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PREVALENCE OF TEXT NECK SYNDROME AND ITS ASSOCIATION WITH SMARTPHONE USAGE AMONG SHOPKEEPERS IN KARACHI

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ABSTRACT

Background

Smartphone usage had led to text neck syndrome, a new clinical ailment linked to prolonged use in both upright and seated positions, indicating a potential health risk associated with prolonged smartphone usage.

Objectives

The study aimed to identify the frequency of text neck syndrome among shopkeepers in Karachi and to determine the relationship between smartphone users and TNS.

Methods

This research comprised a cross-sectional investigation carried out across six different markets located in Karachi, Pakistan, spanning a period of one year. The sample size was 334 participants, selected through non-probability convenience sampling. The outcome measures included SAS-SV questionnaire for smartphone addiction and NDI for evaluating cervical disability.

Results

The study encompassed 334 male shopkeepers in Karachi, revealing a high prevalence (70.3%) of text neck syndrome. Prolonged smartphone usage was significantly associated with increased neck pain, stiffness, and eye discomfort. Moreover, daily usage duration showed a positive association with both frequency and intensity of neck pain. Neck disability index scores positively correlated with neck position while using smartphones, indicating greater disability with improper posture. Recommendations for prevention and management were warranted based on these findings.

Conclusion

Excessive smartphone usage among Karachi shopkeepers contributed to text neck syndrome, causing neck pain and strain. Recommendations for shopkeepers included reducing screen time, maintaining proper posture, and utilizing speech-to-text software for prevention.

Key Words: *Text neck, Syndrome, Neck pain, Smartphone Addiction, Neck Disability, Karachi.*

INTRODUCTION

The fourth leading cause of disability worldwide was neck pain. In recent times, there had been a concerning increase in the prevalence of smartphone usage and addiction, especially related to texting, particularly among the youth. Evidence suggested that when viewing a smartphone screen, respondents head position was more forward than when they were neutrally standing. Additionally, a forward head posture might have put more mechanical strain on the cervical spine joints and ligaments and might have raised the demand on the posterior neck musculature due to the high gravitational force. [1]

Smartphones had become an indispensable component of daily life, and with a variety of mobile applications for communication, education, and entertainment, one of the most widely used technical devices worldwide among people of all ages was the smartphone. At that time, smartphones became the most extensively used device enabling plenty of daily tasks, including exchanging information, browsing the internet, watching films, participating in games, using social media, and an array of different tasks because of extended, strong, low amplitude, repetitive use of handheld devices, there had been a rise in the occurrence of musculoskeletal issues leading to disability in various parts of the upper body, including the hands, wrists, forearms, arms, and neck. [2]

There was mounting evidence that people of all ages even kids, displayed higher FHP when looking at a smartphone compared to when they were standing neutrally. Together, these elements played a key role and lent support to the biomechanical theory. Text Neck Syndrome (TNS), a complex cluster of clinical manifestations including neck pain, shoulder tightness, migraine and headaches, and pain down the arm and forearm, could have been caused by improper neck posture when using personal computers and smartphones for texting. An international source of impairment was neck discomfort. It was a public health issue that had dramatically gotten worse in recent years. Independent of age, the prevalence was considerable and on equivalence with low back pain. [3]

Neck pain was a musculoskeletal disorder which in general was a worldwide cause of disability. It was a community health problem that had remarkably amplified nowadays. It had a significant frequency across all age groups. It was a sort of stress injury marked by an incorrect neck position brought on by continuous usage of electronic devices. When using a smartphone for extended periods of time, prolonged neck flexion might have aggravated text neck syndrome and led to improper body positioning and posture. Text neck syndrome was often diagnosed by examination and evaluation of the occurrence of neck pain. In Sweden, 82 percent of the people between the ages of 15 and 24 had smartphones and frequently sent and received SMS messages. [3] Dependency on smartphones was a growing problem in society and fell under so-called behavioral habit genre. [4]

TNS was often identified and screened by physical therapists, or possibly by self-perception, by estimating how frequently they had neck pain. History, physical examination, and postural imaging provided the basis of a prompt diagnosis and screening of the increased risk group to show TNS. The cervical region was at greater risk than the lumbar. Certainly, using various modern electronic devices forced the neck into a stressful position, therefore showed a link to neck pain. [5]

During an average person's waking hours, they spent only two hours without holding their smartphone. Around 79% of people around the globe who were between the ages of 18 and 44 regularly used smartphones. At the end of 2019, there were approximately 3.5 billion smartphone users globally, and by 2021, the number was projected to increase to 3.8 billion. [5]

Several research linked the degree of head bending to neck pain brought on by smartphone usage. One of the research findings even suggested that the length of time spent utilizing a smartphone enhanced the number of head bending that caused the neck pain. [6]

Utilizing a smartphone excessively could have led to overuse syndrome, which, if ignored, could have permanently harmed the surrounding structures, including the muscles, connective tissues, and causing an imbalance in

the stress to strain ratio and catastrophic injuries to neck. [7]

