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Cervical Spine Symptoms Due to Smartphones Use at University

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Abstract

Objective: The use of smartphones has increased dramatically in the world. In Togo, users are estimated at nearly 7 million (89%) of the population in 2019. Globally, users are spending at least 4 hours per day on smartphones. Smartphones usage forces neck bending postures, causing musculoskeletal disorders. The objective of this study was to evaluate knowledge and also adverse effects of bad postures on the cervical spine of smartphones users in young people.

Methods: This is a prospective analytic study realized on students (18-45 years old) from Lome and Kara universities over a period of 3 months (May 1 to July 30, 2021). They filled out a form directly or electronically through the social networks (WhatsApp) of the targeted universities. The main parameters assessed were: Age, duration of smartphone use, daily time of use, occurrence of cervical spinal symptoms.

Results: A total of 431 participants with average age 23.6 years were enrolled. Almost all (98.8%) had a smartphone since 3.6 years in average. Most of participants (55%) reported that their cervical postures were bad during smartphone using (66.8%). The main symptoms reported were neck pain (48,7%) and ervical radiculopathy (27,8%). The frequency of neck pain was correlated with the daily use time of smartphones. These disorders motived medical consultation in 18% (7% specialized). All the patients who consulted for neck pain were using smartphones more than 8 hours per day. Imaging found degenerative lesions in 23.7%.

Conclusion: The smartphones, although essential, are responsible of spinal degenerative pathologies caused by bad postures. The daily usage time is the main factor on which action should be taken to minimize the harmful effects on the spine; as adoption of correct positions seems difficult to be applied.

Keywords: Smartphones; Postures; Musculoskeletal disorders; Togo; Cervical spinal symptoms

Introduction

The technology has significantly changed humanity life. The advent of smartphones is the perfect illustration and has become almost essential for all daily tasks. Over the past decade, the use of smartphones has increased dramatically. According to a survey carried out in January 2020, there were approximately 5.19 billion mobile phone users, representing 67% of the world's population [1]. In Togo, users are estimated at nearly 7 million (89%) of the population in 2019 [2]. Globally, users are spending at least 4 hours per day on smartphones [3]. Smartphones usage forces neck bending postures, which causes stress to neck structures [4,5]. This chronic anti-physiological posture has adverse effects as musculoskeletal disorders [6]. While the adverse effects of smartphone on the mental health of users are well known, data are missing in Africa. The objective of this study was to evaluate knowledge and also adverse effects of bad postures on the cervical spine of smartphones users in young people.

Materials and Methods

This is a prospective analytic study realized on students (18-45 years old) from Lome and Kara universities over a period of 3 months (May 1 to July 30, 2021). They filled out a form directly or electronically through the social networks (WhatsApp) of the targeted universities. The main parameters assessed were: Age, duration of smartphone use, daily time of use, occurrence of cervical spinal symptoms.

Five hundred one university students, from two institutions in two different regions, were included in this cross-sectional study, on a voluntary basis. Students from these different cities with different socio-cultural characteristics, habits and lifestyles were included in order to reflect the wider community. The research protocol was approved by the local ethics committee.

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After all participants were informed about the study, written, informed consent was obtained and all stages of the study were sustained in accordance with the Declaration of Helsinki. Three inclusion criteria applied were that the participants be enrolled in university, that they be smartphone users and that they did not have any history of systemic, neurological or psychiatric diseases. The age and gender of all participants were recorded. All participants were evaluated with Visual Analogue Scale (VAS) in terms of the severity of neck pain, Neck Disability Index (NDI) in terms of the effect of neck pain on daily living activities and Smartphone Addiction Scale (SAS) in terms of smartphone use dependence. Participants were divided into three groups defined as "non-disability", "mild disability" and "moderate to complete disability".

Smartphone Addiction Scale (SAS): The Smartphone Addiction Scale (SAS) is a self-rating scale consisting of 33 items and developed by Kwon, et al. Each item is evaluated with a Likert-type scale ranging from 1 (definitely not) to 6 (absolutely yes). The distribution of points to be obtained from this scale is between 33 and 198 points, whereas the scale consists of 6 subscales: Daily life disorders (5 items), positive anticipation (8 items), withdrawal (6 items), cyberspace-oriented relationship (7 items), overuse (4 items) and tolerance (3 items). Higher scores indicate a more serious smartphone addiction and a cut-off value is not given in its original form. The developers of the scale found that the internal consistency of the scale was Cronbach α=0.9678; the Turkish validity and reliability was performed by Demirci, et al.

Results

A total of 431 peoples agreed to participate in the study. The rate of forms reception was respectively 31% for physical and 22.4% for electronic. The average age of the participants was 23.6 years. There was a male predominance (70.1%). Students represented 80.7% of respondents. Almost all (98.8%) had a smartphone and 28.3% of them also a laptop. The complementary using of a computer at least one hour per day was 90.7%. They were using smartphones since 3.6 years in average. The number of participants was increasing gradually as increase of daily use time (Table 1).

Table 1: Daily smartphones use time by respondents.

Time	Numbers	Percentages (%)
1-2 h	32	7,4
3-4 h	107	24,8
5-8 h	118	27,4
More than 8 h	174	40,4
Total	431	100

This use of smartphone had increased during COVID-19 pandemic as remote teaching was mandatory (85.8%). Learning online (50%) and personal researches (68.6%) were secondary reasons for using smartphones compared to communication and social networks (100%). Most of respondents (63.8%) declared incapable to live now without the telephone. The financial cost of smartphones using was exorbitant (Figure 1). Most of participants (55%) reported that their cervical postures were bad during smartphone using and can generate musculoskeletal symptoms (66.8%). The main symptoms reported are summarized in Table 2.

