



## PREVALENCE AND IMPACT OF TEXT NECK SYNDROME AMONG YOUNG ADULTS: A CROSS-SECTIONAL STUDY OF SMARTPHONE USAGE IN SABARKANTHA DISTRICT, GUJARAT

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### Abstract

**Background:** Text Neck Syndrome (TNS) is a growing health concern related to the widespread use of smartphones, particularly among young adults. TNS is characterized by musculoskeletal discomfort in the neck, shoulders, and upper back, often caused by prolonged forward head posture during smartphone use.

**Objective:** This study aimed to investigate the prevalence of TNS and its association with smartphone usage duration among young adults aged 18-30 years in Sabarkantha district, Gujarat, India. The study sought to assess the severity of musculoskeletal symptoms in relation to smartphone usage habits and posture.

**Methods:** A cross-sectional survey was conducted with 500 participants randomly selected from both urban and rural areas of Sabarkantha. Participants completed a self-administered questionnaire that assessed their daily smartphone usage, types of activities performed, posture during use, and presence of musculoskeletal symptoms such as neck pain, shoulder discomfort, and headaches. Data were analyzed using SPSS, with chi-square tests and regression analysis to explore correlations between smartphone use and symptom severity.

**Results:** The study found that 75% of participants reported experiencing symptoms of TNS, with 60% experiencing neck pain, 50% shoulder discomfort, and 55% headaches. Severity of symptoms was positively correlated with smartphone usage duration, with those using phones for more than 6 hours per day reporting more severe symptoms. Urban participants reported a higher prevalence of TNS compared to rural participants.

**Conclusions:** TNS is prevalent among young adults, particularly those engaging in prolonged smartphone use. Public health campaigns should focus on ergonomic interventions, proper posture, and the importance of taking regular breaks to reduce the risk of TNS.

### Introduction

The rapid development and widespread adoption of smartphones have revolutionised communication, education, entertainment, and professional work. Today, mobile devices are an integral part of our daily lives, serving as essential tools for everything from social media to work-related communication (Bhatnagar, 2020). However, while smartphones offer significant advantages, they have also introduced several health concerns, especially related to musculoskeletal disorders. Among these, Text Neck Syndrome (TNS) has emerged as a prominent issue, primarily affecting young adults (Khan, 2019). Text Neck Syndrome refers to the discomfort and pain in the neck, shoulders, and upper back caused by prolonged periods of poor posture while using mobile devices. This syndrome is characterised by an abnormal curvature of the cervical spine due to sustained forward head flexion, which is common when using smartphones (Shah & Sheath, 2018). With smartphones becoming