The age of smartphone users varied from teenagers to geriatrics. Repetitive motions and poor posture might have triggered musculoskeletal conditions, which, once untreated, could have had a lasting impact. In the USA, 87% of teens aged 14 to 18 had a smartphone, while in the UK, 79% of teenagers aged 12 to 15 had one; 91% of Americans currently owned a smartphone; and 35% of those people engaged in text messaging. [7]

According to the Pakistan Telecommunication Authority (PTA), there were 150 million smartphone users in Pakistan, with a telephony density of 73.28%. Social networking apps like Facebook, WhatsApp, Messenger, and others were used by over 58 million people. The predominant method of communication was texting. Worldwide, more than 560 billion text messages were transmitted each month. [7]

A Canadian study indicated that 46–52% of those surveyed experienced shoulder issues, while 68% experienced neck complaints as reported by smartphone users. 40% of those surveyed in an additional investigation of young Chinese phone users stated that they had neck and shoulder pain. A further investigation indicated that 60.3% of medical students had a mobile device fixation, and the most prevalent pain related to this was neck pain (60%) and shoulder discomfort (40%). [8]

Numerous studies looked into how smartphone addiction affected the musculoskeletal system. In a study conducted by Wahab et al., they discovered a direct link between neck issues and smartphone addiction. According to Berolo et al., there was a strong correlation between the amount of time spent using a smartphone in recent years and neck and shoulder pain, which was an issue that was becoming more and more serious and had a significant global impact. [9]

When using a smartphone, the users extended their necks to look down at the screen, which caused excessive lower cervical lordosis and compensating upper thoracic kyphosis. The "bending head", "turtle neck,", or "text neck" posture was a bad posture that could have caused insufficiency and exhaustion in the neck extensor muscles and cervical spine due to excessive gravitational movement. [10]

The total number of text neck syndrome instances and its correlation with shopkeeper smartphone usage were still unknown. Therefore, the purpose of this study was to determine the prevalence of text neck syndrome among shopkeepers, along with how often they used smartphones, and whether there was any relationship between the two.

STATEMENT OF PROBLEM

Neck pain was a common health concern. It could have led to a cluster of symptoms which might have caused text neck syndrome. In the modern era, text neck syndrome had become a dreadful dilemma as a lot of people were addicted to smartphones. Chronic neck pain was brought on by holding your head forward for an extended amount of time. The forward-bent posture influenced the neck, shoulder, and underlying muscles.

Conditions that were left untreated could have caused the spine's curve to straighten, arthritis to develop earlier, disc compression, and herniation.

RATIONAL OF THE STUDY

Global researches on text neck syndrome had been conducted and completed; however fewer local studies were discovered. There had never been an observational study in Karachi and research done exclusively on shopkeepers. The best option in managing text neck syndrome was prevention. Through our research, we aimed to spread awareness towards people to reduce the time spent on smartphones, maintenance of posture while using smartphones, and exercises that could have prevented from text neck syndrome.

OBJECTIVES

Primary Objective: To identify the frequency of text neck syndrome among smartphone users of shopkeepers in Karachi.

Secondary Objective: To determine the relation between smartphone users and text neck syndrome among shopkeepers in Karachi.

OPERATIONAL DEFINITIONS:

Text neck syndrome: It was a repetitive stress injury of the neck. It was a type of neck pain that was caused when the neck remained in a flexed

position for a long period while using electronic devices such as mobile phones, laptops, computers, and tablets. [11]

Smartphone: It was a movable, lightweight, and convenient device that combined the feature of computers and mobile phones. It had many quality features such as texting, calling, browsing, gaming, clicking and saving pictures, and videos. [12,13]

LITERATURE REVIEW

The proliferation of electronic devices, particularly smartphones, in recent years had revolutionized various aspects of daily life, encompassing work, social interaction, and entertainment. In the research carried out by Mustafaoglu et al. (2020) with a representative sample of 249 undergraduates at Istanbul University, it was determined that smartphone addiction had a significant impact on the frequency of pain in the musculoskeletal system. The areas with the greatest number of cases of musculoskeletal ache were the upper portion of the back (70.3%), neck (65.9%), and wrists and hands (68.7%) among smartphone consumers, especially those with an obsession with their smartphone. These findings underscored the growing concern regarding the detrimental effects of excessive smartphone usage on physical health, highlighting the need for further investigation and interventions to address this emerging public health issue. [2]

Walankar et al. (2021) chose 200 undergraduate students for the purpose of the research with the goal of identifying the prevalence of musculoskeletal discomfort and associated risk factors in undergraduates using smartphones in Indian universities. Of these, 34.2% reported neck pain, and there was a significant correlation between this prevalence and the size of the individual's smartphone (p=0.005). [5]

Alsalameh et al. (2019) selected 242 participants, from which it was revealed that the percentage of smartphone misuse among medical learners was comparatively high (60.3%), in order to conduct a study to determine the frequency of addictive or overuse of smart phones among medical learners and to investigate whether there was a link between smartphone addictions and musculoskeletal discomfort. The cervical, lower back, and shoulders were the areas of the body where smartphone addiction most frequently caused pain (60.8%, 46.8%, and 40.0%, respectively). [6]

