



FROM SMARTPHONES TO HUNCHBACKS: UNDERSTANDING STUDENT POSTURE IN THE DIGITAL ERA

¹Dr. Anupama Dhuria, ²Dr. Shallabh Kumar Singh

¹Assistant Professor, ²Assistant Professor

¹Department of Physiotherapy,

¹Era University, Lucknow, India

Abstract : In the digital era, smartphones have become integral to the daily lives of undergraduate students, raising concerns about their potential impact on posture and musculoskeletal health. Forward head posture, a common issue associated with prolonged smartphone use, can lead to discomfort and postural imbalances. Understanding the relationship between smartphone usage and posture in this demographic is essential for developing targeted interventions and promoting responsible smartphone habits. This cross-sectional study assessed the posture of undergraduate students and explored the prevalence of forward head posture deviations. A diverse sample of undergraduate students aged 18 to 25 years, who regularly used smartphones, participated in the study. The Plumb Line Test was used for quantitative posture assessment, while self-reported data on smartphone usage patterns and posture-related discomfort were collected through questionnaires. Qualitative interviews provided deeper insights into students' perceptions regarding smartphone usage and its impact on posture. The average forward head posture deviation among undergraduate students was 2.6 cm, indicating some participants exhibited forward head posture. A moderate positive correlation ($r = 0.42$) was found between average daily smartphone usage time and forward head posture deviation, suggesting increased smartphone usage is associated with poorer posture. Qualitative interviews revealed students' heavy reliance on smartphones, the experience of posture-related discomfort, and challenges in maintaining proper ergonomics during smartphone use. The study highlights the importance of addressing smartphone usage habits and promoting responsible smartphone use among undergraduate students. Educational interventions focused on ergonomic practices, posture alignment strategies, and the significance of taking breaks during smartphone use can mitigate posture-related issues. By raising awareness of the potential impact of smartphone usage on posture, this study contributes to improved musculoskeletal health among the tech-savvy student population

IndexTerms - Digital Era, Forward Head Posture, Smartphone Usage, Posture,.

I. INTRODUCTION

In the digital era, smartphones have become ubiquitous, and their usage has permeated various aspects of daily life, particularly among young adults and undergraduate students. While these devices offer unparalleled convenience and connectivity, their excessive use and potential impact on posture have raised concerns among healthcare professionals and researchers.

Posture plays a crucial role in maintaining musculoskeletal health and overall well-being. Poor posture, such as forward head posture, can lead to musculoskeletal imbalances and discomfort, particularly in the neck, shoulders, and upper back. Forward head posture is a common issue associated with prolonged periods of screen time and sedentary behavior, which are characteristic of smartphone use (Kwon et al., 2015; Xie et al., 2017).

The prevalence of smartphones among undergraduate students makes them a pertinent population to study regarding posture and smartphone usage patterns. Understanding the relationship between smartphone use and posture in this demographic can provide valuable insights for developing targeted interventions and educational programs aimed at promoting healthier technology habits.

Research examining the association between smartphone usage and posture among undergraduate students is essential to identify potential risks and inform preventive measures. Therefore, this study aims to assess the posture of undergraduate students and explore the prevalence of forward head posture deviations in relation to their smartphone usage patterns.

By utilizing quantitative posture assessment tools, self-reported data on smartphone usage patterns, and qualitative interviews, we can gain a comprehensive understanding of the relationship between smartphone usage and posture among undergraduate students. The findings of this study can serve as a foundation for designing evidence-based interventions to improve posture habits and promote responsible smartphone use among students in the digital age.

II. METHODOLOGY:

This research was a cross-sectional study design to assess the posture of undergraduate students and explore the prevalence of posture-related issues. A cross-sectional approach allows us to gather data from a diverse sample of students at a

single point in time, providing a snapshot of the current situation. The study involves a sample of undergraduate students from various disciplines and academic levels. To ensure a diverse sample, participants were selected from different departments or faculties within the university. A sample size calculation was performed to determine the required number of participants to achieve statistical significance. Informed consent was obtained from all participants, ensuring that their confidentiality and privacy are protected throughout the study. Students were included in the study according to the inclusion and exclusion criteria.

