



Prevalence of Neck Shoulder Pain with Daily Use of Computers and Mobile Phones among Secondary School Students: Cross Section Study

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Abstract:

Purpose: to verify the prevalence of neck- shoulder pain with daily use of computers and mobile phones among secondary school students with using computers and phones.

Methods: This study was designed as a cross-section study that was achieved on secondary school students using computers and phones. The sample was made up of 102 secondary school students (50 boys and 52 girls) and their ages ranged between 12 and 16 years old from a total number of 400 students who use computers and phones suffering from neck and shoulder pain. The evaluation was done using a questionnaire about age, sex, and the prevalence of neck and shoulder pain including its onset, severity, direction, nature, type, and how long it lasts. This questionnaire includes also physical activity and daily time usage of computer and mobile phones.

Results: The results showed that 94% of all participants were using computers and phones and 44.1% of the respondents were using them for more than five years daily. About 60.7% always have neck pain and 39.3% sometimes have neck pain. 58.8 % of students had shoulder pain all the time and 39.2% sometimes had shoulders pain, while 2 % did not. 64.7% had moderate pain, and only 5.8 % with severe pain, while 60.7% had increased pain during work and activity.

Conclusion: The results of the present study revealed that exaggerated use of electronic devices such as computers and mobile phones causes significant musculoskeletal problems, specifically in the head and neck region. In addition, the danger of musculoskeletal disorders in the form of neck and shoulder pain increased among secondary school students. Awareness instructions about health and safety risks combined with computer use should be directed toward students to improve their awareness.

Keywords: Mobile Phone - Musculoskeletal Disorders - Pain - Posture.

1. Introduction:

Work-related musculoskeletal disorders refer to injuries in tissues combined with the danger of workplaces such as disorders of cumulative trauma, repetitive strain, and overuse injuries (1). People who use computers and android phone exaggeratedly suffer from neck problems. Computer refers to desktop and laptop, the units of video display, and the terminals of video display for including the use of devices and keyboards (i.e., mice, trackballs) (2). Advancing in applying

electronic media has become very familiar among all people (3).

Cervical pain is a major health problem and the most common in modern societies. The percentage of cervical pain in the world today ranged from 10% to 15% and this is more common in females than male (4). Neck pain is the most commonly seen problem in adults and its ratio ranges from 30% to 50%. The main cause of cervical pain occurrence today is prolonged sitting in the workstation as the ergonomics risk factor (5).

The body of humans responds to the dangers of work environment through the central nervous, automatic nervous, endocrine, and immune systems, which interact as a complex network (6).

The main ergonomics risk factors in workstation, which leads to cervical pain, are awkward postures, repetitive movements of cervical region, and prolonged sitting during work that increase the load and the tension on the paravertebral cervical region (7). The prevalence of musculoskeletal pain such as (stiff neck, brachial neuralgia, dorsal kyphotic posture, and head pain) has increased among adolescents in public schools due to sedentary life (8).

Recently, in our community, a cell phone is an essential instrument, and sharing cellphones in the cell market increased every day to 13.8 percentage in 2009 and 24.9% in 2014 (9). Long time using mobile phones leads to abnormal posture of the back and harmful neck flexion that is a greater risk due to small screen size. Another study reported some abnormalities in the cervical and in the deficit of lumbar and proprioception in the neck region (10).

Continuous use of the computer, abnormal posture with frequency, and the time of sitting are considered risk causes for musculoskeletal disorders especially, shoulder and neck pain, which is known among the problems of health care, associated with basic disablement (11).

This study aimed to verify the prevalence of neck and shoulder pain with the daily use of computers and mobile phones among secondary school students.

2. Methods:

An Ethical Committee of Delta University for Science and Technology approved the study. The written consent and volunteer information sheet were gotten from the parents of the children. All information about the aim of the study, benefits, risks, and the committee that definite time and money are shown in these forms.

This study was designed as a cross -section study that was achieved on secondary school students (12 to 16 years old) using computers and android phones at delta international language schools. The research was designed to investigate cervical shoulder pains among secondary school students. The sample was made up of 102 secondary school students (12 to 16 years old). The total number of girls and boys who use computers and android phones was 400. Only 120 of them were eligible for this study. This research targeted 102 participants of secondary school students who were suffering from neck and shoulder pain as shown in figure (1).

Inclusion Criteria:

The ages of adolescents were between 12 to 16 years old, and those students reported neck and shoulder pain.

Exclusion Criteria:

Students with a history of vertebral column surgery such as lumbar or cervical disc prolapse, deformities of the vertebral column like lordosis, scoliosis, round shoulders ,and trauma to head were excluded from the study.

