		

Test for Normality

The values for kurtosis (0.11) and skewness (0.19) indicate that the data is not significantly deviated from the normal distribution. The data is considered normal when skewness is between -2 to +2 and kurtosis is between -7 to +7 (Hair et al., 2010; Bryne, 2010). The absolute Z-score for skewness (1.11) and kurtosis (0.32) are within the range for normality (Kim, 2013). 4 samples score the lowest score '0' and 2 samples score the highest score '23'. As the number of samples with lowest or highest scores were less than 20 percent, there were no floor or ceiling effects (McHorney et. al., 1999).

Table 2 Descriptive Statistics of Data

Mean	9.16667
Standard Error	0.30508
Median	9
Mode	9
Standard Deviation	4.35739
Sample Variance	18.98686
Kurtosis	0.10762
Skewness	0.19025
Range	23
Minimum	0
Maximum	23
Sum	1870
Count	204

Kolmogorov-Smirnov (KS) test showed that the P values between the normal expected frequencies and the observed frequencies (Table 3) was 0.09 which is greater than significance level 0.05. Therefore, there was no significant reason to reject the normality of the distribution.

Table 3 KS test for normal distribution

Z-score range	Expected Percent Distribution	Expected Frequency	Observed Frequency	KS test	
-3.5 to -3.0	0.1	0.204	0	D max = 0.03449	Dc at 0.05 0.095219 for N=204
-3.0 to -2.5	0.5	1.02	0		
-2.5 to -2.0	1.7	3.468	4		
-2.0 to -1.5	4.4	8.976	9		
-1.5 to -1.0	9.2	18.768	18		
-1.0 to -0.5	15	30.6	25		
-0.5 to 0	19.1	38.964	52		
0 to 0.5	19.1	38.964	34		
0.5 to 1.0	15	30.6	31		

1.0 to 1.5	9.2	18.768	21		
1.5 to 2.0	4.4	8.976	4		
2.0 to 2.5	1.7	3.468	4		
2.5 to 3.0	0.5	1.02	0		
3.0 to 3.5	0.1	0.204	2		

Figure 1
Histogram of the scores

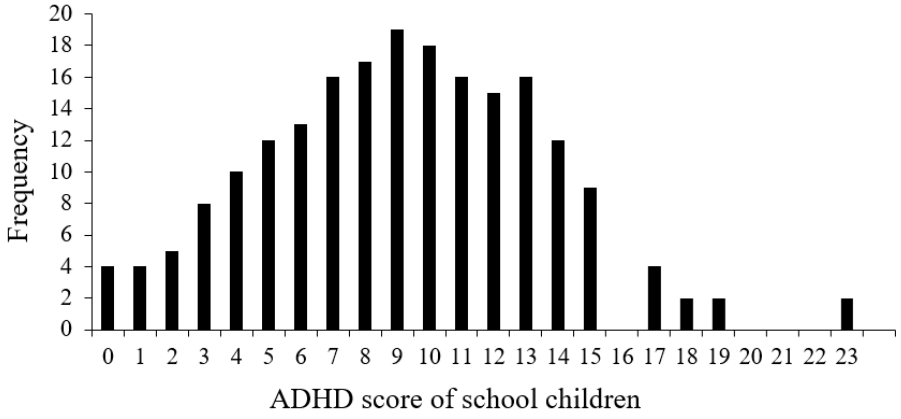
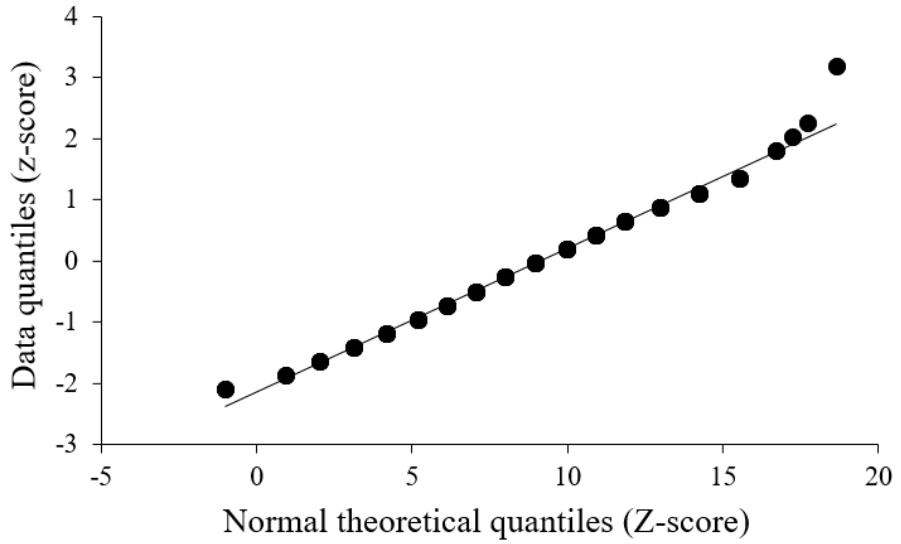


