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IMPACT OF PROLONGED SMARTPHONE USAGE ON NECK PAIN AMONG STUDENTS OF IGTAMSU, ZIRO

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ABSTRACT

INTRODUCTION: In today's digital age, smartphone technology and applications uses are becoming popular among university students. In recent research on Smartphone usage, university students outperformed all other age groups. Consequently, there is evidence of a large and noteworthy percentage of musculoskeletal disease especially in the neck among the college students.

AIM: The study aims to explore the impact of prolonged smartphone usage on neck pain among university students of IGTAMSU.

OBJECTIVES: To assess the relationship between prolonged usage of smartphone and neck pain, to determine the number of students affected with neck pain due to prolonged smartphone use and, to assess the severity of neck pain due to smartphone use.

METHOD: This cross- sectional correlation study was conducted on 209 students from Indira Gandhi Technological and Medical Sciences University, Ziro, Arunachal Pradesh, using probability simple random sampling. Participants age 18-26 years with daily smartphone usage ≥3 hour or more per day. Data collection tools included a self –structured demographic form, the Smartphone Addiction Scale – short Version (SAS-SV) and Neck Disability Index (NDI). Ethical approval and informed consent were obtained prior to data collection.

RESULT: Out of 209 participants,163 (77.99%) were females and 46 (22.01%) were male, with mean age 20.8±1.89 years. About 86.6% (n=103) of students with smartphone addiction were found to have neck pain, whereas only 68.9% (n=62) of those without smartphone addiction experienced neck pain. A Chi-square test of independence was conducted to examine the association between smartphone addiction status and neck pain among students. All expected smartphone frequencies were greater than 5. The results indicated a statistically significant association between smartphone addiction and neck pain, p=0.002.

CONCLUSION: A significant association between smartphone addiction and neck pain among university students of IGTAMSU.

Key words: Neck pain, Smartphone Addiction, SAS-SV and NDI

Introduction:

Smartphones are now the most popular portable electronic device worldwide. In today's digital age, smartphone technology and applications are becoming popular among university students. This could be due to Smartphones multifunctional ability to implement several functions such as information, communication, online learning, and entertainment. In recent research on Smartphone usage, university students outperformed

all other age groups. Consequently, there is evidence of a large and noteworthy percentage of musculoskeletal disease especially in the neck among the college students[1]. According to current estimates (2025), 3.5 billion people use smartphone globally.[2]

Several studies have revealed that smartphone use increased during the covid-19 pandemic. The majority of the world's population has become increasingly reliant on electronic screens on a daily basis. This widespread reliance has resulted in smartphone addiction, particularly among the school and college students[3]. Smartphone addiction, defined as the prolonged overuse of smartphones to the point where it interferes with daily activities, has emerged as a urgent public health concern. This is behavior is especially prominent among university students, who have grown up in an era dominated by digital technology.[4] More than 79% of age (18-44year old) use their cell phones most of the day, with only a short break. Long-term use of smartphone communication technology has been linked to smartphone addiction, with substantial dangers to human health such as significant and persistent functional impairment with distress and behavioral addiction in users[5].

Neck pain is typically defined as discomfort or pain between the occiput and the third thoracic vertebra.[6] The neck or cervical spine has intricate anatomy. It has a well-organized network of bones, ligaments, muscles, nerves, and spinal cords[18]. Neck pain is a widespread musculoskeletal condition and one of the top causes of disability globally. Neck pain can lead to reduce work hours, decreased engagement in recreational activities, and sleep disturbances. Importantly, neck pain is a major factor in employee attrition. According to research, many new neck pain episodes begin in college and last after graduation (2020).[7] Neck pain is a widespread public health concern and one of the main causes of disability worldwide. It has a major impact on quality of life, academic achievement, and productivity particularly in young adults. Neck pain which was previously thought to be more common in older people or those with physically demanding employment, is now being seen in younger, more sedentary groups, such as university students.[8]

Musculoskeletal discomfort among smartphone users ranges from 1% to 67.8%. Neck pain is the most prevalent musculoskeletal complaint among the smartphone users, ranging from 17.3% to 67.8%. Neck pain was more prevalent among frequent smartphone user. Neck pain is associated with the duration of smartphone use, particularly long periods of time spent multitasking[9]. Neck pain is caused by irritation in the neck's muscles and ligaments, generally as a result of poor posture, which limits neck rotation, reduces range of motion, and changes muscle activation patterns. Furthermore, neck pain might compromise cervical spine stability by weakening the muscles.[10]It may also cause by bad posture, overuse of technology, a neutral spine, and excessive neck flexion for extended periods of time. And is the most common pain worldwide and ranks fourth among disabilities.[11]

