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Assessing the Influence of Screen Time on Behaviour in Children Aged 7-9 Years During Dental Treatment

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Abstract: ***Increased screen-time may influence emotional regulation and behaviour in children, but its association with pediatric dental anxiety remains unclear. Aim: To assess the influence of screen-time on dental anxiety and behaviour in children aged 7-9 years undergoing dental treatment. Method: This cross-sectional study included 75 children categorized into low, moderate and high screen-time groups. Screen exposure was assessed using a validated questionnaire while dental anxiety and behaviour were evaluated using the CBC scale and Frankl Behaviour Rating Scale before and after treatment. Data were analysed using paired t-test, ANOVA and Tukey's post hoc test ($p < 0.05$). Results: Baseline scores were comparable among groups. Post-treatment, children with low screen-time showed reduced anxiety and improved behaviour, whereas high screen-time was associated with greater anxiety and poorer cooperation. Conclusion: Higher screen-time is associated with increased dental anxiety and poorer behaviour in children undergoing dental treatment.***

Keywords: Child behaviour; Chotta Bheem-Chutki Scale; Dental anxiety; Digital media; Frankl Behaviour Rating Scale; Pediatric dentistry; Restorative dentistry; Screen-time

1. Introduction

Over the past decade, digital technologies have transformed childhood experiences, with children increasingly exposed to televisions, smartphones, tablets and gaming devices from an early age.[1,2] Children are now considered "digital natives" with prolonged screen-time becoming common globally and in India.[1,3,4,5] Excessive screen-time negatively affects physical, cognitive and psychosocial development, contributing to reduced physical activity, obesity risk, sleep disturbances, delayed language development, impaired problem-solving and poor emotional regulation.[6,7] Early screen exposure limits reciprocal human interaction essential for social and language development and has been associated with poorer expressive vocabulary.[7,8] High screen exposure also affects attention and behaviour. Fast-paced digital content promotes instant gratification, reduced attention span, impulsivity and difficulty following instructions, while background media disrupts parent–child interaction and emotional stability.[9,10] Excessive screen-time may further reduce empathy, emotional resilience and coping ability while increasing anxiety and irritability.[1] Sleep disturbances caused by screen exposure interfere with circadian rhythm, resulting in poor sleep quality, emotional instability and increased stress responses.[6] Parents also influence screen habits, as screens are often used for behaviour management, reducing opportunities for self-regulation and emotional development.[11,12] In pediatric dentistry, these behavioural and emotional changes are clinically significant. Children with high screen-time exposure often exhibit poor coping skills, low frustration tolerance, heightened anxiety and difficulty adapting to dental settings.[1] Dental anxiety itself is multifactorial and influenced by temperament, parental factors and environmental exposures.[13,14] Additionally, excessive screen-time is associated with unhealthy dietary behaviours, frequent snacking, cariogenic food consumption and poor oral hygiene practices, increasing the risk of dental caries and the need for Class I restorations.[13] Reduced parental supervision and irregular routines may further aggravate these effects. Thus, excessive screen-time is emerging as an important psychosocial and behavioural determinant affecting both dental anxiety and oral health outcomes in children. Recognizing screen exposure as a modifiable risk factor may help pediatric dentists adopt preventive and behaviour-oriented management strategies.[1]

2. Materials and Method

The present cross-sectional clinical study was conducted in the Department of Pediatric and Preventive Dentistry, Mahatma Gandhi Dental College and Hospital, Jaipur, to evaluate the influence of screen media exposure on anxiety and behaviour in children undergoing restorative dental treatment. All procedures and assessments were performed by a single calibrated operator to minimize inter-examiner variability. Ethical approval was obtained from the institutional research committee of MGUMST, Jaipur (MGDCH/IEC/1458/JPR/2024/416 dated 16th May 2024). A total of 75 healthy children aged 7–9 years were selected according to the inclusion and exclusion criteria. Sample size was calculated using OpenEpi software (v3.0) at 95% confidence interval and 80% power, with the final sample fixed at 75 considering possible attrition.

