DOI: https://doi.org/10.54393/pjhs.v3i07.425

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 7 (December 2022)

Original Article

Prevalence of Musculoskeletal Pain due to Smart Phone Usage among High School Students: A Cross Sectional Study

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ARTICLE INFO

Key Words:

Neck Pain, Shoulder Pain, Smart Phones, Health Problems, MSK Symptoms

How to Cite:

Khalid, A., Ahmad, J. ., Sarfraz, R. ., Iqbal, A. ., Arshad, A. ., & Zahid, H. . (2022). Prevalence of Musculoskeletal Pain Due to Smart Phone Usage Among High School Students-A Crosssectional Study: Musculoskeletal Pain due to Smart Phone usage. Pakistan Journal of Health Sciences, 3(07). https://doi.org/10.54393/pjhs.v3i07.425

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Received Date: 9th December, 2022
Acceptance Date: 28th December, 2022
Published Date: 31st December, 2022

ABSTRACT

In the past decade, mobile phone usage rates have increased and there have been concerns that the overuse of smart phones may contribute to various musculoskeletal (MSK) problems primarily in neck and shoulder region. The most reported complaint is pain that can be seen in many parts of the body, especially in neck. **Objective:** To check the prevalence of cervical pain and its association with smart phone usage among high school students. **Methods:** It was an observational cross-sectional study in which non-probability purposive sampling technique was used to collect data from high schools of Faisalabad. 105 subjects both male and female with musculoskeletal pain were included. The data were analyzed by SPSS version 23. **Results:** Females were found to have more pain (58.1%) compared to (41.9%) the males. 72.4% subjected recorded the moderate to severe pain measured on VAS. No association was found among disability score and gender and age with p-value > 0.005. **Conclusions:** There was no noticeable relationship between gender and age regarding pain intensity. Most variables showed an association with pain intensity indicating that there is prevalence of cervical pain more than any other musculoskeletal pain in high school students due to smart phone usage.

INTRODUCTION

The previous two decades have seen incredible modifications in portative technologies such as smartphones, and the foreword of tablets, predominantly in the use of touch screen operation preferably than any earlier indirect approach [1]. The combination of repetitious motions, imperfect poses, and the excessive usage of portable phones to send text messages or play games, without taking breaks, can provoke injury, which if bypassed can result in prolonged impairment. This addiction also results changes in cognitive function [2, 3]. Musculoskeletal problems especially in the neck and shoulder area is fairly common [4]. Neck ache is the most expected complaint in hospitals with a plurality varying between 5.9 percent and 38 percent of the inhabitants. There is evidence that the existence of MSK pain including neck and shoulder pain in preadolescence and youth may be a significant element in the outset of pain in adultness [5]. When individuals operate smartphones for a prolonged duration it causes defective posture such as forward neck posture, slouched posture, or rounded shoulder, along with it renders sleep disorders and depression among grown-ups [6]. There is a strong correlation between smartphone and various mental health symptoms like anxiety and depression [7, 8]. In most of the smartphone users, MSK manifestations emerge not only in the neck but also in the additional regions of the body, including shoulders, elbows,

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arms, wrists, and fingers, particularly the thumb. The indications notified are ache, tiredness, immobility, deficiency, and sensorial issues such as numbness and tingling [9]. It is stated that 16 minutes after using a smart phone, the upper neck and back pain signs will initiate, and as the span of use elevates by 10 to 30 minutes, the possibility of the MSK disease predominantly in the shoulder area will rise [10]. It is briefed that strenuous usage of portative phones at late night by adolescents may lead to crankiness, temper swings, personality irritations, and numerous other crises [11]. Comprehensive and periodic use of smart phones, as well as the reprised motion of the upper limbs in a discomfiting posture, have been displayed to be the primary contributing characteristics to the incidence of musculoskeletal symptoms [12]. Even though they are aware of the negative effects, smartphone addicts are unable to control their use [13]. Based on current analyses, it can be acquainted to use the apparatus at eye level with both hands and reverse positions at standard gaps during use [14]. There was relatively little research done on SPA interventions. Six categories of measures for both prevention and treatment were identified: applications restriction, social intervention, psychotherapies, cognitive training, behavioral intervention, and complementary and alternative medicine. Students, parents, or online experts can implement them [15].

METHODS

This study was a Cross-sectional or a survey based study to determine the prevalence of cervical pain due to smart phone usage among high school students. In this study, non-probability purposive sampling technique was used among high school students aged 16-18 years in accordance with their willingness to involve in the study. This study was conducted within private schools and colleges of Faisalabad. The duration of this study was 6 months afterwards approval of research and ethical review committee. Sample size was 105 participants, measured with margin of error 5% and confidence level of 95%. Selection of subjects was based on following criteria. The age range was between 16-18 years, both (male and female) students with their own smart phones. Students who use their phone for 3-6 hours daily. Participants were excluded having subjects with previous history of musculoskeletal diseases, previous head and neck surgeries, previous diagnosis of any cervical disc problems, those with recent head and neck trauma, subjects with cervical and shoulder neurological movement disorders, diagnosed inflammatory joint disease and systemic illnesses, bed ridden subjects, any subjects with psychological issues (depression, anxiety, bipolar disorder etc) and other degenerative changes. Data collection tool used in this study were VAS and Modified neck and shoulder disability index. The questionnaire was used to assess the intensity of pain and its effect on their life. The participants were assured that their information will remain private. Data were analyzed by using SPSS-23. Results were drawn by applying appropriate statistical analysis. Chi-square test was applied, both age and gender wise frequency distribution of physical activity was calculated.

