

How Smartphone Habits Affect Neck Posture and Pain in Health Science Students

Authors

1. Santhosh Krishna Kamaraj

Qualification: Bachelor of Physiotherapy (BPT)

Affiliation: Saveetha College of Physiotherapy,
Saveetha Institute of Medical and Technical Sciences,
Chennai, Tamil Nadu, India.

2. Dr. Vinothkumar Ramalingam (*Corresponding Author*)

Qualification: MPT, Ph.D.,

Affiliation: Saveetha College of Physiotherapy,
Saveetha Institute of Medical and Technical Sciences,
Chennai, Tamil Nadu, India.

3. Bismi Farhana.M

Qualification: Bachelor of Physiotherapy (BPT)

Affiliation: Saveetha College of Physiotherapy,
Saveetha Institute of Medical and Technical Sciences,
Chennai, Tamil Nadu, India.

4. Abinaya Shree A

Qualification: Bachelor of Physiotherapy (BPT)

Affiliation: Saveetha College of Physiotherapy,
Saveetha Institute of Medical and Technical Sciences,
Chennai, Tamil Nadu, India.

5. Hemalatha

Qualification: Bachelor of Physiotherapy (BPT)

Affiliation: Saveetha College of Physiotherapy,
Saveetha Institute of Medical and Technical Sciences,
Chennai, Tamil Nadu, India.

ABSTRACT:

Background:

The widespread use of smartphones, especially among students, has led to growing concerns about its impact on posture and musculoskeletal health. Prolonged use often results in forward head posture (FHP), which may contribute to neck pain and disability.

Objective:

To investigate the association between smartphone addiction, forward neck posture, and neck disability among health science students.

Methodology:

A total of 100 health science students who met the inclusion criteria participated in this cross-sectional study.

Participants completed the **Smartphone Addiction Scale – Short Version (SAS-SV)** and the **Oswestry Disability Index (ODI)** questionnaire to assess addiction levels and neck disability. Photographic analysis was used to measure the **craniovertebral angle** for evaluating FHP via the photogrammetric method. Data were analyzed using the **Mann-Whitney U test** to determine the differences between addicted and non-addicted groups.

Results:

There was a statistically significant difference ($p < 0.001$) between addicted and non-addicted students in terms of smartphone usage duration, FHP, and neck disability. However, within the addicted group, no significant association was found between the degree of addiction and hours of usage, FHP, or ODI scores.

Conclusion:

Smartphone addiction is associated with an increased risk of developing forward head posture and neck disability. Although addiction itself may not directly correlate with usage hours or postural changes, reducing screen time could be a preventive strategy to mitigate musculoskeletal issues among health science students.

INTRODUCTION:

Forward head positioning, or FHP, is the exaggerated anterior posture of the skull with regard to a perpendicular connecting line[1]. The extreme anterior posture of the skull with respect to a perpendicular connecting line is known as front head placement, or FHP[2]. Technology has many advantages, such as improved productivity and efficiency at work, but it can also lead to the development of musculoskeletal disorders [3]. Long periods of forward head position can cause excessive straining in the muscles surrounding the joints and compress the tendons throughout the atlanto-occipital articulation. This can lead to musculoskeletal issues, such as upper crossing syndrome, and affect not only the neck but also the shoulder joints and thoracic spine [4], [5]. The forward head posture (FHP), also known as "text neck," "scholar's neck," "wearies neck," and "reading neck," places the cervical spine anteriorly. Higher forward head position is associated with greater deficits in cervical rotation and flexion range of motion (ROM); increased cervical flexion is associated with more thoracic kyphosis; and decreased cervical ROM is associated with increasing age [6]. Neck pain is strongly associated with female gender, age, smoking cessation, rigorous work schedules, and a lack of social or professional support. Long-term maintenance of compensatory postures may lead to musculoskeletal abnormalities and discomfort [7]. Work-related musculoskeletal ailments are defined by the World Health Organization as injuries to muscles, tendons, peripheral nerves, and arterial arteries that may be caused by, preceded by, or exacerbated by recurrent or continuous use of a specific body component[2],[8]. other portable device, demonstrating the explosive growth in mobile phone use [9]. Smartphones are now the most dependable device for internet-based communication, entertainment, and a variety of other purposes when compared to other recent technical developments. According to some reports, people spend over 20 hours a week using their smartphones for social networking, messaging, emailing, and communicating, which may indicate a smartphone addiction [10]. This condition has resulted in a number of negative consequences, such as a decrease in face-to-face communication, a rise in individualization, addictive behaviors, and psychiatric problems [11]. As per the dictionary, "addiction" is defined as: (1) a pathologic condition that requires constant drug or alcohol administration; (2) a functional abnormality of the body caused by food or pharmaceutical toxins; and (3) the state of not being able to judge or distinguish rationally because of things or ideas. However, "addiction," which is frequently treated in neuropsychiatric hospitals, is a disorder that manifests as social problems, withdrawal symptoms, tolerance, and dependency. Despite being initially limited to drugs or substances, the term is now used to describe a variety of behavioral addictions, including gambling, Internet gaming, and cell phone use [12].