Musculoskeletal problems associated with smartphone use in various body regions have been documented, ranging from 8.2% to 89.9%. Research conducted in Canada found that 84%of students who used smart phones had musculoskeletal pain in at least one body are, with 52% reporting pain in right shoulder, 46% in the left shoulder, 68% in the neck, and 62% in the upperback.[12]

A comprehensive assessment of the literature on risk factors for neck pain in university students discovered a clear link between long- term electronic device use and the development of neck pain. According to the study, extended usage of electronic device (more than 3 hours per day) is a significant risk factor. Long term mobile phone use can cause the formation of locked head and neck positions, putting additional strain on the neck muscles and spine. With the rising popularity of smart phone use in modern day, the chance of posture deterioration may rise as muscles receptors adapt to new circumstance. Frequent mobile phone use can lead to neck muscular stress and discomfort[13]

A person's cervical lordosis is destroyed and the soft tissues surrounding the neck are injured when they use smartphone. The cervical spine's erector spinae and the upper trapezius muscles are under more strain in order to maintain neck equilibrium. The stress on the extensor muscles and connective tissues rises when the head is slouch or positioned forward.[14]

A recent study in India (2022) found that 46.9% of students suffer from neck pain and 29.2% from thumb pain as a result of prolonged smartphone use.[15]

According to a 2019 study, 27 out of every 1000 people had neck pain, the most common musculoskeletal condition. Numerous variables, such as prolonged computer use, repetitive motion, and inadequate ergonomic workplace setups, are frequently linked to neck pain. Lifestyle decision like inadequate physical activity and poor sleep quality exacerbates this.[16]

Prolonged use of mobile phone causes posture alterations. When using a smartphone for extended amount of time, users adopt a forward head posture, which can cause neck pain. Neck pain is caused by forward bending of the neck as a result of abnormal posture due to prolonged static positioning. Prolong placement of neck in inappropriate posture such as forward bending of neck produce neck pain. As the head moves forward the stress sustained by the spine increases significantly.[17]

According to comprehensive assessment of the literature, students who use electronic devices for more than three hours a day are far more likely to experience neck pain. People frequently keep a fixed head and neck position when using smartphone for extended periods of time. The cervical spine, neck muscles, and the surrounding soft tissues are overly strained by this extended static position. Continuous exposure to bad posture habits might eventually lead to postural degeneration since the muscles and receptors gradually adjust to this abnormal position. As a result, excessive use of smartphone and other electronic devices is thought to be a significant risk factor for neck pain, highlighting the importance of maintaining good posture, taking frequent breaks, and limiting screen time[13].

Need of the study:

University students are especially susceptible to neck pain because of their erratic schedule and tendency to adopt bad posture when using smartphone for extended period of time. As many of us may not be aware of the musculoskeletal problem that may arise overtime, even if we may be aware of the dangers of prolonged screen time. Therefore, this study is needed to assess the extent of this issue and promote awareness among the students of IGTAMSU[8].

Aim: The study aims to explore the impact of prolonged smartphone usage on neck pain among university students of IGTAMSU.

Objectives:

i. To assess the relationship between prolonged usage of smartphone and neck pain
ii. To determine the number of students affected with neck pain due to prolonged smartphone use
iii. To assess the severity of neck pain due to smartphone use.
iv. To assess the number of students addicted to smartphones.

Research Question:

1. What is the relationship between prolonged usage of smartphone and neck pain?
2. How many students were affected due to prolonged smartphone use?
3. What was the severity of neck pain due to smartphone use?
4. How many students are addicted to smartphones?