Figure 2
Q-Q Plot of the data



The frequency distribution histogram and the Q-Q plot (Fig. 1 and 2) also do not show any significant deviations from normal curve.

Test for reliability and validity

The Cronbach's coefficient alpha 'α' of the scale from the pilot study is found to be 0.87 indicating the reliability of the scale for screening of ADHD in the district (Hair et al., 2010).

Due to normality of the distribution, Pearson's correlation coefficients between total scale scores and scores of each item were calculated to test construct validity of the CARS (Table 4). The correlation values of the items mostly range from 0.3 to 0.8. Therefore, CARS is considered reliable and valid for use in the targeted population (school children).

Table 4 Pearson's correlation of the items

	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9	Item10	Total
Item1	1										
Item2	0.4604	1									
Item3	0.4111	0.3934	1								
Item4	0.4318	0.3466	0.5295	1							
Item5	0.3708	0.3740	0.4034	0.4405	1						
Item6	0.4052	0.4488	0.3594	0.4659	0.4672	1					
Item7	0.4472	0.3948	0.5099	0.5378	0.3383	0.4634	1				
Item8	0.2731	0.3128	0.3618	0.3735	0.2560	0.2855	0.4782	1			
Item9	0.3037	0.3477	0.3735	0.3923	0.3029	0.4134	0.4609	0.3891	1		
Item10	0.3634	0.3468	0.3760	0.3312	0.4679	0.3933	0.4063	0.3823	0.5219	1	
Total	0.6499	0.6426	0.7023	0.7327	0.6375	0.6877	0.7617	0.6004	0.6793	0.6678	1

Test for significance

Out of the 204 school children who were screened for ADHD symptoms using CARS and later confirmed through visits in OPD, by clinical psychologists (Dr. L. Roshan Singh, Department of Clinical Psychology, Regional Institute of Medical Sciences, Manipur), ten children (4.9 percent) were found positive. ADHD was found to be more prevalent in the males than in the females. Out of total 204 children screened, 94 were males out of which 6 (6.4 percent) were positive. A total of 110 females were screened and 4 (3.6 percent) were positive (Table 5). The analysis shows that there were no significant association between gender and ADHD score ($z=1.518$, $P \geq 0.05$). Regarding the birth order, among the positive cases six were second born child and four were first born child, indicating that ADHD positive children are more of second born child. The association between birth order and ADHD positive cases was not significant ($P \geq 0.05$). 6 of the 10 ADHD positive cases had screen time 2hr or more, and remaining 4 had screen time less than 2hr. The association between screen time and ADHD score was significant ($z= -1.937$; $P < 0.03$).

Table 5 Significance of variables of ADHD cases

Particulars		Children screened	ADHD cases	Test of significance
Gender	Male	94 (46)	6 (6.4)	z = 1.5189,
	Female	110 (54)	4 (3.6)	P = 0.065
Birth order	1st	106 (52)	4 (3.8)	ANOVA
	2nd	82 (40.2)	6 (7.3)	P=0.720
	3rd	16 (7.8)	0 (0.0)	
Screen time	Less than 2 hr	138 (67.6)	4 (2.9)	z = -1.937,
	2 hr or more	66 (32.7)	6 (9.1)	P = 0.026
Figures in parentheses indicate percentage				