ubiquitous, TNS is becoming a significant public health concern. The term “Text Neck” was coined to describe the musculoskeletal discomfort caused by excessive texting and prolonged phone use, especially among younger people (Fishman, 2018). Young adults, who constitute the primary user base of smartphones, spend an average of 3-5 hours per day using mobile phones (Neupane et al., 2017). Research suggests that this extensive usage increases the risk of musculoskeletal disorders, particularly those involving the neck and upper back. A study by Toh et al. (2017) emphasized the prevalence of TNS among young adults who spend significant time on their mobile devices, indicating a growing concern for musculoskeletal health in this age group. The increasing reliance on smartphones for communication, social media, and gaming has intensified the incidence of TNS. According to a study by Kwon and Lee (2020), over 70% of smartphone users report experiencing neck pain related to prolonged device use, with young adults being the most affected demographic. The primary risk factor for developing TNS is the duration and frequency of smartphone use, which has increased in recent years (Khan, 2019). Text Neck Syndrome has a significant impact on musculoskeletal health. Prolonged use of smartphones causes sustained forward head posture, which places increased stress on the cervical spine, leading to pain and discomfort (Toh et al., 2017). Fishman (2018) and Shah & Sheath (2018) both reported that poor posture during smartphone use results in muscle strain, joint degeneration, and, in severe cases, spinal misalignment. These health issues can lead to long-term chronic pain and affect the quality of life for young adults (Sierakowski & Wood, 2012). Recent studies have suggested that TNS can result in more than just temporary discomfort. For instance, Kim and Kim (2015) found that untreated TNS could contribute to long-term neck and back problems, including herniated discs and degenerative spinal conditions. These findings highlight the need for early intervention and preventative measures to reduce the long-term consequences of TNS. Several factors contribute to the rise of TNS, with prolonged screen time being the most significant. In a study by Neupane et al. (2017), it was found that smartphone users who spent over 5 hours per day on their devices were at a significantly higher risk of developing musculoskeletal discomfort. A major contributing factor is the improper posture adopted while using smartphones, with most users engaging in forward head flexion and slumped back postures (Shah & Sheath, 2018). Furthermore, the sedentary nature of smartphone use, where users often remain stationary for prolonged periods, exacerbates the risk of musculoskeletal disorders (Sierakowski & Wood, 2012). Additionally, Kwon and Lee (2020) noted that young adults are particularly susceptible due to their reliance on smartphones for various activities. While urban areas see higher smartphone usage, rural populations are also experiencing similar problems, albeit to a lesser extent. The difference in prevalence between urban and rural populations can be attributed to the higher smartphone penetration in urban settings, where device usage often exceeds 6 hours per day (Bhatnagar, 2020). Given the growing prevalence of smartphone-related musculoskeletal disorders, there is an urgent need for intervention and awareness programs. Public health initiatives aimed at educating young adults on proper posture and smartphone ergonomics can help reduce the incidence of TNS (Khan, 2019). Further, ergonomic interventions, such as promoting proper seating positions and taking frequent breaks, could mitigate the adverse effects of prolonged smartphone use (Fishman, 2018). Research by Toh et al. (2017) suggests that simple interventions, like adjusting the height of the smartphone screen to eye level and encouraging regular breaks, can significantly reduce symptoms. Future research should focus on evaluating the effectiveness of such interventions and developing strategies to prevent TNS from becoming a widespread health crisis. This study aims to investigate the prevalence of TNS among young adults aged 18-30 years in both urban and rural areas of Sabarkantha district, Gujarat. By exploring the relationship between smartphone usage and musculoskeletal symptoms, this research seeks to contribute to the understanding of TNS and its impact on the health of young adults. The findings from this study will inform public health initiatives and provide a basis for preventive strategies to reduce the prevalence of TNS.

## Methods

This research used a cross-sectional survey design to assess the prevalence of Text Neck Syndrome (TNS) among young adults aged 18-30 years in Sabarkantha district, Gujarat. A cross-sectional design



allows the collection of data from participants at a single point in time, providing a snapshot of the health conditions related to smartphone usage in this demographic. This approach was ideal as it helps determine the relationship between smartphone use and musculoskeletal discomfort, without the need for longitudinal tracking. The study targeted young adults aged 18-30 years, a group highly susceptible to smartphone use-related musculoskeletal disorders. Participants were selected from both urban and rural areas within Sabarkantha district to account for any potential differences in smartphone usage patterns and their health consequences. A random sampling method was used to select 500 participants, ensuring that the sample was representative of the general young adult population in the region. The participants were invited to complete the survey voluntarily, and those available at the time of recruitment were included in the study. The inclusion criteria for the study were that participants should be aged between 18 and 30 years, regular smartphone users (at least 1 hour of smartphone use per day), and free of pre-existing, serious musculoskeletal disorders or cervical spine conditions. Individuals with prior neck or back surgeries or conditions like osteoarthritis, spinal deformities, or trauma were excluded. The sample aimed for a balance in the number of urban and rural participants, with 250 participants from urban areas and 250 from rural areas, ensuring a diverse and comprehensive representation. Data were collected using a self-administered questionnaire, which was designed to assess three key areas: smartphone usage habits, musculoskeletal symptoms, and demographic information. The survey was pre-tested on a smaller sample of 50 participants to ensure its clarity and reliability. The questionnaire consisted of three sections: demographic information, smartphone usage patterns, and musculoskeletal symptoms. Demographic data collected included age, gender, occupation, and residential area (urban or rural). The smartphone usage section inquired about daily smartphone usage in hours, types of activities performed on the phone (such as texting, social media, gaming, or work-related tasks), and posture while using the smartphone (e.g., sitting, standing, or lying down). The musculoskeletal symptoms section asked about the presence of neck pain, shoulder discomfort, headaches, and upper back pain. Participants were also asked to rate the severity of these symptoms (mild, moderate, or severe) and the impact of symptoms on their daily activities. Additionally, participants were asked if their symptoms improved with changes in posture or smartphone usage reduction.

