**Screen time and headaches among undergraduate adolescents in Rivers State: A menace of the digital epoch**

**Abstract**

**Background:**
The widespread use of digital technologies has led to increased screen exposure among adolescents, raising concerns about their potential health implications. Prolonged screen time has been associated with various adverse outcomes, including obesity, cognitive disturbances, sleep disorders, and, particularly, headaches. This study aimed to examine the relationship between screen time habits and headaches among undergraduate adolescents in Rivers State, Nigeria.

**Methods:**
A cross-sectional study was conducted among 400 adolescents aged 16–19 years from the Department of Computer Science, University of Port Harcourt. Data were collected using a semi-structured, self-administered questionnaire. Participants were selected using a purposive sampling technique. SPSS version 25 was used for analysis. Descriptive statistic was done while bivariate logistic regression was carried out to identify associations between screen time habits and headache occurrence.

**Results:**
Of the 400 respondents, 58.7% were aged 18–19 years, and 70.5% were male. About 45% reported initiating active screen use before the age of 15 years. The overall prevalence of headaches was 74.5%. Statistically significant risk factors for headaches included male sex (OR 1.8, p= 0.01, 95% CI 1.13-2.29); **screen use frequency (OR=0.21, p= 0.01, 95% CI 0.13-0.34);** and **type of device used** by the adolescent (OR 2.3, p= < 0.001, 95% CI 1.55-4.21). While taking regular **screen breaks** (OR = 0.02, p< 0.001, 95% CI: 0.01–0.06) and duration of **daily screen time of less than 6 hours** (OR = 0.13, p < 0.001, 95% CI: 0.07–0.25) were found to be highly protective from recurrent headaches.

**Conclusion:** Primary headache is common among adolescent undergraduates, with the tension type being the most common. Increased screen time use is a risk factor for recurrent headaches. Interventions targeted at creating awareness in the schools on healthy screen time use and public health initiatives are necessary to reduce the untoward health effects of excessive screen time exposure among adolescents in universities.

Key words: Screen time, habit, headaches, adolescents, digital epoch, sleep disorders

**INTRODUCTION**

Digital screen devices have become indispensable tools of daily living in recent times. Coupled with the advent of artificial intelligence and social media, this makes the screen device more desirable among adolescents and young adults worldwide. Thus, screen time (time spent on any digital or electronic screens) – including television, computers, smartphones, tablets, and video games – has become an integral part of modern life. These technologies have the potential to influence human behaviour and health both positively and negatively. Generally, adolescents’ screen time is now a topical issue with health implications.[1], [2], [3], [4], [5] Studies have shown that adolescents spend up to 6-10 hours per day on screens in western countries consuming entertainment and the trend is tending towards this in Africa, as studies have demonstrated that screen time approaches the 6–9-hour mark among adolescents.[5], [6], [7] There is no consensus definition on what prolonged or safe screen time entails, especially as screen time in itself is a broad concept that encompasses passive, educational, and interactive/social screen use.[8] While it is agreeable that there is no “safe” amount of screen time, some authorities recommend limiting non-educational screen time to 1 hour during the week and up to 3 hours during the weekends in children 2-5 years. For children aged 6 and above, including adolescents and young adults, there is presently no definite recommendation on non-educational screen time, but a proposed “healthy screen time” and limiting activities that involve screen use.[1], [8]

Alongside its advantages, screen time has been associated with some adverse events, including addictions, obesity, mental health disturbances, sleep disorders, as well as limiting the involvement in activities of daily living, including outdoor sports and family time. [3], [4], [9], [10]**.** Screen and digital device use have notably been associated with headaches among adolescents. [10] Most headaches in children are caused by primary headache disorders, but in a very small proportion of people, they can indicate a serious neurological disorder that may be life-threatening. An increase in headache frequency and severity is often seen as a sign of secondary causes. Neuroimaging is necessary for certain warning signs and specific clinical situations. The various types of primary headaches, including the broad differential diagnosis between primary and secondary headaches, have to be considered to be able to offer proper guidance on treatment [11], [12].