Nawaz et al. (2020) conducted a study in order to determine the amount of textural neck discomfort at institutes in Islamabad. The prevalence information gathered from 428 individuals, males and females, revealed that 35.0% of those who used smartphones experienced neck pain on an ongoing basis, 39.5% of the overall population occasionally encountered pain during daily activities, and the vast majority of the group experienced neck pain while using their smartphones while hunched at a tilt of 30-45 degrees of cervical flexion for a maximum of three hours each day. [7]

Elsiddig et al. (2022) undertook a research project with a representative group of 516 undergraduates at Taif Institute to assess the occurrence and contributing variables of cervical and shoulder ache among Saudi university pupils as a consequence of using smartphones and computers. 35.1% of individuals used their smartphones, and 35.1% spent an average of 6 to 9 hours every day. Additionally, 40.5% of consumers of cell phones tilted their heads slightly downward while using the gadget, and 59.1% reported experiencing neck or shoulder discomfort. In addition, 20.3% reported pain during daily activities, while 34.3% exercised after utilizing gadgets. [8]

According to a study carried out by Sirajudeen et al. (2019) at Majmaah University with a sample size of 313, 46% of participants had neck disorders as a result of smartphone use, which was found to be the distribution of text neck posture, smartphone addiction or overuse, and its correlation with neck discomfort among undergraduates. Participants who reported text neck posture and who were classified as smartphone addicts or overusers (P 0.001) had higher risks of neck concerns. [10]

A research project by Kumari et al. (2021) at an Indian institution was conducted to ascertain the incidence of text neck syndrome and cervical pain among undergraduates as well as the impact of cervical pain on their busy routines. Among the 283 feedbacks, 36.5% of the participants reported mild text neck syndrome, 23.4% said they had moderate, 2.1% said they had

significant and total text neck syndrome, and 35.7% said they had none at all. And 73.4% of respondents reported mild to extremely painful cervical and back area symptoms. [11]

Individuals used their smartphones continuously, whenever they preferred, in either an upright or seated position. This behavior was associated with the development of text neck syndrome, a new clinical ailment. Numerous studies indicated a link between this syndrome and regular usage of portable multimedia devices. [14]

Many people were hooked to smartphones and paid lesser attention to their surrounding environment. A cross-sectional study was conducted in Brazil demonstrated that individuals with high and moderate sedentary lifestyles experienced neck pain in such cases. In both males and females, moderate and high sedentary behavior was linked to neck pain. [15]

Gull et al. (2021) conducted a study with a sample size of 143 students to find out the distribution of mechanical neck discomfort in Faisalabad public sector undergraduates. The results of the research revealed that 36.4% had mild, 37.1% had moderate, and 26.6% had severe mechanical neck pain, with the primary cause being the usage of smartphone devices. [16]

Hadidi et al.'s (2019) research, conducted research involving 500 students from the University of Jordan, assessed the correlation between neck pain and the amount of time spent using electronic devices. They took into account factors such as gender, age, and the most frequent posture individuals used their devices in. According to this study, there was a significant connection between the frequency and severity of neck pain and the period of time spent operating a smartphone device. [17]

With 100 students studying physiotherapy as the sample pool at Patil College in India, Sathya P. and Tamboli SA (2020) carried out a study in order to identify the likelihood of text neck syndrome in the population of young adults. Females had the greatest impact (80%), and their age group the most affected turned out to be 22 years (34%). According to this study's findings, 32% of respondents suffered from text neck syndrome. [18]

Blumenberg (2021) completed the research at the University of Brazil to assess the relationship between the amount of time spent using smart phones and computers and the frequency of neck, mid-back, and lower back symptoms. He found that when people used mobile devices for between three and seven hours as well as seven or more hours throughout the day, respectively, the likelihood of neck discomfort was 1.41 and 1.81 times greater than it was for people who used them for a brief period of time. People who used computers for longer than two hours a day had a 1.47-times greater incidence of neck pain than people who did not use computers. He came to the conclusion that excessive use of smartphones was linked to cervical and low backaches compared to excessive use of personal computers, which was exclusively linked to neck discomfort. [19]

Hassnain (2023) used a representative sample of 118 medical graduates at Central Medical College in Lahore to perform a survey to determine the prevalence of text neck syndrome in both lengthy studies and frequent use of smartphones among adolescent undergraduates of medical institutions. The back area, shoulder, or neck-related discomfort was reported by 93.2% of the medical learners. 54.5% of the male pupils and 74.6% of the female medical pupils, respectively, reported headaches and neck pain. Smartphones were the device that 94.1% of students used most frequently. The prevalence of text neck discomfort among young adults was determined to be 93.2%, which was extremely significant. The usage of smartphones was revealed to be the biggest contributing factor, with laptop usage coming in at number two. [20]

In addition to 299 individuals at institutions affiliated with Khyber Medical University in Hayatabad, Peshawar, a research effort took place by Khattak (2020) to ascertain the likelihood of text neck syndrome between doctor of physical therapy students, the extent of dependency on their smartphones, and their knowledge of text neck syndrome. 76 individuals (25.4%) experienced text neck syndrome, while 223 (74.6%) did not. A quarter of the pupils (25.4%) reported having text neck ache as a result of using their smartphones excessively and not being aware of the risks. [21]

