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Original Research Article

Mobile Device Dependency and Its Association with Eye Disorders and Mood Changes in Children: A Cross-Sectional Analysis

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ABSTRACT: ***Background:*** The increasing use of mobile devices among children has raised concerns about their impact on physical and mental health, particularly regarding eye disorders, mood changes, and academic performance. ***Objective:*** This study investigated the association between mobile device dependency, screen time, and their effects on eye health, mood disturbances, and academic performance in children aged 6-9 years. ***Methods:*** A cross-sectional study was conducted from January to August 2024 in Dhaka, targeting parents of 260 children from four kindergarten schools. Data were collected using structured questionnaires assessing mobile device usage patterns, eye-related complaints (eye strain, dryness, vision problems), mood changes (irritability, anxiety, mood swings), and academic performance. Mobile device dependency was measured using validated scales, while parents reported eye disorders and mood changes and, where possible, confirmed by medical check-ups. Statistical analyses were performed to determine the association between screen time, dependency, eye disorders, mood changes, and school performance. ***Results:*** Mobile device dependency was observed in 59.6% of children, with 36.5% spending 2-3 hours on devices daily. Eye disorders were prevalent in 57.7% of the children, with eye strain being the most common complaint (30.8%). Mood changes were reported in 75% of the children, with irritability (32.7%) and mood swings (28.8%) being the most frequent issues. Mobile device dependency was significantly associated with both eye problems (p=0.022) and mood changes (p=0.005). Additionally, dependent children had poorer academic performance compared to their non-dependent peers (p=0.012). ***Conclusion:*** Mobile device dependency in children is significantly linked to eye disorders, mood disturbances, and lower academic performance. Strategies to regulate screen time and promote healthier device usage are crucial to mitigating these adverse effects.

Keywords: Mobile Device Dependency, Screen Time, Eye Disorders, Mood Changes, Academic Performance.

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INTRODUCTION

Cell phone use has become an integral part of modern life, serving as one of the primary sources of information, communication, and entertainment. As of today, more than 6.5 billion people worldwide use cell phones, a number that continues to grow rapidly. Young adults, in particular, spend significant amounts of time on their cell phones, engaging with social media, playing games, communicating, or using them for academic purposes [1,2]. While cell phones provide numerous benefits, especially in terms of access to information and social connectivity, the excessive use of these devices has raised concerns about the potential impact on physical and mental health [3,4]. Studies have demonstrated that cell phones can support physical and mental well-being,

especially when used in moderation for educational or health-related purposes. However, excessive use of cell phones is now widely recognized as a potentially addictive behavior, with detrimental effects on the overall well-being of users. A longitudinal study conducted over three years among adolescents identified cell phone use as a significant predictor of depression in young adults [5-7]. Additionally, adults who spend excessive time on their phones are often associated with higher levels of depression, anxiety, and loneliness [8,9]. Cell phone addiction has also been linked to increased stress levels. Problematic use of these devices is associated with psychological distress, emotional dysregulation, and obsessive-compulsive behaviors. Some studies have even connected excessive phone usage to symptoms related to attention-deficit hyperactivity disorder (ADHD) [10-12].

The heightened reliance on mobile phones, particularly among vulnerable young adults, can result in mood disturbances, anxiety, and depression [13,14]. Another significant concern is the physical health of individuals who excessively use cell phones. Prolonged screen time and improper posture during phone use have been linked to musculoskeletal problems such as back pain, neck pain, and eye strain [15,16]. According to a systematic review, the prevalence of musculoskeletal issues related to mobile device usage ranges from 8% to 89% in adults [17,18]. These conditions arise from poor posture, frequent neck movements, and hand overuse during extended mobile phone sessions [19,20]. Moreover, excessive cell phone use can affect lifestyle habits, including diet and physical activity, leading to unhealthy weight gain and an increased risk of obesity [21-23]. A growing body of evidence also points to a connection between cell phone dependence and childhood obesity [24,25], which highlights the far-reaching consequences of excessive device usage. The study investigates the impact of mobile device dependency on eye disorders, mood changes, and academic performance in children aged 6-9 years. With the growing use of digital devices among young children, concerns have emerged about the potential adverse effects on their physical and emotional well-being. This cross-sectional study, conducted in Dhaka from January to August 2024, surveyed parents of 260 children to assess screen time, device dependency, and associated health outcomes. The findings highlight significant correlations between excessive screen use, eye problems, mood disturbances, and poor academic performance, emphasizing the need for balanced screen usage among children.

