ORIGINAL RESEARCH ARTICLE **OPEN ACCESS**

PREVALENCE OF NECK DISABILITY DUE TO TEXT NECK IN THE POPULATION OF GOA: A SURVEY

[1]Alisha Lilia Gracias, [2]Dr.Ajeet Kumar Saharan and [3]Dr. Sunil K.M.

[1]Department of Physiotherapy, Goa Medical College, Bambolim, Goa 403202
[2]Department of Physiotherapy, Maharaj Vinayak Global University, Jaipur 302028
[3]SDM College of Physiotherapy, Sattur, Dharwad 580009

ABSTRACT

Background: Text neck is an overuse syndrome involving the head, neck and shoulders, usually resulting from excessive strain on the spine from looking in a forward and downward position at any hand held mobile device. This can cause headaches, neck pain, shoulder and arm pain, breathing compromise, and much more. **Objectives:** To find out the prevalence of Neck disability due to Text neck in the population of Goa. **Methods:** The questionnaire of the Neck Disability Index (NDI) of populations results will be applied in order to gather the related data. The NDI is a patient-completed, condition-specific functional status questionnaire with 10 items including pain, personal care, lifting, reading, headaches, concentration, work, driving, sleeping and recreation. The NDI has sufficient support and usefulness to retain its current status as the most commonly used self-report measure for neck pain. NDI has a high degree of reliability, internal consistency and validity for assessing neck disability. **Procedure-**A total of 500 subjects will be selected by simple random sampling for the study after signing the informed consent fulfilling the inclusion and exclusion criteria. **Inclusion Criteria:** Sex: Male and Female of ages 18 to 30 years, Subjects using smart phones more than one year and Subjects who agree to fill the informed consent **Exclusion Criteria:** Subjects will be excluded if they have had history of neck trauma or surgery or with a medical diagnosis of fibromyalgia, cervical radiculopathy, a systemic illness, or connective tissue disorder, Subjects with epilepsy ,Subjects with any orthopaedic condition, Subjects with any neuropathic condition like PPRP ,Subjects with previous Cervical fracture , Subjects with Vertigo , Software engineers and clerical staff , Subjects who do not agree to fill the informed consent. **Results:** The aim of the study was to find the prevalence of text neck in the population of Goa. Data analysis showed that of the 500 subjects, 473 subjects have mild to severe disability and 27 subjects had no difficulty/ disability at all. **Conclusion:** The findings of this study suggests that there is high prevalence of Text neck in the population of Goa .There is also a significant amount of disability associated with the presence of Text neck.

INTRODUCTION

Young adults today have grown up with mobile phones as an evident part of their lives.Smart phones are becoming central to our everyday lives. They serve as a means to fulfil tasks both at work and home (Ewa Gustafsson, 2017).Texting has become an integral part of daily life. The time spent using a mobile phone and its small keyboard for texting is likely to increase because of the increased multi-functionality of the smart phones.

Excessive mobile phone use such as texting, emailing and browsing the Internet has been associated with neck pain. With the dramatic growth of mobile phone usage, concerns have been raised with regard to the adverse health effects of mobile phone on spinal posture. Neck pain is the fourth leading cause of disability, with an annual prevalence rate exceeding 30%. Most episodes of acute neck pain will resolve with or without treatment, but nearly 50% of individuals will continue to experience some degree of pain or frequent occurrence (Steven, 2015). Text neck is a global epidemic, andis a world-wide health concern, affecting millions of all ages and from all walks of life. Text neck is an overuse syndrome involving the head, neck and shoulders, usually resulting from excessive

*Corresponding author: **Alisha Lilia Gracias,**
Department of Physiotherapy, Goa Medical College, Bambolim, Goa 403202

