IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Awareness Of Preventive Measures For Tech Neck Syndrome Among BSc. It Students

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Abstract: The study aimed to assess the awareness the knowledge of prevention measures of Tech Neck Syndrome (TNS) among BSc. IT students who are very much dependent on digital devices for academic and personal activities. A cross-sectional survey was conducted among 203 students between 17 and 25 years of age in South Mumbai using a self-validated online questionnaire. The results showed that although 86.2% of the students used mobile phones and 54.2% used laptops daily, almost 83% of the students had never heard about TNS. The most commonly reported symptoms were neck pain, headache, and eye strain. While 67% of respondents agreed to maintain correct posture and 55% agreed with the benefits of stretching as preventive measures, only 21% of the respondents practiced regularly. Interestingly, 59.7% felt that physiotherapy plays a role in prevention, and many of them expressed willingness to make lifestyle changes if prompted.

KEYWORD **:** Awareness, Ergonomics, Physiotherapy, Preventive Measures, Tech Neck Syndrome

I. INTRODUCTION

The exponential growth of the IT industry in education, information, and entertainment has created health implications that cannot be neglected. Students who are having more use of electronic gadgets like Computer, Mobile phones and Ipad are usually more prone to it. I.T students emerge in the world of coding and digital design. They are particularly susceptible to adverse effects of neck pain when neglected and the prolong use of gadgets for longer hours can cause many physical disorders. Along the years neck pain has turned into the leading cause for disability.[1] Globally, neck pain is the most frequent pain, rating fourth among the disabilities. [2]According to recent studies, high mobile phone usage is common which has given rise to neck related disorders and musculoskeletal problems with prevalence ranging from 17.3% to 67.8% Text next Syndrome is one of them. Neck pain when left untreated and ignored can lead to permanent damage causing continues stress on neck muscles while viewing device in forward bending position causing Forward head posture hence text neck is also termed as Forward head posture.[3]

The term text neck is used to describe a repetitive stress injury or an overuse syndrome where a person has his/her head hung or flexed in a forward position and is bent down looking at his/her mobile or other electronic device for prolonged periods of time. An U.S Chiropractor named Dr. Dean L. Fishman coined the term Text Neck Syndrome [4]

A condition known as "Tech Neck" is defined by neck pain and discomfort brought on by looking down at phones, tablets, and other digital gadgets for extended periods of time, which can cause an array of uncomfortable head positions.[5] On the other hand, "Text Neck" refers to the practice of texting on a smartphone with the neck flexed. The syndrome can further show signs like pain and tightness in the shoulder, persistent headaches, neck-ache, nagging to intense pain, muscle spasm around the upper back region. In the long way, the neck pain negligence causes inflammation of the neck, ligaments, muscles, and nerves which will lead to persistent arthritic changes.[5,6]Approximately 5 to 7 hours minimum in a day is spend by young students on gadgets with their head bending forwardly toward the phone for typing and viewing purpose. Normally 10 to 12 pounds of force passes through the neck muscles with addition average head of the weight in healthy posture. [7].When texting, the head and the neck is subjected to increased force. Force of about 27 pounds at 15°, 40 pounds at 30° and 49 pounds at 45°and at 60° it weighs 60 pounds.[8]The complications which sets in when left untreated causing impairments includes Flattening of the spinal curve, Onset of early arthritis, Spinal misalignment can be an outcome of text neck, Spinal degeneration, Disc compression, Disc herniation, Nerve damage.[5,9] Tech Neck primarily affects the cervical vertebrae, cervical muscles, and spinal nerves on the posterior region of the neck.[9] Understanding lifestyle modifications and implementing ergonomic work arrangements can help prevent neck pain.[10]

According to some research, the ideal way to use a electronic gadget is to sit with your arms supported, keep your neck in a straight line with electronic gadget and use both of your hands and thumbs.[11]The preventive measures and therapies of text neck involves restricting and avoiding the usage of smart devices, such as laptops and mobile phones, along with taking regular breaks after 20 to 30 minutes of usage. Likewise, incorrect posture can be rectified by standing with the shoulders pushed back.[7]This study aimed to identify about awareness of Tech Neck Syndrome and its preventive measures amongst BSc. IT students.

I. NEED FOR STUDY

There is no adequate knowledge about the awareness of preventive measures of Tech Neck Syndrome. A study conducted in 2020 suggested lack of education and level of ignorance regarding this syndrome. Thereby necessitating the need to explore the level of awareness further.