Some studies on headaches have linked them with exposure to screens. The relationship between regular computer usage and primary headaches has been documented among children and adolescents.[10] For instance Xavier et al [13] showed a positive correlation between headaches and excessive use of electronic devices among adolescents. They further opined that excessive use of screen was a risk factor for developing migraine type of headaches among adolescents. A similar report was observed among young adults, were excess screen use was linked to migraine headache. [14]. On the other hand, studies have reported that children with episodic tension- type headaches and migraines utilised computers more frequently than children without headaches [12], [15]. Likewise, reports has shown that screen use (including computers and television) can trigger headaches in people with primary headaches especially migraine and tension type of headaches [12] , [16].

The mechanism by which the use of screens causes headaches is yet to be fully established, but associations with eye strains from prolonged gaze, eye fatigue, and screen light triggering migraine headaches have been documented. [10] The effects of this on the quality of life of adolescents and their productivity are thus brought into question.

Few studies have been done on screen time in Nigeria; related studies in Africa have demonstrated some effects in terms of neuro-cognition, but most other reports have focused on the psychosocial and physiological effects of digital device use as well as screen time management and academic performance of children and adolescents. [2],[4] There is a paucity of studies on the effect on headache prevalence in our setting. This study was done to report the relationship between screen time habits and primary headaches among undergraduate adolescents at the University of Port Harcourt.

**Materials and methods**

This study is a cross-sectional descriptive study that was carried out among students studying computer science at the University of Port Harcourt, Nigeria, between March 2025 and May 2025.

**Study participants:**  These were adolescents aged 16 to 19 years studying computer science at the University of Port-Harcourt.

**Sample size calculation:** Sample size formulae for a single population was used

$$n=Z^{2}×\frac{P\left(1-P\right)}{d^{2}}$$

Where Z is 1.96, for the confidence level of 95%, p is 51.1% [17] which is the prevalence of headache among adolescents and young adults after active use of the screen, and d is the margin of error set at 0.05, with a non-response rate of 10%. The calculated sample size was 384 adolescents; however, 422 adolescents participated in the study.

**Sampling method:** The Department of Computer Science, in the University of Port Harcourt was selected for this study. Participants were recruited by systematic sampling method. For every three student that enters the department the third was recruited for the study until the sample size of 422 was met.

**Study tool:** Data were obtained using a self-administered structured questionnaire, however, trained researchers supervised the students when necessary. Consent/assent was obtained from the participants after the details of the study were explained to them. For those participants who were less than 18 years, in addition to the assent they gave, a confirmation of permission from parents to participate was obtained. The following information were obtained- socio-demographic details of participants; medical history; history of headache after active screen time use; screen time habits such as type of device used; frequency of screen use per week, daily hours spent on the screen, if there were breaks taken and how long (enough break: 15 minutes break after using the screen for 2 hours, little break: 10 minutes break after using the screen for 2 hours, no breaks: 4 hours on the screen without a break).

**Eye problems**: For the eye problems, the study participants were asked to indicate if they had been diagnosed with any type of eye problems or if they had one, even if they had not seen a doctor.

**For insomnia**, participants were asked if they found it difficult falling asleep or staying asleep at night, or both, after extended use of screens into the night.

**For the headaches**, on the questionnaire, participants were asked if they had ever developed headaches that lasted for several hours in the last 12 months. For participants who reported yes, further questions were asked on the nature of their headache symptoms based on the International Classification of Headache Disorders 3rd edition (ICHD-3). [18] These questions include the location, quality and intensity, frequency, if it pulsates, the effect on daily activities, relieving and worsening factors, and presence of nausea or vomiting, as well as light or sound sensitivity. Also, questions on any accompanying neurologic symptoms, like a change in vision, weakness of limbs, numbness or neck pain, were asked. All the participants had primary headaches, which were further classified into different types based on the ICHD-3.[18]

**Statistical analysis** was performed using the IBM SPSS program version 25. The analysis was descriptive statistics, which was presented in frequencies and percentages using tables. Bivariate logistic regression analysis was used to determine the relationship between screen time habits and recurrent headaches. A p-value equal to or less than 0.05 (p ≤0.05) was considered significant.