strain on the spine from looking in a forward and downward position at any hand held mobile device, i.e. Mobile phone, video game unit, computer, mp3 player, e-reader. This can cause headaches, neck pain, shoulder and arm pain, breathing compromise, and much more. In a study of university students in the United States, text messaging (SMS) emerged as the most frequently used type of communicative medium (Skierkowski and Wood, 2012). The physical exposure when text messaging on a mobile phone consists of low physical load, repetitive thumb movements and neck flexion (Gustafsson *et al*., 2010, 2011). In an experimental study among young adults, (Gustafsson *et al*., 2010, 2011) it is found that there are differences in posture, typing style, and muscle activity while texting on the phone between those with and without musculoskeletal symptoms in neck and upper extremities. In the group with symptoms, almost all individuals had the neck flexed forward and did not support their arms. This causes static muscular load in the neck and shoulders. Another study observing posture and typing style of college students typing on mobile devices found that almost all subjects had a flexed neck and a non-neutral typing-side wrist; nearly half of them typed with both thumbs, and one third typed with one thumb (Gold *et al*., 2012). Adolescents playing games, sending text messages, and phoning while walking, standing, lying, or sitting, may overload the upper extremities rather than the low back. Paula T. Hakala et.al. Guan, X. Et.al. 2015, found that compared to neutral standing, subjects display a more forward head posture when viewing the mobile phone screen, which is correlated with neutral posture, gaze angle and gender.It was also found that prevalence of neck/shoulder Pain (NSP) and Low Back Pain (LBP)is significantly associated with PC-use habits, the use of mobile phones and tablets, academic stress, and depression[3]. Zhi Shan et.alin across-sectional questionnaire study with a population of university students and staff associations, it was found that that texting can be associated with musculoskeletal disorders of the neck and upper extremity (Zhi Shan, 20130). Widespread overuse of handheld mobile technology is resulting in a harmful and dangerous physical condition on the human body. It is noted by Jacob and Isaac (18) that university students are amongst the highest contributors to the increasing number of smart phone sales. The factor that most influences the increase in smart phones usage is the functionality that helps users in their daily life especially business people and university students. A review of existing literature indicates that texting can be associated with musculoskeletal disorders of the neck and upper extremity. However, the published studies are cases, small experimental or cross-sectional studies. Hence, this research aims to assess the prevalence of Neck disability due to text neck in the population of Goa.

Aim and Research Hypothesis: The aim of the study was to find out the prevalence of Neck disability due to Text neck in the population of Goa.

Hypothesis: There will be a significant prevalence of neck disability due to text neck amongst the population of Goa.

Null hypothesis: There may or may not be significant prevalence of neck disability due to text neck amongst the population of Goa.

MATERIALS AND METHODS

Study design: Cross-sectional study will be done

Sample size: Sample size was calculated based on prevalence of neck disability due to text neck on 30% with error margin +5% or -5% with 95% confidence interval. Based on this input, 500 subjects are required for the study.

Sampling method: 500 subjects will be selected using random number table by simple random sampling method.

Recruitment: Males and females between the age group of 18-30 years will be recruited

Study setting: Population of Goa will be taken for the study.

Eligibility Criteria: A total of 500 subjects will be selected by simple random sampling for the study after signing the informed consent fulfilling the inclusion and exclusion criteria.

Inclusion Criteria

- Sex: Male and female of ages 18 to 30 years.
- Subjects using smart phones more than one year
- Subject who agree to fill the informed consent

Exclusion Criteria

- Subjects will be excluded if they have had history of neck trauma or surgery or with a medical diagnosis of fibromyalgia, cervical radiculopathy, a systemic illness, or connective tissue disorder.
- Subjects with epilepsy
- Subjects with any orthopaedic condition
- Subjects with any neuropathic condition like PPRP
- Subjects with previous Cervical fracture
- Subjects with Vertigo
- Software engineers and clerical staff
- Subjects who do not agree to fill the informed consent

Procedure

The potential volunteered candidates will be explained the nature and the purpose of the study and those who agree to participate will be taken for the study. Eligible candidates will be given the consent form. Descriptive variables of all subjects, such as age and sex will be recorded.

Tools and measuring methods: The questionnaire of the Neck Disability Index (NDI) of the populations results will be applied in order to gather the related data. Questionnaire of the NDI is distributed to the volunteered candidates in the form of paper

RESULTS

The aim of the study was to find the prevalence of text neck in the population of Goa. The sample size consisted of 500 subjects. Data analysis showed that of the 500 subjects, 473 subjects had mild to severe disability and 27 subjects had no difficulty/ disability at all (Table 1; Fig. a). Hence, 94.6% of the population experienced some amount of symptom and disability in the neck and 5.4% of the population did not experience any difficulty at all. Figure a. shows us the severity of disability amongst the 500 participants. It is seen that 5% of the subjects showed nil disability, followed by 35% participants who showed moderate disability.

