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The Effect of Smartphone Usage in Neck Pain at University Students: A Study on Text Neck Posture During Online Learning

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Abstract: ***This study aimed to investigate the relationship between text neck posture resulting from excessive smartphone use and e-learning, and its impact on the progression of neck pain among university students in Palestine. A descriptive analytical approach was employed using a questionnaire administered to a sample of 153 male and female students in April 2024. The findings revealed a statistically significant association between prolonged use of smart devices and the prevalence of neck pain, with excessive use of smartphones and computers identified as the most influential factor (60%), while poor head posture, particularly forward head inclination, contributed notably to increased pain levels (30%). Although neck pain negatively affected students' concentration and engagement during online learning sessions, it did not significantly influence their academic performance or overall well-being, highlighting the importance of adopting proper ergonomic practices to mitigate musculoskeletal risks. The originality of this study lies in its integrated examination of text neck posture within the context of e-learning among Palestinian university students, linking behavioral patterns of smart device usage with musculoskeletal health in a contemporary digital learning environment, thereby addressing a notable gap in local empirical research.***

Keywords: Neck Pain; Text Neck Posture; Online Learning; Smartphone Usage.

1. Introduction

The development of online learning platforms has transformed the education sector, making learning more accessible and flexible for students across the globe. Nevertheless, there have been concerns about the level of engagement and effectiveness of online learning platforms compared to traditional learning. On the other hand, the widespread use of smartphones for various purposes, including online learning activities, has resulted in the development of smartphone addiction as a major global concern. Smartphone addiction, together with prolonged use in unfavorable positions, such as the text neck position, has been associated with negative consequences among university students. In light of the prevailing challenges in Palestine, including the COVID-19 pandemic and conflicts in the region, it is important to appreciate the implications of smartphone use among university students [1].

Online learning has emerged as an important area of focus in education because of its flexibility The development of information technology makes online learning possible, which enhances academic performance. It provides flexibility, accessibility, and convenience to the learner. Different forms of distance learning. It facilitates interaction between students and teachers, adopts innovative approaches to teaching, increases the efficiency of administration, reduces costs, maximizes use of resources, and provides opportunities for outreach. Online learning, also known as e-learning or web-based education[2].

The use of smartphones is prevalent, as it acts as a key component for information and communication, with many users worldwide. Young individuals spend additional hours on their mobile phones to engage in social media, gaming, and other forms of entertainment, either for communication or academic purposes. The mental and physical health of young individuals is a matter of concern due to the excessive use of mobile phones. increase in smartphone usage among university students for various purposes, leading to addiction and physical health issues. Smartphone addiction has become a global concern. This addiction is associated with memory impairments, attention deficits, decreased academic performance, and musculoskeletal disorders. The improper posture adopted while using smartphones can cause neck pain and other associated problems. increase in smartphone usage among university students for various purposes, leading to addiction and physical health issues. Smartphone addiction has become a global concern. [3]

"Text neck syndrome " is a modern era pain caused by prolonged neck flexion while using handheld devices, such as smartphones and computers. results in neck discomfort and upper back muscle injuries. The syndrome is prevalent among college students and has been linked to smartphone addiction, leading to neck and shoulder pain. flexing the neck at different angles while looking at devices can put significant pressure on the neck, with forces increasing with greater flexion. [4].

Neck pain is a main cause of disability and a common musculoskeletal problem, is increasingly being associated with the use of smartphones, particularly among university students. Neck pain, ranging from 17.3% to 67.8%, is the most frequent musculoskeletal problem, often chronic in nature. Its etiology is associated with muscle and ligament irritation from poor

posture, which limits neck movement and leads to muscle weakness and instability of the cervical spine. posture-related neck pain is further exacerbated by the use of mobile phones, which have 3 billion users worldwide. The addiction to phones that emit potentially harmful radiofrequency radiation is a cause for concern. Studies have found that university students are avid users of mobile phones, resulting in muscle spasm. With the weight of the head increasing the pressure on the cervical spine, even minimal head flexion can have a substantial effect on the neck. It is important to focus on smartphone-related neck pain in university students to provide relief from discomfort and possible chronic musculoskeletal problems [5].

1.1 Statement of The Problem

The use of online learning, fueled by the pandemic and the conflict in Palestine, has resulted in an increase in the use of smartphones among university students, which is a worrying trend of "text neck" posture. This problem is a result of a lack of awareness of the dangers posed by the prolonged use of smartphones in such a posture. There is a lack of educational material available to educate students on proper posture.

1.2 Research Question

1. Does the duration of device usage have a positive association with the likelihood of experiencing neck pain, regardless of the type of device used or sitting position?
2.Do academic factors such as academic year and number of completed semesters have a significant influence on the occurrence of neck pain among students?
3. Is there a positive correlation between poor head posture, particularly frequent forward head leaning, and the likelihood of experiencing neck pain, while considering the impact of breaks from device usage or sitting?
4. How does neck pain affect students' interest and concentration in online learning activities, and is there a direct influence on academic performance or quality of life.?