Methodology:

a) Study design: Survey (Correlation study)
b) Study setting: Indira Gandhi technological and medical sciences university Ziro Arunachal Pradesh.
c) Study duration: 1year
d) Study population: Students of IGTAMSU (456)
e) Sample size: 209
f) Method of data collection: Questionnaire method.
g) Sample technique: simple random sampling

h) Selection criteria: -

- Inclusion criteria: -

- Students age group:18 years to 26 years old
- Students who are willing to take participate
- Students who are able to understand and responds to the questionnaire in the language of administration (i.e. English)
- Both gender (Male and Female)

- Exclusion criteria: -

- History of pre-existing cervical spondylosis, cervical disc herniation.
- Students who are not willing to participate
- History of surgery or trauma in the neck.

i) Material and equipment required:

- Printed Questionnaire
- Pen
- Paper
- Pencil

MEASURING TOOLS

a. SAS-VS (SMARTPHONE ADDICTION SCALE – SHORT VERSION)
b. NDI (NECK DISABILITY INDEX)

Data collection procedure

Prior to data collection, ethical approval was obtained from the Institutional. Participants were approached during the least busy hours to minimize any disturbances with their duties. Each participant received an information sheet about the study's objectives, risk and benefits of participation, right to withdraw at any time, confidentiality assurance. The written informed consent was obtained from every participant before data collection started. Data was primarily collected through face-to-face interviews and filling up the questionnaire form for clarity and completeness. Completed forms were securely collected immediately after completion. The data were presented as measures of frequency and percentage of the variables with graphs. The results were analyzed using Microsoft Office Excel.

Result

Results illustrate that 107 (51.20%) students had age 18-20 years, however; 83(39.71%) students had age 21-23 years and 19 (9.09%) students had age 24-26 years. The majority of the respondent were females 163(77.99%) and 46(22.01%) were males (table 1).

Table 1. Age distribution

Age Group (Years)	Frequency (n=209)	Percentage (%)
18-20	107	51.20
21-23	83	39.71
24-26	19	9.09
Mean age = 20.81±1.83		

In terms of gender distribution, out of 209 participants,163 (77.99%) were females and 46 (22.01%) were males. This indicates that the majority of participants in the study were females.

Table 2. Gender distribution

Gender	Frequency (n=209)	Percentage (%)
Male	46	22.01
Female	163	77.99

Regarding the distribution of students that uses smartphone, shows that all 209 students (100%) used smartphone, while none of the students reported not using smartphones (0%).

Table. 3. Distribution of students that uses smartphone

Smartphone used by students	Frequency (n=209)	Percentage (%)
Yes	209	100
No	0	0

Out of those 157 students (75.12%) use smartphone for ≥4hours, and 52students (24.88%) use smartphone for 2-3 hours, while no students reported using smartphone for 1-2 hours (table 4). Study shows that among 209 students, most students (114 students, 54.55%) used smartphone intermittently, while 94 students (45.45%) used smartphone continuously. This indicates that intermittent smartphone use was slightly more common among the students (table 5)

Table 4. Distribution of duration of smartphone usage among students

Duration of smartphone usage	Frequency (n=209)	Percentage (%)
1 hour-2hours	0	0.00
2 hours-3 hours	52	24.88
≥4hours	157	75.12

Table 5. Distribution of use of smartphone

Smart phone usage type	Frequency (n=209)	Percentage (%)
Continuous	95	45.45
Intermittent	114	54.55

Result show that the smartphone addiction status of 209 students, which were assessed by using the SAS-SV scale, shows that, 119 students (56.94%) were classified as smartphone addicted, while 78 students (37.32%) were identified as being at high risk of smartphone addiction. Only few students were found to be non-addicted. Overall, the finding indicate that the majority of students are either addicted to smartphone or are at risk of smartphone addiction (table 6).

Table 6. Distribution of smartphone addiction status of students using SAS-SV

SAS-SV	Frequency (n=209)	Percentage (%)
Addiction	119	56.94
High Risk	78	37.32
non addiction	12	5.74

Out of 209 recruited participants a vast proportion of participants 40 (33.61%) reported mild neck disability, 36 (30.25%) participants reported moderate neck disability, 16 (13.45%) participants reported severe neck disability, 11 (9.24%) participants reported complete neck disability and 16(13.45%) participants reported no disability which was assessed by using Neck Disability Index scale. Thus, the result indicates that mild to moderate neck disability was more common among the smartphone addicted students (table 7).

Table 7. Distribution of neck disability status among smartphone addicted students using NDI

NDI	Frequency (n=119)	Percentage (%)

Complete	11	9.24
Severe	16	13.45
Moderate	36	30.25
Mild	40	33.61
no disability	16	13.45

A Chi-square test of independence was conducted to examine the association between smartphone addiction status and neck pain among students. All expected cell phone frequencies were greater than 5. The results indicated a statistically significant association between smartphone addiction and neck pain, $\chi^2(1, N=209) = 9.61$, $p=0.002$, $\varphi = 0.21$, OR = 2.91, 95% CI [1.47, 5.76]. Thus, H1 was supported.