**Results:**

A total of 422 questionnaires were distributed for the study, 22 of which were incomplete, giving a response rate of 95%. A total of 400 questionnaires were analyzed.

Social demographic and health variables: The ages of the study participants ranged from 16-19 years. The mean age was 17.7±1.4 years. Two hundred and thirty-five (58.7%) are 18-19 years and 165(41.3%) are aged 16-17 years. The majority of them 282 (70.5%) are males while 118(29.5%) are females. Two hundred of eleven (52.8%) of them are in levels 3 and 4 in the university. Three hundred and one (75.3%) of the participants reported that they often use their devices one hour before sleep. Of the 400 participants, 104 (26.0%) had a history of eye problems, 250 (62.5%) had a history of insomnia, and 298(74.5%) reported a history of recurrent headaches after the use of the screen. (Table 1)

Table 1: Socio-demographic and medical history of participants

|  |  |  |
| --- | --- | --- |
| **Variables**  | **Frequency N=400** | **Percentage**  |
| Age 16-1718-19Mean±SD (years) 17.7±1.4 | 165235 | 41.358.7 |
| SexMales Females  | 282118 | 70.529.5 |
| Level in school1-23-4 | 189211 | 47.252.8 |
| Family history of headachesYes No  | 164236 | 41.059.0 |
| Do you use your device within 1 hour before sleep?YesNo | 30199 | 75.324.7 |
| History of eye problemsYesNo | 104296 | 26.074.0 |
| History of insomnia YesNo | 250150 | 62.537.5 |
|  |  |  |
| **Total**  | **400** | **100.0** |

Of the 400 participants, 298 (74.5%) reported headaches, while 102 (25.5%) did not have recurrent headaches. The most common type of primary headaches among the participant was the tension headaches in 131(44.0%) of them followed by migraine headaches in 91 (30.5%), the least were the headaches that were unclassified in 76 (25.5%) of them. (Table 2)

Table 2: Description of absolute frequency of headache occurrence and classification among participants.

|  |  |  |
| --- | --- | --- |
| Variables  | Frequency | Percentage  |
| **History of recurrent headaches** Yes No  | 298102 | 74.525.5 |
| **Total**  | **400** | **100** |
| **Classification of headaches** Tension Migraine Others | 9113176 | 44.030.525.5 |
| **Total**  | **298** | **100** |

Table 3: this shows the screen time use habits of the study participants: Of the 400 participants, 192 (48.0%) reported that they started using screens actively at the age of 15 years or less. Two hundred and fifty-seven (64.2%) used the screen 6-7 days a week, while 193(48.3%) spent 6-12 hours on screen daily, with an average daily screen time of 8.20±2.45 hours.

Concerning the type of devices the participants use, 165 (41.2%) of them use only smartphones, while 103(25.8%) use both smartphones and television, and 198(49.5%) of the participants use the screen without taking a break.

Table 3: screen time habits

|  |  |  |
| --- | --- | --- |
| Variables  | Frequency  | Percentages  |
| **Age when active screen use started**≤15 years >15 years  | 192208 | 4852 |
| **How often do you use the screen in a week?**1-3 days4-5 days 6-7 days | 35108257 | 8.827.064.2 |
| **Hours spent daily on the screen**<2hours 2-6 hours 6-12 hours>12 hoursMean time spent daily on screen **8.20±2.45** | 839193160 | 2.09.748.340.0 |
| **Type of device used**Smartphone onlySmart phone/tabletSmart phone/tablet/computerSmart phone/TVComputer.  | 16528951039 | 41.27.023.725.82.3 |
| **Do you take a break while using your device?**Use with enough breaks Use with a little breakNo break  | 81121198 | 20.330.249.5 |
| Total  | 400.0 | 100.0 |

Table 4: Bivariate logistic regression analysis was done to determine the relationship between screen time habits of the participants and the prevalence of recurrent headache after the use of screen.