With a total sample comprising 273 and a rate of occurrence of textual neck syndrome of

64.5%, Rashid (2022) investigated the frequency of TNS between medical undergraduates during the COVID-19 lockdown in Iraq. Over a period of five hours per day (63.7%) were spent using mobile devices by approximately two-thirds (61.5%) of respondents. A survey of medical undergraduates revealed a high frequency of neck impairments. The primary risk factors for neck limitations were addictions and frequent use of smartphones, along with a disregard for warming up the cervical muscles prior to usage. [22]

Gudegowda et al. (2023) studied an overall count of 100 undergraduate medical students in Bangalore, India, in order to determine the frequency of text neck syndrome and potential risk issues related to it. 15% of the entire population had mild textural neck syndrome. 46% of the individuals showed a moderate degree of textural neck syndrome. 11% of the entire population had text neck syndrome to a significant degree. 15% of people had extreme nomophobia. [23]

In addition to the sample comprising 120 MBBS and BDS individuals, Khan et al. (2020) executed a study to ascertain the prevalence of text neck syndrome across medical and dental learners at Sharif Medical and Dental College, Lahore. Among the 120 individuals, 19 (16%) had minor nomophobia, 80 (67%) had intermediate nomophobia, and 21 (17%) had extreme nomophobia. 50 students (42%), who had used their phones for extended periods, experienced neck pain. [24]

To determine whether there might be a correlation between text neck and neck discomfort in young individuals, Damasceno et al. (2018) studied 150 students aged 18 to 21 years old representing a public high school in the state of Rio de Janeiro.[1] The present research found no link between text neck and cervical pain in youngsters aged 18 to 21 years. [25]

Abdali et al. (2020) conducted an online cross-sectional survey within the Saudi population residing in Jazan, with 385 respondents participating. Of these, 50.1% fell within the age bracket of 21 to 30 years, 61% reported using smartphones for over 5 hours daily, and 90.1% expressed awareness of the negative implications associated with smartphone usage. Interestingly, only 14.8% of respondents were familiar with text neck syndrome. Nearly half of the participants, 47.2%, acknowledged the multifactorial nature of the syndrome. While a small proportion, 1.6%, had received a formal diagnosis of text neck syndrome, a significant majority, 80.5%, experienced multiple symptoms associated with prolonged smartphone use. [26]

Kumar and colleagues (2024) conducted a cross-sectional survey aiming to ascertain the frequency and awareness of text neck and thumb text syndrome. They enlisted 200 volunteers aged 18 to 25, who had been using smartphone for the past five years. Results revealed that 57.1% of participants were not aware of text thumb syndrome, and 50.3% were unfamiliar with text neck syndrome. The primary activities on smartphones were texting and calling, with approximately 45.2% of individuals using their right thumb and forefinger for texting. Moreover, 33% of respondents reported using their phones with their heads tilted forward. He concluded that the substantial occurrence of text neck and thumb text syndrome among young adults underscores the need for proactive pain management and heightened awareness of users. More research was deemed necessary to assess the long-term impact of these technologies on neck health and to prevent future health issues. [27]

METHODOLOGY

STUDY DESIGN:

Cross-Sectional Study.

STUDY SETTING:

Six Markets (Landhi, Korangi, Defence, Bahadurabad, Mehmoodabad, and Saddar) in Karachi, Pakistan.

STUDY DURATION:

One year.

SAMPLE SIZE: Previous studies showed the prevalence of 68.1% population who had Text Neck Syndrome due to smartphone usage. [28]

In total, n=334 participants were included in this study using a 95% confidence interval, a margin of error of 5%, and a *p*-value (<0.05) determined using Epi info, Version 3.

Equation

$$\text{Sample size } n = [DEFF*Np(1-p)]/ [(d^2/Z^2_{1-\alpha/2}*(N-1)+p*(1-p)]$$

SAMPLING TECHNIQUE:
Non-Probability Convenience Sampling.

INCLUSION CRITERIA:
- Age: 20-40 years.
- Gender: Male Shopkeepers.
- Work experience: Shopkeepers who had been working in the shop for more than 6 months.
- Smartphone usage: More than one hour per day.

EXCLUSION CRITERIA:
- Mobile phone repairers.
- History of Previous neck and shoulder surgeries
- History of cervical fractures.

OUTCOME MEASURES:
SAS-SV:
Self-made questionnaire which was specifically designed for the addiction of smartphone usage. [29]

NDI:
NDI consisted of ten components. A lowest total score of 0 and an upper limit total score of 50 could be obtained by evaluating every component from 0 to 5. Five different levels of cervical disability (0–4 = no disability, 5–14 = mild disability, 15–24 = moderate disability, 25–34 = severe disability, and >34 = complete disability) were used to determine the overall score. This indicator was highly validated for evaluating impairment in individuals with cervical pain. [30]

DATA COLLECTION PROCEDURE:
Data was collected by asking the shopkeeper to fill out a simple self-structured questionnaire. The Questionnaire took approximately 15 - 20 minutes for the participants to be filled.