Questionnaire:

The questionnaire includes questions about age, sex, and the prevalence of neck and shoulder pain; its onset, severity, direction, nature, type, and how long it lasts. In addition, other questions are related to physical activity and daily time usage of computer and mobile phone.

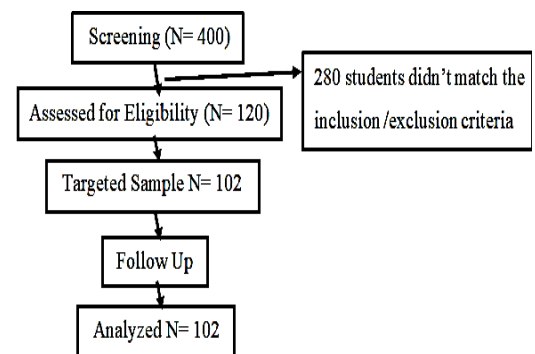


Figure (1): Flowchart for patient participation.

Statistical analysis:

The results of our research were obtained using (SPSS) program version (20). Qualitative data were shown as numbers and percentages with means and standard deviations.

3. Results:

Results represent the general characteristics of participants that target 102 participants in form of 50 boys (49%) and 52 girls (51%). As the mean age of all participants (14.8 ± 1.20) ranged from (12 -16) years old with a mean percentage of gender between females and males who were (30.4%- 69.6%) respectively. The mean height (cm) was (156.15 ± 8.19) which ranged from (146.0 cm-165.0 cm). The mean weight (kg) was (47.83 ± 5.57) that ranged from(42.0 kg-54.0 kg) and the mean BMI (kg/m²) was (19.56 ± 0.95) that ranged from (18.50-20.50) as shown in table (1).

While the frequency distribution of neck and shoulder pain was presented as follow:

Regarding neck pain properties; about 60.7% of the sample had neck pain and 39.2 % sometimes had it. With respect to shoulder pain, the results showed 58.8 % of the sample had it, 39.2% sometimes had it, and 2 % did not. While the type of pain differed in its percentage among the sample as 4.9% of the sample had stinging pain, 12.7% had

numb pain, 4.9% had burning pain, 73.5 % had muscle spasms, and 3.9 % had others. In addition, 39.3 % of the sample with continuous pain and 60.7 % had interrupted pain.

According to the severity and direction of pain, about 29.4% of the sample had mild pain level, 64.7 % was moderate, and 5.8 % with severe pain. Thus, more than 50% had moderate pain, which was acceptable. 19.6% have pain in the right shoulder, 24.5 % have pain in the left shoulder, 41.1 % have pain in the neck and shoulder, 14.7 % have pain around the head, and 39.3% have the pain that occurs suddenly, but 60.7% have pain that happened gradually.

Table 1. General characteristics of participants

	Mean ± SD	Minimum	Maximum
Age (Years)	14.8 ± 1.20	12.0	16.0
Height (cm)	156.15 ± 8.19	146.0	165.0
Weight (kg)	47.83 ± 5.57	42.0	54.0
BMI (kg/m²)	19.56 ± 0.95	18.50	20.50
Gender			
Boys	50 (49 %)		
Girls	52 (51 %)		

***Data is presented as mean and standard deviation, minimum and maximum and number & percentages**

Regarding the duration of pain, pain lasted one day in 49 %, pain lasted two days, and more in 39.3 %, while 11.7% have pain lasted all the time. About 29.5 % had severe pain during waking up, 60.7 % had pain during the work, and 9.8% had pain at night. The findings referred to the relationship between work and neck pain. This revealed that 60.7 % had increased pain during work as shown in table (2).

4. Discussion:

All participants were using electronic tools such as computers and phones and 44.1% of the respondents were using them for more than five years daily. In addition, 60.7% have neck pain, while 39.2% sometimes have neck pain. 58.8 % of the participants have shoulders pain, 39.2% sometimes have shoulder pain, and 2 % did not.

Table 1. Frequency distribution of neck and shoulder pain, regarding neck pain properties.

