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Pervasiveness of Neck Pain Due to Text Neck in Students

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ABSTRACT

With the unmatched growth in the popularity of smartphones, the most widely used hand-held device, there has been a tremendous increase in the incidence of a variety of musculoskeletal conditions. As per the recent report by Statista, the numbers of smartphone users all throughout the world have escalated from 3668 million in 2016 to 6378 million in 2021. With a raise in numbers at this scale it is not unlikely to expect a simultaneous increase in reports of pathological complaints. Globally, the number of prevalent cases of neck pain was 288.7 million in 2017. The purpose of this study is to find out the prevalence of text neck in the youngsters of Uttarakhand, using a smartphone on a regular basis. A survey study design was used for the 200 subjects who participated in the study. The subjects were chosen on the basis of inclusion and exclusion criteria. All subjects had undergone measurement for all the ten sections of Neck Disability Index (NDI). NDI is an alteration of the Oswestry Low Back Pain Disability Index. It is a self-administered, condition-specific functional status questionnaire with a total of 10 items. The results of the present study shows that the students of Uttarakhand region of India are suffering from text neck due to regular use of mobile phone. Both male and female students included in our study were equally affected due to a flexed neck position assumed for a long time while using smartphone devices

Key Words:- Smartphones, NDI, Students, Turtle neck

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INTRODUCTION

With the unmatched growth in the popularity of smartphones, the most widely used hand-held device, there has been a tremendous increase in the incidence of a variety of musculoskeletal conditions.

A smartphone, as defined by the Oxford Learner's Dictionary, is "a mobile phone that also has some of the functions of a computer"¹. The multi-functionality of this device, owing to the presence of innumerable features, makes one devoted to it thus leading to its unrestricted use, at times to the point of becoming an obsession.

As per the recent report by Statista, the numbers of smartphone users all throughout the world have escalated from 3668 million in 2016 to 6378 million in 2021 and are estimated to surge up to 7516 million by 2026², the major contributors being China and India with 911.92 million and 439.42 million users, respectively.³

With a raise in numbers at this scale it is not unlikely to expect a simultaneous increase in reports of pathological complaints.

From amongst the myriad of musculoskeletal conditions manifested, neck pain due to excessive use of smartphone is a comparatively ordinary occurrence and is commonly known as text neck or turtle neck⁴. The term 'text neck syndrome' was first given by Dr Dean L. Fishman and implies to an overuse injury of the neck. The injury could also be because of poor posture during smartphone use since the neck goes into forward flexion and therefore the normal curvature of the cervical spine is flattened and stretched on the neck musculature. This poor posture leads to chronic musculoskeletal pain of the cervical spine and the upper back.⁵

The bending of head forward to 15 degrees places approximately 27 pounds of force on the cervical spine. This same force raises to 40 pounds at 30 degrees, 49 pounds at 45 degrees and 60 pounds at 60 degrees⁴. While using a hand-held device, the neck is mostly flexed at 45 degrees flexion loading the neck quite significantly⁶.

Globally, the number of prevalent cases of neck pain was 288.7 million in 2017, with age standardised point prevalence per 100000 population of 3551.1 million.

The highest age standardised point prevalence of neck pain per 100000 persons in 2017 was found in Western Europe (4636.1 million per 100000) and East Asia (4589.7 million per 100000).

The age standardised point prevalence for South Asia was 2582.2 million per 100000 persons with that for India being 650 to <700 million per 100000⁷. Almost half of mobile users in India are younger than 25 years, 40% belonging to the 18 to 25 year age group. Studies suggest that 79% of the population, ages 18-44, have their cell phones with them for around 22 hours per day, spending

an average of two to four hours per day hunched over, reading e-mails, sending texts or checking social media sites.⁸ With such enormous engagement of youngsters in the usage of smartphones and the ever increasing graph for prevalence in neck pain, it becomes necessary to evaluate and find a correlation between smartphone use and neck pain, if any.

This paper attempts to find the same through an observational form of research in college students that fall in the 15-25 years of age.