This study will aid in providing insight regarding level of awareness of preventive measures to be taken to avoid development of Tech Neck Syndrome. Thereby, aiding formation of preventive strategies for the population

III. REVIEW OF LITERATURE

1. Pais V, Shahida F, Thaslima F., Is Tech Neck A Growing Hazard among the Young? Indian Journal of Physiotherapy &Occupational Therapy 2021. This prospective study included 88 participants between the ages of 18 and 25 who have been using digital devices from Yenepoya (Deemed to be University) for six months or more were chosen using a convenience sampling method. Participants were divided into four categories according to the duration of usage of digital. Each group will be composed of 22 participants. Using lateral photography method they were tested for cervical range of motion with the help of goniometer and craniovertebral angle. There is a significant decrease in cervical flexion among groups but there is no significant difference between groups in cervical extension and craniovertebral angle. The present study suggests that repeated use of digital devices may influence raising Neck flexion ability. Tech Neck would thus be an increasing danger among the young population.

2. Suhani Toshniwal, Tejas Borkar, Prevalence of Tech Neck in Adults- A survey. Annals of Public Health and Research 2023.This study is characterized as an observational comparative investigation involving a total of 80 volunteers, spanning the age range of 14 to 59. The participants were randomly chosen and categorized into two groups based on their age. They were administered a self-completion questionnaire, specifically the Neck Disability Index, followed by an evaluation of their posture using the Ruler Method. Subsequently, their Cervical Muscle Strength was measured using Manual Muscle Testing (MMT) was then used to test their cervical muscle strength, and the Oxford grading system was used to assign grades. The study used an unpaired 't test' for statistical analysis. Group B sees a larger prevalence of Forward Head Posture (67.5%, mean score 2.53) than Group A, which has a much smaller impact (25%, mean score 2.19), according to the study findings. In addition, Group B had higher Neck Disability Index (NDI) scores than Group A, but Group A and Group B had very similar Manual Muscle Testing (MMT) scores for cervical muscles (Group A scored 4.33 and Group B scored 4.3), with Group A showing a slight strength advantage.

3. Sunil Neupane, U T Ifthikar Ali, Mathew A, Text Neck Syndrome - Systematic Review, Imperial Journal of Interdisciplinary Research (IJIR). A structured literature search was done using various electronic and print data bases. As stated in the review smart phone induced neck pain and associated problems are of chronic progressive nature, timely interpretation, and interventions along with good knowledge about postural correction are the key entities to deal with Text Neck Syndrome. It can be prevented by taking frequents breaks from the mobile device, like every 20 min or so. You should constantly look up bring the neck back into its original neutral position and some lifestyle modifications are required.

4. Pranita Rathi, Jaspreet Kaur Talwar, Neeraj Athavale, Rachana Dabadghav, Ashok Shyam, Parag Sancheti, Awareness about text neck syndrome amongst adolescents. The Journal of Indian Association of Physiotherapists. It is an observational cross-sectional study in which 302 subjects and Subjects were recruited from Pune city both male and female students, subjects using smartphones, age group of 13–17 years, smartphone usage one or more than 1 h per day using Self-made Questionnaire. The awareness (67.2%), knowledge, and perception regarding causes, health hazards of TNS is good. There is a lack of knowledge about preventive measures (58.30%) ; hence, the practice of the same is poor. There is a need to create the awareness regarding text neck in adolescents in terms of preventive measure

5. Pankti P. Samani, Neeraj A. Athavale, Ashok Shyam, Parag K. Sancheti, Awareness of text neck syndrome in young-adult population, International Journal of Community Medicine and Public Health. This is an Observational Study with a sample size of 311. Subjects using phone since past 1 year and their age should be between 18-24 years. This study was performed on the population living in Mumbai and Pune cities of Maharashtra and demonstrated a low level of awareness of text neck syndrome amongst young adult population. Only 35% population has heard of Text neck syndrome out of which only 21% know about the preventive measures.

IV. AIMS

- To assess the level of Awareness of Preventive Measures for Tech Neck Syndrome Among BSc. IT Students.

V. OBJECTIVES

- To determine the level of Awareness of Preventive Measures for Tech Neck Syndrome Among BSc. IT Students.

- To evaluate the level of perceived importance of prevention of Tech Neck Syndrome among BSc. IT students.

