MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.2.414.418

OPEN ACCESS

Key Words
ADHD, mobile phone use, children, cross-sectional study, inattention, hyperactivity, impulsivity

Corresponding Author
J. Bijin Jose,
Department of Paediatrics, Sree Mookambika Institute of Medical Sciences, Kanyakumari, Tamilnadu
bijinjose930@gmail.com

Author Designation
[2,3,4]Junior Resident
[1]Associate Professor

Received: 28 February 2024
Accepted: 14 March 2024
Published: 17 March 2024

Citation: Masaraddi Sanjay Krishna, J. Bijin Jose, Riya Cherian and Ashna S. Kariyath, 2024. ADHD and use of Mobile Phones among Children-A Cross Sectional Study. Res. J. Med. Sci., 18: 414-418, doi: 10.36478/makrjms.2024.2.414.418

ADHD and Use of Mobile Phones among Children: A Cross Sectional Study

[1]Masaraddi Sanjay Krishna, [2]J. Bijin Jose, [3]Riya Cherian and [4]Ashna S. Kariyath

[1-4]Department of Paediatrics, Sree Mookambika Institute of Medical Sciences, Kanyakumari, Tamilnadu

Abstract
The increasing prevalence of Attention-Deficit/Hyperactivity Disorder (ADHD) and the widespread use of mobile phones among children have raised concerns about the potential impact of mobile phone use on ADHD symptoms. This study aims to investigate the association between mobile phone use and ADHD symptoms in children. A cross-sectional study was conducted involving children aged 6-12 years. Data on mobile phone use, ADHD symptoms and other relevant factors were collected using standardized questionnaires and clinical assessments. Statistical analyses were performed to identify associations between mobile phone use and ADHD symptoms. The study included 300 children, with an average daily mobile phone use of 2.5 hours. Increased mobile phone use was significantly associated with higher ADHD symptom scores, including inattention, hyperactivity and impulsivity. These findings suggest that excessive mobile phone use may exacerbate ADHD symptoms in children. The study highlights the need for guidelines to limit mobile phone use among children, particularly those with ADHD, to mitigate potential adverse effects on their symptoms. Interventions aimed at reducing mobile phone use and promoting healthier habits should be prioritized to improve overall well-being in this population.

INTRODUCTION

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common neuro developmental disorders in children, characterized by symptoms of inattention, hyperactivity and impulsivity. The disorder can significantly impact academic performance, social interactions, and overall quality of life. The etiology of ADHD is multi factorial, involving genetic, environmental and neurobiological factors.

In recent years, the widespread use of mobile phones has become a ubiquitous part of children's lives. Mobile phones offer numerous benefits, including educational content and communication tools, but there are growing concerns about their potential negative impact on children's health and behavior. Excessive use of mobile phones has been associated with various health issues, including sleep disturbances, vision problems, and behavioral problems[1,2].

The primary objective of this study is to investigate the relationship between mobile phone use and ADHD symptoms in children aged 6-12 years. By examining the extent and nature of this association, the study aims to provide insights into the potential effects of mobile phone use on ADHD symptoms and inform guidelines for healthier usage patterns.

MATERIALS AND METHODS

This cross-sectional study was designed to evaluate the association between mobile phone use and ADHD symptoms among children aged 6-12 years. The study was conducted with ethical approval from the Institutional Review Board of sree mookambika institute of medical sciences.

Study Design and Setting: The study utilized a cross-sectional design to collect data at a single point in time. The setting included several schools, selected to represent a diverse population in terms of socioeconomic status and access to digital devices. Schools were selected through stratified random sampling to ensure a representative sample of the population.

Participants: The study targeted children aged 6-12 years enrolled in participating schools.

Inclusion Criteria Were:

- Children aged 6-12 years
- Enrollment in one of the selected schools
- Parental/guardian consent to participate in the study

Exclusion Criteria Were:

- Children with diagnosed physical or mental health conditions that could independently affect mobile phone use or ADHD symptoms
- Incomplete data on key variables

To ensure a representative sample, the study used a multistage sampling technique. In the first stage, schools were randomly selected from urban and rural areas. In the second stage, classes within each school were randomly chosen and finally, students within these classes were selected through systematic random sampling.

Sample Size: A sample size of 300 children was determined to be adequate based on power calculations to detect significant associations between mobile phone use and ADHD symptoms. This calculation was based on an assumed prevalence of ADHD symptoms, anticipated effect sizes, a confidence level of 95%, and a power of 80%.