RESULTS

The frequency distribution for age of high school students who participated in the study, majority of the students 74.3% aged between 16-17 years and 25.7% aged 18 years who responded to the NDI questionnaire. Out of 105 students, majority of the student i.e., 61 (58.1%) were females while 44 (41.9%) were the males. The VAS scale shows that the 76(72.4%) have moderate pain and 24(22.9%) have mild pain. However, Modified neck and shoulder disability index shows that 59% students have moderate disability and 28% have mild severity (Table 1).

Variables	Responses	F(%)
Age	16-17 yrs.	78(74.3)
	18yrs	25(25.7)
Gender	Female	61(58.1)
	Male	44(41.9)
VAS Scale	No pain	1(1)
	Mild pain	24(22.9)
	Moderate pain	76(72.4)
	Severe pain	4(3.8)
Modified neck and shoulder disability index	Mild	28(28)
	Moderate	59(59)
	Severe	18(17.1)

Table 1: Showing the frequencies and percentages for respective variables of VAS and Modified neck and shoulder disability index

129 students belong to age group <18 among which 66.1% show moderate disability and in >18 age group 71 students were enrolled among which 33.9% have moderate disability. There was insignificant association between age and Modified neck and shoulder disability index (p-value>0.0)(Table 2).

Age	Modified neck and shoulder disability index			Total	p-value
	Mild Disability	Moderate Disability	Severe Disability		
<18	42(58.3%)	74(66.1%)	13(81.3%)	129(64.5%)	0.194
>18	30(41.7%)	38(33.9%)	3(18.8%)	71(35.5%)	

Table 2: Association of age and Modified neck and shoulder disability index

114 students were female among which 59.8% show moderate disability and in male group 86 students were enrolled among which 59.8% have moderate disability. There was insignificant association between gender and Modified neck and shoulder disability index (p-value>0.0)

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(Table 3).

Gender	Modified neck and shoulder disability index			Total	p-value
	Mild Disability	Moderate Disability	Severe Disability		
Female	42(58.3%)	67(59.8%)	5(31.3%)	114(57.0%)	0.09
Male	30(41.7%)	45(40.2%)	11(68.8%)	86(43.0%)	

Table 3: Association of gender and modified neck and shoulder disability index

DISCUSSION

Our findings demonstrated that cervical pain has dominant prevalence in 74.3% of smart phone users between the age group 16-17 years, which also corresponded to the study conducted in (2002) that explains that More than 30% of people, particularly young adults, reported waking up with neck pain at least once a week. This problem is common. 37.3% of people with neck pain said they had persistent pain that made them disabled, and 9.9% said their neck problems got worse in a follow-up year [16]. Extreme cervical posture and neck pain were not linked in several studies. Additionally, no correlation has been reported between cervical posture and deep cervical flexor endurance. However, when compared to people who never or rarely experience neck pain, those with frequent neck pain had lower levels of neck muscle endurance. Only a few studies examined the relationship between a position and cervical range of motion in relation to neck pain, and the findings of those studies were inconclusive [17]. However, the results of this study was in favor of the current study. most of the people who reported with cervical pain usually ranged between the age group 16-17 years. Males present with more flexible postures than females. The range of bending was linked with the duration of usage of computer and digital devices, even the cause of this relationship were necessary to be determined. This study presents the link between gender importance and daily use of digital devices on health of cervical curve. In this study comparison was determined between the routine of standing and mobile use. Because people looked at their mobile phones the angle of head and neck flex increased to 23.54 degree respectively, this indicates a flexed neck position [18]. Results of the investigation of Madardam *et al.*, suggested that adults have a higher pain threshold than children do. It was discovered that the participants' varying ages and the length of the game may cause minor pain variations. The results of this study was in contrast to the current study where students reported higher level of moderate pain [19]. Additionally, a correlation between smartphone addiction risk and MSD in particular body regions has been demonstrated by a study. The use of smartphones, which required repetitive movements over the thumb and fingers as well as prolonged static neck flexion, is one common body region the researcher focused on when it came to MSD related to problematic smartphone use. Previous studies found that the main pathology of MSD is linked with the presence of physical risk factors like repetitive movements and static posture [20]. The results of this study were consistent to the current research. Kim and Kim conducted a study to determine the musculoskeletal symptoms, hazard ratio, and use of smartphones by university students in specific areas. After using smartphones, the shoulders and neck were found to be the body parts that were the most painful. Back pain was found to be positively correlated with the size of the smartphone's liquid crystal display (LCD) screen in the musculoskeletal system, while pain in the legs and feet was found to be negatively correlated with the amount of time spent using the smartphone. Subsequently, it was uncovered that the utilization of a cell phone corresponded with outer muscle side effects. As a result, in today's environment, where smartphone use is on the rise, it is necessary to improve smartphone usage and create a preventative program to alleviate musculoskeletal damage symptoms [21]. These findings were found to be consistent with the current study.

CONCLUSIONS

The majority of the students reported moderate pain and disability measured through VAS and Modified neck and shoulder disability index questionnaire. Additionally, there was insignificant association between age and Modified neck and shoulder disability index along with insignificant association between gender and Modified neck and shoulder disability index.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article

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