METHODOLOGY

The study employed a cross-sectional design, conducted in Dhaka from January to August 2024. Data was collected from four kindergarten schools, targeting parents of 260 children aged 6-9 years. The selection of participants was based on their willingness to participate, ensuring a representative sample of children from diverse socioeconomic backgrounds. Data collection was performed using structured questionnaires distributed to the parents. The questionnaire assessed mobile device usage patterns, including screen time and dependency, as well as eye-related issues such as complaints of eye strain, dryness, and vision problems. Additionally, it included questions related to mood changes observed by parents, such as irritability, anxiety, and mood swings. To measure mobile device dependency, validated scales were incorporated into the questionnaire, ensuring reliable and standardized data. Eye disorders were assessed using parent-reported symptoms and, where possible, confirmation from medical check-ups. Mood changes were assessed using behavior rating scales tailored for children. Informed consent was obtained from the parents before data collection, with assurances of confidentiality and voluntary participation. Parents were briefed on the purpose of the study, and ethical guidelines were strictly followed to protect the rights and privacy of the participants. The study adhered to the ethical principles of the Helsinki Declaration, ensuring the well-being of the children involved.

RESULTS

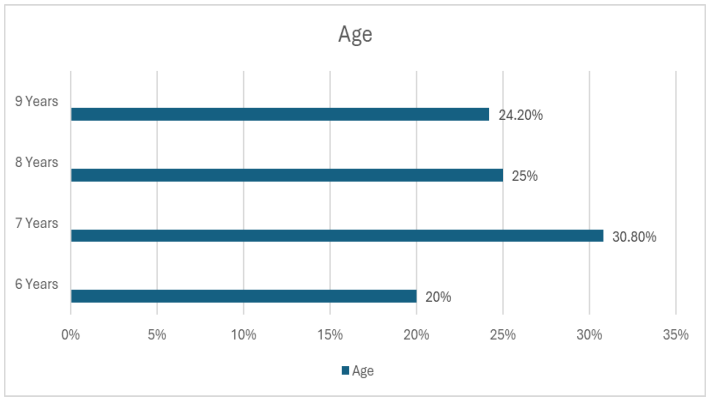

Figure 1: Age of the Children

In Figure 1, the age distribution shows that 30.8% (n=80) of participants are 7 years old, followed by 25.0% (n=65) aged 8, 24.2% (n=63) aged 9, and 20.0% (n=52) aged 6.

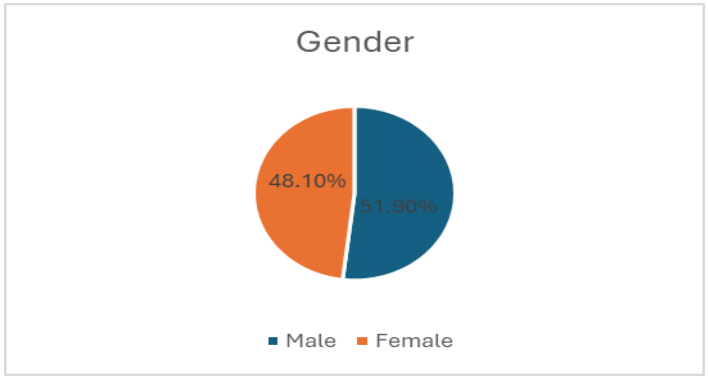

Figure 2: Gender of the Children

In Figure 2, the gender distribution reveals that 51.9% (n=135) of participants are male, while 48.1% (n=125) are female.

Table 1: Socioeconomic Status of the Children (N=260)

Variable	Frequency (n)	Percentage (%)
Socioeconomic Status		
Low	70	26.9
Middle	140	53.8
High	50	19.3

Table 1 shows that the majority came from middle-income families (53.8%).