1.3 Hypothesis of The Study

H1. Prolonged device usage is positively associated with an increased likelihood of experiencing neck pain, regardless of device type or sitting position.
H2. Academic factors such as academic year and number of semesters completed do not significantly influence the occurrence of neck pain.
H3. Poor head posture, specifically frequent forward head leaning, is positively correlated with an increased likelihood of experiencing neck pain, while breaks from device usage or sitting do not significantly affect neck pain occurrence.
H4. Neck pain decreases students' interest and concentration in online learning activities, but it does not directly influence their academic performance or quality of life.

1.4 Research Objectives

The primary objective of this study is to investigate the relationship between text neck posture during smartphone usage in online learning and neck pain among university students in Palestine. Specific objectives are:
1. To examine the relationship between the use of the device for a long time and the incidence of neck pain among students, taking into account the type of devices used and the sitting position.
2. To establish the effect of academic-related variables, such as the academic year and the number of semesters completed, on the incidence of neck pain among students.
3. To examine the relationship between poor head posture, specifically text neck posture, and the risk of developing neck pain, taking into account the effect of breaks from device use or sitting position.
4. To determine the effect of neck pain on the interest and concentration of students in online learning sessions, its direct effect on academic performance, and its relationship with quality of life.

1.5 Significance of the study

This study holds significant implications for both academia and public health in Palestine. By shedding light on the prevalence of text neck posture and its impact on neck pain among university students engaged in online learning, the findings aim to inform educational institutions, policymakers, and healthcare providers about the urgent need for interventions. Through increased awareness and targeted interventions, the study endeavors to mitigate the risks associated with smartphone usage, ultimately enhancing the well-being and academic performance of university students in Palestine.

2. Theoretical framework

The application of technology in the education sector has significantly changed the learning environment, with online learning becoming one of the most popular learning modalities. On the other hand, the increasing use of smartphones has significantly changed the way people conduct their daily activities, including learning. However, there have been concerns about the negative impacts of excessive smartphone use, especially on posture and musculoskeletal disorders. This literature review aims to review the existing literature on the prevalence of text neck posture and its relationship with neck pain among university students, especially in the context of online learning in Palestine.

2.1 Neck anatomy

The neck connects the head to the body, contains important structures for different roles. This region is complex, containing organs and tissues crucial for breathing, speaking, swallowing, metabolism regulation, and circulatory and lymphatic processes. It acts as a pathway for transmitting signals between the brain and the rest of the body, supporting the head, and facilitating blood flow to the brain and head. The neck is divided into anterior and posterior triangles, with each further divided into smaller anatomical areas. The anterior triangle is defined by the sternal notch, clavicle, sternocleidomastoid muscle, and trachea, thyroid, and cricoid cartilages. The posterior triangle is bordered by the trapezius muscle, sternocleidomastoid muscle, and clavicle, showcasing the intricate nature of this region in the body [6].

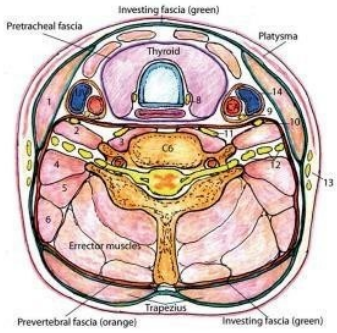

Figure 1: Axial cut through the neck at the C6 level. Fascia's, muscles, bones, vessels and nerves [7].

2.2 Neck anatomy

2.2.1 Skeletal anatomy of neck:

The cervical spine includes seven vertebrae (C1-C7) and six intervertebral discs, supporting the head/neck, allowing for rotation, and protecting the spinal cord. It extends from the base of the skull to the top of the trunk where the thoracic vertebrae begin. The atlas (C1) and axis (C2) are crucial for head rotation and movement. The atlas lacks a vertebral body, forming the atlanto-occipital joint with the skull. This joint allows for half of the head's flexion and extension. The axis has the odontoid process that connects with the atlas, forming the atlanto- axial joint for side-to-side head rotation and neck rotation. The remaining vertebrae (C3-C7) provide support for the head and neck, with limited mobility. Overall, the atlas and axis play a significant role in head movement and weight transfer through the cervical spine, while the other vertebrae offer support and stability. The cervical spine protects nerves from the spinal cord, damage can affect the nervous system, daily activities, and even cause paralysis. Intervertebral discs support loads, affect vertebrae and nerves, but are prone to injury due to extensive movement in the cervical spine. This can lead to weakness, numbness, tingling, and loss of feeling [8].

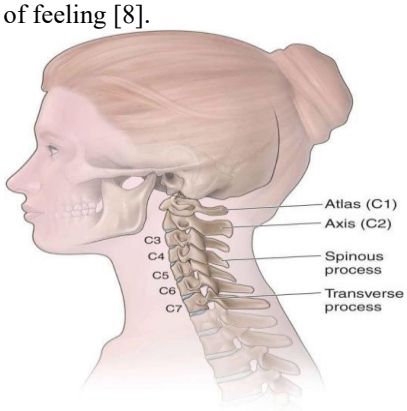

Figure 2: Cervical vertebra [9].