As shown in Table 8, 86.6% (n = 103) of students classified as addicted reported neck pain compared to 68.9% (n = 62) of students who were not addicted.

Table 8. Association between smartphone addiction status and neck pain among students

Addiction status/Neck pain	Neck Pain	No Neck Pain	Total
Addicted	103 (86.6)	16 (13.4)	119 (100)
Not Addicted	62 (68.9)	28 (31.1)	90 (100)
Total	165 (78.9)	44 (21.1)	209 (100)

Discussion

The first objective of the study was to assess the relationship between prolonged usage of smartphone and neck pain. The study revealed that there is significant association between smartphone addiction and neck pain, $\chi^2(1, N=209) = 9.61$, $p=0.002$, $\varphi = 0.21$, OR = 2.91, 95% CI [1.47, 5.76]. A cross- sectional study was conducted by (**Suresh A et al, 2022)** on Impact of smartphone addiction on neck pain and disability in university students, the study concluded that longer the use of smartphones would result in significant neck pain and disability. A another cross- sectional survey study was conducted by **Manzoor N et al,2023** on Prevalence of neck pain due to prolonged use of smartphone among university students, the study concluded that there is a high prevalence of neck pain in mobile phone users. Moreover, prolonged use of mobile phone is strongly associated with neck pain and neck disability. According to study conducted by **Tariq S et, al 2025** in relationship of smartphone addiction with musculoskeletal discomfort among undergraduate university students. The study concluded that there is a significant correlation exists between smartphone addiction and musculoskeletal discomfort among undergraduate students, particularly in the neck, upper back, and upper limbs.

The second objective of the study was to determine the number of students affected by neck pain due to prolonged smartphone use. The result revealed that 86.6% (n = 103) of students classified as addicted reported neck pain compared to 68.9% (n = 62) of students who were not addicted. Neck pain is the most prevalent musculoskeletal complaint among the smartphone users, ranging from 17.3% to 67.8%. Neck pain was more prevalent among frequent smartphone user[9]. Musculoskeletal problems associated with smartphone use in various body regions have been documented, ranging from 8.2% to 89.9%. A research conducted in Canada found that 84%of students who used smart phones had musculoskeletal pain in at least one body are, with 52% reporting pain in right shoulder, 46% in the left shoulder, 68% in the neck, and 62% in the upperback.[12] A recent study in India (2022) found that 46.9% of students suffer from neck pain and 29.2% from thumb pain as a result of prolonged smartphone use.[15]

The third objective of the study was to assess the severity of neck pain due to smartphone use. The result revealed that out of 209 recruited participants a vast proportion of participants 40 (33.61%) reported mild neck disability, 36 (30.25%) participants reported moderate neck disability, 16 (13.45%) participants reported severe neck disability, 11 (9.24%) participants reported complete neck disability and 16(13.45%) participants reported no disability which was assessed by using Neck Disability Index scale. Thus, the result indicates that mild to moderate neck disability was more common among the smartphone addicted students.

Conclusion:

According to the current study, smartphone addiction is very common among university students and is strongly linked to neck pain. The majority of participants were female students between age of 18-20 years. All participants reported using smartphones, and the majority of students used them for more than 4hours per day, mostly while in a seated position. The prevalence of intermittent smartphone use was somewhat higher than that of constant use.

A significant percentage of students were either smartphone addicted or at high risk of becoming hooked, which has been asses by using SAS-SV scale. The most prevalent type of neck disability among students was mild to moderate, according to NDI.

According to statistical study, there is a strong correlation between neck pain and smartphone addictions, i.e. students who are more addicted to their phones are more likely to have neck pain. Thus, extended and excessive use may link to musculoskeletal issues like neck pain in the university students.

In order to minimize the neck pain and lower the risk of smartphone addiction among university students, it is crucial to raise awareness of good posture, restrict screen time, take regular breaks and adopt healthy smartphone usage practices. Universities should support educational and awareness initiatives that foster greater physical health and appropriate smartphone use.

Limitation:

- Utilization of different electronic devices such as computer, laptop and tablets.
- Involvement of students from specific age groups.
- The study involved students from one university only.
- Participation was higher among female students than male students.
- The research did not consider factors like stress, anxiety and depression that may influence smartphone addiction.

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