Data Collection: Data were collected using standardized questionnaires and clinical assessments. The process involved the following steps:

Questionnaire Administration:

- **Mobile Phone Use:** Parents/guardians were asked to report their child's average daily mobile phone use, including time spent on different activities such as gaming, social media, watching videos, and educational apps
- **ADHD Symptoms:** ADHD symptoms were assessed using the Conners' Parent Rating Scale-Revised (CPRS-R), which measures symptoms of inattention, hyperactivity, and impulsivity[3-4]
- **Demographics:** Information on age, gender, socioeconomic status, and other relevant factors was collected using a demographic questionnaire

Clinical Assessments:

- **Height and Weight:** Measured using standardized protocols to calculate BMI (Body Mass Index)
- **Cognitive Functioning:** Assessed using standardized tests appropriate for the age group

Statistical Analysis: Data were analyzed using statistical software. Descriptive statistics were used to summarize demographic characteristics, mobile phone use, and ADHD symptom scores. Bivariate analyses (e.g., Pearson correlation, chi-square tests) were conducted to identify associations between mobile phone use and ADHD symptoms.

Multivariate linear regression and logistic regression models were used to adjust for potential confounders and to examine the independent effects

Table 1: Detailed Questionnaire

Section	Questions	Measurement Tool
Mobile Phone Use	Average daily use., Time spent on gaming, social media, videos, educational apps	Custom questionnaire
ADHD Symptoms	Frequency and severity of inattention, hyperactivity, impulsivity	Conners' Parent Rating Scale-Revised (CPRS-R)
Demographics	Age, gender, socioeconomic status, parental education level	Demographic questionnaire
Physical Health	Height, weight, BMI	Standardized measurement protocols
Cognitive Functioning	Attention, memory, executive function	Standardized cognitive tests

Table 2: Demographic Characteristics

Characteristic	Frequency (%)
Age (years)	
-6-8	100 (33%)
-9-10	120 (40%)
-11-12	80 (27%)
Gender	
-Male	160 (53%)
-Female	140 (47%)
Socioeconomic Status	
-Low	90 (30%)
-Middle	150 (50%)
-High	60 (20%)
Parental Education	
-High School	110 (37%)
-Undergraduate	130 (43%)
-Graduate	60 (20%)

Table 3: Average Daily Mobile Phone Use and Activities

Activity	Average Daily Time (hours)
Gaming	1.0
Social Media	0.7
Watching Videos	0.5
Educational Apps	0.3
Total Mobile Phone Use	2.5

Table 4: ADHD Symptoms Scores

ADHD Symptom	Mean (SD)
Inattention	5.2 (1.5)
Hyperactivity	4.8 (1.4)
Impulsivity	4.5 (1.3)
Total ADHD Symptoms Score	14.5 (3.6)

Table 5: Physical Health Measures

Physical Health Measure	Mean (SD)
Height (cm)	130.5 (10.2)
Weight (kg)	30.5 (7.8)
BMI (kg/m^2)	18.0 (2.5)

Table 6: Cognitive Functioning Scores

Cognitive Measure	Mean (SD)
Attention	5.5 (1.4)
Memory	5.2 (1.3)
Executive Function	5.0 (1.2)

Table 7: Association Between Mobile Phone Use and ADHD Symptoms

Mobile Phone Use (hours/day)	Inattention (Mean±SD)	Hyperactivity (Mean±SD)	Impulsivity (Mean±SD)
<1	4.0±1.2	3.5±1.0	3.2±1.1
1-2	4.8±1.3	4.3±1.2	4.0±1.3
2-3	5.6±1.4	5.2±1.3	4.8±1.4
>3	6.4±1.5	5.8±1.4	5.4±1.5

of mobile phone use on ADHD symptoms. Variables considered in the multivariate models included age, gender, socioeconomic status, parental education level and BMI[5,6].

Ethical Considerations: Ethical approval for the study was obtained from the Institutional Review Board of sree mookambika institute of medical sciences. Informed consent was obtained from parents or guardians and assent was obtained from the children. Participants were assured of the confidentiality and anonymity of their responses. Data were securely stored and only accessible to the research team.

RESULTS AND DISCUSSIONS

The results section includes detailed findings from the study, organized into six tables to comprehensively present the data.

This table presents the demographic characteristics of the study participants, including age, gender, socioeconomic status and parental education level.

This table details the average daily mobile phone use spent on different activities.

This table shows the average scores for different ADHD symptoms based on the Conners' Parent Rating Scale-Revised (CPRS-R).

This table presents the average height, weight, and BMI of the children.

This table shows the average scores for attention, memory and executive function based on standardized cognitive tests.

This table illustrates the association between average daily mobile phone use and ADHD symptom scores, showing that higher mobile phone use is associated with higher scores for inattention, hyperactivity, and impulsivity.

The findings of this study highlight significant associations between mobile phone use and ADHD symptoms in children aged 6-12 years. The results indicate that increased mobile phone use is correlated with higher scores of inattention, hyperactivity and impulsivity, suggesting that excessive use of mobile phones may exacerbate ADHD symptoms.

Mobile Phone Use and ADHD Symptoms: Children in this study had an average daily mobile phone use of 2.5 hours. Higher mobile phone use was significantly associated with increased ADHD symptoms, including inattention, hyperactivity, and impulsivity. These findings align with previous research indicating that screen time, including mobile phone use, can negatively impact attention and behavior in children[7,8].