2.2.2 Blood vessels and lymphatics:

The major blood vessels of the neck, including the common carotid artery, internal carotid artery, and internal jugular vein, are located within the carotid sheath. The right common carotid artery branches off the brachiocephalic artery, while the left common carotid artery branches directly from the aortic arch. The common carotid artery divides into the internal and external carotid arteries at the level of the thyroid cartilage. The external carotid artery exits the sheath to supply the face and neck, giving off various branches. The internal carotid artery continues into the temporal bone and connects to the circle of Willis. The internal jugular vein is connected to the sigmoid sinus and receives drainage from other veins before joining the brachiocephalic vein. Blood from the face and scalp drains into the external jugular vein, which ultimately connects to the subclavian vein [10].

Multiple lymph nodes are found in the neck, mainly along the internal jugular vein. Lateral neck lymph nodes are located on each side of the neck, draining the head and neck structures.

Deep central neck nodes connect to mediastinal nodes, draining the thyroid and trachea. Retropharyngeal nodes drain the nasopharynx. Supraclavicular nodes are above the clavicle. Virchow's node, near the thoracic duct, drains lymph from the body. Tumors from the abdomen or pelvis can enlarge Virchow's node. Overall, the lymph nodes in the neck play a crucial role in draining various areas of the head and neck region [11].

2.2.3 Nerves anatomy of neck:

The neck contains neural structures that are intricately connected to various parts of the body, including the skull base, spine, upper extremities, and organs in the neck. These structures include the cervical and brachial Plexi, the sympathetic system, lower cranial nerves, and their branches.

Cervical ganglia consist of three paravertebral ganglia of the sympathetic nervous system: the Superior cervical sympathetic ganglion (CSG) near C2/C3, the Middle CSG near C6/C7, and the Inferior CSG near C7/T1. brachial plexus is formed by the ventral rami of C5–C8 and T1, giving motor and sensory innervation to the upper limbs. It includes roots, trunks, divisions, cords, and terminal branches, with the roots forming upper, middle, and inferior trunks near the subclavian artery after leaving the interscalene triangle. As the trunks of the brachial plexus cross the clavicle, they divide into anterior and posterior divisions. The divisions from different trunks reunite to form cords around the axillary artery. These cords separate into five terminal branches after passing the pectoralis minor muscle [12].

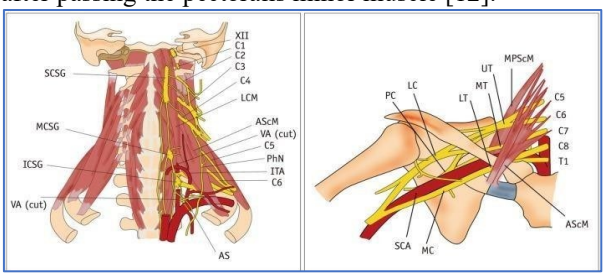

Figure 3: Diagram of cervical sympathetic trunk (A) and brachial plexus (B) [12]

cervical plexus is formed by the ventral rami of the first four cervical spinal nerves and is located in front of C1 to C4 vertebrae, deep to the sternocleidomastoid muscle, and posterior to the longus capitis muscle. It has cutaneous branches for skin innervation around the auricle, neck, and clavicle, as well as muscular branches for the infrahyoid muscles and diaphragm. The largest ascending cutaneous branch of the cervical plexus is the

greater auricular nerve, originating from the ventral rami of C2 and C3. It wraps around the posterior edge of the SCM, beneath the platysma after perforating the deep cervical fascia. Dividing into anterior and posterior branches, it innervates the facial skin over the parotid gland and the skin over the mastoid process on the back of the auricle. Supraclavicular nerves come from C3 and C4 rami, supplying skin over the clavicle, upper chest, and shoulder. Phrenic nerve mainly from C4, with input from C3 and C5, forms near anterior scalene muscle's upper border [12].

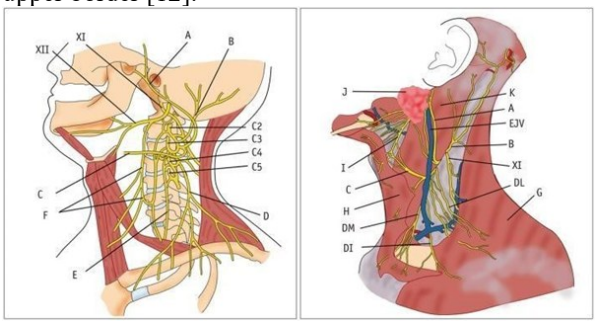

Figure 4: Diagram of cervical plexus and its branches [12].

vagus nerve is the longest cranial nerve with widespread distribution in the body. It consists of parasympathetic, motor, sensory, and taste fibers. Exiting the skull through the jugular foramen, it runs alongside the carotid artery and internal jugular vein. Two distinct enlargements along its path include a superior ganglion in the jugular foramen and a larger inferior ganglion near the C1 vertebra [12]. The spinal accessory nerve provides motor innervation to the SCM and trapezius muscles in the neck. It has two components, the cranial root, and the spinal root, with the cranial root separating from the spinal root after exiting the jugular foramen. The spinal accessory nerve enters the posterior cervical triangle, crossing the IJV at the level of the posterior belly of the digastric muscle. Most nerves cross the IJV anteriorly, with the rest crossing posteriorly. It continues into the posterior neck, passing deep to the SCM and ending in the trapezius muscle [12].

