Prevalence of Neurological Consequences of Text Neck Syndrome and its Association with Smartphone Use Among Healthcare Students in Career Point University

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Abstract ,Background: Text neck syndrome is an emerging musculoskeletal and neurological disorder associated with prolonged smartphone use and sustained neck flexion. Its prevalence is rising among university students due to increased screen exposure and poor ergonomic practices.**Methods**: A cross-sectional study was conducted among 80 healthcare students aged 17–26 years at Career Point University, Kota, Rajasthan. Participants with smartphone usage exceeding 7 hours per day were included. Data were collected using validated tools, including the Visual Analogue Scale (VAS), Numerical Rating Scale (NRS), and Neck Disability Index (NDI). Random sampling was employed, and statistical analysis was performed to determine prevalence and associated neurological manifestations.**Results**: The overall prevalence of text neck syndrome was 53%. Among affected individuals, 36% demonstrated mild disability, 16% moderate disability, and 1% severe disability based on NDI scores. Frequently reported neurological symptoms included neck pain, stiffness, upper limb numbness, radiating pain, and reduced cervical range of motion. Prolonged smartphone use and poor posture showed a significant association with increased pain intensity and disability levels.**Conclusion**: A high prevalence of text neck syndrome was observed among healthcare students, with notable neurological consequences. Implementation of ergonomic interventions and awareness programs is recommended to mitigate long-term musculoskeletal and neurological complications.**Keywords**: Text neck syndrome, smartphone use, prevalence, neck disability, neurological manifestations

Introduction: Text neck refers to neck pain triggered by a handheld device like a smartphone or tablet.it occurs when you keep your neck in a forward flexed position for hours during texting reading, surfing internet from mobile device.

Symptoms of text neck syndrome like Chronic neck Pain, numbness in arm & forearm or weakness of the arms and hands, Unilateral pain, Stiffness, Inability to ADL, reduced ROM, Posture deformity, our head is bending forward our shoulder are hunched and our back is arched, which is a bad posture for the body.

we can prevent the recurrence of text neck syndrome by adjusting your posture while doing activities and establishing a good behaviour when using your mobile or daily activities both in terms of posture and the.

Review of Literature:

1 n,niazi etal{2015} the prolonged use of mobile phones is assosiated with a greater frequency of neck pain and a higher NDI score.there is a significant postive correlation between text neck syndrome and mobile phone usage.initially the musculoskeleted changes are short term but can cause disabilities in later life if proper care and prevention are not taken.

2 9 Hyo-Jeong Kim*et al(july 2015) The relationship between students en smartphone use and subjective musculoskeletal symptoms and university .the use of smartphones is on the rise, it is necessary to improve the ways that they are used and to develop a preventive program to alleviate the symptoms of musculoskeletal damag.

3 leena Korpinen et al{2018]In addition, exhaustion at work had associations with some physical symptoms. In the future, it is essential to note ergonomic reasons and exhaustion at work when young adults experience pain, numbness or aches.

4 Ewa Gustafsson,etal 2017 Prospective associations were found between text messaging on mobile phones and musculoskeletal disorders. The results imply mostly short-term effects, and to a lesser extent, long-term effects on musculoskeletal disorders in neck and upper extremities.

5 .Amira Khalaf, etal 2017 a survey was done with 722 respondents in order to measure and analyze the pain level associated with the main factors of TN occurrence. Also, Minitab software was used to analyze both the survey's data and RULA scores to show the most significant factors affecting the neck pain. Solutions and recommendations were given in order to reduce the pain level and ergonomic risks on the neck.

6 M. Vijayakumar, et al (2018 here are various co-morbid factors of Text-Neck syndrome out of which severity of Neck pain and upper back pain is more followed by headache, shoulder pain. Also Forward Head Posture is oneof the main serious co-morbid factors. Along with that, cervical joint ROM mainly flexion, extension andlateral flexion (left and right both) are restricted. As stated above, smartphone induced neck pain and otherco-morbid factors are of chronic, progressive nature, timely interpretation and interventions along with postural correction will be the key entities to deal with Text-Neck syndrom

7 Pankti P. Samani etal(2018)This study has demonstrated a low level of awareness of text neck syndrome amongst young adult population. Also it mentioned about lack of knowledge of preventive measures in this population.

8 .Sema Can*at al (2019) information can be provided about the importance of reducing sitting time during smartphone use and increasing the duration of moderate/vigorous-intensity physical activity (PA) so awareness can be raised on the issue among university students..

9.Binoy Mathew K V 1*at al(2020) The relation between posture during smartphone use and neck pain development needs special attention. Considering the pandemic time and associated restrictions, preventive self-management strategies for neck pain like "Smartphone-Free Time", "Smartphone-Free 3

10 Maša Legan et al [2020] Prevalence of mobile device-related musculoskeletal pain among working university students: a cross-sectional study. Results showed that the prevalence of MSP was 39.6%. Most musculoskeletal symptoms were reported in the back (57.1%) and shoulder (50%). This study highlights the importance of knowledge of mobile device ergonomics among working students

11 Sathya P1 etal(2020)prevalence of text neck syndrome is 32%. The major component affected according to neck disability index out of all thecomponents is headache followed by sleeping, concentration and reading.