Table 2: Symptoms reported by respondents.

Symptoms	Numbers	Percentages (%)
Neck pain	210	48,7
Cervical radiculopathy	120	27,8
Neuralgia	76	17,6
No complains	25	5,8
Back pain	83	19,2
Lombosciatica	13	3

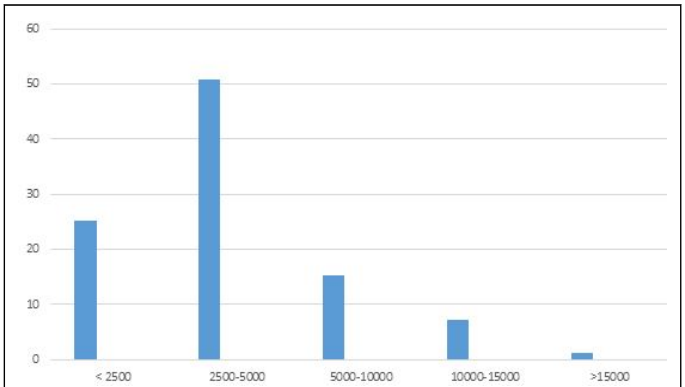

Figure 1: Monthly spending for smartphone.

The frequency of neck pain was correlated with the daily use time of smartphones (Figure 2). These disorders motived medical consultation in 18% (7% specialized). All the patients who consulted for neck pain were using smartphones more than 8 hours per day. Imaging had been prescribed in 5.3% of cases: X-ray (82.7%), CT (4.6%), MRI (0.7%). The main results were: Cervical kyphosis (14.2%), degenerative lesions (23.7%), disc herniation (0.9%). No patient was operated [7]. Regarding the prevention of these disorders, only 9.7% declared be able to reduce the time of daily use of the telephone.

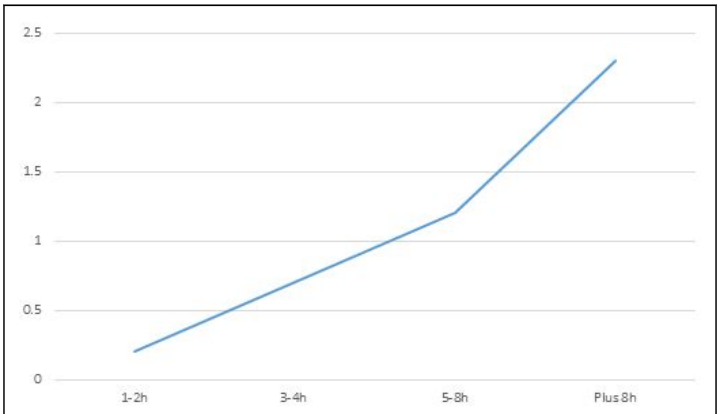

Figure 2: Annual episode of neck pain according to smartphone time use.

Discussion

The importance of postures in the genesis of spinal pathologies is widely documented [8,9]. According biomechanics, the load in cervical spine is rising from 5 kg in the neutral position to 27 kg at 60° flexion [10]. When using a smartphone, the posture often adopted is head down, chin pointing towards the chest and the neck in flexion increases the constraints on the cervical spine with the consequence of musculoskeletal disorders such neck pain, headaches and stress [11-13]. The smartphone has become an inseparable tool for social life and also educational technology, allowing access to all kinds of information. Its use is surging among all social categories. Togo is not exempted as almost all students have phones with a significant daily use time. This increased use like an addiction had adverse effects on health. If the telephones are not incriminated in the occurrence of pathologies such as brain tumours, it's proven with a high level of evidence their roles in spinal pathologies. The incrimination of smartphones is reinforced, in our view, by the fact that despite a high percentage of cervical symptoms reported in our study, very few of the respondents complained of low back pain, whereas generally the frequency of low back pain is higher [14,15]. In addition, the frequency and intensity of spinal symptoms are correlated to the daily use time of smartphones. This correlation is largely found by several authors [16].

Smartphones have become an inseparable part of daily life with the increase in the conveniences it provides to individuals. However, in addition to these, smartphone addiction, which may develop due to excessive use, is an issue that needs to be addressed in a significant way, such as has been done for alcohol, cigarette and drug addictions. In studies published in recent years, it was reported that musculoskeletal symptoms increased with the addiction of smartphones. The most frequent musculoskeletal pain region being accounted in these studies was neck.

The imaging of symptoms noted early degenerative lesions regarding their youngness (23.7%). This testifies objectively that poor postures using telephones have adverse repercussions on the spine. In addition, the use of smartphones had high cost compared to student income. But according to the respondents, it is a necessary evil. Indeed, because of online teaching, digitization of documents many knowledge is online and the smartphone remains the easiest way to access knowledge compared to computers which are more expensive especially for student in Africa. This need increased during COVID pandemic with mandatory online teaching, even communication and social networks remain the main reasons of phones use. It is possible therefore, regarding the reasons, to reduce daily time of phones by handily them usefully. Indeed, to prevent these musculoskeletal disorders, it is important to use phone properly and allow the spinal structures to rest. The users must find the right balance between necessity and harmfulness. For example, do not "cradle" a telephone between the shoulder and ear when using it.

Conclusion

Although previous studies have found a correlation between computer use and neck pain, recent studies have found that the frequency and severity of neck problems is higher in smartphone use, compared to computer use. The smartphones, although essential, are responsible of spinal degenerative pathologies caused by bad postures. The daily usage time is the main factor on which action should be taken to minimize the harmful effects on the spine; as adoption of correct positions seems difficult to be applied.

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