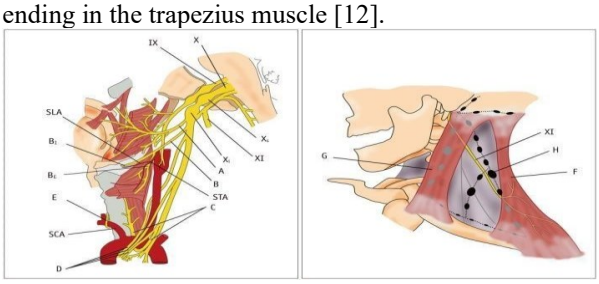

Figure 5: Distribution of vagus (A) and spinal accessory (B) nerves in neck.[12]

2.2.4 Main of Neck muscle:

platysma muscle extends from the upper thorax to the cheek and lower lip, functioning to draw the central lip inferiorly and tense the neck superficially. It is innervated by the cervical branch of the facial nerve [13].

sternocleidomastoid muscle originates from the sternal manubrium and clavicle, rotating the head to the opposite side and innervated by CN XI [14].

trapezius muscle extends from the occipital bone to the lower thoracic vertebrae and scapula, stabilizing and moving the scapula, innervated by CN XI [15].

suprahyoid muscles include the digastric, mylohyoid, and geniohyoid muscles, attaching to the hyoid bone and mandible, elevating the hyoid bone, and innervated by CN XII or branches CNXI [16].

infrahyoid muscles consist of the thyrohyoid, omohyoid, sternothyroid, and sternohyoid muscles, innervated by the ansa cervicalis except for the thyrohyoid muscle, which is innervated by CN XII [17].

2.3 Text neck posture

Prevalence of Text Neck Posture: The term "text neck" refers to the postural syndrome resulting from prolonged periods of looking down at mobile devices, such as smartphones and tablets. Studies indicate a rising prevalence of text neck posture, especially among young adults and university students [12]. found that approximately 79% of young adults exhibited forward head posture associated with smartphone use. Similarly, a study reported a high prevalence of text neck posture among university students. The popularity of the HHMD such as smartphones is on the rise, resulting in increased usage among adults, adolescents, and children. Adults use their smartphones for an average of 5.1 hours a day, resulting in musculoskeletal complaints such as neck, shoulder, back, finger, and thumb pain. The most common complaint is neck pain, also known as text neck, caused by prolonged neck flexion when using HHMD. This is related to the increased use of HHMD, with neck posture and duration of use being significant risk factors [18].

Anatomical change in text neck posture FHP in the cervical spine is one of the most frequent anatomical changes that have been associated with neck pain and other habits such as computer addiction and smartphone addiction. This posture is characterized by a combination of lower cervical flexion and upper cervical extension, which results in joint compression in the atlanto-occipital and atlantoaxial joints. In addition, it may also cause muscle compression, facet joint disease, and nerve entrapments. Observational findings indicate that the position of the head is anterior to the line of gravity, which is associated with a loss of cervical lordosis and an alteration of thoracic kyphosis [19].

Muscle activation in Text posture Texting can lead to increased muscle activation in the neck and shoulders, causing fatigue, pain, and poor posture known as "text neck." Flexed neck positions during phone use increase activity in the sternocleidomastoid and middle trapezius muscles Correcting posture can decrease muscle activity in the serratus anterior and upper trapezius, improving movement patterns and reducing neck and shoulder pain. Adopting a neutral head and thoracic posture can prevent text neck and its negative impacts on the musculoskeletal system [18].

2.3.1 Impact on Neck Pain:

The link between text neck posture and neck pain has been widely investigated in the literature. Identified that neck pain is a global burden that affects all age groups and demographics. The prolonged use of smartphones in unfavorable postures worsens this burden, resulting in musculoskeletal disorders and discomfort. Moreover, established a positive link between text neck posture and

the severity of neck pain among university students, emphasizing the need for posture awareness and ergonomic measures [19].

Figure 6 Visual representation of the head flexion angle (HF) and neck flexion angle (NF) in both neutral head posture and when using HHMD[18].

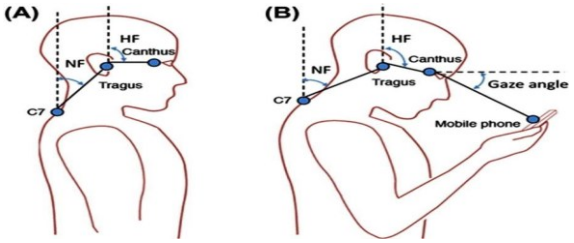

Figure 6: Visual representation of the head flexion angle (HF) and neck flexion angle (NF) in both neutral head posture and when using HHMD [18].

