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Association of Screen Time with Neck Pain and Headache Frequency among Hostel Students: A Cross-Sectional Observational Study

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Abstract: ***Background: Increased smartphone, tablet and laptop use among young adults has raised concerns about musculoskeletal discomfort and headaches. Prolonged screen use may involve sustained neck flexion, cervical muscle loading and visual strain. Aim: To assess the association of daily screen time with neck pain and headache frequency among hostel students. Methodology: This cross-sectional observational study included 130 hostel residents aged 18–25 years. Screen time was obtained from smartphone usage records. Neck pain was assessed using the Numeric Pain Rating Scale (NPRS), and headache frequency was recorded for the preceding four weeks. Spearman's correlation was used; $p < 0.05$ was considered significant. Results: Mean age was 20.60 ± 1.97 years and mean daily screen time was 4.10 ± 1.76 hours. Mean NPRS score was 1.99 ± 3.41 and mean headache score was 1.63 ± 3.42. Screen time had a weak positive correlation with neck pain (rho = 0.204, p = 0.020), but not headache frequency (rho = 0.035, p = 0.695). Conclusion: Screen time was weakly associated with neck pain, but not headache frequency. Ergonomic awareness, postural variation and regular breaks may help reduce screen-related discomfort.***

Keywords: Screen time, neck pain, headache frequency, hostel students, smartphone use.

1. Introduction

Smartphones, tablets and laptops are widely used by university students for learning, communication and entertainment. Increasing screen exposure has raised concerns about its effects on musculoskeletal health, particularly neck discomfort, as well as sleep and wellbeing [1,2].

Prolonged device use often involves sustained neck flexion and static sitting, which may increase loading on the cervical and shoulder muscles. Hostel students may be exposed to screens for academic and recreational purposes, sometimes with prolonged sitting and limited ergonomic support [2].

Although previous studies have linked smartphone overuse with neck pain, the relationships between screen time, neck pain and headache frequency remain unclear among hostel students. This study examined the association of daily screen time with neck pain and headache frequency in this population.

2. Methodology

A cross-sectional observational study was conducted among 130 hostel students from colleges in and around Mandya, Karnataka, between February and April 2026. Convenience sampling was used following Institutional Ethics Committee approval. The sample size was calculated using an expected correlation of 0.25, 95% confidence and 80% power.

Eligibility criteria

Inclusion criteria were hostel residence, age 18–25 years, regular smartphone use for at least one year, screen use of at least two hours daily, and willingness to participate. Students with cervical spine surgery, neurological disorders, neck- or shoulder-related orthopaedic conditions, diagnosed migraine, recent surgery or trauma, or vestibular disorders were excluded.

Outcome measures and data collection

Daily screen time was obtained from smartphone usage records. Neck-pain intensity was measured using the 0–10 NPRS [3], and headache frequency was recorded as the number of headache days in the preceding four weeks using a structured questionnaire. After hostel permission and written informed consent, data were collected using these measures. Participants reporting symptoms received general postural, ergonomic and exercise advice.

Permission was obtained from hostel authorities, and written informed consent was obtained from all participants. Data were collected using smartphone screen-time records, NPRS and a structured questionnaire. Participants reporting symptoms were given general postural and ergonomic advice and appropriate exercise guidance.

3. Results

The study included 130 hostel students. Demographic details, screen-use patterns and symptom characteristics are presented in Tables 1–4.

Table 1: Demographic Characteristics of Participants (n = 130)

Sr. No	Particulars	n	%
1	Age		
	18–20	85	65.2
	21–25	45	34.6
2	Gender		
	Male	64	49.2
	Female	66	50.8
3	Education		
	Undergraduate (UG)	129	99.2
	Postgraduate (PG)	1	0.8
4	Average daily sleep		
	<5 hours	3	2.3
	5–6 hours	41	31.5
	6–7 hours	42	32.3
	7–8 hours	30	23.1
	>8 hours	14	10.8
5	Use of spectacles/contact lenses		
	Yes	35	27
	No	95	73

The study included 130 hostel students, predominantly aged 18–20 years (65.2%), with a nearly equal gender distribution (49.2% males and 50.8% females). Almost all participants were undergraduates (99.2%). Regarding sleep duration, 32.3% reported sleeping 6–7 hours daily, followed by 31.5% reporting 5–6 hours. Only 2.3% reported sleeping less than 5 hours. Most participants (73.1%) did not use spectacles or contact lenses, whereas 27% reported their use.