VI. METHODOLOGY

A cross-sectional study was conducted among 150 BSc. IT students in South Mumbai using purposive sampling. Participants aged 18–28 years, using digital devices for at least five hours daily, and providing informed consent were included. Students with neck or spine disorders or unwilling to participate were excluded. Data were collected using an expert-validated, self-designed questionnaire created on Google

Forms and distributed through WhatsApp and email to assess awareness of preventive measures for Tech Neck Syndrome.

VII. STATISTICAL ANALYSIS

The data collected will be analysed using descriptive analysis in MS Excel.

The data has been analysed using Descriptive Analysis in the MS Excel. In the first section of the Questionnaire, the Demographics, 203 BSc. IT Students participated from which 139 (68.5%) were Males and 64 (31.5%) were Females. The age was between 17-25 years, with majority being of age 19 and 20.

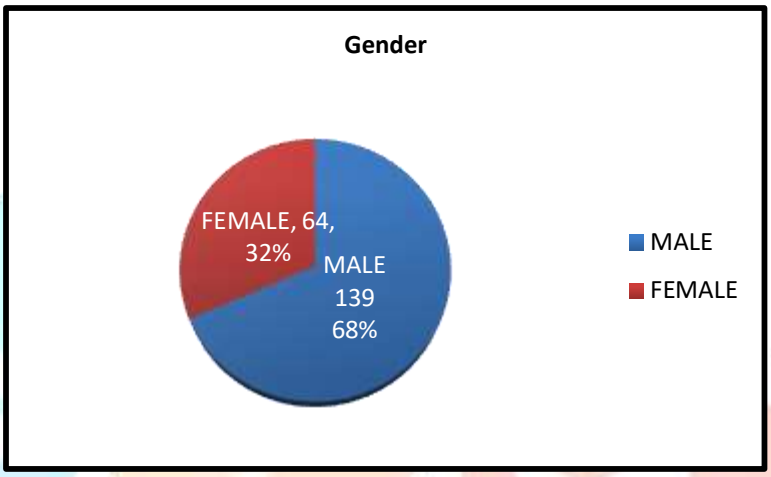

FIGURE-1 : Gender of Respondents

This pie chart below represents the distribution of the BSc. IT Students across different years of study, based on the respondents the majority 111 (54.7%) 3rd Year Students followed by 63 (31%) 1st Year Students and lastly 29 (14.3%) 2nd Year Students.

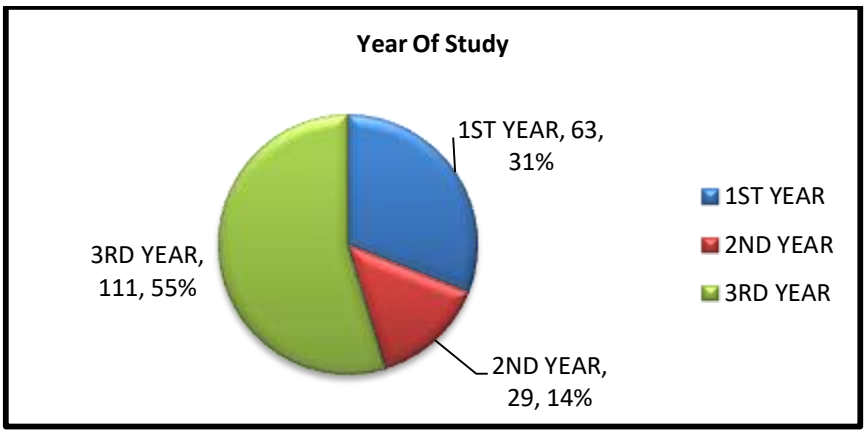

FIGURE-2 : Year of Study

The pie chart (FIGURE – 3) illustrates the daily gadget usage among students. The majority, **132 students (65%)**, reported using gadgets for **5 to 6 hours** per day. This is followed by **41 students (20%)** who use gadgets for **7 to 8 hours**, while **30 students (15%)** reported using them for **more than 8 hours** daily.