This survey comprised of three sections:
- The initial part pertained to socio-demographic information.
- The second part consisted self-made questionnaire on a diagnosis of text neck syndrome, based on SAS-SV (smartphone addiction scale-short version) relevant to the population
- The third section was neck disability index, which was a standard instrument for measuring neck disability and pain. Scoring was done according to standard.

DATA ANALYSIS PROCEDURE:
The Statistical Package for the Social Sciences, version 27, was used to conduct the analysis after the responses were imported into Microsoft Excel 2019. Statistics were interpreted significant at $p<0.05$. Utilizing descriptive statistics, the frequencies of text neck syndrome was expressed. To show that an association exists, correlation and chi-square tests was employed.

RESULTS
A total of 334 shopkeepers from six different Karachi markets participated in this study. Male shopkeepers who were older than eighteen years were the participants of this investigation. When using their smartphones, 276 (82.1%) of the shopkeepers used their right hand the most, with 198 (58.9%) using them for over four hours a day. Among the participants, 148 people (44%) used their smartphones for calling and messaging. When seated in a forward-bent position, 174 (51.8%) of the shopkeepers reported more neck pain, 131 (39.0%) reported occasional eye pain, and 171 (50.9%) reported stiff neck muscles. Just 5 participants (1.5%) exercised out their neck very often before using smartphones, and 35 individuals (10.4%) took breaks frequently from using them (Table-1).

Among 334 participants, the prevalence of text neck syndrome was 70.3%. According to the neck disability index, 136 (40.5%) of the study's participants showed mild neck disabilities. Of the individuals, 63 (18.8%) had a moderate neck disability, 28 (8.3%) had a severe neck disability, 9 (2.7%) had a complete neck disability, and 100 (29.8%) had no neck pain (Figure 1).

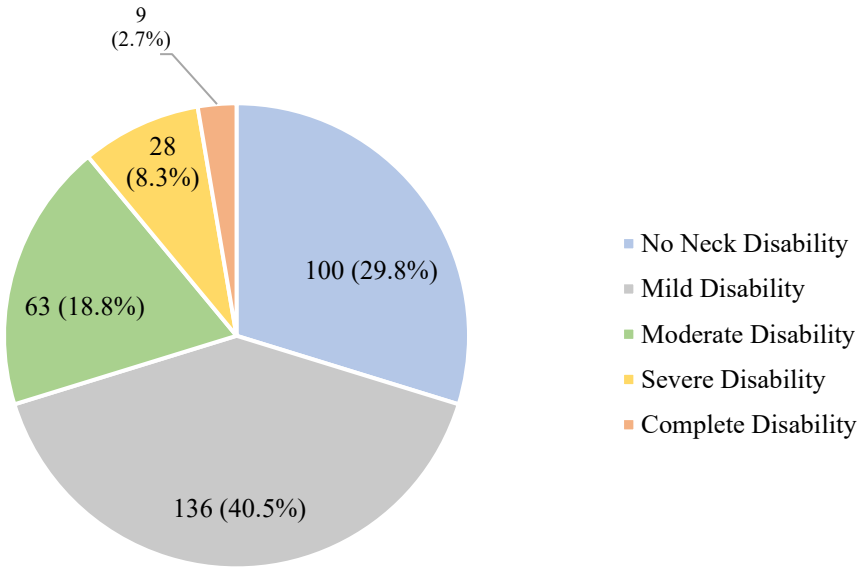

Figure 4.1: Neck Disability Index

Neck pain was reported by 179 participants (77.2%) who had been using smartphones for over five years. Seventy participants who had been using smartphones for over five years reported having neck pain for longer than six months (83.3%). Ninety-four (76.4%) reported having frequent neck pain at some point during their five years or longer of smartphone use. After using their smartphones for more than five years, the majority of survey participants, 80 (65.6%) reported having mild neck pain (Table-2).

When using a smartphone, 158 (47.0%) shopkeepers held their neck at a position of 30°, while 80 (23.8%) held their neck at a 45° angle. Thirty-eight (8.9%) of the shopkeepers maintained their neck at 60° when using their smartphones, compared to 68 (20.2%) who held 15° (Figure-2).