Table 2: Screen Time Characteristics (n = 130)

S. No	Particulars	n	%
6	Study screen time on average weekday		
	<2 hours	28	21.5
	2–4 hours	47	36.1
	4–6 hours	41	31.5
	6–8 hours	11	8.4
	>8 hours	3	2.5
7	Screen time on weekend day		
	<2 hours	21	61.3
	2–4 hours	30	23
	4–6 hours	45	34.6
	6–8 hours	26	20
	>8 hours	8	6.1
8	Primary purpose		
	Online classes	16	12.3
	Social media	57	44.1
	Movies / Series	28	21.5
	Reading / Assignments	27	20.6
	Other	2	1.5

The majority of participants reported 2–4 hours (36.1%) or 4–6 hours (31.5%) of screen time for study on an average weekday. On weekends, 34.6% reported 4–6 hours of screen exposure. Social media was the predominant purpose of screen use (44.1%), followed by watching movies/series (21.5%) and reading/assignments (20.6%). Overall, screen exposure was substantial, with social media emerging as the primary contributor to recreational screen use.

Table 3: Neck Pain and Headache Characteristics (n = 130)

S. No	Particulars	n	%
9	Neck pain/stiffness in last 4 weeks (n=127)		
	Never	60	47.2
	1–3 days/month	48	37.8
	4–7 days/month	3	2.4
	8–14 days/month	10	7.9
	>15 days/month	2	1.6
10	Headache in last 4 weeks		
	No headache	73	56.1
	Headache present	57	43.9
11	Duration of headache		
	I do not get headaches	53	40.7
	<1 hour	46	35.3
	1–4 hours	25	19.2
	4–24 hours	6	4.6
	>24 hours	0	0.2
12	Headache worsens after screen use		
	Always	0	0
	Very often	3	2.3
	Sometimes	19	14.6
	Rarely	0	0
	Never	19	14.6
	Do not get headaches	89	68.5

Among 127 participants, 47.2% reported no neck pain or stiffness during the preceding four weeks, while 37.8% experienced symptoms for 1–3 days per month. Headache was reported by 43.9% of participants, whereas 56.1% remained headache-free. Regarding headache duration, 35.3% experienced episodes lasting less than one hour, while 19.2% reported episodes lasting 1–4 hours. Screen exposure was reported to aggravate headaches sometimes in 14.6% and very often in 2.3% of participants. Overall, neck discomfort and headache were relatively common complaints among the hostel students, although most reported no or infrequent symptoms.

Table 4: Neck Pain Intensity (NPRS 0–10) among Hostel Students (n = 130)

NPRS Score	Interpretation	Number of Participants (n)	Percentage (%)
0	No pain	54	41.5
1	Mild pain	19	14.6
2	Mild pain	11	8.4
3	Mild pain	17	13
4	Moderate pain	9	6.9
5	Moderate pain	6	4.6
6	Moderate pain	0	0
7	Severe pain	6	4.6
8	Severe pain	2	1.5
9	Severe pain	1	0.7
10	Worst pain	5	3.8

Most participants were aged 18–20 years (65.2%), with a nearly equal gender distribution. Social media was the most common purpose of screen use (44.1%). Headache was reported by 43.9% of participants, while 56.1% reported no headache.

