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Excessive Screen Time and Its Emerging Health Hazards in Children of Female Health Care Professionals: A Descriptive Cross-Sectional Study

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ABSTRACT

Excessive screen time is a growing concern, particularly among children of working parents, including female health professionals. While digital devices are often used as convenient tools to manage childcare amidst demanding schedules, prolonged exposure poses risks to physical, cognitive, and emotional health. **Objectives:** To determine the prevalence and health hazards of excessive screen time in children of female health professionals. **Methods:** This descriptive cross-sectional study was conducted over six months, from January 2025 to July 2025, at the Combined Military Hospital, Lahore, Pakistan. A total of 195 children aged 4–15 years were included. Excessive screen time was defined as more than 2 hours per day. Data were collected using a validated questionnaire, and statistical analysis was performed using the chi-square test to determine associations, with a p-value <0.05 considered statistically significant. **Results:** Of the participants, 44.6% were obese, 47.7% had behavioral problems, 53.8% showed speech delays, and 49.2% reported sleep disturbances. Musculoskeletal pain (46.7%) and eye strain (44.6%) were also common. Excessive screen use was significantly associated with sleep and developmental delays. Chi-square test showed significant associations with behavioral issues and education level. **Conclusions:** Excessive screen time poses multiple health risks in children of female health professionals. Interventions through parental education, ergonomic guidance, and policy measures are needed to reduce these hazards.

INTRODUCTION

Screen time is a significant component of modern life for children, often referred to as 'digital natives,' who grow up surrounded by electronic media. Over the past five years, there has been a sharp increase in digital device ownership and usage among families. The easier availability of new technologies has been linked to a significant rise in children's average screen time engagement (such as smartphones and tablets). Regardless of the potential benefits of media exposure, inappropriate or excessive use of technology negatively influences children's general health [1-5]. Digital technical devices are electronic gadgets with screens that require digital signals to operate and emit radiation from the screens [6]. Tablets, laptops, desktops, cell phones, and monitors are some examples of more modern digital electronic devices. Screen time is spent using digital devices with screens [7, 8]. Female health professionals often have demanding work schedules, including irregular duty hours, long shifts, and on-call responsibilities. This can result in limited quality time spent with their children. The demanding nature of healthcare work can lead to physical and mental fatigue for female healthcare professionals. When they return home, they may have limited energy to engage in activities with their children, leading to the use of screens as a convenient

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means of entertainment. The irregular and unpredictable schedules of female health professionals may make it challenging to arrange consistent childcare. In the absence of alternative caregivers, children may spend more time with screens as a form of entertainment or companionship. The situation further deteriorated during the coronavirus disease (COVID-19) pandemic. Prolonged lockdowns and school closures led to a substantial increase in children's use of video games and social media, which often went unnoticed by parents. In many households, restrictions on screen time were relaxed to keep children occupied and manage their restlessness. In several cases, these limits disappeared altogether as digital devices, computers, tablets, and smartphones became central to both education and social interaction [9]. A study conducted in the United Kingdom revealed that 28% of children use electronic devices for almost three to four hours daily [10]. Prolonged exposure to artificial blue light from screens causes the light-sensitive cells in the eyes to create toxic compounds that degrade vision, cause blindness, and have other severe effects. In a study conducted at the University of Rome, 15.6% of primary school students, 39.5% of secondary school students, and 62.1% of high school students spent more than 10 hours a day on devices. Interestingly, even younger children experienced increased screen time. The strongest associations were found with computer use (94%), video games (86%), and mobile devices (83%), all of which consistently related to adverse sleep effects [11-13]. Excessive exposure to electronic media was linked to negative impacts on children's expressive vocabulary and language skills, as well as lower language scores and speech delays. Speech and language delays were noted in 28.4% of children who used media for more than three hours [14]. Another study conducted in Toronto showed that 42% children who had more than two hours of daily screen time and less than 11 hours of nighttime sleep at three years old faced nearly double the risk of being overweight or obese [15]. The prevalence of behavioral issues was significantly higher in children who were exposed to screens at an early age. Specifically, conduct problems were observed in 16.2% of children, learning problems in 24.2%, psychosomatic issues in 28.7%, and impulsive-hyperactive behavior in 19.9% Overall, 24% to 53% of children endorsed having musculoskeletal problems such as neck strain, shoulder and back pain while 12% to 55% had visual symptoms such as watering from eyes, refractive error and eye strain during and/or after electronic device use. Musculoskeletal and visual symptoms were approximately 1.8 to 3.0 times higher in secondary school students than in primary school students [16, 17].

