



# Investigating the Harmful Impact of Android Cell Phone Use Across Age Groups in the Amravati Region, Maharashtra

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## Abstract

This cross-sectional study examines the physical, cognitive, and psychosocial impacts of Android Smartphone use among children (<12), adolescents (13–18), adults (19–60), and elderly (>60) in Amravati, Maharashtra. Using standardized questionnaires, cognitive tasks, eye/posture assessments, and focus-group interviews, we analyzed usage patterns, dependency behaviors, and health outcomes. Results revealed significant associations between prolonged screen time and attention deficits, sleep disturbances, musculoskeletal discomfort, and smartphone dependency symptoms across all age groups. Findings highlight the need for age-specific interventions and awareness programs in semi-urban Indian communities.

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**Keywords:** *Android Smartphone overuse, Screen time and health, Age-specific digital impact*

## Introduction

Smartphones—particularly Android devices—have become indispensable tools for communication, education, and entertainment in modern India. While they offer significant benefits, their **excessive use has been associated with sleep disturbances, musculoskeletal pain, attention deficits, anxiety, and depression** (Kwon et al., 2013; Gupta & Krishnan, 2017). Existing research has primarily focused on urban populations, leaving a gap in understanding the **age-specific health and cognitive impacts of Smartphone overuse in semi-urban regions like Amravati, Maharashtra**, where digital literacy and access vary considerably. Furthermore, the growing penetration of Smartphone's among children, adolescents, and even the elderly raises concerns about long-term behavioral and physiological consequences. Therefore, this study aims to systematically investigate the harmful impact of Android smartphone use across different age groups in Amravati.

### The objectives of the study are to:

1. **Quantify** daily Android Smartphone usage patterns and dependency levels across age groups.
2. **Evaluate** age-specific physical (vision strain, posture issues), cognitive (attention, memory), and psychosocial outcomes (sleep quality, anxiety).
3. **Recommend** practical, age-tailored interventions for healthier Smartphone use.

## Materials and Methods

### Study Design & Participants

A cross-sectional study was conducted in Amravati. **200 participants (50 per age group)** were recruited via schools, colleges, workplaces, and senior citizen groups.

### Data Collection Tools

- **Usage Patterns:** Android screen-time logs, self-report questionnaires
- **Dependency:** Smartphone Addiction Scale (Kwon et al., 2013)
- **Cognitive Tests:** Trail Making Test (attention), Digit Span (working memory)
- **Physical Health:** Eye strain and posture assessment checklist
- **Psychosocial:** Pittsburgh Sleep Quality Index, Beck Anxiety Inventory

### Procedure

Participants completed surveys and cognitive tests. Clinical checks for eye strain and posture were conducted. Focus-group interviews (5 per group) provided qualitative insights.

### Data Analysis

Quantitative data analyzed using ANOVA and Pearson's correlation. Qualitative interview data underwent thematic coding.



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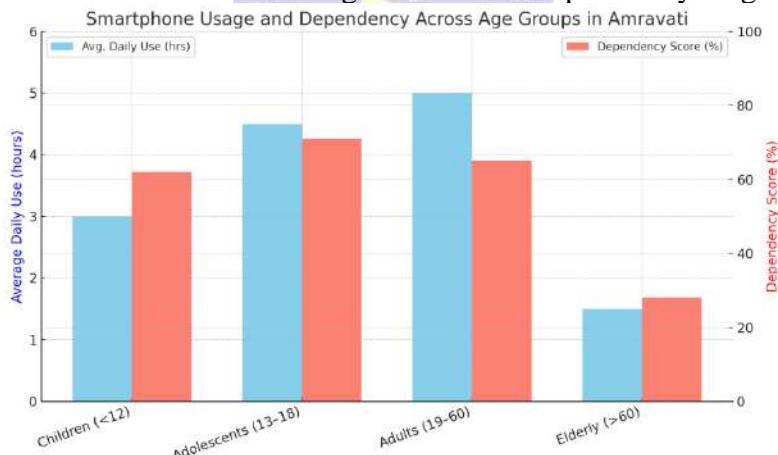
## Observations and Results

Table 1 Summary of key findings across age groups

Age Group	Avg. Daily Use (hrs)	Dependency Score (% High)	Key Physical Effects	Cognitive Effects	Psychosocial Effects
Children (<12)	3.0	62%	Eye strain (40%), mild posture issues	Attention deficits ( $-1.2$ SD vs norm)	Irritability when phone removed
Adolescents (13–18)	4.5	71%	Eye strain (52%), neck pain (35%)	Memory lapses ( $\beta = -0.41$ , $p=0.003$ )	Poor sleep quality, mild anxiety
Adults (19–60)	5.0	65%	Neck/shoulder pain, eye fatigue	Cognitive distraction during work	Work-life imbalance, relationship strain
Elderly (>60)	1.5	28%	Visual fatigue (50%)	Slower cognitive task completion, longer fixation times	Mild tech-related anxiety

### Statistical Highlights

- Sleep quality strongly correlated with screen time in adolescents ( $r = -0.45$ ,  $p < 0.01$ ).
- Smartphone dependency linked to workplace distraction in adults ( $r = 0.42$ ).
- Elderly required 30% more time on cognitive tasks compared to younger groups.



Here's the bar chart showing:



- Blue bars → Average daily Smartphone use (hours)
- Red bars → Dependency score (% reporting high dependency)

### Discussion

The findings parallel global studies on the negative impacts of smartphone overuse, particularly in children and adolescents (Twenge, 2019; Panova & Carbonell, 2018). Adolescents in Amravati exhibited **sleep disruption and anxiety**, echoing patterns seen in urban Indian settings (Davey & Davey, 2014).

Adults reported **workplace distraction and musculoskeletal pain**, while the elderly struggled with **visual strain and slower cognitive processing**, consistent with findings from Bangalore's mobile usability eye-tracking study (arXiv, 2021).



**Strengths:** Multi-method approach with both quantitative and qualitative data.  
**Limitations:** Cross-sectional design limits causality; reliance on self-report; small sample size.

## Conclusion

Android smartphone overuse in Amravati correlates with:

- **Children/Adolescents:** Attention deficits, sleep disruption, anxiety.
- **Adults:** Neck/shoulder pain, cognitive lapses, relationship strain.
- **Elderly:** Visual fatigue, slow cognitive performance.

### Recommendations:

- Screen-time caps:  $\leq 2$  hrs/day for children/adolescents (AAP, WHO).
- Digital hygiene workshops for families and schools.
- Ergonomic awareness sessions for adults.
- Simplified digital interfaces and training for elderly users.
- Road safety campaigns addressing smartphone use.

### Future research should include **longitudinal tracking** and **controlled intervention trials**.

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