The present study found CARS fit for use as a preliminary ADHD screening tool for the population under study. CARS was used to assess presence of ADHD in Assam, North-East India (Ghosh et al., 2017), Coimbatore, Tamil Nadu, India (Venkata et al., 2013) and Bengaluru, India (Mannapur et al., 2015). CARS

was also used to screen ADHD presence in Jordan (Abbasi et al., 2023). The prevalence of ADHD for the present study is 4.9 percent with male to female ratio 1.5:1. The ADHD prevalence in Kakching district is supported by 5 percent prevalence of ADHD among children stated in DSM-V (American Psychiatric Association, 2013). The prevalence of 4.9 percent is slightly lower than findings in other studies conducted in India (Sharma et al., 2019; Kiranmayi et al., 2018; Catherine et al., 2019).

The ADHD worldwide pool prevalence was 5.29 percent among individual below 18 years of age in a systematic review and meta regression analysis which is quite consistent with our result (Polanczyk et al., 2007). Difference in the instrument, diagnostic criteria and geographical location influenced the results of ADHD studies (Joseph & Devu, 2019). Another study suggested that heterogeneity of estimates was significantly associated with diagnostic criteria, impairment criterion and source of information (Polanczyk et al. 2014). Therefore, there are variations in prevalence of ADHD among different studies including the present study. Small sample size of the present study may also be a factor for its variation in estimates from some other studies.

Gender and ADHD

Male to female ratio of ADHD case was 1.5:1 which is consistent with a study in Bengaluru having male to female ratio 1.6:1 (Ramya et al., 2017). The higher positive cases among males is consistent with other recent studies (G et al., 2021; Venkata & Panicker, 2013; Mannapur et al., 2016; ; Chawla et al., 2022; Catherine et al., 2019; Ghosh et al., 2017; Venkata et al., 2013). But there was no significant association between gender and positive cases, which is consistent with another study in Tamil Nadu, India (Catherine et al., 2019).

Birth order and ADHD

Regarding the birth order, One-way ANOVA analysis was conducted and found no significant difference between the group means (Table 5). The result is consistent with a study which concluded that prevalence of ADHD is not significantly related to birth order (Keshavarzi1 et al., 2014). But it contrasts the report of an Indian study which reported significant association between birth order and prevalence of ADHD (Catherine et al., 2019).

Screen time and ADHD

With p-value less than 0.05 ($P = 0.026$), it shows a significant association between screen time of children and positive cases. But, it does not affirm screen time as a factor causing ADHD. A recent meta-analysis study also found a positive correlation between screen time and the risk of ADHD and also concluded that excessive screen exposure may significantly contribute to the development of ADHD in children (Liu et al., 2023). Another cross-sectional study had also shown that an increased TV time is associated with hyperactive behaviour among school children (Page et al., 2010).

CONCLUSIONS

ADHD is common among school children. Since ADHD children suffers from social and academic problems, it is high time for proper diagnosis and in time intervention. The present study found a significant relationship ($P = 0.026$) between screen time and positive cases of ADHD. Regulation and limitation of daily screen time of children may reduce the risk of ADHD. In addition, the relevance of many other factors such as age, birth type, religion, educational level of mother, etc. can be analysed for association with ADHD. More robust tools like Conners Rating Scale for ADHD, Vanderbilt ADHD Diagnostic Rating Scales (VADRS) can be used to further study the subtypes of ADHD, its comorbidity, its effect on behaviour and academic performance.

Limitations

The sampling of the present pilot study was done in a single school. Moreover the findings of the study could not report any causal relationship. Considering the limitations of the present pilot study, the findings of the present study can be considered preliminary for further rigorous screening processes.