Variable	Number (%)	Mean ± SD
Neck pain		
1. Sometimes	40 (39.3 %)	1.6 ± 0.49
2. Yes	62 (60.7 %)	
3. No	0 (0 %)	
Shoulder Pain		
1- Yes	60 (58.8 %)	1.8 ± 0.97
2- No	2 (2 %)	
3- Sometimes	40 (39.2 %)	
Type of Pain		
1- Tingling	5 (4.9 %)	4.28 ± 1.29
2- Numbness	13 (12.7 %)	
3- Burning	5 (4.9 %)	
4- Others	4 (3.9 %)	
5- Muscle Spasm	75 (73.5 %)	
Nature of Pain		
1- Continued	40 (39.2 %)	1.6 ± 0.49
2- Interrupted	62 (60.7 %)	
Severity of pain		
1- Severe	6 (5.8 %)	2.58 ± 0.60
2- Mild	30 (29.4 %)	
3- Moderate	66 (64.7 %)	
Direction of pain		
1- Around neck & shoulder	42 (41.1 %)	2.22 ± 1.18
2- Extend to head	15 (14.7 %)	
3- Left shoulder	25 (24.5 %)	
4- Right shoulder	20 (19.6 %)	
Onset of pain		
1- Evenly	62 (60.7 %)	1.39 ± 0.49
2- Unexpectedly	40 (39.3 %)	
Duration of Pain		
1- Always	12 (11.7 %)	2.37 ± 0.68
2- Two days & more	40 (39.3 %)	
3- One day	50 (49 %)	
Pain increase		
1- When getting up from sleep	30 (29.5 %)	2.31 ± 0.90
2- During night	10 (9.8 %)	
3- During work	62 (60.7 %)	

***Data is presented as numbers and percentages or mean and standard deviation.**

About 64.7% had moderate pain and only 5.8% with severe pain. Most of them had neck-shoulder pain might be due to the hand and faulty posture use of electronic devices. Muscle spasm was a common kind of pain that is placed around cervical and both shoulders by percent 73.5%. 60.7% have increased pain during work and activity.

A previous study demonstrated that there was a positive relationship between gender and neck-shoulder pain ($p = 0.02$). The percentage of cervical pain in females was 62%, which was higher than the percentage of cervical pain in males 38% (12). Another study concluded that there was high musculoskeletal pain in females and there was no linkage between pain and using electronic tools, but it was noticeable that the females who were at secondary school had a higher danger to develop musculoskeletal pain (13).

Another study found the development of cervical pain in the United Kingdom and concluded that there is a linkage between gender and neck shoulder pain between 6% and 76% among female workers (5). In addition, there was a positive relationship between cervical shoulder pain and gender among women than men and mainly increased among those who deal with the display of video (14).

This present study revealed that the males' percentage was 69.6%, but the females' percentage was 30.4%. Moreover, there is a relationship between gender and cervical pain. The value was ($P = 0.004$) which was applicable to most of the studies. In addition, the psychosocial factors were predominant among women, and this showed the reason for the positive relationship between gender and cervical shoulder pain (15).

The study, titled "the effects of using smartphones on the cervical angle and the pain threshold of neck muscles," discovered that using smartphones puts pressure on the cervical spine, causing the cervical curve and pain threshold of the muscles around the neck to change. Smart phones have a negative impact on a person's mental health, such as depression (16).

Another study among medical students found that the prevalence of musculoskeletal disorders was high, with 85.3% having musculoskeletal disorders in one position at any time from using electronic devices (17). As a result, there is a high risk of increased health problems. Increased use of devices will result in more musculoskeletal injuries. Other research has 94% of linked continuous smartphone use to neck pain in undergraduate students (18).

There was no link between neck pain and daily smartphone use, and there was no link between

neck pain and gender (19). Excessive mobile phone use had a negative impact on health, particularly in the head and neck region. Users are constantly exposed to subjective symptoms, the severity of which is dependent on the frequency with which they use mobile phones (20). Working in a stable setting for an extended period of time with faulty posture, such as neck flexion, puts strain on the neck and shoulder muscles, eventually leading to neck and shoulder pain (21).

Nowadays, education is based on online learning or blended learning, particularly after the COVID19 pandemic, as well as the use of computers, tablets, and mobile phones. This is a major concern among students, and untreated neck pain can be similar to occupational overuse syndrome, so students should complete their daily activities at the same time to avoid complications. excessive neck tilt for a long time (22).

5. Conclusion and Recommendation:

The results of the present study revealed that exaggerated use of electronic devices such as computers and mobile phones causes great musculoskeletal problems, specifically in the head and neck region. In addition, the danger of musculoskeletal disorders in the form of neck and shoulder pain increased among secondary school students. Awareness instructions about health and safety risks combined with computer use should be directed toward students to improve their awareness. In addition, they should be promoted to report neck and shoulder pain and other relevant problems associated with the use of electronic devices.

Authors' Contributions

A.M.N.T. collected the data and performed the questionnaire, M.N.A. analyzed and interpreted the patient data, While A.M.N.T. wrote the manuscript. Both authors read, revised, and approved the final manuscript.

Ethical Approval

Before the study commencement, approval was granted by the institutional review board at Delta University for Science and Technology.

Conflict of interest

There was no conflict of interest.

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Availability of Data

The datasets generated during and/or analyzed are available from the corresponding author upon reasonable request.

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