2.4 Online learning:

Online learning has experienced immense growth, with more than millions of students taking online learning courses. Online learning is considered an effective learning process due to its accessibility and ability to accommodate different learning styles. Moreover, online learning encourages student and instructor interaction through discussion boards, video conferencing, and collaboration tools. Institutions of higher learning understand the significance of online learning in their long-term strategic plans, emphasizing the accessibility advantage of online learning. Online learning provides numerous benefits to students, instructors, and institutions [20].

2.5 Neck pain:

Neck pain is a complex condition with multiple etiologies and is a major problem in today's society. Although neck pain is not as common as other musculoskeletal conditions, it is still an important problem with multiple risk factors, including older age, female sex, low social support, and previous neck. [21]. Musculoskeletal disorders (MSDs) are the second most important cause of disability in the world. MSDs affect many workers, especially those whose work involves a considerable amount of physical and mental effort. Neck pain due to MSDs is a major contributor to illness and reduced ability to function in everyday life and at work, affecting about 34.4% of office workers worldwide every year. It can be attributed to several factors such as the individual's functional status, physical activity, psychosocial status, and work behavior. Neck pain is increasing in prevalence, especially in low and middle-income countries, affecting the quality of life and overburdening healthcare systems. Stress and anxiety are strongly associated with neck pain and disability. Also, Women with poor sleep quality have an risk of developing neck pain [22].

2.5.1 Role of Smartphone Addiction:

It found a significant relationship between smartphone addiction and poor posture habits, emphasizing the importance of behavioral interventions in reducing the negative impacts of smartphone addiction [24].

2.6 Similar study:

In a study conducted it aims to find out the association of neck pain with text neck postural among students Central Medical College, Lahore [25]. the Study found the text neck pain is found to be 93.2% which is very high among the young population and smartphones were found to be the highest risk factor for this text neck pain. Female students comparatively suffer more from frequent pain and discomfort. Experience of pain and discomfort was significantly associated with the number of hours consumed in using the device and reading a book.

in a study done it aims are to determine the effect of using smart devices on the increase in physical disorders during the Covid-19 period among university students in the Kingdom of Saudi Arabia [26]. The current study's findings showed that nearly half of the participants experienced neck disorders. Smartphone addiction and text neck posture were significantly associated with the occurrence of neck disorders.

In a study done, the aim of the study is to find out if there is a relationship between neck pain and the use of smartphones among students from King Abdulaziz University in Jeddah, Saudi Arabia [19]. The current study's finding the previous history of neck and shoulder pain and the number of hours of study on smartphones and computers are the only two factors that predicted the duration and occurrence of pain, and the severity of pain is related to the number of hours of use of smartphones and was predicted individually.

In a study done, the aim is investigating the association between smartphone usage and the prevalence of neck pain among university students in University of Sialkot [5]. Finding the result of the study shows a strong correlation between the usage of smartphones and neck pain.

The literature review discussed above shows the complex relationship between the usage of smartphones, text neck posture, and neck pain in university students. To address these issues, a multi-faceted approach is needed. Through awareness and intervention, educators, healthcare professionals, and policymakers can work together to address these issues.

3. Methodology

This study aims to explore the relationship between text neck and neck pain in young adults. And the contribution to reducing text neck posture among university students and the lack of research that studies this relationship between online learning and neck pain during text neck posture.

3.1 study design:

Observational cross-sectional design, that was conducted in west bank area and universities students who have received online education for at least one semester.

3.2 study setting:

The study takes place at the west bank universities. The study is done between February 2024 and May 2024.

3.3 Study sample:

3.3.1 Sampling method:

Taking convenience samples and questionnaires distributed to universities in west bank

3.3.2 Sample size:

Male and female students were selected in different universities,153 male and female student from west bank area.

3.3.3 Inclusion criteria:

Universities students with different age, students of west bank universities and both genders males and females.

3.3.4 Exclusion criteria:

Every student does not study in the west bank universities, university students who have not received online education for at least one semester and any student who is not at the university.

3.4 Data collection

3.4.1 Data collection tool:

The survey was derived from several standardized questionnaires developed in order to find the relationship between Smartphone Use and Neck pain with text neck postural During Online Learning.

3.4.2 Data collection procedure:

we visited the Universities to collect data from university's students to find out the effect of Smartphone on Neck pain with text neck postural During Online Learning. We collected data using the questionnaire.

4. Results

This chapter includes presenting data analysis, testing hypotheses, answering research questions, and reviewing the results

4.1 Demographic data:

After collecting the study data, the researchers reviewed it in preparation to be entered to the computer, it has been entered to the computer by giving specific figures, that means to transfer the answer from verbal to digital. The data has been statistically processed, by extraction the numbers, the percentages, the averages, and the standard deviations. The hypotheses have been examined at the level of $\alpha = 0.05$, by the following statistical tests: Chi square, Pearson correlation. By using the computer with statistical packages for Social Sciences, version SPSS 24. Software.