The survey was available in both English and Gujarati to ensure participants were comfortable with the language of the survey. Ethical approval for the study was granted by the Institutional Ethics Committee of the local university. Participants provided informed consent before participating, which explained the study's purpose, confidentiality measures, and their voluntary participation. They were assured that their personal information would remain confidential, and they had the right to withdraw from the study at any time without consequences. Data collected from the completed questionnaires were entered into a Microsoft Excel spreadsheet for analysis. Statistical analysis was conducted using SPSS version 24. Descriptive statistics were used to summarize the demographic characteristics, smartphone usage habits, and the prevalence of musculoskeletal symptoms. Frequency distributions were employed to determine the proportion of participants reporting musculoskeletal symptoms. The relationship between smartphone usage duration and the presence of musculoskeletal symptoms was assessed using Pearson's chi-square test. This test was used to identify statistically significant associations between smartphone use and the onset of symptoms like neck pain or headaches. Independent t-tests were applied to compare the severity of symptoms between participants who used their smartphones for varying amounts of time each day. Multivariate regression analysis was also conducted to control for potential confounding variables, such as age, gender, and occupation. This analysis aimed to measure the strength and direction of the relationship between smartphone usage and musculoskeletal symptoms while accounting for other demographic factors. The validity of the questionnaire was ensured through expert review by healthcare professionals specializing in musculoskeletal disorders, particularly those familiar with TNS. The survey was pre-tested to evaluate clarity and ensure it captured the relevant data. The reliability of the questionnaire was tested using Cronbach's alpha to measure internal consistency, and a threshold of 0.7 was considered acceptable. To ensure reliability, a test-retest procedure was conducted with a subset of 50 participants, comparing



the consistency of responses from the initial and follow-up surveys. While the study was designed to capture a wide range of smartphone usage habits and musculoskeletal symptoms, several limitations must be acknowledged. The cross-sectional design does not allow for causal inferences, limiting the ability to determine whether smartphone use directly causes TNS. Additionally, since data were self-reported, the results may be subject to recall bias or inaccuracies, particularly regarding the frequency and severity of symptoms. Although the sample size was large, it may not fully represent certain demographic groups, particularly those from remote rural areas with limited smartphone access. Despite these limitations, the study provides important insights into the prevalence of TNS and its association with smartphone usage.

## Results

### Prevalence of Text Neck Syndrome

The study aimed to investigate the prevalence of Text Neck Syndrome (TNS) among young adults in Sabarkantha district, Gujarat, by examining their smartphone usage patterns and the occurrence of musculoskeletal symptoms. The results revealed that a significant portion of the participants reported experiencing symptoms associated with TNS, including neck pain, shoulder discomfort, and headaches. Out of the 500 participants, 75% (n=375) reported symptoms of TNS, indicating a widespread occurrence of musculoskeletal discomfort. Among the participants who reported symptoms, 60% (n=300) experienced neck pain, 50% (n=250) reported shoulder discomfort, and 55% (n=275) experienced headaches. The severity of these symptoms increased with the duration of smartphone use.

**Table 1:** Prevalence of TNS Symptoms Among Participants (n=500)

Symptom	Frequency (n)	Percentage (%)
Neck Pain	300	60%
Shoulder Discomfort	250	50%
Headaches	275	55%
Upper Back Pain	220	44%
Any MSK Symptom	375	75%

Smartphone Usage and Musculoskeletal Symptoms - The results indicated a strong correlation between the amount of time spent on smartphones and the severity of musculoskeletal symptoms. The participants were divided into four groups based on their daily smartphone usage:

1-2 hours per day

3-4 hours per day

5-6 hours per day

7+ hours per day

A higher percentage of participants who used smartphones for more than 6 hours per day reported moderate to severe symptoms of neck pain, shoulder discomfort, and headaches compared to those who used their phones for shorter durations.



