Vol 2 | Issue 2 | April - June | 2022

ORIGINAL ARTICLE - PHYSICAL MEDICINE AND REHABILITATION

SMART PHONE USAGE IN UPPER LIMB MUSCULOSKELETAL PAIN – A CROSS SECTIONAL STUDY

T. Niveditha [(1)], *K. Sathish* [(1)]

(1) - Department of Physical Medicine and Rehabilitation, Thiruvannamalai Medical College, Thiruvannamalai.

Abstract

Introduction : Musculoskeletal disorder is defined as damage to the musculoskeletal structures as a result of repetitive motions, forces, and postures adopted during the execution of certain activities. Smartphone forces an individual to look at their phone's small screen and perform repetitive movements in an awkward posture for a prolonged duration, which can cause musculoskeletal problems.

Methodology: 50 participants of age 18 to 40 attending OPD at Department of Physical Medicine and Rehabilitation, Thiruvannamalai Medical College with complaints of pain involving neck and upper limbs were taken as participants between March 2022 and June 2022.

Results: The mean duration of screentime was 4.98 hours per day in the study population who presented with upper limb and neck pain who were smart phone users. The mean(SD) duration of smart phone usage in the study population was 4.6(±1.04) years. The maximum screentime was on gaming, social media, watching videos, reading, browsing, work related. The mean(SD) duration of the complaint was 6.18(±3.03) weeks.

Conclusion: The study reported that the prevalence of pain in smartphone users is high with common sites being neck, thumb, wrist, shoulder and back region.

Keywords: Pain, risk, smartphone, musculoskeletal problems

INTRODUCTION

Mobile phones creates convenient platform for communication. Smart phones were invented in the year 1992. Since the invention there has been usage of smart phone. It is estimated that around 2.5 billion people use smart phones. It is being observed that the usage is steadily increasing among adolescents which might affect them psychologically and lead to cumulative trauma disorders. Following COVID-19, smart phone use drastically imcreased among the school going children as schools were closed to break the chain of transmission and classed were held online. This has led to various health problems among school and college students. Office goers were made to work from home increasing the duration of device usage among employees. This sudden change in ergonomics have led to various pain syndromes like neck pain, shoulder pain, carpal tunnel syndrome, de Quervain's disease,etc. This study aims to observe the association between musculoskeletal pain and smart phone usage.

Ergonomics is the technology of work design which is based on the human anatomy, physiology, and psychology. It is important to create awareness in the community regarding the hazards of prolonged smart phone usage with regards to musculoskeletal system and its long term impacts. Though there are many other aspects such as phone addiction, accidents due to use while driving, psychosocial issues that are not in the scope of this study.

Various studies observe that head posture adopted while using electronic devise has been identified as one of the risk factors for musculoskeletal pain. It is also indicated that increased neck flexion angle while using smart phones is one of the risk factors for musculoskeletal pain [1] Neck flexion for prolonged periods at varying degrees increased weight loads on cervical spine dramatically and this increased stress potentially leads degenerative changes in the spine.[2] The pattern of phone usage and the posture adapted while holding the phone seems to be having an important role in determining the evolution of musculoskeletal pain. [3]

METHODOLOGY

STUDY POPULATION :

50 participants of age 18 to 40 attending OPD at thiruvannamalai medical college with complaints of pain involving neck and upper limbs.

STUDY PERIOD : March 2022 to June 2022

STUDY CENTRE : Department of Physical Medicine

Please Scan this QR Code to View this Article Online
Article ID: 2022:02:01:09
Corresponding Author : K. Sathish
e-mail :

and Rehabilitation, Thiruvannamalai Medical College, Thiruvannamalai.

PROCEDURE : Patients within the age group 18-40 with complaints of neck and upper limb pain who attended OPD at Department of Physical Medicine and Rehabilitation at Thiruvannamalai Medical College Hospital were included in the study. Both sexes were included. The participants were given a customized questionnaire in both English and tamil to the study participants who consented to participate in the study. Demographic details like age, sex, occupation, education status, pattern and duration of smart phone usage were collected. The questionnaire also had a picture so that the participants can point out the site of pain. The duration of such complaint and was recorded. Statistical analysis was done.