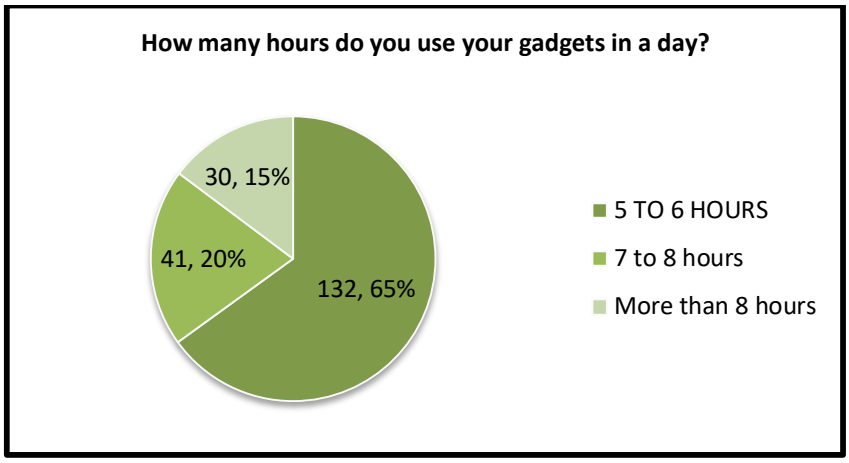

FIGURE-3 : Showing result of the question, How many hours do you use your gadgets in a day?

The bar graph (FIGURE-4) represents the types of gadgets used by students on a daily basis for practical work and assignments. The majority, **175 students (86.2%)**, reported using **mobile phones**. This is followed by **110 students (54.2%)** who use **laptops**, **30 students (14.8%)** who use **desktop computers**, and only **3 students (1.5%)** who use **IPads**.

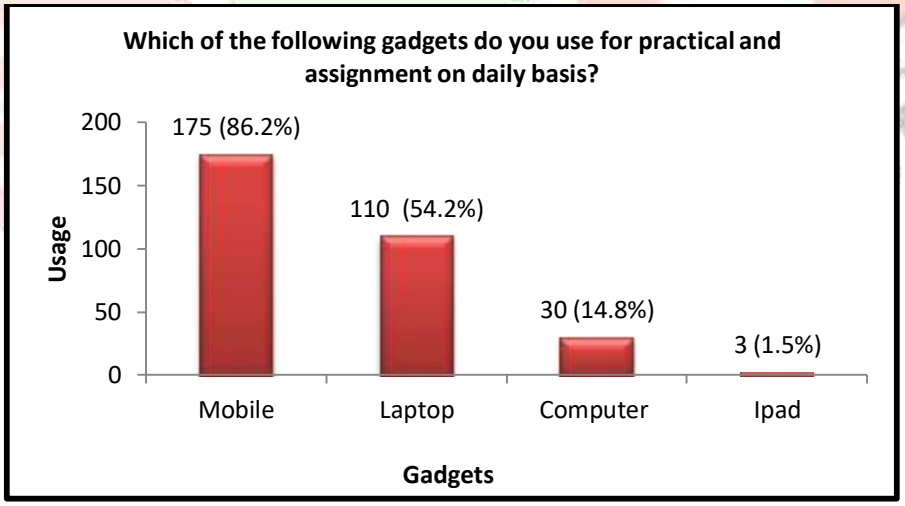

FIGURE-4 : Showing result of the question, Which of the following gadgets do you use for practical and assignment on daily basis?

The bar graph (FIGURE-5) represents students medical diagnoses related to the neck. A majority of **192 students** reported having **no medical diagnosis**. Meanwhile, **5 students** responded "yes" to having a diagnosis, with **4 students** specifically reporting **cervical pain** and **2 students** reporting **back pain**.