All these hazards in children are of great concern for parents, especially when both are working. Excessive screen time among children of female health professionals poses a growing concern due to its potential health hazards. However, most existing research has been conducted in Western or general parental populations, with little attention to children of female health professionals in South Asia. In Pakistan, although studies have examined patterns of screen use, there is no focused analysis on the health hazards in children of female health professionals, a group particularly vulnerable due to their mothers' demanding professional schedules. This aimed to determine the prevalence and health hazards of excessive screen time in children of female health professionals.

METHODS

This cross-sectional study was conducted at the Combined Military Hospital, Medical College, and Institute of Dentistry, Lahore, over a period of six months, from January 2025 to July 2025. Ethical approval was granted by the Combined Military Hospital Ethical Review Committee (Ref. No: 108/ERC/CMH/LMC). Informed consent and written parental consent were obtained before participation. Children's data were anonymized, coded, and stored securely. A non-probability purposive sampling technique was employed to recruit 195 participants. The sample size was calculated at a 95% confidence level with a 5% margin of error, using an expected prevalence of behavioral problems of 24% (p=0.24). The single-proportion formula was applied: $n = (Z^2 \times p \times (1 - p)) / d^2$, where Z=1.96 for 95% confidence, p=0.24, and d=0.05. The calculated sample size was approximately 280 participants; however, due to feasibility constraints, 195 children were enrolled. The mothers of all enrolled children were educated healthcare professionals, including doctors, nurses, and allied health workers. Children aged 4–15 years who used digital devices for more than two hours daily and whose mothers were employed as doctors, nurses, or allied health professionals at CMH were included. Children already diagnosed with behavioral problems, visual defects, sleep disorders, musculoskeletal disorders, or speech problems, as well as those unwilling to participate, were excluded. Operationally, excessive screen time was defined as using digital devices for more than two hours daily. Health hazards were defined as follows: obesity was considered as BMI ≥95th percentile (CDC growth charts); sleep disorder as <10 hours/day in children <6 years or <9 hours/day in children ≥6 years. Mothers were asked direct questions regarding their child's behavior, including aggression, restlessness, difficulty sustaining attention, and hyperactivity. No standardized behavioral assessment tools (e.g., SDQ or CBCL) were used. Visual problems were assessed based on maternal reports of poor vision, squinting, or difficulty identifying colors.

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Although Snellen and Ishihara charts are standard ophthalmological tests, these were not administered in this study. Musculoskeletal disorders were assessed through maternal reports of frequent neck, back, or wrist pain in the child. No clinical examinations were performed. Maternal observations regarding delayed speech, unclear articulation, or stammering were also noted. Data were collected using a validated questionnaire (Cronbach's alpha=0.87) on screen use and associated health hazards. No clinical examinations or speech assessments were conducted as part of this cross-sectional survey. All outcome data were based on maternal subjective reporting through the questionnaire. Data analysis was conducted using SPSS version 26.0, with descriptive statistics presented as frequencies and percentages for qualitative data, and mean ± standard deviation for quantitative data.

RESULTS

Our collected data provides a comprehensive overview of the demographic and contextual characteristics of the participants. Among mothers, the most common age group was over 45 years (28.7%), followed by 36–45 years (25.1%), with smaller proportions in the 18–25 years (23.6%) and 26–35 years (22.6%) categories. Regarding professions, nurses made up the largest group (36.9%), followed by doctors (32.3%) and allied health professionals (30.8%). The children's age distribution showed the highest proportion in the 7–9 years group (27.7%), with other age groups 4-6 years (24.6%), 10–12 years (25.1%), and 13–15 years (22.6%)—being relatively evenly distributed. A slight majority of the children were male (53.3%) compared to females (46.7%). Education levels revealed that most children were in secondary education (39.5%), followed by primary (35.9%) and pre-school (24.6%). In terms of siblings, more children had no siblings (53.8%) compared to those who had siblings (46.2%). Device ownership among families highlighted laptops as the most commonly owned device (28.2%), followed by smartphones (26.2%), TVs (25.6%), and tablets (20.0%). This distribution reflects a diverse and balanced sample in terms of age, profession, and household resources (Table 1).

Table 1: Demographic Characteristics of the 195 Participating Mothers and Their Children (N=195)

Variables	Category	n (%)
Mother's Age (years)	18-25	46 (23.6)
	26-35	44 (22.6)
	36-45	49 (25.1)
	>45	56 (28.7)
Mother's Profession	Doctor	63 (32.3)
	Nurse	72 (36.9)
	Allied Health Professional	60 (30.8)
Child's Age (years)	4-6	48 (24.6)
	7-9	54 (27.7)
	10-12	49 (25.1)
	13-15	44 (22.6)
Child's Gender	Male	104 (53.3)
	Female	91 (46.7)
Child's Education Standard	Pre-school	48 (24.6)
	Primary	70 (35.9)
	Secondary	77 (39.5)
Siblings	Yes	90 (46.2)
	No	105 (53.8)
Devices Owned	Laptop	55 (28.2)
	Tablet	39 (20.0)
	TV	50 (25.6)
	Smartphone	51 (26.2)

Eye strain showed no significant associations with maternal or child characteristics, sibling presence, or device ownership. However, children whose mothers were doctors and those aged 4–6 years reported slightly higher frequencies of eye strain. Additionally, children who owned smartphones had a marginally higher frequency of eye strain (60.8%), though this did not reach statistical significance. Across all conditions, no single variable emerged as a consistent predictor (Table 2).