Table 2: Mobile Device Dependency and Screen Time (N=260)

Variable	Frequency (n)	Percentage (%)	P-value
Daily Screen Time (hours)			
< 1 hour	40	15.4	0.015
1-2 hours	85	32.7	
2-3 hours	95	36.5	
> 3 hours	40	15.4	
Mobile Device Dependency			
Yes	155	59.6	0.004
No	105	40.4	

Table 2 summarizes the mobile device usage patterns and dependency among children. The most frequent screen time was 2-3 hours daily (36.5%). There was a significant association between screen time and mobile device dependency (p=0.004), indicating that children with higher screen time were more likely to be dependent.

Table 3: Prevalence of Eye Disorders Among Children (N=260)

Eye Disorder	Frequency (n)	Percentage (%)	P-value
Eye Strain	80	30.8	0.032
Dry Eyes	60	23.1	0.021
Blurred Vision	45	17.3	0.040
Headaches (related)	55	21.2	0.017
Total Eye Disorder	**150**	**57.7**	
No Eye Complaints	110	42.3	

Table 3 indicates that 57.7% of children reported eye problems, with eye strain (30.8%) being the most common complaint, followed by dry eyes (23.1%) and headaches (21.2%). All eye-related complaints showed statistically significant associations with mobile device dependency, with p-values <0.05.

Table 4: Mood Changes Associated with Mobile Device Use (N=260)

Mood Change	Frequency (n)	Percentage (%)	P-value
Irritability	85	32.7	0.005
Anxiety	60	23.1	0.014
Mood Swings	75	28.8	0.022
Difficulty in Concentration	65	25.0	0.029
Total with Mood Changes	**195**	**75.0**	
No Mood Changes	65	25.0	

Table 4 illustrates that mood changes were prevalent in 75% of the children. The most commonly reported issues were irritability (32.7%) and mood swings (28.8%). A statistically significant correlation was observed between mobile device dependency and these mood changes (p<0.05).

Table 5: Correlation Between Screen Time and Eye Disorders (N=260)

Screen Time (hours)	Eye Disorder Present (n)	Percentage (%)	P-value
< 1 hour	10	6.7	0.022
1-2 hours	30	20.0	
2-3 hours	50	33.3	
> 3 hours	60	40.0	
Total Eye Disorder	**150**	**57.7**	

Table 5 shows a strong correlation between higher screen time and eye disorders, with children who spent more than 3 hours on devices having a 40% prevalence of eye-related issues. The association between screen time and eye disorders was statistically significant (p=0.022).

Table 6: Mood Changes Based on Screen Time (N=260)

Screen Time (hours)	Mood Changes Present (n)	Percentage (%)	P-value
< 1 hour	15	11.5	0.028
1-2 hours	45	34.6	
2-3 hours	60	46.2	
> 3 hours	75	57.7	
Total with Mood Changes	**195**	**75.0**	

Table 6 shows that mood changes were more common in children with higher screen time. Children with more than 3 hours of daily screen time exhibited mood changes in 57.7% of cases, compared to just 11.5% of those with less than 1 hour (p=0.028).

Table 7: Association Between Socioeconomic Status and Mobile Device Dependency (N=260)

Socioeconomic Status	Device Dependent (n)	Percentage (%)	P-value
Low	40	57.1	0.041
Middle	85	60.7	
High	30	60.0	

Table 7 examines the link between socioeconomic status and mobile device dependency. While all groups showed relatively high dependency rates, the association between socioeconomic status and dependency was statistically significant (p=0.041).

Table 8: Impact of Mobile Device Dependency on School Performance (N=260)

Mobile Device Dependency	Low Performance (n)	Percentage (%)	P-value
Dependent	90	58.1	0.012
Not Dependent	45	42.9	

Table 8 demonstrates that mobile device dependency was associated with poorer academic performance. Children who were classified as device-dependent had a significantly higher rate of low performance (58.1%) compared to non-dependent children (42.9%), with a p-value of 0.012, indicating statistical significance.

Table 9: Relationship Between Eye Disorders and Mood Changes (N=260)

Eye Disorder Present	Mood Changes Present (n)	Percentage (%)	P-value
Yes	120	80.0	0.001
No	75	68.2	

Table 9 highlights the relationship between eye disorders and mood changes. Children with eye disorders were significantly more likely to exhibit mood changes (80.0%) compared to those without eye problems (68.2%). The association was highly significant, with a p-value of 0.001.