Inclusion and Exclusion criteria:
Healthy children aged 7–9 years, with no history of previous dental experience, requiring Class I restorations, having screen time and whose parents provided written informed consent. Medically compromised children, children with previous dental experience, children with deep caries and pulpal involvement, children without screen time and those without consent were excluded.

After enrolment, baseline behaviour and anxiety were assessed using the Frankl Behaviour Rating Scale[15] and the Chota Bheem Chutki Dental Anxiety Scale (CBC-DAS)[16], respectively. The CBC-DAS is a child-friendly pictorial scale in which children selected the image best representing their emotional state. Screen-time exposure was evaluated using a self-designed structured questionnaire assessing daily screen duration, device type, digital content and parental supervision. The questionnaire was validated through expert review, pilot testing and reliability analysis, showing high agreement (Kappa = 0.826). Based on total scores, children were divided into three equal groups (n = 25 each): Group A (low exposure), Group B (moderate exposure) and Group C (high exposure). Class I restorative treatment was performed according to routine departmental protocol. Immediately after treatment, behaviour and anxiety were reassessed using the Frankl Scale[15] and CBC-DAS[16] to compare pre- and post-treatment responses.

Figure 1: Assessment of Pre CBC Scores

Scoring System of the Questionnaire
Each questionnaire item had four options representing increasing screen exposure, scored as follows: Option 1 = 1, Option 2 = 2, Option 3 = 3 and Option 4 = 4. The total score was calculated by summing all item scores for each child. Based on the total score, children were equally divided into three groups (n = 25 each): Group A (low exposure, score < 30), Group B (moderate exposure, score 30–40) and Group C (high exposure, score > 40).

Figure 1: Assessment of Screen time and Media Exposure through questionnaire

Figure 2: Class 1 Restoration Procedure

Figure 3: Assessment of Post CBC Scores

3. Results

A total of 75 children aged 7–9 years were equally distributed into three groups based on screen-time exposure: Group A (low), Group B (moderate) and Group C (high). The mean age was 7.92 ± 0.85 years, with comparable age and gender distribution among groups, indicating population homogeneity (Table 1).

Dental Anxiety (CBC Scores)
Baseline CBC scores showed no significant intergroup difference (p = 0.330), indicating similar pre-treatment

anxiety levels (Table 2). Post-treatment CBC scores differed significantly among groups (F = 12.661, p < 0.001) (Table 2). Group A demonstrated reduced anxiety (2.52 ± 1.15 to 1.88 ± 1.09), Group B showed no significant change (3.08 ± 1.46 to 3.24 ± 1.71), while Group C showed increased anxiety (2.96 ± 1.51 to 4.20 ± 1.97). Tukey's post hoc test showed significantly lower post-treatment CBC scores in Group A compared to Groups B (p = 0.012) and C (p < 0.001), with no difference between Groups B and C (Table 4). Within-group analysis revealed significant improvement in Group A (p = 0.003), no significant change in Group B (p = 0.382), and a significant increase in Group C (p = 0.009) (Table 2). These findings are illustrated in Figure 1.

Behavioural Assessment (Frankl Scores)

Pre-treatment Frankl scores were comparable among groups (p = 0.064) (Table 3). Post-treatment scores showed significant intergroup differences (F = 9.261, p < 0.001) (Table 3). Group A showed behavioural improvement (2.80 ± 0.81 to 3.16 ± 1.02), Group B remained unchanged (2.44 ± 0.82 to 2.44 ± 1.00), while Group C demonstrated reduced cooperation (2.24 ± 0.87 to 1.92 ± 1.03). Tukey's post hoc analysis revealed significantly higher post-treatment Frankl scores in Group A compared to Groups B (p = 0.040) and C (p < 0.001), with no significant difference between Groups B and C (Table 4). Within-group analysis showed significant improvement in Group A (p = 0.026), no change in Group B (p = 1.000), and a non-significant decline in Group C (p = 0.133) (Table 3). These trends are shown in Figure 2.