Table 2: Frequency of Health Hazards Associated with Excessive Screen Time (N=195)

Variables	Category	n (%)	95% CI
Sleep Disturbances	Yes	96 (49.2)	42.1 – 56.3
	No	99 (50.8)	43.7 – 57.9
Delayed Speech	Yes	105 (53.8)	46.7 – 60.8
	No	90 (46.2)	39.2 – 53.3
Obesity	Yes	87 (44.6)	37.6 – 51.7
	No	108 (55.4)	48.3 – 62.4
Behavioral Problems	Yes	93 (47.7)	40.7 – 54.8
	No	102 (52.3)	45.2 – 59.3
Musculoskeletal Pain	Yes	91 (46.7)	39.7 – 53.8
	No	104 (53.3)	46.2 – 60.3
Eye Strain	Yes	87 (44.6)	37.6 – 51.7
	No	108 (55.4)	48.3 – 62.4

However, trends suggest that a child's age, education level, and certain devices, such as smartphones and tablets, might influence specific outcomes, warranting further exploration. These findings underline the need for targeted interventions during early childhood and the potential impact of technology usage on child health and behavior (Table 3).

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Table 3: Association of Potential Confounders with Screen-Time–Related Health Hazards

Confounders	Sleep Disturbances	Delayed Speech	Obesity	Behavioral Problems	Musculoskeletal Pain	Eye Strain
Mother's Age	0.871	0.311	0.754	0.786	0.783	0.826
Mother's Profession	0.260	0.869	0.784	0.358	0.419	0.589
Child's Age	0.551	0.653	0.328	0.013*	0.106	0.435
Child's Gender	0.605	0.565	0.908	0.206	0.659	0.686
Education Standard	0.836	0.606	0.480	0.030*	0.100	0.431
Siblings	0.842	0.191	0.965	0.550	0.249	0.965
Devices Owned	0.928 (F)	0.398 (F)	0.678 (F)	0.811 (F)	0.293 (F)	0.742 (F)

*(F) indicates Fisher's Exact test was applied due to expected cell counts <5. P<0.05=significant

DISCUSSIONS

This study highlights the significant health and developmental risks associated with excessive screen time among children of female health professionals, offering insights into a relatively underexplored population. Earlier studies found 42% of children with over two hours of daily screen use and less than 11 hours of sleep at age three faced nearly double the risk of being overweight or obese [15]. Screen time was also linked to conduct issues (16.2%), learning difficulties (24.2%), psychosomatic complaints (28.7%), and impulsive-hyperactive behaviors (19.9%) [16, 18]. By focusing on children of female healthcare professionals, this study provides novel insights into a group uniquely affected by irregular maternal work schedules and limited supervision, suggesting that professional commitments may inadvertently increase screen exposure, often substituting for direct parental interaction. This is particularly relevant during periods such as the COVID-19 pandemic, when digital devices became central to learning and recreation [19]. The type and manner of media use also influenced outcomes, with structured educational content offering benefits, whereas unregulated use was associated with sleep disturbances, musculoskeletal pain, eye strain, speech delays, and mental health concerns [20-22]. Previous research emphasizes balancing screen time with alternative activities [23], and our findings support the use of parental guidance, structured schedules, and outdoor play to mitigate screen-related harms. The high prevalence of eye strain (44.6%), musculoskeletal complaints (46.7%), and behavioral disturbances (47.7%) underscores the need for targeted interventions, including programs to help healthcare professionals balance work and childcare responsibilities, public awareness campaigns, and promotion of healthier screen habits [19, 22]. While this study provides context-specific insights, reliance on maternal self-reporting may introduce reporting bias, though validated questionnaires and operational definitions improve reliability. Future research should employ objective measures and longitudinal designs to confirm these findings. Overall, the results have practical implications for healthcare professionals, educators, and policymakers, highlighting the importance of parent education, regulated device use, school-based awareness sessions, and ergonomic training to promote healthier screen practices among children.

CONCLUSIONS

Excessive screen time poses multiple health risks in children of female health professionals. Interventions through parental education, ergonomic guidance, and policy measures are needed to reduce these hazards.

Authors Contribution

Conceptualization: FZ
Methodology: FZ, AC. FA
Formal analysis: FZ, AC, IF, BA
Writing review and editing: FZ, AC, FA, QUA, IF, BA

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

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