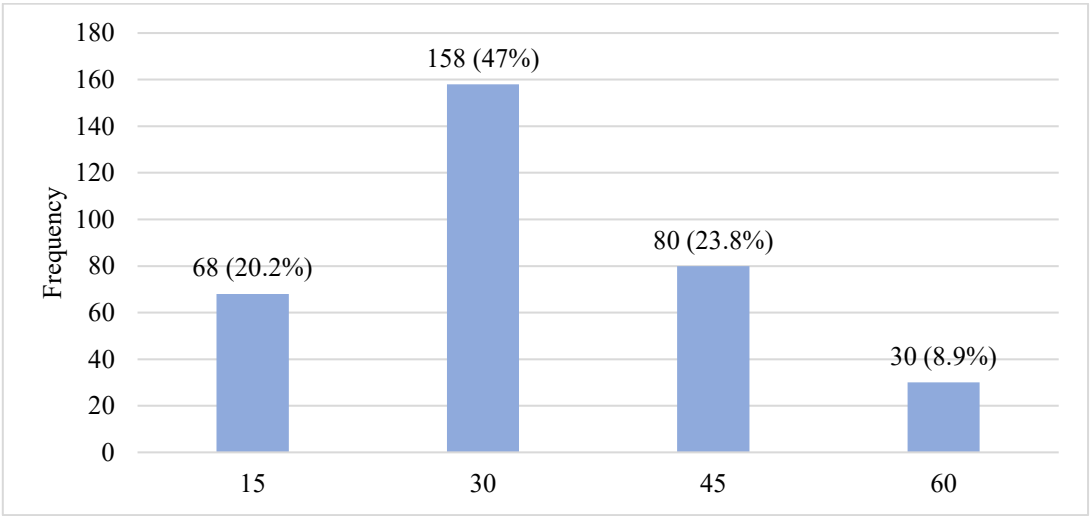

Figure 4.2: Neck angle during Smartphone use

The Chi square Test (χ^2) was performed to analyze the association between Neck pain, neck pain increase while sitting in forward bent posture, Stiffness in neck muscles, eyes pain and Duration of Smartphone use. There was statistically substantial association between cervical pain and duration of smartphone use (p<0.001), neck pain increase while sitting in forward bent posture (p<0.001), Stiffness in neck muscles
(p<0.001), and eyes pain (p<0.001). As the shopkeepers had used smartphones for more than 5 years, they experienced more neck pain, more stiffness, and eye pain (Table-3).

There was statistically substantial association between frequency of cervical pain and daily use of smartphones (p-value< 0.001) and intensity of neck pain with the daily use of smartphones (p-value< 0.001). As the daily use of a smartphone per day increased, the frequency of neck pain also increased, and the intensity of neck pain also increased, more specifically, from mild to moderate (Table 4).

The normality of the NDI score for continuous data was assessed using the Kolmogorov-Smirnov test. According to the p-value (<0.001), the data was not normally distributed, so we used Spearman's correlation (ρ) to assess the correlation between the NDI score and the position of the neck while using a smartphone.

Using Spearman's Correlation (ρ), there was strong positive correlation seen between the participants' neck position while using a smartphone and their NDI score. This meant that as the position of the neck while using a smartphone increased, the NDI also tended to increase (rs=0.502, p<0.05) (Table-5).

Variables	N (%)				
Hand Dominance	Right 276 (82.1%)	Left 28 (8.3%)	Both 32 (9.5%)		
Daily use of Smartphone	4 hours 138 (41.1%)	More than 4 hours 198 (58.9%)			
Purpose of Smartphone use	Texting/calling 148 (44%)	Browsing the internet/ social media 122 (36.3) %	Watching Videos/ movies 22 (6.5%)	Taking pictures 6 (1.8%)	Others 38 (11.3%)
Neck Pain Increases While Sitting in Forward Bent Posture	Yes 174 (51.8%)	No 162 (48.2%)			
Eyes Pain	Severe 14 (4.2%)	Moderate 68 (20.2%)	Sometime 131 (39.0%)	Never 123 (36.6%)	
Stiffness in neck muscles	Yes 171 (50.9%)	No 165 (49.1%)			
Breaks While Using Smartphone	Most of the time 35 (10.4%)	Some of the time 130 (38.7%)	Seldom 72 (21.4%)	Never 99 (29.5%)	
Neck Exercises	Never 280 (83.3%)	Sometimes 51 (15.2%)	Very often 5 (1.5%)		

Table 4.1: Demographic data

Table 4.2: Frequency of Neck pain and Duration of Smartphone

		Duration of smartphone use		*P*- value
		Upto 5 years	More than 5 years	
Neck pain	Yes	53 (22.8%)	179 (77.2%)	0.001
	No	45 (29.2%)	59 (70.8%)	
Neck pain increase while sitting in forward bent posture	Yes	30 (17.2%)	144 (82.8%)	0.001
	No	68 (42%)	94 (68%)	
Stiffness in neck muscles while using smartphone	Yes	34 (19.9%)	137 (80.1%)	0.001
	No	64 (38.8%)	101 (61.2%)	
Eyes pain	Yes	44 (20.7%)	169 (79.3%)	0.001
	Never	54 (43.9%)	69 (56.1%)	

Table 4.3: Association of Neck pain, Neck pain increases while sitting in forward bent posture, Stiffness in neck muscles, eyes pain and Duration of Smartphone use

		Daily use of smartphone duration		*P*- value
		Upto 4 hours	More than 4 hours	
Frequency of neck pain	Symptoms are present all day	7 (21.9%)	25 (78.1%)	0.001
	Symptoms only while using a smartphone	42 (34.1%)	81 (65.9%)	
	Symptoms are present on & off for more than 5 hours a day	17 (37.8%)	28 (62.2%)	
	Present all day except sitting & sleeping	12 (34.3%)	23 (65.7%)	
	NA	60 (59.4%)	41 (40.6%)	
Intensity of neck pain	No pain	61 (59.2%)	42 (40.8%)	0.001
	Mild pain	57 (46.7%)	65 (53.3%)	
	Moderate pain	17 (18.9%)	73 (81.1%)	
	Severe pain	3 (14.3%)	18 (85.7%)	

Table 4.4: Association of daily use of Smartphone duration with Frequency and Intensity of neck pain