Table 1: Demographic Characteristics of Study Participants

Variable	Group A (n=25)	Group B (n=25)	Group C (n=25)	Total (n=75)
Mean Age (years)	7.72 ± 0.89	8.28 ± 0.79	7.76 ± 0.77	7.92 ± 0.85
Age Range	6–9	7–9	7–9	6–9
Females n (%)	16 (64%)	11 (44%)	14 (56%)	41 (54.7%)
Males n (%)	9 (36%)	14 (56%)	11 (44%)	34 (45.3%)

Table 2: Comparison of Pre- and Post-Treatment CBC Scores

Group	Pre-CBC (Mean ± SD)	Post-CBC (Mean ± SD)	p-value (Paired t-test)
Group A	2.52 ± 1.15	1.88 ± 1.09	0.003*
Group B	3.08 ± 1.46	3.24 ± 1.71	0.382
Group C	2.96 ± 1.51	4.20 ± 1.97	0.009*

Intergroup (ANOVA): F = 12.661, p < 0.001

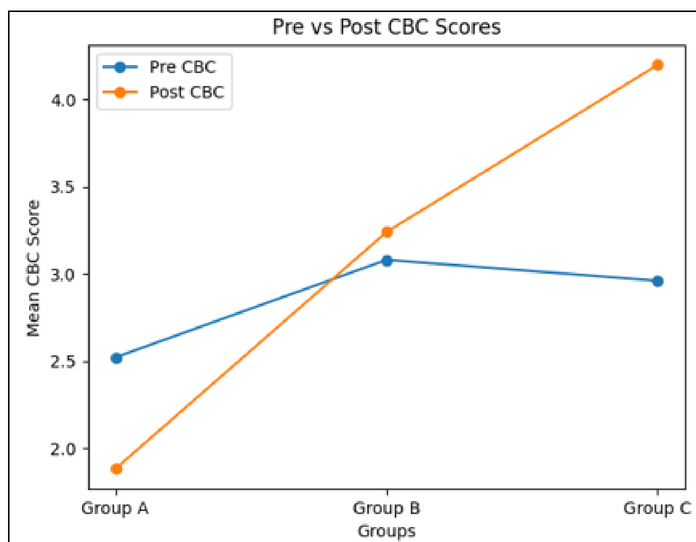
Table 3: Comparison of Pre- and Post-Treatment Frankl Scores

Group	Pre-Frankl (Mean ± SD)	Post-Frankl (Mean ± SD)	p-value (Paired t-test)
Group A	2.80 ± 0.81	3.16 ± 1.02	0.026*
Group B	2.44 ± 0.82	2.44 ± 1.00	1.000
Group C	2.24 ± 0.87	1.92 ± 1.03	0.133

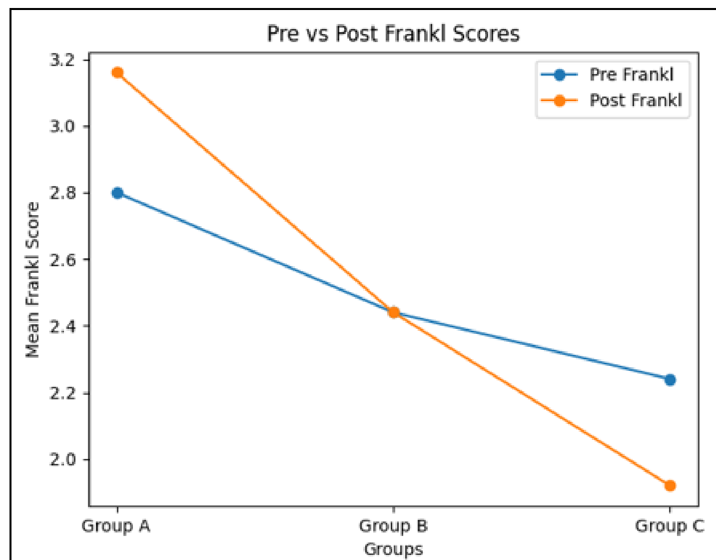
Intergroup (ANOVA): F = 9.261, p < 0.001