INCLUSION CRITERIA :

- Both males and females
- Pain in neck and upper limb
- last 6 months of smart phone usage
- Consent to participate in the study

EXCLUSION CRITERIA :

- Racket sports
- Inflammatory joint disease
- Continuous electronic device use by occupation (computer job)
- Previous surgery/injury at pain site

DATA COLLECTION

Demographic details such as age, sex, education status, employment status were collected. The details of pattern of phone usage, duration of phone use and site of pain were collected.

RESULTS

64% of the participants were males and 36% were females. Among males 43% were belonging to 18 to 30 years age group and 57% were in the 31 to 40 years age group. Among females 57% belonged to 18 to 30 years age group and 43% were in 31 to 40 years age group. 60% of the study participants were employed, 30% unemployed and 10% were students. Education status of the population as follows 50% were graduates, 6% high school, 8% completed 10th class and 36% 12th class.

Mean(SD) duration of smart phone usage in the study population was 4.6(±1.04) years. Mean(SD) duration of smart phone usage among the population was 4.40(±0.95) years among males and 4(±1.88) years among females.

Mean(SD) duration of smart phone usage per day over last week was 4.98(±1.67) hours per day. Mean(SD) duration of smart phone usage per day was (4.93±1.54) hours per day among males was and 4.98(±1.67) among females.

Table 1 : Demographic details

Demographic details			
Sex		male	64%(32)
		female	36%(18)
Age	Males	18-30 years	43%
		31-40 years	57%
	Females	18-30 years	57%
		31-40 years	43%
Employment status		Employed	60%
		Unemployed	30%
		Student	10%
Education status		Graduate	50%
		12^{th}	36%
		10^{th}	8%
		High school	6%

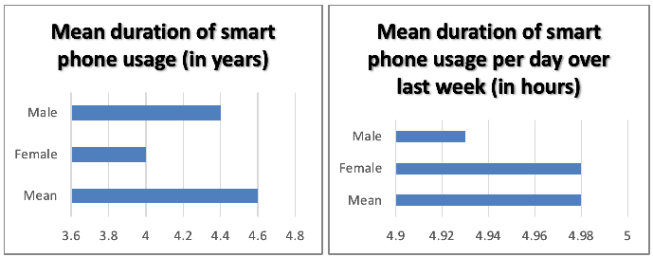

Figure 1 : Mean duration of smart phone usage

44% of the population had neck pain, 8% had shoulder pain, 12% had wrist pain, 8% had hand pain, 12% had upper back pain, 8% had thumb pain, 8% had shoulder pain, 10% had elbow pain, 2% had lowback pain and 2% had mid back pain.

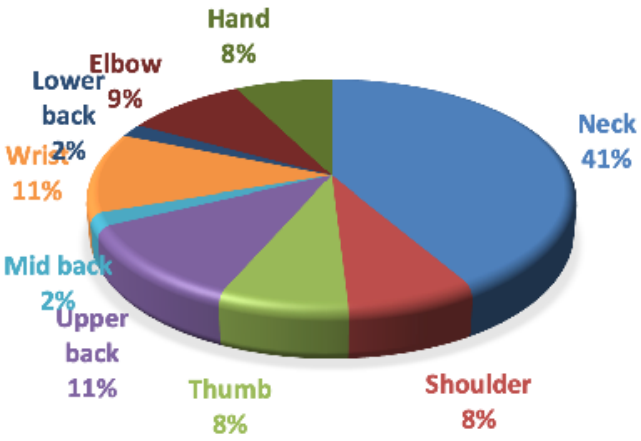

Figure 2 : Site of Pain

The maximum screentime was on gaming, social media, watching videos, reading, browsing, work related. The mean(SD) duration of the complaint was 6.18(±3.03) weeks. All the participants reported to use the smart phone by placing the phone below the chest level during screentime.