		Position of neck while using smartphone	NDI Score
Position of neck while using smartphone	Correlation Coefficient	1.000	.502**
	Sig. (2-tailed)		0.001
	N		334

NDI Score	Correlation Coefficient	.502**	1.000
	Sig. (2-tailed)	0.001	.
	N	334	

Table 4.5: Spearman correlation of Position of neck while using smartphone and NDI Score

			Duration of Smartphone use	
			Upto 5 years	More than 5 years
Neck pain	Yes	N (%)	53 (22.8%)	179 (77.2%)
	No	N (%)	45 (43.3%)	59 (56.7%)
Duration of neck pain	Upto 6 months	N (%)	40 (26.5%)	111 (73.5%)
	More than 6 months	N (%)	14 (16.7%)	70 (83.3%)
	NA	N (%)	44 (43.6%)	57 (56.4%)
Frequency of neck pain	Symptoms are present all day	N (%)	8 (25.0%)	24 (75.0%)
	Symptoms only while using a smartphone	N (%)	29 (23.6%)	94 (76.4%)
	Symptoms are present on & off for more than 5 hours a day	N (%)	9 (20.0%)	36 (80.0%)
	Present all day except sitting & sleeping	N (%)	8 (22.9%)	27 (77.1%)
	NA	N (%)	44 (43.6%)	57 (56.4%)
Intensity of neck pain	No pain	N (%)	44 (42.7%)	59 (57.3%)
	Mild pain	N (%)	42 (34.4%)	80 (65.6%)
	Moderate pain	N (%)	9 (10.0%)	81 (90.0%)
	Severe pain	N (%)	3 (14.3%)	18 (85.7%)

DISCUSSION

The objective of this study was to determine the prevalence of text neck syndrome among shopkeepers in Karachi and whether it was associated with smartphones. Brazilian youth used their smartphones for more than four hours a day, according to Damasceno et al. [1] According to the study's findings, 60.3% of students were smartphone addicts. The relationship between smartphone addiction/overuse and musculoskeletal pain among medical students at Qassim University was evaluated. [6]

According to the findings of a study conducted in 2021 among 283 Indian college students, 76.6% of the participants overall reported having text neck syndrome. [11]

There was a total of 334 participants in this study. The neck disability index indicated that the overall score was 50. The study included 100 students studying physiotherapy from Mumbai, Maharashtra, India, during which 68% of the population was considered to have no disability. However, because of sample size limitations, which were related to the age group from that study, which was 18 to 25 years old because the majority of physiotherapy students fell into that age range but only 100 participants—or 29.8%—experienced no disability in our study. According to another study, it was found that mild neck disability, defined by scores in the range of 5–14, was present in 30% of the population. However, in our study, we observed a higher prevalence of mild disability, with 40.5% (136) of participants reporting mild neck disability. Similarly, the study indicated that moderate disability, with scores in the range of 15–24, was seen in 1% of the population. In contrast, our study found a higher prevalence of moderate disability, with 18.8% (63) of participants reporting moderate neck disability. Severe disability, defined by scores in the range

of 25–34, was observed in 1% of the population in the other study. However, in our study, 8.3% (28) of participants had severe neck disabilities. Complete disability, with scores above 35, was considered to have 0% prevalence in the general population. In our study, however, 2.7% (9) of participants reported complete neck disability. [18]

A study carried out among undergraduate students indicated that fifty out of 120 students complained of neck pain, with a 42% prevalence of the pain. [21]

According to a study, a large percentage of students (84.2%) reported using their smartphones for four hours or more every day. Interestingly, the study also found that those who used their smartphones for five hours a day were 2.818 times more likely to experience a rise in neck impairment. [22]

According to a study from Sharif Medical and Dental College in Lahore, users of smartphones spent an average of five hours a day on smartphones. [24] Nearly 79% of people used a smartphone every day, and the percentage of users was rising daily. It caused bad posture from slouching. Since neck pain was now a prevalent complaint among smartphone users, it was essential to increase awareness of text neck syndrome. [24]

Based on our study results, we found that a significant number of shopkeepers (58.9%) were using smartphones for more than four hours daily. Interestingly, those who exceeded this four-hour threshold experienced symptoms only while using their smartphones and were more likely to have increased neck disability. This finding highlighted the importance of addressing the issue of text neck syndrome and raising awareness about its prevention. It was crucial to prioritize preventive measures rather than becoming victims of this syndrome. By spreading awareness and educating people about the prevention of text neck syndrome, we could tackle this alarming situation head-on. Alsiwed et al. discovered that 58.2% of medical students used smartphones for more than five hour every day. [28]

On the other hand, our study had 334 participants, reflecting that the prevalence was higher, and there were 232 (69%) shopkeepers who reported experiencing neck pain. Ayhualem et al. found that 47.4% of smartphone-using students in Ethiopia reported having neck pain during a year-long study to determine the prevalence of this particular ailment. [31]

Persistent pain in the neck and shoulders was linked to headaches, especially stress headaches. The most affected age group for smartphone users was 38 to 48, according to a recent survey. Additionally, it was claimed that neck pain got worse over time when using a smartphone, with five hours or more having the worst effect. [32]