Inclusion Criteria:

1. Undergraduate students aged 18 to 25 years.
2. Regular smartphone users engaging in various activities.
3. Voluntarily provide informed consent.

Exclusion Criteria:

1. Participants outside the specified age range.
2. Non-smartphone users or infrequent smartphone users.
3. Individuals with pre-existing medical conditions affecting posture.
4. Participants with incomplete or missing data.

Posture Assessment: The posture assessment was conducted using the Plumb Line Test, a widely used and reliable method to evaluate musculoskeletal alignment. The Plumb Line Test involves the visual examination of the alignment of key body landmarks while participants stand in a relaxed and balanced position. Body landmarks, such as the earlobe, acromion process, greater trochanter, and lateral malleolus, was observed and compared to establish the participants' posture deviations. Participants were also asked to complete questionnaires related to their smartphone usage patterns, including the duration and frequency of use, types of activities performed, and posture-related discomfort experienced during smartphone usage. To gain deeper insights into students' perceptions and attitudes towards smartphone usage and its impact on their posture, qualitative interviews were conducted with a subset of participants. Semi-structured interviews were used to allow for open-ended responses and explore emerging themes.

Data Analysis: Data collected through the Plumb Line Test was analyzed descriptively, prevalent posture issues and deviations from established norms was also identified. Descriptive statistics were also used to analyze the self-reported data on smartphone usage patterns and posture-related discomfort. Correlation analysis was conducted to examine relationships between smartphone usage and posture. Thematic analysis was employed to identify patterns, themes, and insights from the qualitative interview data. Participants' responses were coded and categorized to extract meaningful information.

III. RESULT:

Quantitative Data Results

Posture Assessment: The average forward head posture deviation among the undergraduate student participants was 2.6 cm, with a standard deviation of 0.8 cm. The forward head posture measurements ranged from 1.5 cm to 4.5 cm.

Self-Reported Data

Table 1: Descriptive Statistics of Self-Reported Data

Variable	Mean	Standard deviation	Minimum	Maximum
Smartphone usage (hours)	5.0	1.0	3.0	7.0
Frequency of breaks (per day)	5.2	1.2	3.0	8.0
Discomfort during smartphone use (1-5 scale)	3.1	0.8	2.0	4.0

The self-reported data showed that, on average, the undergraduate students spent approximately 5.0 hours per day using their smartphones, with a standard deviation of 1.0 hour. The frequency of breaks taken during smartphone usage averaged around 5.2 breaks per day, with a standard deviation of 1.2 breaks. The discomfort experienced during smartphone use was rated, on average, at 3.1 on a 1-5 scale, with a standard deviation of 0.8.

Correlation Analysis:

To examine the relationship between smartphone usage and forward head posture deviation, we conducted a Pearson correlation analysis.

Table 2: Correlation between Smartphone Usage and Forward Head Posture Deviation

variable	Smartphone usage (hours)	Forward head posture deviation (cm)
Smartphone usage (hours)	1.00	0.42**
Forward head posture deviation	0.42 **	1.00

**Correlation is significant at the 0.01 level (2-tailed)

The correlation coefficient (r) between smartphone usage and forward head posture deviation was 0.42, indicating a moderate positive correlation. The correlation was statistically significant at the 0.01 level (2-tailed), suggesting that there is a meaningful relationship between the average daily smartphone usage time and forward head posture deviation among undergraduate students.

Qualitative Data Results

Through qualitative interviews with a subset of participants, several themes emerged regarding the perceptions and attitudes of undergraduate students towards smartphone usage and its impact on posture.

- *Theme 1: Smartphone Usage Habits* Participants mentioned using their smartphones extensively for academic work, social interactions, and entertainment activities.

Quotation: "I rely on my phone for studying, chatting with friends, and watching videos. It's like a mini-companion throughout the day".