Table 1, A total of 153 students took part in the study, providing a diverse sample for analysis. The average age of the participants was 20.83 years, with a relatively narrow range indicated by the standard deviation of 2.54 years. This implies that most of the participants were of a similar age group.

The physical attributes of the participants were also considered, showing that the average height of the participants was 166.44 cm, with an average weight of 65.18 kg. These averages, together with their standard deviations, give a clear indication of the variability of the sample population. Moreover, the average BMI of 23.36 shows that on average, the participants were of normal weight, based on the BMI categories.

The gender composition of the participants was also considered, showing that the male gender made up 28.1% of the sample population, while the female gender made up 71.9% of the sample population provides context for analyzing any gender-related differences in the study's outcomes (Figure 7).

Distribution of the participants according to the academic year was also analyzed. The results showed that 22.88% were first-year students, 20.22% were second-year students, 30.07% were third-year students, and 20.8% were fourth-year students. This enables the analysis of possible differences in the results according to the academic year (Figure 8).

Among the total participants, a large percentage, approximately 87.6%, experienced neck pain during the study period. This result emphasizes the prevalence of neck pain among the study population and emphasizes the importance of the current study in examining the factors that influence its occurrence and management (Figure 9).

Table 1: demographic characteristics of the study participants

Variables	N	Minimum	Maximum	Mean	S.D
Age	153	18	39	20.83	2.54
Weight (kg)	153	39	140	65.18	15.15
Height (Cm)	153	144.0	196.0	166.444	9.81

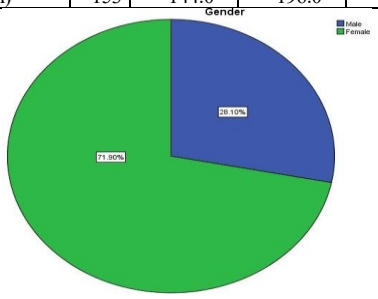

Figure 7 Gender Distribution Among Study Participants

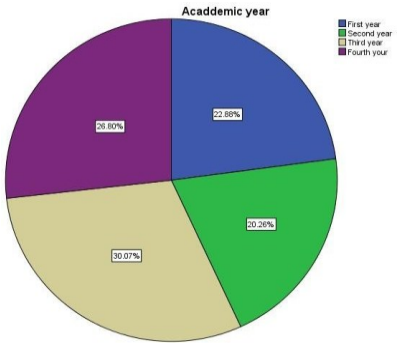

Figure 8 Academic year Distribution Among Study Participants

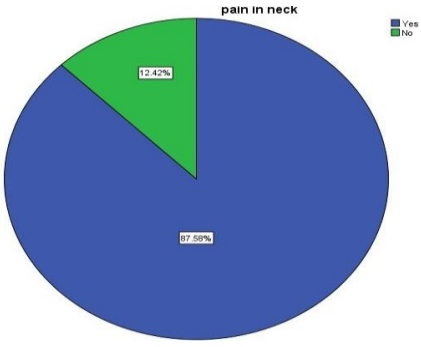

Figure 9 Prevalence of Neck Pain Among Study Participants.

In table 2, the Pearson Chi-square test was employed to investigate the relationship between various factors and the incidence of neck pain. Among the various factors, gender was found to be statistically significant, with a p-value of 0.04, which suggests a significant relationship between gender and neck pain. This indicates that gender could be a contributing factor to the development of neck pain, and further research is required to investigate gender-specific risk factors or physiological differences that may be responsible for this association.
In addition, the number of hours spent using electronic devices on a daily basis also showed a significant relationship with neck pain, as indicated by the p-value of 0.03. This finding indicates that the more time spent using devices, the more likely it is to experience neck pain, perhaps as a result of improper ergonomics or excessive strain on the neck muscles from prolonged screen time.
Notably, although some variables like academic year, smartphone size, sitting position, average break time, sports activity, and number of semesters failed to establish a significant relationship with neck pain (with p-values ranging from 0.154 to 0.7), the posture of text neck posturing was found to be statistically significant (with a p-value of 0.04). This implies that people who tend to display text neck posture are likely to suffer from neck pain, thus emphasizing the need to maintain proper posture to avoid musculoskeletal discomfort.
On the other hand, variables like the type of device used did not show significant associations with neck pain, suggesting that the particular device used may not be an important contributing factor to the development of neck pain. In light of these observations, the significance of these observations lies in the fact that they re-emphasize the multifactorial nature of neck pain and the need to consider a variety of lifestyle factors in the evaluation of risk factors and the implementation of preventive strategies to reduce the prevalence of neck pain.
Here's what the results indicate:
This research reveals some interesting links to neck pain, but many common factors are irrelevant. There is no significant difference in neck pain risk based on Academic year: What year you are in school doesn't seem to make much difference to neck pain. Whether you're a freshman or a senior, the risk stays about the same, Smartphone size: The size of your phone doesn't seem to make a difference in whether you get neck pain or not, sitting position: How you sit doesn't seem to be strongly linked to neck pain. Whether you slouch or sit up straight, it doesn't matter much, Number of semesters: How many semesters you've completed in school doesn't really affect neck pain. Whether you're in your first semester or your last, the risk is similar, Sports: Playing sports doesn't seem to have a big impact on neck pain. Being active or not doesn't seem to change things, or the Type of device: Whether you use a phone, tablet, or computer doesn't seem to be connected to neck pain. They all seem to have similar effects, Interestingly, gender may play a role: Being male or female might have something to do with neck pain. male and female might experience it differently, and how you hold your head matters. If you tend to lean your head forward a lot (text neck), you might be more likely to have neck pain. The total amount of time spent on devices appears to be the biggest risk factor. Taking breaks specifically from screens might be the most effective preventive measure.