Statement of Question

The present study intends to assess the pervasiveness of text neck in persons using a smartphone, aged 15-25 years, in the Uttarakhand region of India.

Purpose of Study

The purpose of this study is to find out the prevalence of text neck in the youngsters of Uttarakhand, using a smartphone on a regular basis.

Clinical Significance

Text neck is a global epidemic and a world-wide health concern affecting millions of people irrespective of the age group. With the dramatic growth of mobile phone usage, concerns regarding the adverse effects of mobile phone on user health have surfaced.

The conclusive results of this study, if a positive correlation between smartphone use and neck pain is established, can assist students, mobile phone users, health care providers, and mobile phone makers in developing prevention strategies to reduce the incidence of neck pain in the young population.

Operational Definitions

Text Neck: Text neck is defined as an overuse syndrome involving the pinnacle, neck and shoulders, usually resulting from excessive strain on the spine from looking in an exceedingly forward and downward position at any hand-held mobile device, i.e., mobile, game unit, computer, mp3 player, e-reader. This can cause headaches, neck pain, shoulder and arm pain, breathing compromise, and much more.⁹

Smart Phone: A smartphone is “a mobile phone that also has some of the functions of a computer”.¹

METHODOLOGY

Study Design: purposive sampling; quantitative design; descriptive type of study

Sample: A pool of subjects was created based upon the inclusion and exclusion criteria.

Size: 200 subjects were selected from the sampled pool for study

Gender: Both male and female candidates were included.

Age: 15 to 25 years

Source of Students: Participants from the Uttarakhand region of India were involved.

Method of Selecting Subjects

A total of 200 subjects were selected by simple sampling after they had signed the informed consent according to the inclusion and exclusion criteria.

Inclusion Criteria

- 1) Sex: male and female subjects aged 15-25 years
- 2) Subjects using smartphones for over a year
- 3) Subject who agreed to fill the informed consent

Exclusion Criteria

- 1) Subjects who presented with a history of neck trauma or surgery or have been diagnosed with fibromyalgia, cervical radiculopathy, a systemic illness, or connective tissue disorder.
- 2) Subjects who did not agree to fill informed consent

PROCEDURE

- The potential candidates who volunteered were explained the nature and the purpose of study, and those who agreed to participate were considered for further evaluation.
- Eligible candidates were provided with the consent form.
- Descriptive variables of all subjects, such as age, duration of phone usage, and sex were recorded.

TOOL AND MEASURING METHOD

The Neck Disability Index (NDI), a patient-reported outcome questionnaire, was used to gather reliable data for analysis.

Neck Disability Index (NDI):- The NDI is an alteration of the Oswestry Low Back Pain Disability Index. It is a self-administered, condition-specific functional status questionnaire with a total of 10 items. The questionnaire has satisfactory support and credibility to hold its status as the most commonly used self-report measure for neck pain.¹⁰

The NDI was distributed to the candidates found eligible for the study in the form of paper.

DATA ANALYSIS

A survey study design was used for the 200 subjects who participated in the study. The subjects were chosen on the basis of inclusion and exclusion criteria. All subjects had undergone measurement for all the ten sections of Neck Disability Index (NDI). NDI is an alteration of the Oswestry Low Back Pain Disability Index. It is a self-administered, condition-specific functional status questionnaire with a total of 10 items. The questionnaire has satisfactory support to hold its current status as the most commonly used self-report measure for neck pain.¹⁰ The questionnaire was distributed to the candidates in the form of paper.

RESULT

Demographic Data (15-20 years)

100 male and female students from NCR completed the procedure and their results were taken up for statistical analysis (Table 1).

	Mean	St. Deviation
Age (years)	17.68	2.32
N	100	100

Table 1:- Demographic Data

Prevalence of Neck Pain (15-20 years)

The results show that the duration of phone use and the prevalence of neck pain have a statistically significant positive correlation with r value of 0.22 and p value of 0.025 (mean=17.68, std. deviation=2.32). The results also showed that the prevalence of neck pain was not highly correlated to the duration of phone use as the r value was less than 0.5 (Table 2).