Table 4: Key Intergroup Differences (Post-treatment)

Comparison	CBC Score (p-value)	Frankl Score (p-value)
Group A vs Group B	0.012*	0.040*
Group A vs Group C	<0.001*	<0.001*
Group B vs Group C	NS	NS



Graph 1: Mean pre and post-treatment CBC scores across study groups



Graph 2: Mean pre and post-treatment Frankl scores across study groups

4. Discussion

The present study evaluated the influence of screen-time exposure on dental anxiety and behaviour in children undergoing Class I restorative treatment. Children with lower screen-time exposure showed reduced anxiety and improved behaviour, whereas those with higher exposure demonstrated increased anxiety and poorer cooperation following treatment. These findings are consistent with literature reporting that excessive screen-time negatively affects emotional regulation, attention and behavioural adaptability in children.[1,5,17] High digital exposure during developmental years may impair cognitive and social maturation, leading to irritability, impulsivity and reduced coping ability.[6,7] Children accustomed to fast-paced digital stimulation may find it difficult to adapt to the structured dental environment, thereby increasing anxiety and behavioural challenges.[9]

In the present study, Group A (low screen exposure) demonstrated significant reduction in anxiety and improvement in behaviour after treatment, possibly due to better emotional regulation and adaptive coping skills. Similar findings have been reported in children with lower screen-time exposure, who exhibit improved attention span, communication and cooperation in clinical settings.[8,10] Conversely, Group C (high screen exposure) showed increased anxiety and deterioration in behaviour, supporting studies linking excessive screen-time with emotional dysregulation, anxiety and behavioural problems.[1,18] Increased sympathetic activation, poor stress tolerance and heightened sensitivity to unfamiliar stimuli may contribute to negative behaviour in dental settings.[19] Group B (moderate exposure) showed no significant changes, suggesting a possible dose–response relationship between screen-time and behavioural outcomes. Similar trends of increasing anxiety, irritability and inattention with rising screen exposure have been previously reported.[20,21] Language development and communication may also influence dental anxiety, as excessive screen exposure has been associated with delayed language skills and reduced expressive abilities.[7,22] Children with limited communication may struggle to understand procedures or express discomfort, increasing anxiety during treatment. Sleep disturbances related to screen-time further contribute to emotional instability and poor stress tolerance.[6,23] Parental practices also play a role, as screens are often used for emotional soothing and behaviour management, limiting opportunities for development of self-regulation skills.[12] Reduced parent–child interaction may further contribute to insecurity and anxiety during dental visits.[23] The present findings support earlier studies directly associating higher media exposure with increased dental fear, negative behaviour and difficulty in behaviour management.[1,14,18] Clinically, screen-time should be considered a modifiable behavioural risk factor. Incorporating screen-time assessment into routine history taking may help clinicians anticipate behavioural challenges and modify management strategies accordingly. Overall, the study highlights that screen-time is an important psychosocial factor influencing emotional regulation, child behaviour and dental anxiety. Regulating digital habits through parental counselling and preventive strategies may improve both behavioural outcomes and oral health in pediatric patients.

5. Conclusion

Screen-time significantly influences dental anxiety and behaviour in children. Lower screen exposure was associated with reduced anxiety and better cooperation, while higher exposure led to greater anxiety and poorer behaviour. Excessive screen use may impair emotional regulation and coping ability, affecting adaptability to dental treatment. Regulating screen-time through parental guidance may improve behaviour management and treatment outcomes in pediatric dentistry.

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