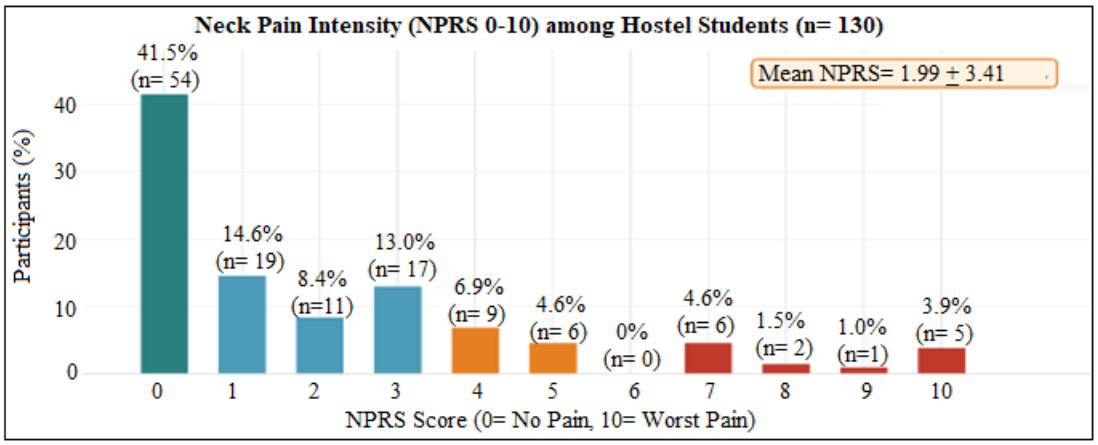


Figure 1: Neck pain intensity NPRS rating

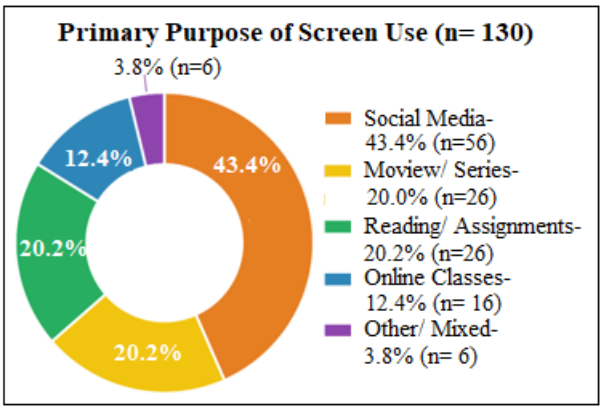


Figure 2: Screens used by hostel students

Descriptive statistics

Variable	Mean	SD
Age	20.60	± 1.97
Screen Time	4.10	± 1.76
NPRS Neck Pain	1.99	± 3.4
Headache /4 weeks	1.63	± 3.42

Correlation analysis

Variables	Correlation and p-value	Interpretation
Screen-Time vs Headache	r = 0.035; p = 0.695	No significant correlation
Screen time vs Neck pain	r = 0.204; p = 0.020	Significant positive correlation

Mean daily screen time was 4.10 ± 1.76 hours. A weak positive correlation was found between screen time and neck pain (r = 0.204, p = 0.020). No significant association was observed between screen time and headache (r = 0.035, p = 0.695).

4. Discussion

A weak but statistically significant positive association was found between daily screen time and neck pain. Students reporting longer screen exposure tended to have higher neck-pain scores, consistent with previous reports linking electronic-device use with neck discomfort [4–7]. Sustained neck flexion and static positioning may increase the mechanical demand on cervical and shoulder muscles.

Screen time was not significantly associated with headache frequency. Headache is multifactorial and may be influenced by sleep, stress and visual problems [8–11], which were not comprehensively assessed in this study. The relationship between screen use and headache may therefore involve factors beyond exposure duration.

These findings should be interpreted cautiously. Posture, workstation setup, physical activity and uninterrupted screen-use duration were not directly measured. In addition, the cross-sectional design cannot establish cause and effect. The results support student education on ergonomic screen use, regular movement breaks and physical activity, although these measures were not tested as interventions.

5. Limitations

The cross-sectional design did not allow follow-up or assessment of the effects of reducing screen exposure. Posture, device-holding habits, floor sitting and bag-carrying patterns were not assessed and may have influenced symptoms.

6. Conclusion

Daily screen time showed a weak, statistically significant positive association with neck pain among hostel students, but no significant association with headache frequency. Causation cannot be inferred. Ergonomic education, regular breaks and physical activity may be useful components of preventive student-health initiatives.

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