NEED FOR THE STUDY:

With the rapid integration of smartphones into daily life, particularly among health science students for academic, social, and recreational purposes, there has been a noticeable rise in musculoskeletal complaints, especially in the cervical spine region. Forward head posture (FHP), commonly observed during prolonged smartphone use, can lead to long-term postural imbalances and neck disability. While smartphone addiction is increasingly recognized as a behavioral concern, its physical implications—such as postural changes and associated disability—remain underexplored in the student population.

Understanding the relationship between smartphone addiction, forward neck posture, and neck disability is essential to develop early preventive strategies and promote awareness among students. As future healthcare professionals, health science students must be made aware of the health risks linked to their own digital habits. This study aims to fill the gap in existing literature by providing insight into these associations and helping guide ergonomic and behavioral interventions

METHOD

Students from a private institution in southern India with a background in health sciences were chosen as the study's subjects. During the preliminary phase, which ran from October 2023 to December 2023, participants were recruited via the Google link. The survey link received responses from 250 of the 500 health science students. Only 100 of them satisfied the requirements for study enrollment. Students between the ages of 18 and 23 and those who use their smartphones for more than an hour are included in the inclusion criteria. Participants are classified as either addicted or non-addicted based on their SAS score; those with an SAS score of 45 or more are classified as addicted.

REVIEW OF LITERATURE

Balthillaya et al. (2022) proposed a systematic review protocol focusing on the effectiveness of posture-correction interventions for individuals with mechanical neck pain and FHP. Their work underscores the growing need for evidence-based therapeutic strategies to address posture-related issues, particularly those affecting the cervical spine due to prolonged forward head posture [1].

Wiguna et al. (2019) conducted a study on junior high school students in North Denpasar and found a significant relationship between smartphone addiction and forward head posture. Their findings highlight how early exposure to excessive screen time can lead to lasting postural imbalances in adolescents [2].

Abdollahzade et al. (2017) examined the impact of a four-week postural correction exercise program on individuals with FHP. The study revealed significant improvements in cervical alignment, supporting the efficacy of targeted physical interventions for posture correction [3].

Ashok et al. (2020) investigated the prevalence of FHP among electronic gamers and found that prolonged gaming, often in poor ergonomic setups, contributed to postural deviations. This study emphasizes how lifestyle factors and screen time habits are strongly associated with FHP, especially in youth populations [4].

Contractor et al. (2018) explored the correlation between craniovertebral angle and neck pain among young adults. Their study showed that a smaller craniovertebral angle—a marker of FHP—was associated with higher levels of neck pain, suggesting that even minor postural changes can significantly affect cervical spine health [5].

TABLES:

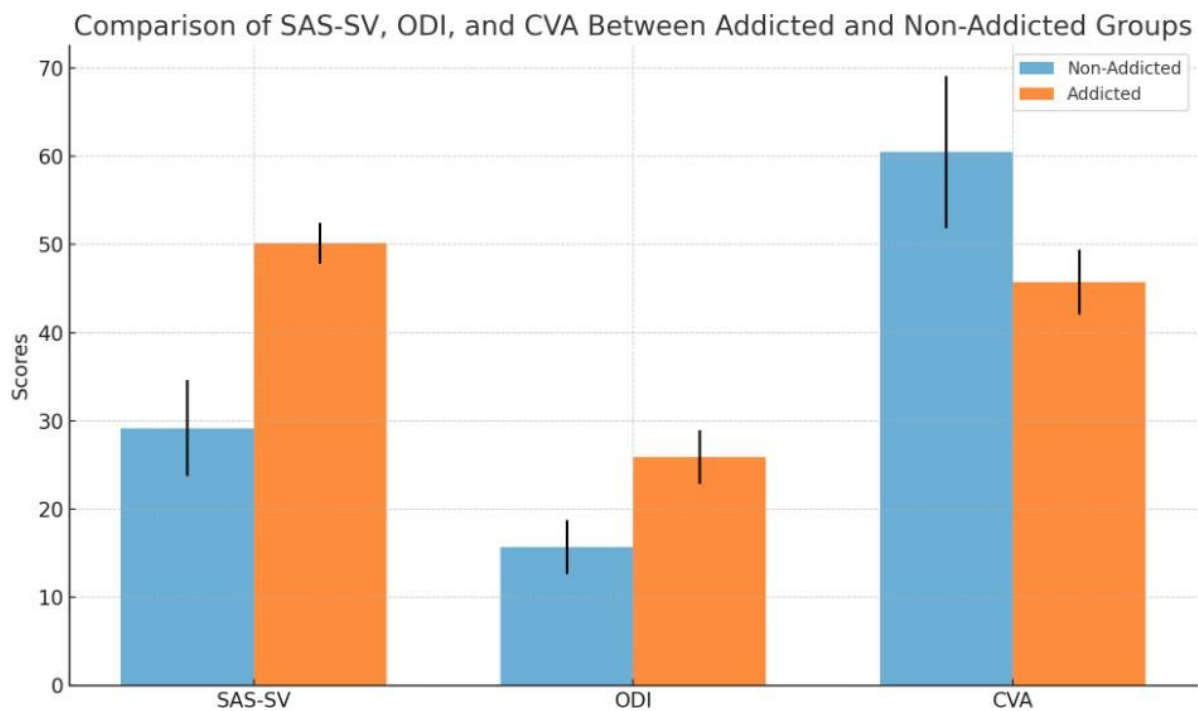
Table 1: Descriptive Statistics for Non-Addicted Group (n = 87)

Variable	Mean	Standard Deviation (SD)
Smartphone Addiction Scale – Short Version (SAS-SV)	29.17	5.46
Oswestry Disability Index (ODI)	15.72	3.05
Craniovertebral Angle (CVA)	60.49	8.65

Table 2: Descriptive Statistics for Addicted Group (n = 13)

Variable	Mean	Standard Deviation (SD)
Smartphone Addiction Scale – Short Version (SAS-SV)	50.14	2.31
Oswestry Disability Index (ODI)	25.92	3.05
Craniovertebral Angle (CVA)	45.74	3.68

Graph



Here's the graph comparing the **SAS-SV**, **ODI**, and **CVA** scores between the **addicted** and **non-addicted** groups, including error bars for standard deviation.

RESULTS:

The study included a sample of 100 health science students, comprising 87 non-addicted and 13 addicted participants, categorized based on their Smartphone Addiction Scale – Short Version (SAS-SV) scores. A comparative analysis of smartphone addiction, neck disability, and forward head posture was conducted using mean scores and standard deviations for each group.

- **Smartphone Addiction (SAS-SV):**

The addicted group showed a significantly higher mean SAS-SV score (50.14 ± 2.31) compared to the non-addicted group (29.17 ± 5.46), confirming the marked difference in addiction levels between the two groups.

- **Neck Disability (ODI):**

The mean ODI score was substantially greater in the addicted group (25.92 ± 3.05) than in the non-addicted group (15.72 ± 3.05), indicating a higher level of functional neck disability among addicted students.

- **Forward Head Posture (CVA):**

Craniovertebral angle (CVA), an indicator of forward head posture, was lower in the addicted group ($45.74^\circ \pm 3.68$), suggesting a more pronounced forward head posture. In contrast, the non-addicted group showed a higher mean CVA ($60.49^\circ \pm 8.65$), reflecting better cervical alignment.

These findings illustrate a clear pattern where students classified as smartphone-addicted demonstrate significantly poorer posture and higher neck disability compared to their non-addicted peers. The data highlights the potential physical consequences of excessive smartphone usage and supports the need for ergonomic awareness and usage moderation among students.

CONCLUSION

This study establishes a significant association between smartphone addiction, forward head posture (FHP), and neck disability among health science students. Participants identified as smartphone-addicted demonstrated markedly higher levels of neck disability and more pronounced forward head posture, as indicated by lower craniovertebral angles, compared to their non-addicted peers.

While addiction was clearly linked to poorer postural and functional outcomes, the findings also suggest that high smartphone usage, even in the absence of addiction, may contribute to musculoskeletal strain over time. These results emphasize the importance of promoting awareness about ergonomic practices, limiting screen time, and incorporating posture-corrective strategies to mitigate the adverse effects of excessive smartphone use among students.

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