Table 1. Prevalence and characteristic of disability

| Characteristics of disability	Frequency	Percent	Valid Percent	Cumulative Percent
Mild	300	60.0	59.2	59.2
Moderate	173	34.6	34.6	94.6
Severe	0	0.0	0.0	0.0
Nil	27	5.4	5.4	100.0

Figure a. Pie chart depicting severity of disability
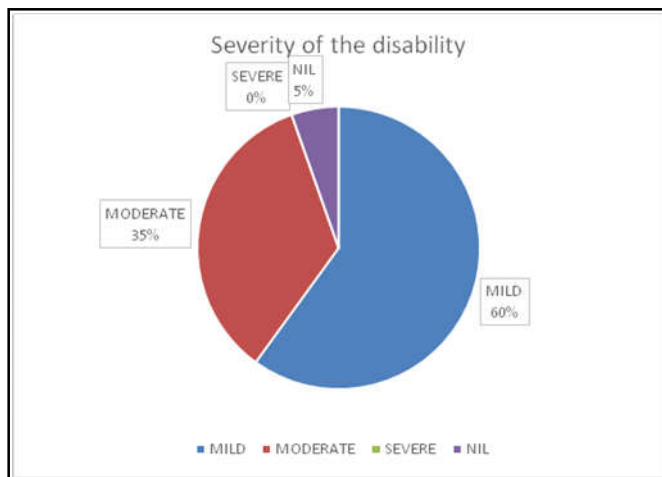
Table 2. Mean age of participants

Characteristic of disability	N	Mean Age(years)	Std. Deviation
Nil	27	22.44	3.826
Mild	300	25.85	4.083
Moderate	173	26.80	3.953
Severe	0	25.99	4.130

Figure b. Bar graph showing mean age of participants
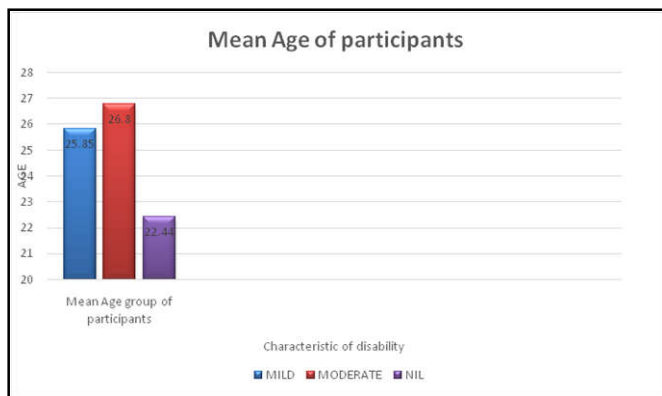
Majority of the population i.e. 60% of them experienced mild disability. None of the participants had any severe disability. Information about a subject's age , number of hours of phone usage per day and number of years of using phone was also collected. Data analysis gave the following results:

Mean Age of Participants:

The mean age of the participants from various levels of severity if the disability are:

1. The mean age of subjects with no disability is 22.44 years.
2. The mean age of subjects with mild disability is 25.85 years

3. The mean age of subjects with moderate disability is 26.80 years

A bar graph depicting the distribution of participants of various ages in shown in Figure b. Hence, it can be concluded that participants having no disability belong to a younger age group compared to those who have mild-moderate disability. Comparison between mild and moderate disability shows that those with moderate disabilities have a mean age greater than those with mild disability.

Mean number of hours of phone usage per day:

Table 3. Mean Hours of Phone usage by participants

Characteristic of Disability	Number of subjects	Mean hours pf phone usage	Standard Deviation
Nil	27	3.67	2.418
Mild	300	5.24	1.911
Moderate	173	9.17	4.798

Those with no disability used the phone for an average of 3.67 hours per day followed by those with mild disability who used the phone for an average of 5.24 hours per day. Lastly, those with moderate disability use the phones for an average of 9.17 hours per day. (as seen in Figure c. and Table 3).

Figure c. Bar graph depicting mean hours of phone usage per day
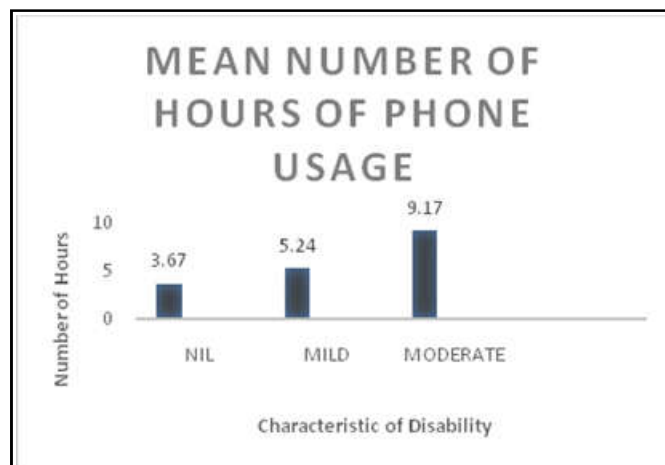
Hence, it is seen that those who use the phones for a longer period of time have more disability compared to those without. Participants with moderate amount of disability use the phone for a greater amount of time followed by those with mild disability and lastly, least number of hours of phone usage is seen in those with no disability.