12 Damla Cankurtaran etal(2020)We concluded that it would be beneficial to question the frequency and position of smartphone use, to recommend to use it less, and to avoid prolongation in neck flexion for patients with chronic neck pain

13.Amninder Kaurl[september 2021] et al The study findings revealed that nearly 37.8% had mild neck disability and (53.75%) subjects had good sleep quality among smartphone users and was significantly associated with habitat.

14 ABDULLAH FAROOQ W KHAN1 et al (july 2021) Are You Suffering Pain Neck Due to Smart Phone Text Neck Syndrome. we concluded that majority of the students were suffering neck pain that was aggravated with using smart phone or other electronic devices. They don't warm up before reading or using device. .

15.Damla Cankurtaran1 et al;(2021)How does smartphone usage affect the severity of neck pain, neck-pain related disability, and cervical lordosis A pilot study.We concluded that it would be beneficial to question the frequency and position of smartphone use, to recommend to use it less, and to avoid prolongation in neck flexion for patients with chronic neck pain

16.Kholoud T. et al [2021]. The prevalence of text neck syndrome and its association with smartphone use among medical students in Jeddah, Saudi Arabia. The current study found that medical students had a neck disability, and there was a significant association between text neck syndrome and smartphone use.

17. Supriya Kumari et al [2021] - Text Neck Syndrome: The Pain of Modern Era. It concludes, text neck syndrome is a repetitive stress injury induced by prolonged neck flexion at different angles and pain sustained from excessive watching or texting on handheld devices for long periods. It should be referred to as "Modern Era Pain" due to its direct association with the modern era's Gadgets.

18 Ahmad Ali SAl Miarajetal(2021)the prevalence (p=0.002) of neck pain among smartphone users of university academic staff in International Islamic University Malaysia. It also depicted the importance of posture while using the mobile phone device and explained the faulty posture that contributes to the development of text neck syndrome.

19 Sohel Ahmed1 etal(2021)The results of this study showed that text neck syndrome and SMS thumb are seen in nomophobic students. The musculoskeletal problems may be short term initially but can develop into long-term disabilities if proper caution is not taken

20 Saloni Shetty et al;(2022)The study shows significantly high prevalence rate of attaining text neck syndrome due to smart phone addiction and concludes saying increase in smartphone addiction increases neck pain.

21 Muayad Kadhim Rashid etal (2022) the prevalence of neck disability was high among the surveyed medical students Addiction and excessive smartphone use with a lack of attention to warm up the neck muscles before usage was the most prominent predictors of neck disability.

22 Maryam Heidary Torkamani etal(2022): The positive correlation between smartphone addiction and both decreased extensor muscle endurance and changes in neck postural alignment is concerning.

23 Eric Chun-Pu Chu etal(2022)the current study reported a progression of text neck, which has been insufficiently treated. Sustained flexion of the neck will cause cervical spine distortion. The improvement of neurologic symptoms has been shown to correlate with radiographic and electromyological alterations responding to the correction of cervical misalignment.

24 Zenat Khired etal(2022) This study revealed a high prevalence of neck pain among adults in Jazan, Saudi Arabia, and a remarkable association with people who spend many hours daily using electronic devices, reading, performing work, sitting for a long time, and with lack of exercise.

25 Maryam Heidary Torkamani etal(2022)The positive correlation between smartphone addiction and both decreased extensor muscle endurance and changes in neck postural alignment is concerning

Need of study: To assess the prevalence of Text Neck Syndrome among smartphone users in selected college (Career point university)

Purpose of study: The purpose of the study was rule out the prevalence rate of neurological consequences of text neck syndrome in university healthcare students.

Hypotheses:

H_1 = Study shows significantly high prevalence rate of attaining text neck syndrome due to smart phone addiction and concludes saying increase in smartphone addiction increases neck pain.

H_2 = Study does not show significantly high prevalence rate of attaining text neck syndrome due to smart phone addiction and concludes saying increase in smartphone addiction increases neck pain.

Methodology: The study was a cross sectional study. The participants of the study were 100 students among them 80 students fulfil the criteria of study [40 physiotherapy and 40 pharmacy] of career point university Kota Rajasthan. The

study was based on pain intensity, age and gender. It was conducted at career point university Kota, from oct 2021 to April 2022 among Health care students. According to the Rao soft sample size calculator, the minimum sample size needed for the study with a 95% confidence level, a 5% margin of error, and a 50% response distribution was Therefore, all undergraduate Health care students were invited to participate.

Two scale were used :1 Visual analogue scale (VAS)

2 Numerical rating scale (NRS)

3.Neck Disability Index (NDS)

Sample no. of subject- 80 subjects

Source of subject – All Subjects are taken from career point university

Study design-: Cross sectional study

Inclusion criteria:

1. Age 17-26
2. Mobile phone use, more than 7 hours
3. Both Gender included

Exclusion criteria:

1. Trauma
2. Bone abnormity.
3. Joint degenerative disease.
4. Rheumatic disorder.
5. Recent surgery.
6. Non-cooperative patient.

