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Relationship between smartphone addiction and musculoskeletal pain among students - A cross Sectional Study

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Abstract

Background: Smartphone use has greatly increased in recent days, and most of the daily tasks are done through these devices. As a result, long time use may involve bad posture that may result in musculoskeletal pain. Therefore, it is important to evaluate the association between addiction/overuse of smartphones and musculoskeletal pain.

Aim: To determine the prevalence of addictive of smartphones among medical students and to investigate if there is an association between smartphone addiction and musculoskeletal pain.

Material and Methods: In a retrospective study on fifty patients with an edentulous space, the thickness of the lateral wall of the maxillary sinus, one centimeter above the sinus floor in the second premolar (P2), first molar (M1) and second molar (M2) areas was determined by cone beam computed tomography scans(CBCTs) and a digital ruler in Romexis F software (Planmeca Romexis 2.4.2.R) and it was compared with values measured in fifty dentated individuals. Three-way analysis of variance was applied for comparison after confirmation of the normal distribution of data.

Results: A total of 300 participants were included in this cross-sectional study. The body parts that were reported with highest prevalence of musculoskeletal pain were the upper back (65.3%), neck (55.5%), and wrists/hands (58.3%).

Conclusions: The differences in the thickness based on the location and dental status necessitates assessment of the wall thickness of the maxillary sinus in addition to the current evaluation of bone thickness between the sinus floor and the edentulous crest before maxillary sinus surgery.

Keywords: Pain, Smartphones, Screen, Light.

Introduction

Smartphone is a term for distinguishing mobile phone with advanced features from basic feature phones. The term "Smartphone" first appeared in 1977, when Ericsson described its GS 88 "Penelope" concept as a

smartphone. Smartphones are mobile phones with advanced features that are used widely for purposes other than the basic needs of communication. It is a popular device that can perform complicated tasks, which typically have a touchscreen interface.

It has features including internet browsing, Wi-Fi, gaming, listening, watching video and apps for online shopping. In recent years, smartphones kept evolving to be multitasking, complete and on many times to displace electronic devices such as a computer, camera and many others. Thus, smartphone has inevitably become need rather than a luxury in the life of individuals. This has led to new kind of health hazards among young population termed as smartphone addiction. Smartphone addiction is an emerging phenomenon in the communities which lies under behavioral addiction category. Behavioral addiction produces short term reward that may lead to persistent behavior even with knowledge of adverse consequences.

- There were 600 million internet users in January 2023.

Smartphone addiction has been conceptualized as a behavioral dependency. Studies show that this addiction is associated with behavioral problem including inactive lifestyle, musculoskeletal problems, pain, anxiety, compulsive behaviour, control deficiency, sleep disorder, functional disorder and tolerance problem.

Musculoskeletal problems arise from long term exposure to certain physical factors including recurrent movements, vibration or force. This problem may be acute, chronic and recurrent, thereby accepted as public health problem.

Methodology

This was a cross-sectional study conducted at the Medical College. The smartphone Addiction Scale Short Version (SAS-SV) questionnaires was used to measure the level of smartphone addiction while Nordic musculoskeletal questionnaire (NMQ) was utilized to evaluate the musculoskeletal pain of the study participants.

Assuming prevalence of addiction P=0.5(50%), e= 0.05(5%) and confidence interval (CI) 95% applied on medical students' population(N=700) sample will be 200.

Number of samples calculated through the following formulas:

1. $n1=[z^2 \times p \times (p-1)] / e^2$ which gives 384 and adjusted by
2. $n2=(N \times n1)/[n1+(N-1)]$ giving the final sample estimation 255.

study has carried out from 1st January 2023 to 31st January 2023. All medical students who give consent were included in study. In present Study participants with diagnosed musculoskeletal disorder were excluded. Predesigned, pretested semi-structured questionnaire was used. The questionnaire consists of three parts. First part is demographics including age, gender, type of family, year of MBBS etc. The second part is the scale for time spend and behavior on smartphone using Smartphone addiction Scale short version (SAS-SC) the third part consist of questions to measure the existence of musculoskeletal pain using another valid questionnaire (NMQ). SAS-SV is a well validated questionnaire consisting of 10 questions that assess the level of risk on the addiction of smartphone. Nordiac musculoskeletal questionnaire design to screen the existence of musculoskeletal pain. NMQ contains two major parts, the general part and specific part. General part made to assess the existence of musculoskeletal pain without targeting specific anatomical locations while the specific part focusing on specific anatomical areas of

body. Specific part furthermore contains questions about symptoms and duration of the symptoms in the past time.

Statistical analysis

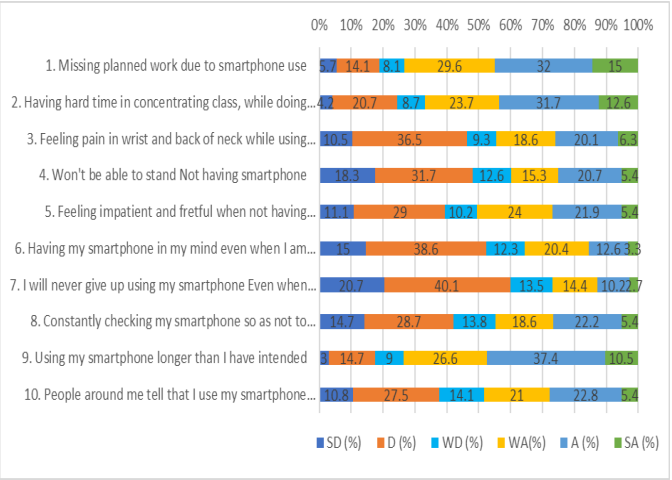
The Smartphone Addiction Scale (SAS-SV), a short version where 10 out of 33 question was selected for use in this study. As recommended by Kwon, Kim et al.[16] we used smartphone addiction cut of value of 31 points in male and 33 points in females to determine non-addiction and addiction.