Mean years of phone usage: Participants with no disability have been using a smartphone for an average of 4.22 years. Those with mild disability have been using their smartphones for an average of 7.98 years and those with moderate disability have been using a smartphone for an average of 10.43 years (as seen in Figure d). It is seen that participants with a higher amount of disability have been using smartphones for a longer period of time compared to those with mild disability and no disability at all. This implies that prevalence of disability in the neck due to usage of smartphone is linked to the number of years a person has been using it, i.e. higher the number of years of using a smartphone the higher the chance of having a disability in the neck.

Figure d. Bar graph depicting mean number of years of phone usage
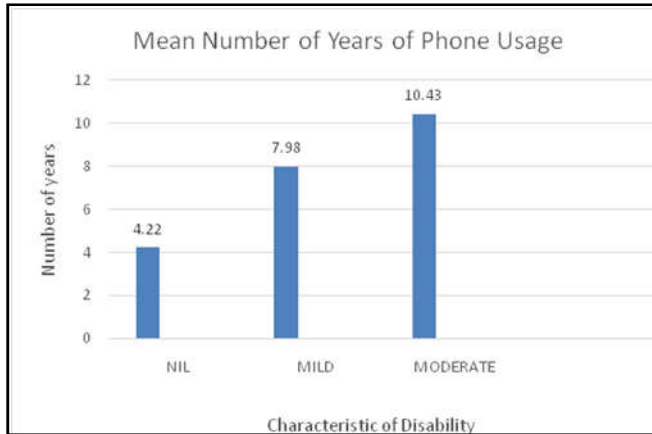
Table 4. Mean years of phone usage by participants

Characteristic of Disability	Number of subjects	Mean years pf phone usage	Standard Deviation
Nil	27	4.22	2.044
Mild	300	7.98	4.114
Moderate	173	10.43	3.524

DISCUSSION

The main aim of the study was to find out the prevalence of text neck in the population of Goa and measure the severity of the disability using the NDI. As seen from the results of the study, 473 out of 500 participants had some form of the disability, while only 27 of them did not present with any disability or complaint. These results conclude that, Text neck is prevalent in the population of Goa and the use of smartphones does lead to mild to moderate amount of disability. None of the participants experienced any severe disability due to text neck. The study coincides with the findings of a study conducted by Junhyuk Park *et al*, which concluded that heavy smartphone use mayproduce considerable stresses on the cervical spine, thus changing the cervical curve and pain threshold of the muscles around the neck (Junhyuk Park, 2015). A study was conducted by Sang In Jung, MS, PT *et al* on 'The effect of smartphone usage time on posture and respiratory function'. The study had similar findings which said that prolonged use of smartphones could negatively affect both, posture and respiratory function (Man-Sig, 2015).

J.E. Gold *et al*, conducted a study on Postures, typing strategies, and gender differences in mobile device usage: An observational study. This study observed that most of the subjects i.e. 91% of the subjects (782 out of 859 participants had a flexed neck hence implying significant strain in the neck due to typing on the smartphone (Gold, 2012). P stalin*et al* conducted a study on mobile phone usage and its health effects in adults of semi urban area in south India. The study concluded that neck pain was one of the numerous side effects of using smart phones (Stalin, 2016). Zhi Chan *et al*, studied the 'Correlational Analysis of neck/shoulder Pain and Low Back Pain with the Use of Digital Products, Physical Activity and Psychological Status among Adolescents in Shanghai'. Among all respondents, 85.4% were mobile phone users who were less likely to suffer from Low Back Pain (LBP), but a period of mobile phone use longer than 2 hours per day were related to a significant increase in the prevalence of Neck-