	Mean	St. Deviation
Age (years)	22.66	2.44
N	100	100

Table 2:- Correlations Between duration of phone use and the prevalence of neck pain

Demographic Data (21-25 years)

100 male and female students of NCR completed the procedure and their results were taken up for statistical analysis (Table 3).

		Duration of Phoneuse (hours)	Score(%)
Duration of Phoneuse (hours)	Pearson Correlation	1	.24*
	Sig. (2-tailed)		.025
	N	100	100
Score(%)	Pearson Correlation	.24*	1
	Sig. (2-tailed)	.025	
	N	100	100

*. Correlation is significant at the 0.05 level (2-tailed).

Table 3:- Demographic Data

Prevalence of Neck Pain (21-25 years)

The results show that the duration of phone use and the prevalence of neck pain have a statistically significant positive correlation with r value of 0.32 and p value of 0.022 (mean=22.66, std. deviation=2.44). The results also showed that the prevalence of neck pain was not highly correlated to the duration of phone use as the r value was less than 0.5 (Table 4)

Table 4:- Prevalence of Neck Pain (21-25 Years)

		Duration of Phoneuse (hours)	Score(%)
Duration of Phoneuse (hours)	Pearson Correlation	1	.32*
	Sig. (2-tailed)		.022
	N	100	100
Score(%)	Pearson Correlation	.32*	1
	Sig. (2-tailed)	.022	
	N	100	100

*. Correlation is significant at the 0.05 level (2-tailed).

DISCUSSION

The purpose of this study was to find a correlation between the duration of smartphone use and the prevalence of neck pain in 15-25 year olds, if any. Participants were selected based on the inclusion and exclusion criteria. The Neck Disability Index (NDI) was used to assess the presence and severity of neck pain in the sample selected.

The curiosity of this study lies in the knowledge that mobile phones have been known to cause musculoskeletal pain, especially that of the neck, in individuals of all ages. A number of previous studies have shown that extended use of mobile phone with a bent neck leads to an increase in the neck flexion angle thus increasing the load on the cervical spine.

Lee et al, 2015, carried out an experimental study on a limited number of individuals (N=18) of both genders. They found that the neck flexion angle was the highest during texting with values 37.2 degrees in standing and 46.8 degrees while sitting.¹¹

A similar study was performed by Shousha et al, 2021. A cross-sectional study design was used to evaluate student participants (13-17 years of age) from various international schools using convenient sampling method. They found a significant increase in both neck flexion angle (p=0.001) and forward neck translation for all ages.¹²

The analysis of the results obtained through this study revealed a positive correlation between smartphone use and neck pain.

Our findings are in accordance with those of Gustafsson et al, 2017. From amongst a sample of 7092 participants (both male and female), aged between 20-24 years, taking part in a longitudinal, population-based cohort study in Sweden, both men and women presented with neck pain as a result of excessive texting with odds ratio 2.0 and 1.4, respectively. ¹³

Shah et al, 2018, also reported similar results in a sample of 20-25 year olds participating in an observational analytical study carried out in Ahmedabad, India. Significant moderate positive correlation with p value less than 0.001 was found. ¹⁴

The results of our study are also in agreement with those of Al-Hadidi et al, 2019, who reported that neck pain severity increases with increase in both, the duration of mobile phone use (p=0.001) and age (p=0.04). They also found that the duration of pain increased with the duration of phone use (p=0.036). ¹⁵

Though the findings of the present study are of value, they are not highly significant as the r value is less than 0.5. This is in conformation with the finding that mobile phone use is mostly associated with short-term effects initially ^{13,14}, which if not treated become chronic ¹⁴ and should thus be prevented using early interventions.

Clinical Implication

The results of this study can be used to educate young individuals regarding the risks of prolonged mobile phone use and its deteriorating effects on cervical spine. Ergonomic changes can be promoted apart from introducing primary care and occupational health services to improve posture and prevent chronic musculoskeletal conditions.