Table 2: Crosstab of neck pain with risk various factors

Factor	Categories	Neck Pain	Total	Pearson Chi Square (Sig.)	
		Yes	No		
Gender	Male	34	9	43	3.98 (0.046)
	Female	100	10	110	
Hours for device use daily	4-5 h	31	5		4.8 (0.03)
	5-10 h	83	12		
	10-15 h	20	2		
Academic year	First	31	4	35	1.77 (0.7)
	Second	27	4	31	
	Third	42	4	46	
	Fourth	34	7	41	
Size of smartphone screen	Small	13	2	15	1.02 (0.6)
	Medium	103	16	119	
	Large	18	1	9	
Positions	straight back	23	5	28	1.77 (0.6)
	Lying on you back	20	4	24	
	Hunched posture	80	9	89	
	lying on your side	11	1	12	
Average Break Time	Less than 30 min	84	7	91	0.42 (0.34)
	1 h	27	6	33	
	1.5 h	14	5	19	
	2 h	4	0	4	
	More than 2 h	5	1	6	
Sports activity	Yes	60	7	67	0.42 (0.62)
	No	74	12	86	
Number of semesters	91-2	99	10	109	3.7 (0.154)
	3-4	17	4	21	
	5-6	18	5	23	
Text neck Posture	Yes	115	14	129	6.21 (0.04)
	No	19	5	24	
Device	Mobile	43	8		1.56 (0.46)
	Tablet	9	0		
	Laptop	76	11		
	PC	6	0		

Table 3 investigating how neck pain impacts various factors, including academic performance, desire to engage in online learning, concentration during online learning, and quality of life. We used the Pearson Chi-Square test to determine the relationship between neck pain and the above factors. The findings showed some interesting results.
Firstly, the relationship between the desire to participate in online learning and neck pain was discovered to be statistically significant, with a p-value of less than 0.05. This implies that people experiencing neck pain may have a lower desire to participate in online learning activities. It indicates that neck pain could affect the motivation of students to participate in online learning materials.
Likewise, the correlation between concentration during online learning and neck pain was also significant, with a p-value of less than 0.05. This shows that neck pain can negatively influence the concentration of students during online learning sessions. Neck pain may cause discomfort or distraction to students, which can affect their concentration and attention during online learning sessions.
On the other hand, the correlation between neck pain and academic performance, as well as quality of life, did not show statistical significance, as the p-values exceeded 0.05. This indicates that neck pain may not have a direct effect on academic performance or quality of life among the participants. Other variables may have a dominant

role in determining academic performance and quality of life.

In conclusion, the results of our study emphasize the significant effect of neck pain on online learning, specifically with regard to motivation and concentration. However, neck pain does not appear to have a direct relationship with academic performance or quality of life.

Here's what the results indicate:

We have shed light on the effects of neck pain on online learning. Neck pain may not seem to have any direct effects on the performance and well-being of students, but it can be a major setback for a student. Students with neck pain showed less interest in online activities and had difficulty concentrating in online classes. This shows the significance of managing neck pain in students pursuing online learning. Neck pain can be managed to ensure that students remain focused and motivated in online learning.

Table 3 Impact of neck pain on various factors.

Effect of Neck Pain on:	Categories	Neck Pain		Total	Pearson Chi-Square (Sig.)
		Yes	No		
Academic Performance	Yes	117	17	134	2.51 (0.112)
	No	14	5	19	
Desire to engage in online Learning	Yes	109	25	134	5.44
	No	11	8	19	(0.026)
Concentration during online learning	Yes	115	19	134	3.68
	No	13	6	19	(0.046)
Quality of life	Yes	126	8	134	0.015 (0.69)
	No	18	1	19	

4.2 Testing of hypothesis:

4.2.1 Device usage for a prolonged period is positively related to the likelihood of neck pain.

The test showed that there is a statistically significant relationship (p-value = 0.03), which means that device usage for a prolonged period is indeed related to the likelihood of neck pain.

4.2.2 The Academic variables like academic year and number of semesters completed are not significant factors in the occurrence of neck pain.

The test failed to establish a significant relationship between academic variables and the occurrence of neck pain (p-values between 0.154 and 0.7), indicating that academic year and the number of semesters completed are not significant factors in the occurrence of neck pain.