Headaches were more commonly reported among males 220 (78%) compared to females 78(66.1%). This sex difference was statistically significant (OR 1.8 p=0.01, 95 % CI: 1.13-2.29)

Frequent screen use (6-7 days per week) was commonly associated with headaches 219 (85.2%), however, those who used screen for less than 6 days a week were less likely to have recurrent headaches (OR=0.21, p< 0.001, 95% CI 0.13-0.32). This shows that using the screen for less than 6 days a week is protective against recurrent headaches.

The type of devices the participants used was a significant factor in the occurrence of recurrent headaches. Participants who only used Smartphones were 2 times more likely to have recurrent headaches compared to participants using smartphones and other devices. (OR =2.3, p=<0.001< 95% CI= 1.55 - 4.21)

Taking steady breaks from the screen while using it was reportedly an important protective factor for the study participants against recurrent headaches. (OR=0.02, P <0.001, 95% CI 0.01-0.06).

The number of hours spent on screen time daily was another significant factor. Participants who spent less than 6 hours a day on the screen had a lower odds of experiencing recurrent headaches (OR =0.13, p <0.001, 95% CI: 0.07-0.25).

Neither the age at which active screen usage was initiated nor the participant’s current age significantly determined the occurrence of headaches. In addition, the participants’ level of study did not show any significant relationship with the occurrence of recurrent headaches.

Table 4: Bivariate logistic regression to determine the relationship between age, sex, level of study, screen time habits and the occurrence of headaches

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variables  | Presence of headaches  | Total (N/%) | P value  | OR  | 95% CI  |
| Yes (N/%) | No(N/%)  |
| **Age** 16-1718-19 | 116(70.3)182(77.5) | 49(29.7)53(22.5) | 165(100.0)235(100.0) | 0.11 | 0.6 | 0.43-1.08 |
| **Sex**MalesFemales | 220(78.0)78(66.1) | 62(22.0)40(33.9) | 282(100.0)118(100.0) | 0.01\* | 1.8 | 1.13-2.29 |
| **Level of study**Years 1-2Years 3-4 | 139(73.5)159(75.4) | 50(26.5)52(24.6) | 189(100.0)211(100.0) | 0.68 | 0.91 | 0.58-1.42 |
| **How often do you use the screen in a week**1-5 days6-7 days | 79 (55.2)219(85.2) | 64(44.8)38(14.8) | 143(100.0)257(100.0) | 0.000\* | 0.21 | 0.13-0.34 |
| **Types of devices used**Smartphone onlyOthers  | 139(84.2)156(67.7) | 26(15.8)76(32.3) | 165(100.0)235(100.0 | 0.000\* | 2.3 | 1.55-4.21 |
| **Do you take a break**Yes No  | 104(51.5)194(98.0) | 98(48.5)4(2.0) | 202(100.0)198(100.0) | 0.000\* | 0.02 | 0.01-0.06 |
| **Number of hours per day**≤6hours>6hours  | 16(34.0)282(79.9) | 31(66.0)71(20.1) | 47(100.0)353(100.0) | 0.000\* | 0.13 | 0.07-0.25 |
| **Age at which active use of the screen started** ≤15 years>15 years | 140(72.9)158(76.0) | 52(27.1)50(24.0) | 192(100.0)208(100.0) | 0.48 | 0.85 | 0.54-1.34 |
| **Total**  | 298(74.5) | 102(25.5) | 400(100.0) |  |  |  |

DISCUSSION

The average daily screen time of adolescents in university of Port Harcourt is 8 hours, 20 minutes. The average screen time obtained in this study is higher than global average screen time of 6 hours, 40 minutes a day.[5] The surge in mobile smart device use in sub-Saharan Africa and the use of conversational artificial intelligence (AI) tools make it unsurprising that screen time emanating from Nigeria is fairly comparable to that obtained among adolescents in South Africa; the country with the highest average screen time (9 hours) in Africa.[5], [19] The average screen time reported in this study appears to be more than 1/3 of the stipulated awake time of the average adolescent, with the majority of respondents using screen devices for about 6-12 hours daily. Such screen habits have been shown to have a tendency towards negative impact on daytime functioning and sleep among adolescents and young people. [20].