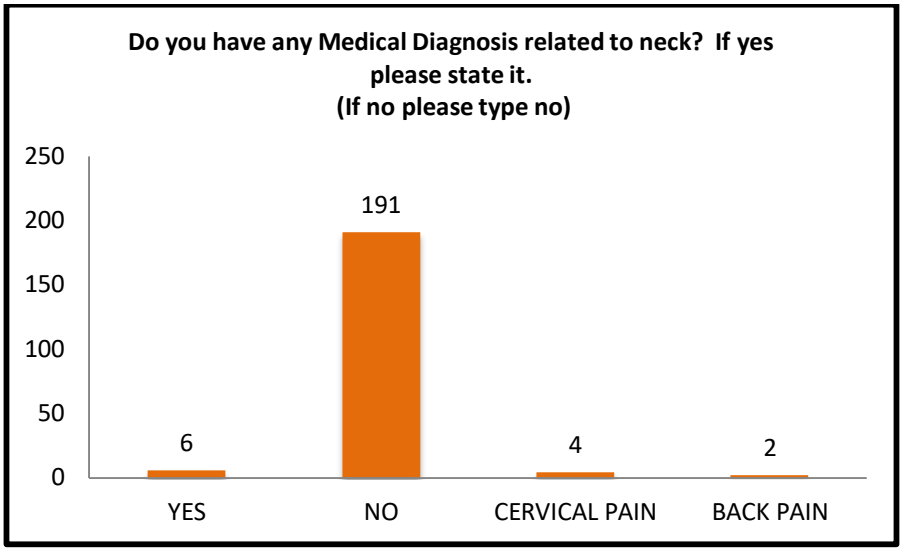

FIGURE-5: Showing result of the question, Do you have any Medical Diagnosis related to neck? If yes please state it. (If no please type no).

The pie chart **(FIGURE-6)** represents students medical diagnoses related to the neck. A majority of **191 students (94%)** reported having **no medical diagnosis**, while only **12 students (6%)** reported having a diagnosis related to the neck.

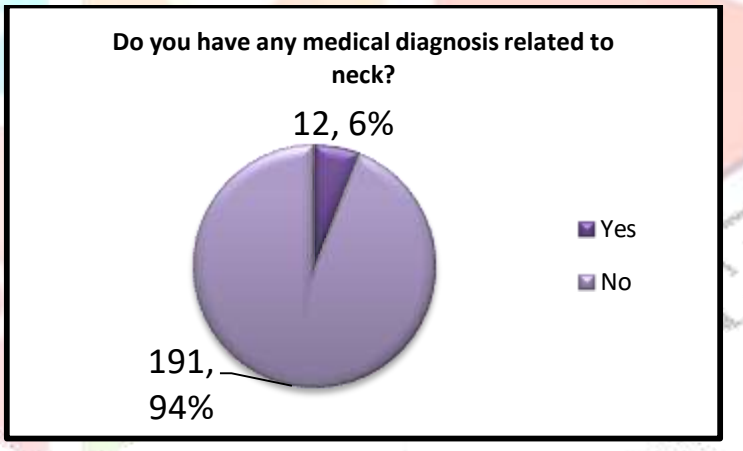

FIGURE-6: Showing result of the question, Do you have any medical diagnosis related to neck?

In the next Section of the Questionnaire questions related to Awareness about Tech Neck Syndrome, The pie chart (FIGURE- 8) presents the level of awareness regarding **Tech Neck Syndrome** among students. A significant majority, **158 students (83%)**, reported that they had **not heard** of the condition, whereas only **33 students (17%)** were familiar with it.

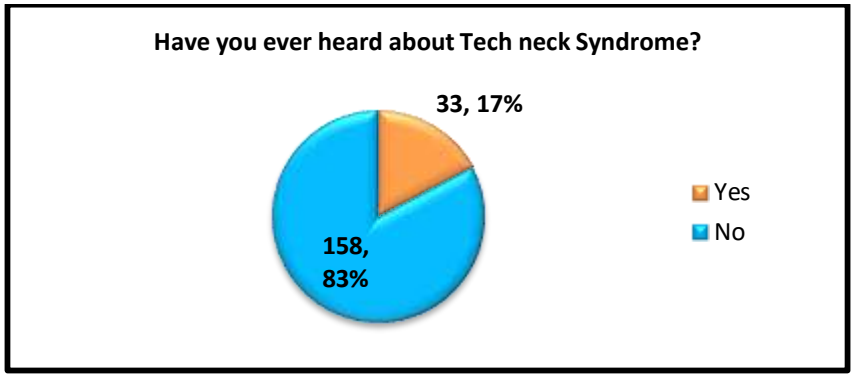

FIGURE-7: Showing result of the question, Do you have any medical diagnosis related to neck?

The pie chart **(FIGURE-8)** illustrates the sources through which students first became aware of **Tech Neck Syndrome**. The majority, **23 students (70%)**, reported learning about it through **social media**. Smaller proportions cited other sources, including **news articles (3 students, 9%)**, **school/university (4 students, 12%)**, **healthcare providers (1 student, 3%)**, **friends (1 student, 3%)**, and **seniors (1 student, 3%)**.