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REFERENCES

1. Abbasi, L. N., Mazzawi, T., Abasi, L., Ali, S. H., Alqudah, A., & Al-Taiar, H. (2023), "The prevalence and associated factors of attention deficit hyperactivity disorder among primary school children in Amman, Jordan", Cureus, Vol. 15, No. 4, e37856. https://doi.org/10.7759/cureus.37856
2. American Psychiatric Association (2013). Diagnostic and Statistical Manual of Mental disorders (5th ed.). https://doi.org/10.1176/appi.books.9780890425596
3. Bener, A., Al-Qahtani, R., & Abdelaal, I. (2006), "The prevalence of ADHD among primary school children in an Arabian Society", Journal of Attention Disorder, Vol. 10, pp. 77–82. http://dx.doi.org/10.1177/1087054705284500
4. Byrne, B. M. (2010). Structural equation modeling with AMOS: Basic concepts, applications, and programming. New York: Routledge.
5. Catherine, T. G., Robert, N. G., Mala, K. K., Kanniammal, C., & Arullapan, J. (2019), "Assessment of prevalence of Attention Deficit Hyperactivity Disorder among schoolchildren in selected schools", Indian Journal of Psychiatry, Vol. 61, No. 3, pp. 232. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_333_17
6. Chawla, G. K., Juyal, R., Shikha, D., Semwal, J., Tripathi, S., & Bhattacharya, S. (2022), "Attention Deficit Hyperactivity Disorder and associated learning difficulties among primary school children in district Dehradun, Uttarakhand, India", Journal of Education and Health Promotion, Vol. 11, pp. 1-6. https://doi.org/10.4103/jehp.jehp_922_21
7. Ghosh, P., Choudhury, H. A., & Victor, R. (2018), "Prevalence of attention deficit hyperactivity disorder among primary school children in Cachar, Assam, North-East India", Open Journal of Psychiatry & Allied Sciences, Vol. 9, No.2, pp. 130. https://doi.org/10.5958/2394-2061.2018.00025.3
8. G, S. K., J, P., Paulsamy, P., Alshahrani, S. H., Mohamed, S., Venkatesan, K., Sethuraj, P., & Venkatesan, K. (2021), "A descriptive study to assess the prevalence of ADHD and its' co-morbidity among school children", World Journal of Pharmaceutical Sciences, Vol. 9, No. 10, pp. 1–5. https://doi.org/10.54037/WJPS.2021.91001.
9. Hair, J.F., Black, W.C., Babin, B.J., & Anderson, R.E. (2010). Multivariate Data Analysis (7th ed.). New Jersey: Pearson Educational International.
10. Joseph, J. K., & Devu, B. K. (2019), "Prevalence of attention-deficit hyperactivity disorder in India: A systematic review and meta-analysis", Indian Journal of Psychiatric Nursing, Vol. 16, No. 2, pp. 118-125. https://doi.org/10.4103/IOPN.IOPN_31_19
11. Kim, H. Y., (2013), "Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis", Restorative Dentistry and Endodontics, Vol. 38, No.1, pp. 52–54. https://doi.org/10.5395/rde.2013.38.1.52
12. Keshavarzi1, Z., Bajoghli1, H., Mohamadi1, M. R., Holsboer-Trachsler, E., & Brand, S. (2014), "Attention deficit hyperactivity disorder in children is found to be related to the occurrence of ADHD in siblings and the male gender, but not to birth order, when compared to healthy controls", International Journal of Psychiatry in Clinical Practice, Vol. 18, No. 4, pp. 1-8. https://doi.org/10.3109/13651501.2014.957704
13. Kiranmayi, K., Hemalatha, S., & Bhagyalakshmi, M. (2018), "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 Science and Research, Vol. 8, No. 11, pp. 144-153.
14. Liu, H., Chen, X., Huang, M., Yu, X., Gan, Y., Wang, J., Chen, Q., Nie, Z., & Ge, H. (2023). "Screen time and childhood attention deficit hyperactivity disorder: a meta-analysis. Reviews on environmental health", https://doi.org/10.1515/reveh-2022-0262
15. Manjunath, R., Manohar Rao, K., Kulkarni, P., BM, S., & Sathyamurthy, S. (2015), "Magnitude of

Attention Deficit Hyper Kinetic Disorder among school children of Mysore city", Journal International Neuropsychiatric Disease Journal, Vol. 6, No. 1, pp. 1-7. https://doi.org/10.9734/INDJ/2016/21954