Shoulder PainandLBP (Zhi Shan, 2013). Junhyuk Park *et al*, concluded that heavy smartphone use may produce considerable stresses on the cervical spine, thus changing the cervical curve and pain threshold of the muscles around the neck thus supporting our study (Junhyuk Park, 2015). B R Glaukus*et al*, conducted a study on, "The Head Down Generation: Musculoskeletal Symptoms and the Use of Smartphones Among Young University Students". The results of the study showed that one of the main results found was a tendency for participants to have symptoms of musculoskeletal pain with regards to their typing methods on smartphones. When asked about the cases when such symptoms were considered to be related to the use of the device, most cited the cervical region (43.87% of cases). It was also found that those who type on their phones with the head at 45° and 60° angles are about twice as likely to have higher scores of severe symptoms than those typing with their neck at 0° (anatomical position) (Glaukus Regiani Bueno, 2018). A study done in Korea mentions a positive relationship between hours of mobile phone use and subjective musculoskeletal problems. This finding coincides with the findings of our study which shows that longer the hours of mobile phone usage, greater the number of people experiencing disability. When smart phones are constantly used without any rest, and a poor posture is maintained over a long period of time, musculoskeletal pain can occur (Kim, 2015). A study was carried out by Damasceno, G.M *et al*, on 'Text neck and neck pain in 18–21-year old young adult'. The findings of this study is contrasting to ours and shows that there is no association between text neck and neck pain in 18–21-year-old young adults. This could be due to the fact that the study population was from a younger age group compared to our study (Damasceno, 2018).

Limitations of the study

- The gender differences amongst participants was not taken into consideration for the purpose of the study
- The occupational differences amongst the participants could be a contributing factor in the study and was not taken into consideration
- Equal distribution of participants from all over Goa wasn't taken

Scope for further Study

- Further studies to evaluate the gender differences in the prevalence of text neck could be undertaken
- The most used feature of the smartphone by participants can be studied and its contribution to the prevalence of text neck can be found

Conclusion

Data analysis shows that 473 subjects are mild to severe disability and 27 subjects had no difficulty/ disability at all (Table 1; Fig. a). That is 94.6% of the adults experienced some amount of symptom and disability in the neck and 5.4% of the adults did not experience any difficulty at all. Majority of the population i.e. 60% of them experienced mild disability. None of the participants had any severe disability. Hence the findings of this study suggests that there is high prevalence of text neck in the population of Goa .There is also a significant amount of disability associated with the presence of text neck.

REFERENCES

Damasceno, G.M., Ferreira, A.S., Nogueira, L.A.C. *et al.* Eur Spine J. 2018 27: 1249. https://doi.org/10.1007/s00586-017-5444-5

Ewa Gustafsson, Sara Thomee, Anna Grimby-Ekman, Mats Hagberg 2017. Texting on mobile phones and musculoskeletal disorders in young adults: A five-year cohort study. Applied Ergonomics 58 (2017)208-214

Glaukus Regiani Bueno, Lucas França Garcia, Sonia Maria Marques Gomes Bertolini and Tiago Franklin Rodrigues Lucena. The Head Down Generation: Musculoskeletal Symptoms and the Use of Smartphones Among Young University Students. https://doi.org/10.1089/tmj.2018.0231

J.E. Gold*, J.B. Driban1, N. Thomas, T. Chakravarty, V. Channell, E. Komaroff. Postures, typing strategies, and gender differences in mobile device usage: An observational study. J.E. Gold *et al.* / Applied Ergonomics 43 (2012) 408e41

Junhyuk Park1, Jinhong Kim1, Jonggun Kim1, Kwangho Kim2, Namkang Kim2, Inwon Choi2, Sujung Lee2, Jongeun Yim1,2 *. The effects of heavy smartphone use on the cervical angle, pain threshold of neck muscles and depression. Advanced Science and Technology Letters Vol.91 (Bioscience and Medical Research 2015), pp.12-17

Kim HJ, Kim JS. The relationship between smartphone use and subjective musculoskeletal symptoms and university students. J Physical Therapy Sci. 2015;27(3):575-9

Man-Sig Kim, PhD, Influence of neck pain on cervical movement in the sagittal planeduring smartphone use. J. Phys. Ther. Sci.27: 15–17, 2015.

Stalin,P.Sherin Billy Abraham, K. Kanimozhy, R. Vishnu Prasad, Zile Singh, and Anil J. Purty. Mobile Phone Usage and its Health Effects Among Adults in a Semi-Urban Area of Southern India. Published online 2016 Jan1. doi: 10.7860/JCDR/2016/16576.7074

Paula T. Hakala, ArjaH.Rimpela , Lea A. Saarni, Jouko J. Salminen, 2006. *European Journal of Public Health*, Vol.16, No 5,536-541.

Steven P. Cohen 2015. Epidemiology, Diagnosis, and Treatment of Neck pain. 90(2):284-99

Zhi Shan , Guoying Deng , Jipeng Li , Yangyang Li, Yongxing Zhang, Qinghua Zhao (2013). PLOS ONE October2013/ Volume8/ Issue10.

Zhi Shan, Guoying Deng , Jipeng Li , Yangyang Li, Yongxing Zhang, Qinghua Zhao 2013. PLOS ONE October2013/ Volume8/ Issue10.

****