- *Theme 2: Posture-Related Discomfort* Many students reported experiencing discomfort, particularly in the neck and shoulders, after extended periods of smartphone use.

Quotation: "After hours of scrolling and typing, my neck starts hurting, and my shoulders feel tense. I guess it comes with the territory of using phones so much".

- *Theme 3: Awareness of Proper Posture* While students acknowledged the importance of maintaining good posture, they admitted finding it challenging to consistently practice proper ergonomics during smartphone use.

Quotation: "I know I should sit straight while using my phone, but it's hard to remember all the time, especially when I'm engrossed in something".

- *Theme 4: Taking Breaks to Relieve Discomfort* Many participants recognized the value of taking short breaks to relieve discomfort and make adjustments to their posture during these breaks.

Quotation: "When my neck feels stiff or my eyes strain, I take short breaks to stretch and relax my muscles. It does help for a while".

IV. DISCUSSION:

The results of this study provide valuable insights into the relationship between smartphone usage and posture among undergraduate students. Both quantitative and qualitative data shed light on the prevalence of forward head posture deviation, self-reported smartphone usage patterns, and students' perceptions regarding the impact of smartphone use on their posture.

Result revealed that the average forward head posture deviation among undergraduate students was 2.6 cm, indicating that some participants exhibited forward head posture. This finding aligns with previous research that has shown the prevalence of forward head posture and associated musculoskeletal issues among individuals who frequently use electronic devices, including smartphones (Kwon et al., 2015; Kim et al., 2016). The forward head posture can lead to increased stress on the neck and upper back muscles, potentially contributing to discomfort and postural dysfunction (Hansraj, 2014).

The correlation analysis demonstrated a moderate positive correlation ($r = 0.42$) between the average daily smartphone usage time and forward head posture deviation. This finding suggests that as undergraduate students spend more time using their smartphones, they are more likely to exhibit forward head posture. Similar results have been reported in previous studies, indicating that increased smartphone usage is associated with poorer posture and musculoskeletal complaints (Xie et al., 2017; Peper et al., 2017).

The qualitative interviews provided additional insights into students' smartphone usage habits and their perceived impact on posture. Participants mentioned heavy reliance on smartphones for academic work, social interactions, and entertainment activities. This reliance on smartphones is in line with the widespread use of these devices among young adults for various purposes.

Posture-related discomfort emerged as a common concern among participants, particularly in the neck and shoulders. Students reported experiencing discomfort after prolonged smartphone use, echoing findings from previous studies that link smartphone usage to neck and shoulder pain (Hakala et al., 2012; Coqueiro et al., 2017). Such discomfort may be attributed to prolonged static postures, repetitive movements, and poor ergonomics during smartphone use (Lee et al., 2019).

Students' awareness of the importance of maintaining good posture was evident from the interviews. However, they acknowledged finding it challenging to consistently practice proper ergonomics while using their smartphones. This challenge could be attributed to the immersive nature of smartphone activities, which may distract users from adopting appropriate posture (Alghadir et al., 2017).

Participants recognized the value of taking breaks to relieve discomfort and make posture adjustments. Taking breaks from smartphone usage can be beneficial in reducing the risk of musculoskeletal issues and visual strain associated with prolonged screen time (Hong & Kim, 2017).

It is essential to acknowledge the limitations of this study. Firstly, the cross-sectional design limits the establishment of causality between smartphone usage and forward head posture deviation. Secondly, self-reported data may be subject to recall and response biases. Additionally, the sample was drawn from a single university, potentially limiting generalizability to other populations.

V. CONCLUSION:

This study underscores the importance of addressing smartphone usage habits and promoting responsible smartphone use among undergraduate students. Educational interventions could focus on encouraging ergonomic practices, providing strategies for better posture alignment, and emphasizing the importance of taking breaks during smartphone use. By raising awareness of the potential impact of smartphone usage on posture and musculoskeletal health, universities and healthcare professionals can empower students to adopt healthier smartphone habits and reduce the risk of posture-related issues.

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