Limitations

The present study has several limitations. For our study the pool of participants were selected from a confined geographical location and were also specific in terms of age group. The NDI, which is a self-reporting questionnaire, was used for assessing neck pain and since self-administered questionnaires always increase the risk of response bias they significantly affect the results. Another limitation is the lack of use of a self-reporting questionnaire as a reliable parameter to assess the

extent of smartphone addiction. Several questionnaires of significant validity and reliability exist and can be utilised for the same.

Patient specific treatment protocol was not implemented for participants who reported pain and other symptoms as a result of prolonged use of smartphone with neck bent. Participants in whom pain relief was established due to isometric exercises and postural correction were not followed post the completion of the study.

CONCLUSION

Neck pain is directly related to excessive use of smartphones in young individuals. Text neck, a term given by Dr Dean L. Fishman, is used to define the same.

The results of the present study shows that the students of Uttarakhand region of India are suffering from text neck due to regular use of mobile phone. Both male and female students included in our study were equally affected due to a flexed neck position assumed for a long time while using smartphone devices.

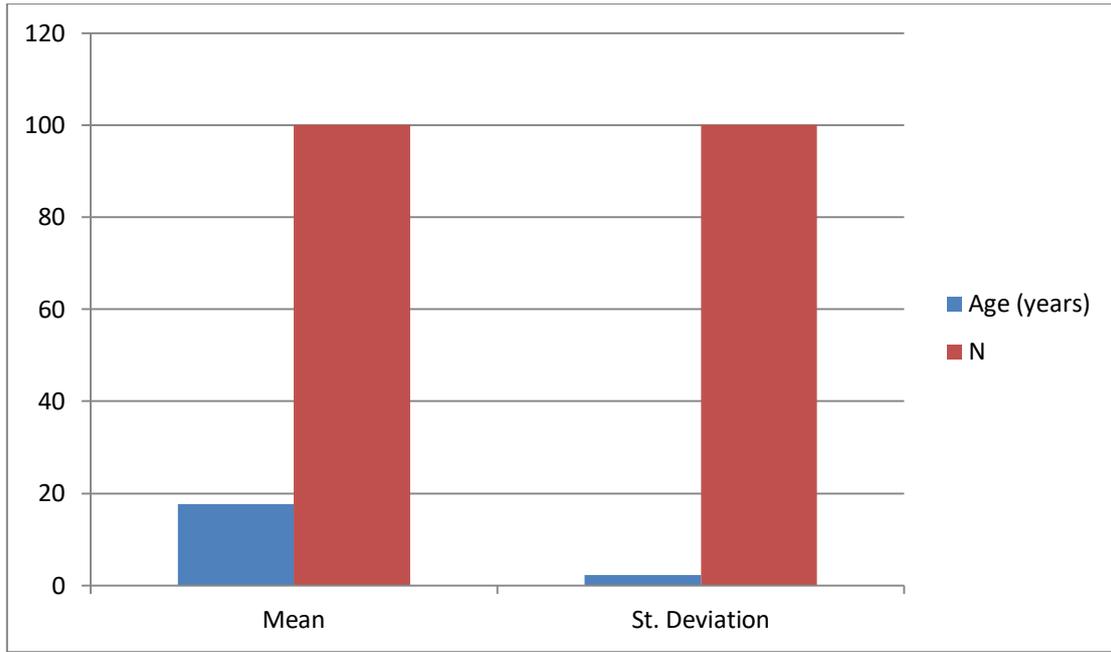
The findings of our study are in accordance with the results of previous studies done in various parts of the globe.

Future researches can build up on this study and find effects of smartphone use in larger samples with individuals of different age groups and variable ethnicity.