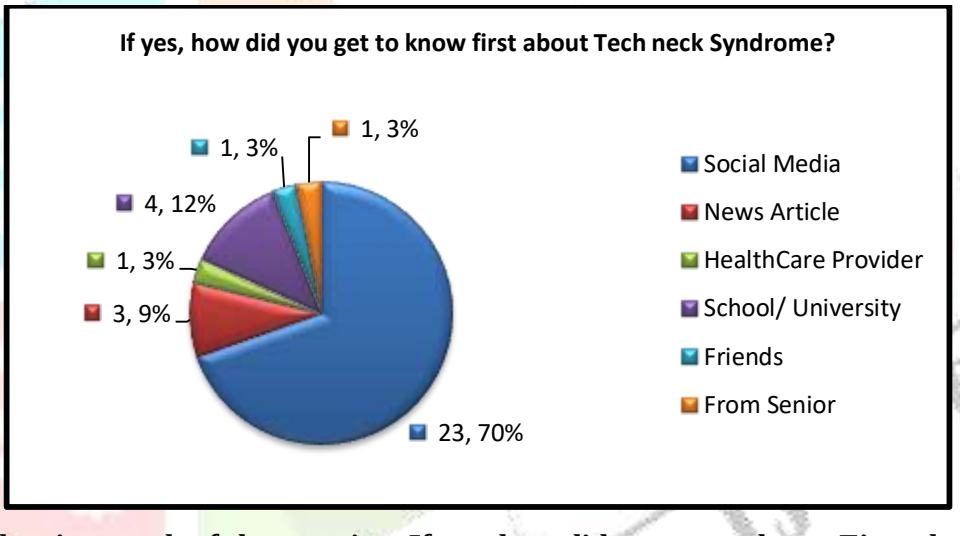

FIGURE-8: Showing result of the question, If yes, how did you get to know First about Tech Neck Syndrome

The bar graph **(FIGURE-9)** depicts students perceptions of symptoms associated with **Tech Neck Syndrome**. The most frequently reported symptom was **neck pain (118 responses)**, followed by **headaches (68 responses)** and **shoulder pain (65 responses)**. Fewer students identified **vision problems (35 responses)** and **arm/hand numbness (21 responses)**. Additionally, **42 students** indicated **none of the above** symptoms.

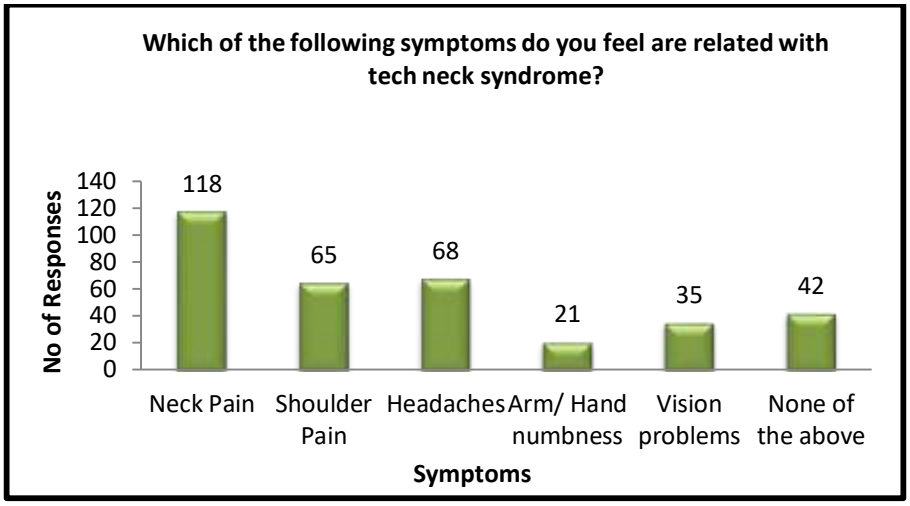

FIGURE-9: Showing result of the question, Which of the following symptoms do you feel are related with Tech Neck syndrome?

The pie chart **(FIGURE-10)** presents students responses regarding the experience of neck tightness while bending forward for prolonged periods to operate devices. A greater proportion, **61%**, reported **not experiencing neck tightness**, whereas **39%** acknowledged experiencing such discomfort.