Method of subject selection: Random

Procedure: Consent will be acquired after explaining. Neck disability index form will be distributed and asked to fill. Later the data will be properly analyzed and interpreted.

Instrumentation of Data Collection /out come Measure

1.visual analogue scale (VAS)

2. numerical rating scale (NRS)

Operation definition -Text Neck Syndrome: A condition characterized by neck pain or discomfort linked to prolonged smartphone usage of at least 7 hours daily, with an NDI score of 1 or above.

Smartphone Use: The total duration of smartphone activity per day, where spending 7 hours or more is categorized as overuse.

Neurological Consequences: Upper limb-related symptoms including tingling, numbness, radiating discomfort, or reduced muscular strength.

Pain Intensity: The degree of pain experienced by an individual, determined using the 0–10 VAS/NRS scoring system.

Neck Disability: The extent to which neck problems interfere with daily functioning, classified through the NDI into mild, moderate, or severe levels.

Prevalence: The overall proportion of students within the study population identified as having text neck syndrome.

Poor Posture: Sustaining a forward neck flexion angle of more than 20° during extended smartphone use.

Space and facility- Physiotherapy OPD, Career Point University

Estimated time needed for Data collection- 6 week

Protocol of Data collection - Interview & Questionnaire method

Universe of study: Career point university, Kota, Rajasthan

Duration: 8 months

S.no	FEMALES SUFFERER	AGE	neurological consequences of text neck syndrome	S.No.	MALE SUFFERER	AGE	neurological consequences of text neck syndrome
1	Stuti kaushik	20	yes	1	Anand kumar	26	No
2	Urwashi sharma	22	yes	2	Abdul maroof pathan	22	No
3	Harshita sagar	22	yes	3	Manish kumar	23	No
4	Zoya khan	22	yes	4	Jalaj sharma	17	No
5	Shamama khan	23	yes	5	Sajal sanadhya	19	No
6	Harshika gupta	22	yes	6	Prashant	20	No
7	Bharti khandelwal	22	yes	7	Abhishek maliya	20	No
8	Chandresh chandel	22	yes	8	Raghav shringi	19	No
9	Harshita mittal	21	yes	9	Lalit prajapati	20	No
10	Arti nagar	21	yes	10	Vishnu mehra	19	No
11	Aditi khandelwal	21	yes	11	Umang singh	20	No
12	Bullul ajmera	21	yes	12	Mushka mittal	20	No
13	Diksha j	21	No	13	Mutapha babanglda	21	No
14	Sharikra khan	20	yes	14	Amit	20	No

15	Saloni sharma	19	yes	15	Yash rizwani	21	No
16	Aishwarya awasthi	18	yes	16	Rishabh sharma	20	No
17	Damini pareta	18	yes	17	Durgesh prajapat	21	No
18	Kesiya T sunny	20	yes	18	Anubhav garg	21	No
19	Aesheen sabbag	21	yes	19	Nishant sharma	21	No
20	Kajal bodhwani	20	yes	20	Abhishek malav	20	No
21	Tina kumari khunahari	19	yes	21	Dinesh kumar nagar	21	No
22	Shagufta naar	20	yes	22	Paritosh rathor	18	No
23	Diksha shrivastva	21	No	23	Hemant jha	19	No
24	Lakshit gaur	20	yes	24	Akash pareta	21	No
25	Shipra singh	22	yes	25	Shubham	19	No
				26	Mohd.aatif	22	No
				27	Anuj yadav	22	No
				28	Chinmay jain	22	No
				29	Piyush faujdar	21	No
				30	Roopsi mehta	19	No
				31	Leslie leuis	24	No
				32	Samar peshwani	22	No
				33	Sudhanshu khandelwal	20	No
				34	Rajkumar vishwakarma	21	No
				35	Prince panchal	21	No
				36	Mahesh chawashita	21	yes
				37	Dheerendra	21	yes
				38	Manish daga	22	yes
				39	Itesh yadav	18	yes
				40	Bhuwnesh gupta	20	yes
				41	Atnam raj	21	yes
				42	Vaibhav goshwani	21	yes
				43	Tavu jagdar	19	yes
				44	Akshat sharma	21	yes

				45	Anmol patidar	19	yes
				46	Anas khan	18	yes
				47	Rohit yadav	21	yes
				48	Touqur ahmed	21	yes
				49	Sahil shaikh	21	yes
				50	Swapnil joshi	22	yes
				51	Om sugandhi	21	yes
				52	Satyam singh	22	yes
				53	Rahul bhardwaj	22	yes
				54	Akash kumar	22	yes
				55	Subham kumar	23	yes

Result: A total of 80 medical students participated, of which (31%) were female, while (68%) were male. The mean age was 20-21 years. The prevalence of text neck syndrome was 53%. Among the participants, 36 % Had mild,16% had moderate, and ……1...% had severe neck disabilities.

FIG. 1 Table On Gender and age Basis

Conclusion: The Prevalence of neurological consequences of text neck syndrome in career point university is Higher. We found the prevalence of text neck syndrome to be 53 % .

Keywords: Text Neck, Neurological Consequences, Population based study, Prevalence, smart phone addition