Potential Mechanisms: Several mechanisms may explain the association between mobile phone use and ADHD symptoms. The constant stimulation from mobile phones, including rapid changes in screen content and the use of multiple apps simultaneously, may contribute to difficulties in maintaining attention and controlling impulsive behaviors[9]. Additionally, the use of mobile phones late at night can disrupt sleep patterns, further exacerbating ADHD symptoms[10].

Implications for Parents and Educators: The study underscores the importance of monitoring and managing mobile phone use among children, particularly those with ADHD. Parents and educators should be aware of the potential negative impacts of excessive mobile phone use on children's behavior and implement strategies to limit screen time. Encouraging alternative activities that promote physical activity, social interaction, and cognitive development can help mitigate the adverse effects of mobile phone use[11].

Future Research: Further research is needed to explore the causal relationships between mobile phone use and ADHD symptoms. Longitudinal studies can provide more definitive evidence on the long-term impacts of mobile phone use on children's behavior and development. Additionally, investigating the effects of different types of mobile phone activities, such as gaming versus educational apps, can offer more targeted recommendations for managing screen time[12].

CONCLUSION

This cross-sectional study provides valuable insights into the associations between mobile phone use and ADHD symptoms among children. The findings highlight the need for guidelines to limit mobile phone use to promote better attention and behavior in children with ADHD. Interventions aimed at reducing screen time and encouraging healthier habits should be prioritized to improve overall well-being in this population.

Parents, educators, and healthcare providers must collaborate to develop and implement effective strategies to manage mobile phone use among children. By understanding and addressing the potential negative impacts of excessive screen time, we can help children achieve better mental and behavioral health outcomes.

REFERENCES

1. Menéndez, G.A., A.A. Jiménez, M.Y. Rodrigo, M.V. Marin, F.S. Sánchez,et al 2020. Adicción a internet, videojuegos y teléfonos móviles en niños y adolescentes: Un estudio de casos y controles. Adicciones, 34: 208-0.
2. Abdulla, F., M.M. Hossain, M.N. Huq, A. Hai and A. Rahman et al., 2023. Prevalence, determinants and consequences of problematic smartphone use among preschoolers (3–5 years) from dhaka, Bangladesh: A cross-sectional investigation. J. Affec Disord., 329: 413-427.
3. Lee, J.I., R.C. Hsiao, C.S. Tsai and C.F. Yen, 2022. Caregivers' difficulty in managing smartphone use of children with attention-deficit/hyperactivity disorder during the COVID-19 pandemic: Relationships with caregiver and children factors. Int. J. Environ. Res. Public Health, Vol. 19, No. 9 .10.3390/ijerph19095194.
4. Krasovsky, T., T. Korytny, H. Hamady and R. Kizony, 2022. Factors associated with texting and walking performance in children with adhd: The role of age, environment, and symptom severity. Gait amp Posture, 98: 96-100.
5. Tsai, S.J., 2020. The importance of measuring problematic smartphone use in children with attention deficit hyperactivity disorder. J. Chin. Med. Assoc., 83: 803-804.

6. Chou, W.J., R.C. Hsiao and C.F. Yen, 2022. Parental efficacy in managing smartphone use of adolescents with attention-deficit/hyperactivity disorder: Parental and adolescent related factors. Int. J. Envir. Res. Pub Health, Vol. 19, No. 15 .10.3390/ijerph19159505.
7. Bourchtein, E., J.M. Langberg, C.N. Cusick, R.P. Breaux, Z.R. Smith and S.P. Becker, 2019. Featured article: Technology use and sleep in adolescents with and without attention-deficit/hyperactivity disorder. J. Pediatr. Psychol., 44: 517-526.
8. Gicquel, L., P. Ordonneau, E. Blot, C. Toillon, P. Ingrand and L. Romo, 2017. Description of various factors contributing to traffic accidents in youth and measures proposed to alleviate recurrence. Front. Psychi., Vol. 8, No. 94 .10.3389/fpsyt.2017.00094.
9. Frölich, J. and G. Lehmkuhl, 2018. Multitasking: Gewinn oder „zeitfalle“?-eine übersicht zum medialen multitasking bei kindern und jugendlichen. Zeits für Kind und Jugendp und Psychot., 46: 431-443.
10. Gurnani, H., S. Naik, A. Dsouza and K. Thakur, 2023. Using a mobile phone-based application as an adjunct to facilitate oral hygiene practices in children with Attention Deficit Hyperactivity Disorder (ADHD). Eur J Paediatr Dent., 24: 267-271.
11. George, M.J., M.A. Russell, J.R. Piontak and C.L. Odgers, 2017. Concurrent and subsequent associations between daily digital technology use and high-risk adolescents' mental health symptoms. Child Dev., 89: 78-88.
12. Loleska, S. and N. Pop-Jordanova, 2023. Web platform for gathering and analyzing data from the neurogame mobile application. prilozi., 44: 189-201.