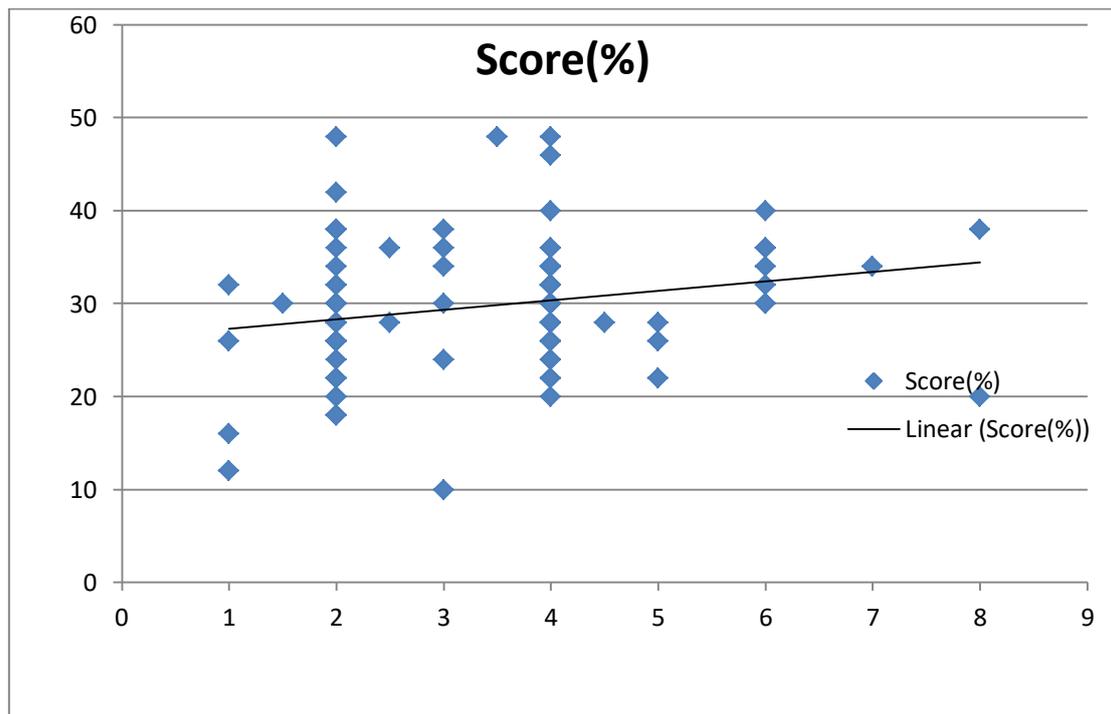
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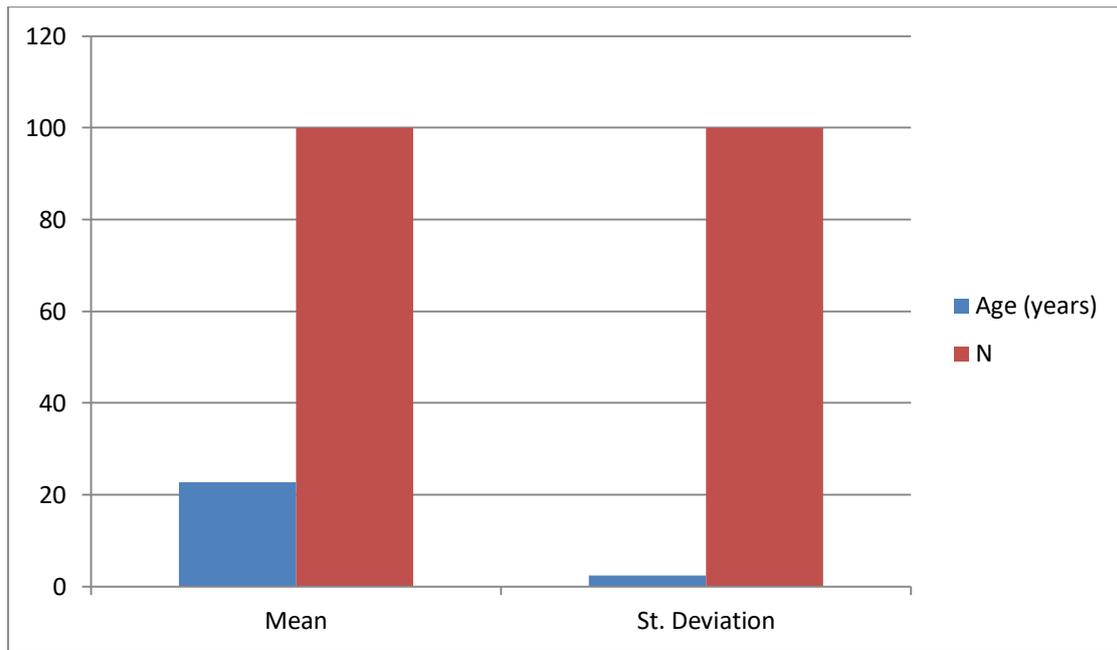
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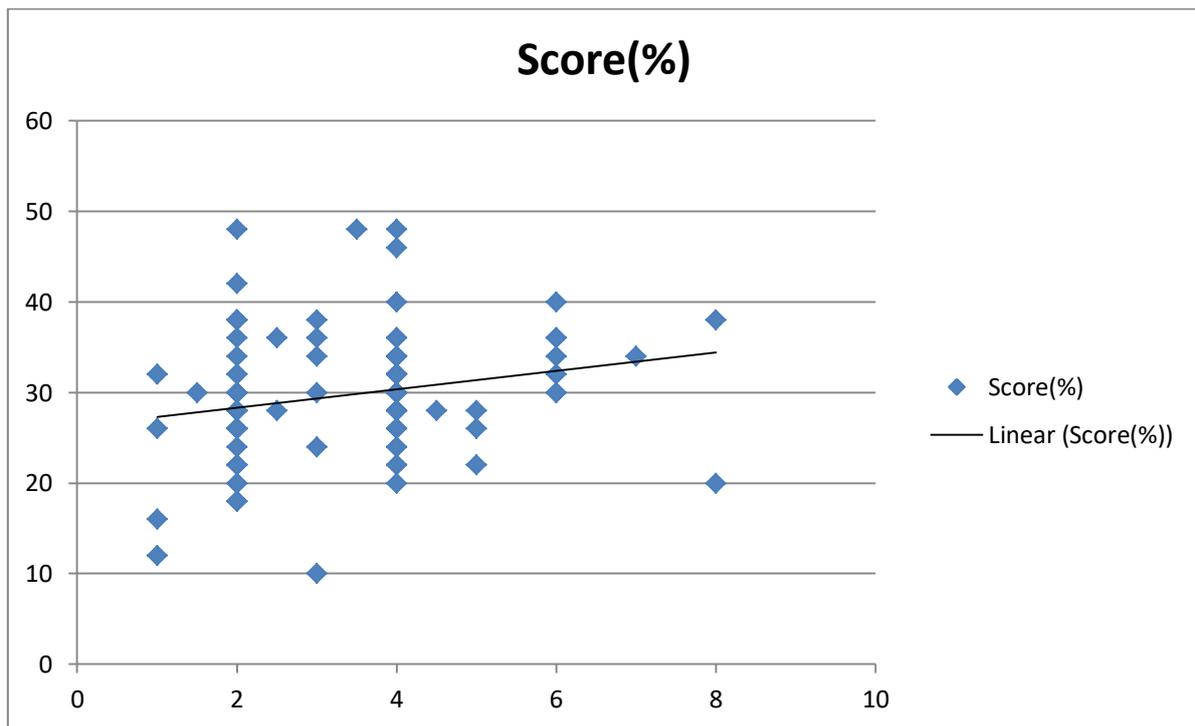
Graph No.1:- Demographic Data (15-20 years)



Graph No.2:- Correlation between duration of phone use and score on NDI (15-20 years)



Graph No.3:- Demographic Data (21-25 years)



Graph No.4:- Correlation between duration of phone use and score on NDI (21-25 years)