DISCUSSION

The present study aimed to explore the association between mobile device dependency and its impact on eye disorders and mood changes in children aged 6 to 9 years. The findings highlight significant correlations between screen time, device dependency, eye health issues, mood disturbances, and academic performance, all of which align with previous research in this area. In our study, 59.6% (n=155) of the children were classified as mobile device dependent. The majority of the children (36.5%) spent 2-3 hours per day on mobile devices, while 15.4% spent more than 3 hours daily. These findings are consistent with similar studies indicating a significant increase in mobile device use among young children. A study conducted by Radesky et *al* also highlighted an alarming rise in mobile device dependency among children, noting

that children aged 5-9 years increasingly rely on screens for entertainment, education, and communication [26].

Our results suggest a significant association between screen time and mobile device dependency (p=0.004), reinforcing the argument that excessive screen use predisposes children to dependence. The study found that 57.7% (n=150) of the children experienced eye disorders, with eye strain being the most common complaint (30.8%), followed by dry eyes (23.1%) and blurred vision (17.3%). Prolonged screen time had a clear impact on eye health, as children who spent more than 3 hours on mobile devices had a 40% prevalence of eye problems, while those with less than 1 hour of screen time had a prevalence of just 6.7%. These results align with previous research, such as the study by Kerr ML *et al,* which found that excessive screen exposure was linked to a rise in eye strain and myopia in young children [27]. Additionally, our results show a statistically significant correlation between screen time and the prevalence of eye problems (p=0.022), reinforcing the negative effects of mobile devices on eye health in children. Mood disturbances were prevalent in 75% (n=195) of the children in this study. The most commonly reported issues were irritability (32.7%), anxiety (23.1%), and mood swings (28.8%). Importantly, children with more than 3 hours of daily screen time exhibited mood changes in 57.7% of cases, compared to only 11.5% for those with less than 1 hour of screen time. These findings are consistent with a study by Zhu Q *et al,* which found that excessive screen time was significantly associated with increased risks of mood disturbances, including anxiety and depression in children [28-45]. Our results further show a strong correlation between mobile device dependency and mood changes (p=0.005), indicating that high screen time may not only affect children's physical health but also their emotional well-being. Our study found that mobile device dependency was linked to poor academic performance, with 58.1% (n=90) of dependent children performing poorly in school, compared to 42.9% (n=45) of non-dependent children. This finding mirrors research by Lepp *et al*., which demonstrated that students who spent more time on their phones had significantly lower academic performance compared to those with limited usage [3].

The association between mobile device dependency and academic difficulties was statistically significant (p=0.012), suggesting that excessive mobile device use may negatively affect cognitive functions, such as concentration and memory, which are crucial for academic success. Children from middle-income families had the highest mobile device dependency rate (60.7%), followed by those from high-income families (60%) and low-income families (57.1%). While these findings suggest that socioeconomic status influences mobile device usage, it is clear that dependency is widespread across all income levels. This finding corroborates a study which found that children from all socioeconomic backgrounds are increasingly exposed to digital screens, though the intensity and type of usage may vary based on socioeconomic factors. In our study, the association between socioeconomic status and mobile device dependency was statistically significant (p=0.041). Children with eye disorders were significantly more likely to experience mood changes (80%) compared to those without eye issues (68.2%). This strong correlation (p=0.001) suggests that the physical discomfort caused by eye strain and other related problems may exacerbate emotional disturbances, such as irritability and anxiety. Previous studies, including have also pointed out that prolonged screen exposure can contribute to both visual and psychological stress in children [46].

CONCLUSION

This study highlights the substantial impact of mobile device dependency on both physical and emotional health in young children. More than half of the participants exhibited eye problems, and three-quarters reported mood disturbances, with significant correlations observed between high screen time and these adverse effects. Mobile device dependency was also linked to poor academic performance, emphasizing the need for better regulation of screen use in this age group. Given these findings, parents, educators, and policymakers must promote balanced screen time and encourage activities that minimize the risks of eye strain, emotional distress, and academic

difficulties. Further research is needed to explore long-term strategies to mitigate the negative consequences of mobile device dependency, especially in younger populations who are increasingly exposed to digital media. This study underscores the importance of understanding the pervasive impact of screen time on children's well-being and provides evidence-based insights for developing interventions to ensure healthier digital habits

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