DISCUSSION

The mean duration of screentime was 4.98 hours per day in the study population who presented with upper limb and neck pain who were smart phone users. The aim of the study was to study the association between duration of phone usage and upper limb musculoskeletal pain. This study was conceptualized with the hypothesis that constant use of electronic gadget is associated with increase in risk of upper limb musculoskeletal pain and neck pain. This has been supported by limited number of studies in India.[5,6] This study was conducted at the Outpatient Department, Department of Physical Medicine and Rehabilitation, Government Thiruvannamalai Medical College, Tamil Nadu.

Musculoskeletal pain is associated with usage of other electronic devices that may be used occupationally with altered ergonomics (7), (8). The knowledge of ergonomics is not that widespread so as the usage of such devices.

In our study it was found that all the participants used the phone below the chest level while using indicating there was variable amount of neck flexion while usage. This may lead to pain on prolonged hours of usage of smart phone while used in positions that may cause increased load on the cervical spine (9) which can even lead to early degenerative changes. The mean(SD) duration of smart phone usage in the study population was 4.6(±1.04) years. As there is an increasing trend towards usage of smart phone from school time, prolonged phone use in neck flexed posture may even lead to kyphosis, early degenerative spine changes.

CONCLUSION

Our study shows that there is an association between prolonged smart phone usage and upper limb musculoskeletal pain. The most common complaint was neck pain.

LIMITATIONS

Small sample size. The effect of other environmental and occupational factors were not considered. There was no control group.

REFERENCES

1. Guan X, Fan G, Wu X, Zeng Y, Su H, Gu G, et al. Photographic measurement of head and cervical posture when viewing mobile phone: a pilot study. European Spine Journal. 2015; 24(12):2892–8.

2. Hansraj KK. Assessment of stresses in the cervical spine caused by posture and position of the head. Surg Technol Int. 2014; 25(25):277–9.

3. Toh SH, Coenen P, Howie EK, Straker LM. The associations of mobile touch screen device use with musculoskeletal symptoms and exposures: A systematic review. PloS one. 2017; 12(8):e0181220.\ https://doi.org/10.1371/journal.pone.0181220 PMID: 28787453

4. Shan Z, Deng G, Li J, Li Y, Zhang Y, Zhao Q. Correlational analysis of neck/shoulder pain and low back pain with the use of digital products, physical activity and psychological status among adolescents in Shanghai. Plos one. 2013; 8(10):e78109. https://doi.org/10.1371/journal.pone.0078109 PMID: 24147114

5. Association Between Text Neck and Neck Pain in Adults Igor Macedo Tavares Correia 1, Arthur de Sá Ferreira 1, Jessica Fernandez 1, Felipe José Jandre Reis 2 3, Leandro Alberto Calazans Nogueira 1 2, Ney Meziat-Filho 1

6. Musculoskeletal disorder and pain associated with smartphone use: A systematic review of biomechanical evidence Aitthanatt Chachris Eitivipart 1 2, Sirinya Viriyarojanakul 3, Lucy Redhead 4

7. Low back pain in adolescents and association with sociodemographic factors, electronic devices, physical activity and mental health Thiago Paulo Frascareli Bento 1, Guilherme Porfirio Cornelio 2, Priscila de Oliveira Perrucini 3, Sandra Fiorelli Almeida Penteado Simeão 4, Marta Helena Souza de Conti 5, Alberto de Vitta 3

8. Risk factors of non-specific neck pain and low back pain in computer-using office workers in China: a cross-sectional study Sunyue Ye 1 2, Qinglei Jing 2, Chen Wei 3, Jie Lu 2

9. The effect of static neck flexion on mechanical and neuromuscular behaviors of the cervical spine Roghayeh Mousavi-Khatir 1, Saeed Talebian 2, Nima Toosizadeh 3, Gholam Reaza Olyaei 4, Nader Maroufi 5