The term “neck flexion” referred to the forward drawing of the head’s weight onto the vertebrae of the lower neck, which put excessive strain on the posterior neck musculature and frequently caused neck pain. Because of this incorrect posture, the muscles in the upper back were continuously working against gravity’s pull on the forward head, which was uncomfortable for the upper back. Meanwhile, this posture often led to forward-hinged shoulders and rounded upper backs, which ultimately caused shoulder pain. [32]

People who complained of mild neck pain when using their phones had a more flexed neck posture than those who did not, according to a Korean study on neck discomfort and smartphone use. [33]

We also discovered that the majority of shopkeepers (around 47.0%) tended to have a neck position of about 30° while using their smartphones. Interestingly, we also found that shopkeepers who used their smartphones with a neck position of 60° experienced more neck disability compared to those who used positions of 15°, 30°, or 45°. According to these studies, text neck syndrome was highly prevalent and might become even more so as the number of smartphone users increased significantly.

According to our study, it was found that 63.4% of participants reported experiencing eye pain. Previous study also addressed the impact of smartphone usage on the eyes. When we constantly flexed our neck while texting, it could strain our eyes and potentially contribute to nearsightedness. Additionally, continuous smartphone use could lead to a decrease in blink rate, causing the tear film to evaporate faster and potentially leading to dry eye disease. When using a smartphone, people with neck discomfort flexed their neck slightly more than people without neck pain. [34]

According to another Korean study, the majority of university pupils surveyed used their smartphones for more than four hours per day. [35]

A fully formed skull normally weighed between 10 and 12 pounds in its neutral posture. This position was associated with the fewest complaints of neck pain and was assumed to have the lowest gravitational moment. The forces pressing on the neck increased linearly with the angle of neck flexion. At a 15° tilt, it rose to around 27 pounds; at a 30° tilt, it reached 40 pounds; at a 45° angle, it reached 49 pounds; and at a 60° angle, it reached more than five times the initial weight of 27 pounds. [36]

Scientists showed that a 10-minute static neck flexion could change the neuromuscular and mechanical function of the cervical spine, weakening the cervical components. Frequent and prolonged neck bending could cause significant harm to the cervical tissues. [37]

Many market union committees and traders began relying on the internet to communicate with shopkeepers through email and messaging apps like WhatsApp. This made it easier for them to share important information, notify about materials and tasks, and introduce new tools. With the internet, shopkeepers could conveniently handle all these tasks using a small and smart device like a smart phone, eliminating the need for bulkier devices like laptops or desktops. It was amazing how technology has made managing a shop more efficient and convenient.

LIMITATIONS:

- Study focused only on male shopkeepers, so the results might not have been applicable to other demographics or occupations.
- Because the research was conducted as a cross-sectional study, it was not possible to determine cause-and-effect relationships.
- There was no medical assessment and examination to confirm the existence of text neck syndrome among the shopkeepers.
- The use of convenience sampling in this study restricted our ability to apply the findings to the entire population of Karachi.

STRENGTH OF STUDY:

- The inclusion of six different markets in Karachi provided a diverse sample, increasing the external validity of the findings.
- The inclusion of 334 participants in the study, coupled with a 95% confidence interval and a 5% margin of error, bolstered the statistical robustness of the findings.
- The study focused on a specific population (male shopkeepers) who were likely to be at higher risk for Text Neck Syndrome due to their occupation and smartphone usage.
- The use of validated outcome measures (SAS-SV and NDI) enhanced the validity and accuracy of the data collected.

WEAKNESS OF STUDY:

- The study used non-probability convenience sampling, which might have limited the generalizability of the findings to a broader population.
- The study relied on participants' self-reporting of smartphone usage and symptoms.
- The study did not include individuals with certain medical histories or occupations

CONCLUSION:

In conclusion, the study conducted on shopkeepers in Karachi shed light on the detrimental effects of excessive smartphone usage, notably the emergence of text neck syndrome. The findings underscored the prevalence of neck pain attributed to prolonged screen time, poor posture, and eye strain among participants. Addressing this issue required a multifaceted approach, as suggested by the recommendations derived from the study. Firstly, individuals needed to consciously reduce their screen time and adopt healthier digital habits to mitigate the risk of text neck syndrome. Emphasizing the importance of maintaining proper posture while using smartphones was crucial, along with avoiding excessive bending of the neck to alleviate strain on neck muscles. Additionally, integrating physical activities and regular exercise into daily routines could have strengthened neck muscles and enhanced overall well-being. Leveraging speech-to-text software presented a viable alternative for

reducing the strain on the neck while engaging with smartphones. Ultimately, prioritizing breaks and practicing mindful smartphone usage was paramount for safeguarding against text neck syndrome and promoting long-term neck health in the digital age.

RECOMMENDATIONS:

- Including a more diverse sample, including both genders and various occupations, would have provided a more comprehensive understanding of Text Neck Syndrome prevalence.
- Utilizing objective measures, such as physical examinations or wearable technology, could have provided more reliable data on smartphone usage and symptoms.
- Exploring additional statistical analyses or multivariate models could have provided a more understanding of the factors influencing Text Neck Syndrome.

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