Data was fed in MS excel. Data was analysed. The statistical significance of the relationship between independent variables and dependent variables are calculated using Chi-square test; $p \leq 0.05$ was considered as statistically significant. All calculations were made using the SPSS V26.0 trial version.

Results

In present study, 200 (100%) medical students were interviewed with predesigned, pretested semi-structured questionnaire. Figure1 depicts the smartphone Addiction Scale-Short Version (SAS-SV), this questionnaire measures the smartphone addiction among medical students. This questionnaire included 10 questions.

Figure 1: Prevalence of smartphone addiction was seen among 100 medical students (50%).



(SD-Strongly disagree, D-Disagree, WD- Weakly disagree, WA- Weakly agree, A- Agree, SA- Strongly agree)

Figure 2: Smartphone Addiction Scale- Short Version (SAS-SV).

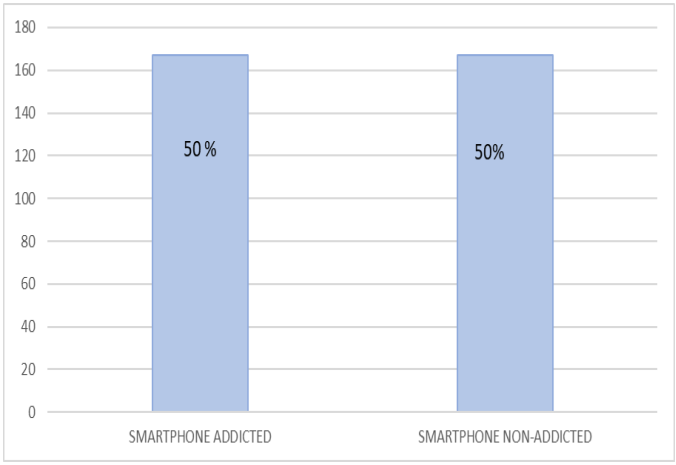


Table 1: Association between sociodemographic factor and smartphone addiction.

Variables	*Frequency*	*Percent*
Smartphone addiction scale		
Mild	103	56.3
Moderate	59	32.2
Severe	21	11.5
Total	183	100
Neck disability index		
Very mild	110	*60.1*
Mild	52	28.4
Moderate	12	6.6
Severe	9	4.9
Very severe	0	0
Total	183	100

Age range of study participants was 17-28 years old and mean age was 20.16 ±1.3 years. Majority were from 21-22 years age group (46.11%). No significant association found between age group and smartphone addiction (p = 0.72). statistically significant association not found between gender and smartphone addiction (p = 0.11). In study most of the participated medical students (45.21%)

were from first year of MBBS and belong to class I (40.42%) according to modified BG Prasad's scale 2020. Out of 334 medical students, 107(32.04%) didn't do any exercise. 178 (53.29%) do exercise <1hr daily and 49 (14.67%) do exercise for more than 1 hr daily. Mean BMI was 2 - 4.4 Kg/$m^{2.}$ No statistically significant association found between BMI and daily hours of exercise with smartphone addiction. On the other hand, statistically, significant association was found between smartphone addiction and number of hours using smartphone (p=0.0008). 55.69% medical students spend more than 3 hours daily on smartphone.

Table 2: Prevalence of musculoskeletal pain during past year and past week in participants by modified Nordic Musculoskeletal Questionnaire

Body part	Past-year musculoskeletal pain	Past-week musculoskeletal pain	Prevented you from doing your normal work (at home or away from home) during the past year
Neck	164 (65.9)	113 (45.4)	42 (16.9)
Shoulder	141 (56.6)	107 (43.0)	37 (14.9)
Elbow	39 (15.7)	29 (11.6)	14 (5.6)
Wrists/hands	171 (68.7)	145 (58.2)	46 (18.5)
Upper back	175 (70.3)	127 (51.0)	56 (22.5)
Lower back	111 (44.6)	79 (31.7)	46 (18.5)

Values are presented as number (%).

We used Pearson's chi-square test to measure association between smartphone addiction and the musculoskeletal pain among medical students. Table no. 3 shows that Neck (0.05), shoulder (0.002), elbow (0. 002), wrist/hand (0.044) and lower back (0.00) were all shows significant association with smartphone addiction

Discussion

According to the results of the present study, musculoskeletal pain symptoms in the past year and past week showed higher pain prevalence in the upper back, neck, and wrist/hands. Participants experienced pain in the upper back, waist, and wrists/hands, where they were unable to perform routine work in their homes or workplaces for a day or more. Smartphone addiction was associated with duration of smartphone use on a typical day, duration of owning a smartphone, and musculoskeletal pain prevalence in the neck, wrists/hands, shoulders, and upper back. The logistic regression analysis showed that spending over six hours a day on a smartphone was significantly associated with high musculoskeletal pain prevalence in the neck, shoulders, and wrists/hands. Moreover, owning a smartphone for over nine years was also significantly associated with high musculoskeletal pain prevalence in the neck and wrists/hands. Smartphone addiction was significantly associated with musculoskeletal pain prevalence in the neck, wrists/hands, and upper back.

Conclusion

Smartphone addiction has become public health issue worldwide. The present shows alarming increase in the prevalence of smartphone addiction and musculoskeletal pain among medical students. There is pressing need for developing arrangement regard the consequences of smartphone addiction among medical students.

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