16. Mannapur, R., Munirathnam, G., Hyarada, M., & Bylagoudar, S. S. S. (2016), "Prevalence of Attention Deficit Hyperactivity Disorder among urban school children", International journal of Contemporary Pediatrics, Vol. 3, No. 1, pp. 240-242. http://dx.doi.org/10.18203/2349-3291.ijcp20160167
17. McHorney, C., Ware, J. J., Lu, J., & Sherbourne, C. (1994), "The MOS 36-item short-form health survey (SF-36): III. Tests of data quality, scaling assumptions, and reliability across diverse patient groups", Medical Care, Vol. 32, pp. 40–66.
18. Naik, A., Patel, S., & Biswas, D. A. (2016), "Prevalence of ADHD in a rural Indian population", Innovative Journal of Medical and Health Science, Vol. 6, No. 2, pp. 45-47.
19. Page, A. S., Cooper, A. R., Griew, P., & Jago, R. (2010), "Children's screen viewing is related to psychological difficulties irrespective of physical activity", Pediatrics, Vol. 126, No. 5, pp. 1011–17.
20. Polanczyk, G., De Lima, M. S., Horta, B. L., Biederman, J., & Rohde, L. A. (2007), "The worldwide prevalence of ADHD: a systematic review and metaregression analysis", American Journal of Psychiatry, Vol. 164, No. 6, pp. 942-948. https://ajp.psychiatryonline.org/doi/10.1176/ajp.2007.164.6.942
21. Polanczyk, G. V., Willcutt, E. G., Salum, G. A., Kieling, C., & Rohde, L.A. (2014), "ADHD prevalence estimates across three decades: an updated systematic review and meta-regression analysis", International Journal of Epidemiology, Vol. 43, No. 2, pp. 434-442. https://doi.org/10.1093/ije/dyt261
22. Ramya, H. S., Goutham, A.S., & Pandit, L.V. (2017), "Prevalence of attention deficit hyperactivity disorder in school going children aged between 5-12 years in Bengaluru", Current Pediatrics, Vol. 21, No. 2, pp. 321-326.
23. Sharma, P., Gupta, R. K., Banal, R., Majeed, M., Kumari, R., Langer, B., Akhter, N., Gupta, C., & Raina, S. K. (2020), "Prevalence and correlates of Attention Deficit Hyperactive Disorder (ADHD) risk factors among school children in a rural area of North India", Journal of Family Medicine and Primary Care, Vol. 9, No. 1, pp. 115. https://doi.org/10.4103/jfmpc.jfmpc_587_19
24. Suthar, N., Garg, N., Verma, K. K., Singhal, A., Singh, H., & Baniya, G. (2018), "Prevalence of Attention-deficit hyperactivity disorder in primary school children: A cross-sectional study", Journal of Indian Association for Child and Adolescent Mental Health, Vol. 14, No. 4, pp. 74–88. https://doi.org/10.1177/0973134220180405
25. Szatmari, P., Offord, D. R., & Boyle, M. H. (1989), "Ontario child health study: prevalence of attention deficit disorder with hyperactivity", Journal of Child Psychology and Psychiatry, Vol. 30, pp. 219–230.
26. Tan, T. X., & Zhou, Y. (2022), "Screen Time and ADHD behaviors in Chinese Children: Findings from Longitudinal and Cross-Sectional Data", Journal of Attention Disorders, Vol. 26, No. 13, pp. 1725-1737. https://doi.org/10.1177/10870547221098181
27. Venkata, J. A., & Panicker, A. S. (2013), "Prevalence of Attention Deficit Hyperactivity Disorder in primary school children", Indian Journal of Psychiatry, Vol. 55, No. 4, pp. 338. https://doi.org/10.4103/0019-5545.120544

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APPENDIX- I

Conner's Abbreviated Rating Scale

Please fill up the particulars of the child and tick (✓) the appropriate option from the options given as "not at all", "just a little", pretty much", and "very much", for each of the ten behaviours listed below:

Name of the child:				
Gender:	Male	Female	Others	
Birth order:	1st	2nd	3rd	4th and above
Screen time:	Less than 2 hr		2 hr or more	
Behaviour	Not at all (0)	Just a little (1)	Pretty much (2)	Very much (3)
Restless and overactive				
Excitable, impulsive				
Disturbs other children				
Fails to finish things- short attention span				
Constantly fidgeting				
Inattentive, easily distracted				
Demands must be met immediately, easily frustrated				
Cries often and easily				
Mood changes quickly and drastically				
Temper outburst, explosive and unpredictable behaviour				
Subtotals				