There was a high prevalence (74.5%) of primary headaches among adolescents in this study. The high prevalence of headaches obtained is comparable to recent reports from Cameroon [21] but higher than previous reports in Nigeria by Sanya et al., who reported a 27.3% prevalence among university undergraduates almost a decade ago.[22] The differences in prevalence rates between the two studies are remarkable. The reason for this difference may be linked to the surge in the use of smart mobile phone devices among the general population, including adolescents in Nigeria, which has increased over the past decade, with some studies now associating mobile phone use with an increased incidence of headaches. [23], [24].

Among the adolescents with primary headache in this study, tension type of headache was predominant, followed by migraine, a finding that collaborates finding by Roy et al [10].

The mechanism by which screen devices cause headaches is yet to be fully established, but they have been linked to the consequences of eye strain, poor posture and visual stimulations which culminate in tension headaches and migraines of varying severities.[10] The modifiable factors and predictors of headaches obtained in this study were the use of smartphones and other screen devices, frequent use (6-7 days /week) of screen device and screen time over six (> 6 ) hours per day. More male respondents in this study reported a history of headaches compared to females; similarly, the odds of this occurring among males were more likely than in females. This is at variance with common findings that have demonstrated that headaches are more prevalent in females including migraines due to certain hormonal and physiologic factors.[25], [26] Our finding is explainable by the fact that more male participants enrolled in this present study and this may likely be a consequence of the gender disparity in undergraduate admissions into institutions of higher learning in Nigeria.[27] On the other hand, the higher tendency for male participants to engage in activities requiring digital screen device and the prevailing “gender divide” in technology may be contributory [28], [29]. There was no association between age and headaches in this study.

In addition to headaches, other symptoms reported by screen users were sleep disturbances (62%) and eye problems (26%). Generally, the commonest eye problem linked to screen use is digital eye strain - a constellation of vision stress (accommodation or binocular) and/or xeropthalmia.[30], [31] This is reported to occur in over 50% of digital screen device users, however only 26% reported eye problems in this study; perhaps this is because the use of laptop/desktop devices was less common than smartphones among the respondents. Such eye problems are more widely associated with the use of the former.[30] The use of screen devices especially before bedtime have been linked with different types of sleep problems including initiation and maintenance of sleep - a consequence of the suppressive effect of light rays on melatonin production which is a key regulator in the sleep-wake cycle.[32] This study obtained a high proportion of adolescents with sleep disturbances and poor sleep quality. In such a study population with an average screen time of over 8 hours, this was not surprising and is reflective of findings by Alshoabi et al among adolescents in Riyadh, Saudi Arabia.[33]

**Conclusion**

In conclusion, the average screen time and habits of adolescents in higher institutions in Port Harcourt have strong associations with the occurrence of headaches. Sleep disorders and eye problems are not uncommon among adolescents with significant digital device usage in our region. Therefore, clinicians need to evaluate such clinical presentations with screen time and habits as plausible contributory factors that may require behavioral modifications as part of their management modalities. Targeted community-based interventions, such as school health education programs involving lecturers, parental guidance, and public health initiatives, are essential to curb the health risks associated with screen exposure among children and adolescents.

**Ethical approval and consent**

Ethical approval was obtained from the University of Port Harcourt Teaching Hospital Research and Ethics Committee. Consent was obtained from the participants after the details of the study was explained to them. For those less than 18 years, in addition to the assent they gave, a confirmation of permission from parents to participate was obtained.

**COMPETING INTERESTS DISCLAIMER:**

Authors have declared that they have no known competing financial interests OR non-financial interests, OR personal relationships that could have appeared to influence the work reported in this paper.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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