4.2.3 The Poor head posture, particularly text neck posture, is a positively correlated factor for the likelihood of occurrence of neck pain, but breaks from device use or sitting are not significant factors in the occurrence of neck pain.

The test established a significant relationship (p-value = 0.04) between poor head posture and neck pain, indicating that people with text neck posture are likely to have neck pain.

4.2.4 Neck pain The Neck pain reduces the students' interest and concentration in online learning activities, but it does not affect their academic performance and quality of life.

Neck pain showed significant associations with the interest in online learning (p-value < 0.05) and the concentration during online learning sessions (p-value < 0.05). However, it did not show any significant associations with the academic performance and quality of life among the study participants (p-values > 0.05).

5. Discussion

The study mostly focused on assessing the effect of using smartphones on neck pain, and the findings were very significant. The study indicated that excessive use of smartphones leads to abnormal positions of the neck being assumed (text neck), resulting in neck pain.

Neck pain in university students is a complicated problem that could have several contributing factors. Gender is one factor that has been found to contribute to neck pain in university students. Furthermore, the amount of time spent on devices has been found to be a contributing factor to neck pain in university students. The longer the student spends hunched over a phone or computer, the greater the chances of developing neck pain. Taking regular breaks and limiting screen time may be an effective way to prevent neck pain. Notably, the level of neck pain is not seen to be significantly affected by the academic year. Whether one is a freshman or a senior, the probability of having neck pain appears to be relatively equal. This implies that the pressures of university life may be a contributing factor to neck pain. Besides, the size of the smartphone and the position in which one sits while using it do not appear to be significantly associated with neck pain. The type of device one is using (phone, tablet, or computer) also does not appear to make a difference. It is likely that these variables may affect comfort levels while using the device, but they do not appear to have a direct effect on the development of neck pain. In Addition, head position is an important consideration in neck pain among university students. Students who tend to lean their heads forward are more likely to have neck pain. This is especially true for students who tend to text or read on their devices in this position. Breaks from device use do not appear to have a significant effect on neck pain. The length of time that breaks are taken does not appear to be an important consideration. Moreover, participation in sports does not seem to have a significant effect on neck pain in university students. It could be a physical activity that helps counteract the effects of spending too much time with sedentary devices, but it does not seem to have a significant effect on the levels of neck pain. Besides, the number of semesters completed does not seem to have a significant effect on neck pain. Whether the student is in their first semester or last semester, it seems that the risk of neck pain is the same. In general, it appears that neck pain in university students is a complex problem. The most critical factors appear to be the duration spent on devices and adopting correct posture when using devices. These measures could be helpful in preventing and managing neck pain in university students.

However, it does seem that neck pain does have an impact on the students' willingness to engage with online learning activities. This could have the potential to restrict their learning experience. In Addition, Neck

pain could also impair the students' capacity to focus during online lessons. It could cause students discomfort and headaches, which could act as a distraction for the students, preventing them from fully comprehending the lessons. This could have a negative effect on their academic performance. However, it should be noted that neck pain does not have a direct negative effect on students' grades or quality of life. It could be one of the many challenges that students may encounter during their university life.

On the other hand, our study found There is a relationship between gender and the presence of neck pain, as the percentage of females in the study was 71.9% and males were 28.1%, and the majority of bitten females suffered from neck pain, as the p value was 0.04. The results of other studies differed from the results of our study because the ratio of males to females differed in the two studies, with an increase in the proportion of females in both. The variations were due to differences in sample size and other influencing factors such as the war in Gaza and the impact of the Corona crisis during the period of application of our research, leading to the disparity in the ratios of our study compared with other.

In a previous study [19], It has found Average time (in hours per day) time spent on using their phones, time spent on devices for studying, and having a history of neck or shoulder pain were significant predictors of neck pain duration in the univariate model ($p<0.018$). Our study found the factors such as academic year, smartphone size, sitting position, average break time, sports activity, and the number of semesters did not show significant associations with neck pain with p-values >0.05, while there were statistically significant changes and the association of neck pain with text neck postural, where the p-value 0.04.

6. Conclusion:

In this study, a relationship was found between the use of smartphones and neck pain during eLearning times among university students due to the text position of the neck. However, there was no statistically significant relationship between association between academic factors, Size of smartphone screen and its type, body Positions, Average Break Time and Sports activity with neck pain.

7. Recommendations:

University students engaging in online learning through smartphones must be cognizant of their posture to avoid the onset of "text neck," a strain injury frequently associated with this activity. It is imperative to hold your smartphone at eye level, which can significantly reduce the tilt of your head and neck, thereby decreasing strain. Make sure to take regular breaks to stand up, stretch, and change your position. Incorporate exercises that help strengthen the muscles in your neck and upper back into your fitness routine to promote good posture. In addition, consider using

a smartphone stands or holder to enable a hands-free experience to promote an ergonomic and upright position during online classes. these tips will not only help promote good posture but also a comfortable learning experience.

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