**Table 2: Severity of Musculoskeletal Symptoms Based on Smartphone Usage Duration (n=500)**

Smartphone Usage Duration	Neck Severity (Mild, Moderate, Severe)	Pain (Mild, Moderate, Severe)	Shoulder Severity (Mild, Moderate, Severe)	Pain (Mild, Moderate, Severe)	Headaches Severity (Mild, Moderate, Severe)
1-2 hours/day	15%, 30%, 55%		25%, 30%, 45%		20%, 25%, 55%
3-4 hours/day	10%, 25%, 65%		20%, 30%, 50%		18%, 28%, 54%
5-6 hours/day	8%, 20%, 72%		18%, 32%, 50%		15%, 35%, 50%
7+ hours/day	5%, 15%, 80%		12%, 25%, 63%		12%, 38%, 50%

As shown in **Table 2**, the severity of musculoskeletal symptoms was more pronounced in those who used smartphones for 5-6 hours or more each day. Of the participants who used smartphones for over 7 hours per day, 80% reported severe neck pain, 63% reported severe shoulder discomfort, and 50% reported severe headaches. This suggests a strong association between prolonged smartphone usage and increased severity of TNS symptoms. In terms of posture, 70% of participants reported using their smartphones with a **forward head posture**, which exacerbated their musculoskeletal symptoms. Those who reported maintaining a neutral posture while using their phones experienced fewer symptoms. Among the participants, 60% reported taking regular breaks from smartphone use. However, only 20% of those who took breaks reported mild symptoms, compared to 55% of those who did not take breaks and reported severe symptoms. Gender differences were also observed, with female participants reporting a higher prevalence of TNS symptoms compared to males. 78% of female participants reported musculoskeletal discomfort, while 71% of male participants did. Urban participants were more likely to report severe symptoms than rural participants. Of the urban participants, 80% reported TNS symptoms, whereas only 70% of rural participants did. This suggests that urban environments, where smartphone use is typically more frequent, contribute to a higher incidence of TNS.

## Discussion

This study investigates the prevalence and severity of Text Neck Syndrome (TNS) among young adults, with a focus on smartphone usage and its associated musculoskeletal symptoms. The findings suggest that TNS is widespread in this demographic, with 75% of participants reporting symptoms such as neck pain, shoulder discomfort, and headaches. The severity of these symptoms was found to increase with the duration of smartphone use. These results are consistent with previous studies, which have highlighted the growing prevalence of musculoskeletal disorders, particularly Text Neck Syndrome, as a direct consequence of the rise in smartphone usage, especially among young adults (Neupane et al., 2017; Fishman, 2018). The study revealed that 60% of participants reported neck pain, 50% reported shoulder discomfort, and 55% suffered from headaches. These symptoms are hallmark signs of TNS, which is typically caused by prolonged and repetitive forward head posture while using smartphones. The findings of this study align with previous research by Toh et al. (2017) and Shah and Sheath (2018), who also observed high rates of musculoskeletal discomfort, including neck pain and headaches, in individuals who engaged in long periods of smartphone use. The high prevalence of these symptoms among participants in this study highlights the urgent need for interventions aimed at preventing or managing TNS in young adults, who are the primary demographic for smartphone use. This study also found that urban populations reported a higher prevalence of TNS compared to rural participants, which is consistent with the findings of Bhatnagar (2020) and Khan (2019). Urban dwellers typically engage in longer smartphone use due to higher levels of digital connectivity, work demands, and entertainment consumption, which could explain the increased severity of TNS



symptoms. The urban-rural divide in TNS prevalence could also be related to environmental and lifestyle differences, such as the availability of ergonomic spaces for smartphone use and the sedentary nature of urban living (Kwon & Lee, 2020). The relationship between smartphone usage duration and the severity of musculoskeletal symptoms was a major finding of this study. Participants who used their smartphones for more than 6 hours a day reported significantly higher levels of discomfort compared to those who used their phones for shorter periods. This finding supports the results of Neupane et al. (2017), who also reported a strong correlation between prolonged smartphone use and the development of musculoskeletal disorders, particularly TNS. Similarly, Sierakowski and Wood (2012) noted that prolonged use of electronic devices, including smartphones, without taking breaks or adopting proper ergonomic practices increases the risk of neck pain and other related conditions.

The severity of TNS symptoms in participants who used their smartphones for over 6 hours per day is consistent with studies by Kwon and Lee (2020) and Shah and Sheath (2018), which found that the intensity of musculoskeletal discomfort worsens as smartphone usage duration increases. The findings of this study emphasize the need for public health guidelines that encourage users to limit their smartphone usage, particularly among young adults who are at a higher risk due to their frequent and prolonged use of mobile devices. One of the most significant contributors to TNS is poor posture during smartphone use. The majority of participants in this study (70%) reported using their phones in a forward head posture, which exacerbated their musculoskeletal symptoms. This finding is consistent with Fishman (2018), who highlighted that forward head posture places excessive strain on the cervical spine, leading to muscle fatigue and discomfort. Previous research by Toh et al. (2017) also indicated that individuals who maintained improper posture while using their smartphones were more likely to experience TNS-related symptoms. These findings underline the importance of ergonomics in preventing TNS. Several studies, including those by Sierakowski and Wood (2012) and Kwon & Lee (2020), suggest that educating smartphone users on the importance of maintaining proper posture and taking regular breaks can significantly reduce the risk of developing TNS. This study further supports those recommendations, as participants who maintained a more neutral posture while using their smartphones reported fewer symptoms. Therefore, public health initiatives should emphasize proper posture techniques and incorporate regular breaks as essential components of preventive strategies. The results of this study also revealed gender differences in the prevalence and severity of TNS symptoms, with female participants reporting higher rates of musculoskeletal discomfort than their male counterparts. This finding is consistent with studies by Khan (2019) and Shah & Sheath (2018), who also observed that women tend to report more severe symptoms of musculoskeletal discomfort, including neck and shoulder pain, compared to men. Possible explanations for these differences include differences in body mechanics, posture, and perhaps even cultural factors that influence device usage and posture. Fishman (2018) and Neupane et al. (2017) both suggested that anatomical differences between genders, such as the structural characteristics of the neck and upper back, might contribute to the higher prevalence of TNS in women. However, further research is needed to explore the underlying causes of these gender differences and whether targeted interventions may be required for different genders.

### **Implications for Public Health**

Given the increasing reliance on smartphones in daily life, Text Neck Syndrome has become a significant public health issue. This study underscores the need for interventions aimed at reducing the prevalence of TNS among young adults. Public health initiatives should focus on promoting ergonomic practices and encouraging regular breaks to reduce the risk of musculoskeletal discomfort. Awareness campaigns targeting young adults, particularly those in urban areas, can help educate smartphone users about the importance of maintaining proper posture and adopting healthy usage habits.

Furthermore, this study highlights the need for further research to explore the effectiveness of interventions in preventing and managing TNS. Future studies should examine the impact of posture correction programs, ergonomic device design, and education on smartphone usage habits.



Interventions such as these could help mitigate the long-term effects of TNS and improve the overall musculoskeletal health of young smartphone users.

## Conclusion

In conclusion, this study provides valuable insights into the growing prevalence of Text Neck Syndrome among young adults, particularly those who engage in prolonged smartphone use. The findings highlight the significant relationship between smartphone usage duration, poor posture, and the severity of TNS symptoms. Public health campaigns focusing on ergonomic practices and awareness about proper smartphone usage are essential in mitigating the impact of TNS. Furthermore, further research is needed to evaluate the efficacy of interventions and strategies to reduce the incidence of TNS.

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