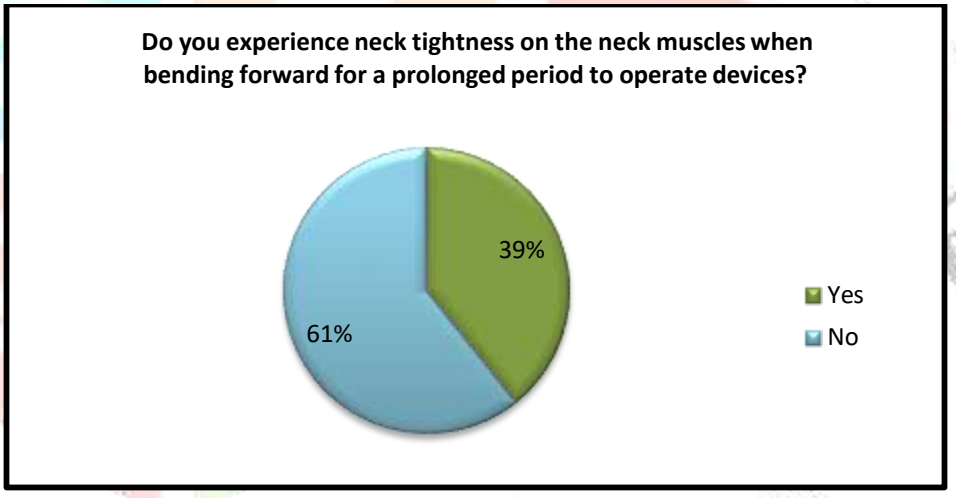

FIGURE-10: Showing result of the question, Do you experience neck tightness on the neck muscles when bending forward for a prolonged period to operate devices?

In the next Section of the Questionnaire questions related to Prevention of Tech Neck Syndrome, The pie chart (**FIGURE-11)** illustrates the frequency of breaks taken by students while using their devices. The largest proportion, **61 students (32%)**, reported taking breaks **every hour**, followed by **55 students (29%)** who take breaks **every 30 minutes**. Additionally, **47 students (24%)** indicated they **rarely** take breaks, while **28 students (15%)** reported taking breaks **every 15 minutes**.

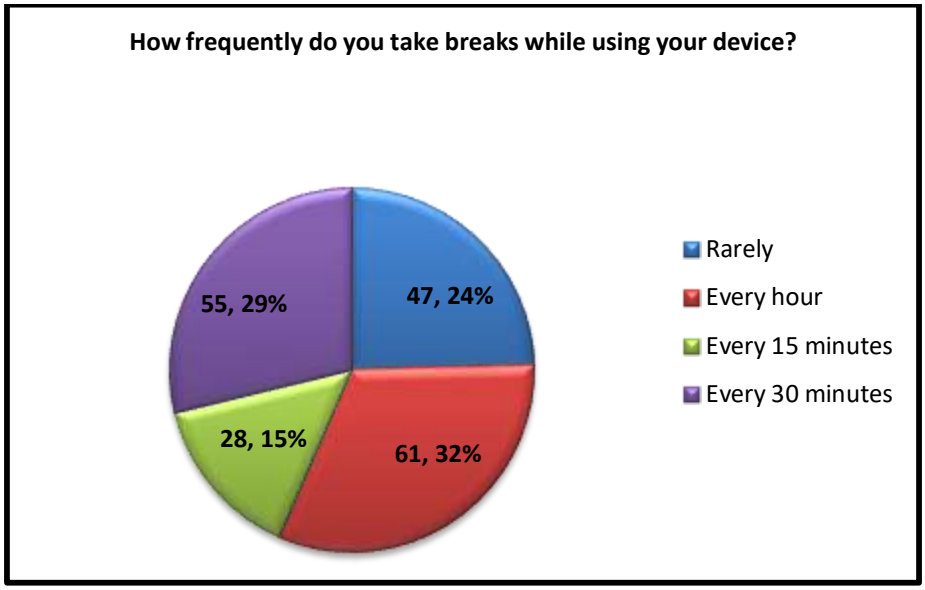

FIGURE-11: Showing result of the question, How frequently do you take breaks while using your device?

The pie chart **(FIGURE-13)** illustrates students perceptions of proper sitting posture. The majority, **128 students (67%)**, correctly identified **sitting upright with a straight back, relaxed shoulders, feet flat on the floor, and knees at a 90-degree angle** as the appropriate posture. Meanwhile, **29 students (15%)** selected **sitting with the back lowered, shoulders rounded forward, and legs crossed**, while **31 students (16%)** chose **sitting with the body twisted and legs extended forward**. A very small proportion, **3 students (2%)**, indicated **leaning forward with a curved back and head reaching toward the screen**.

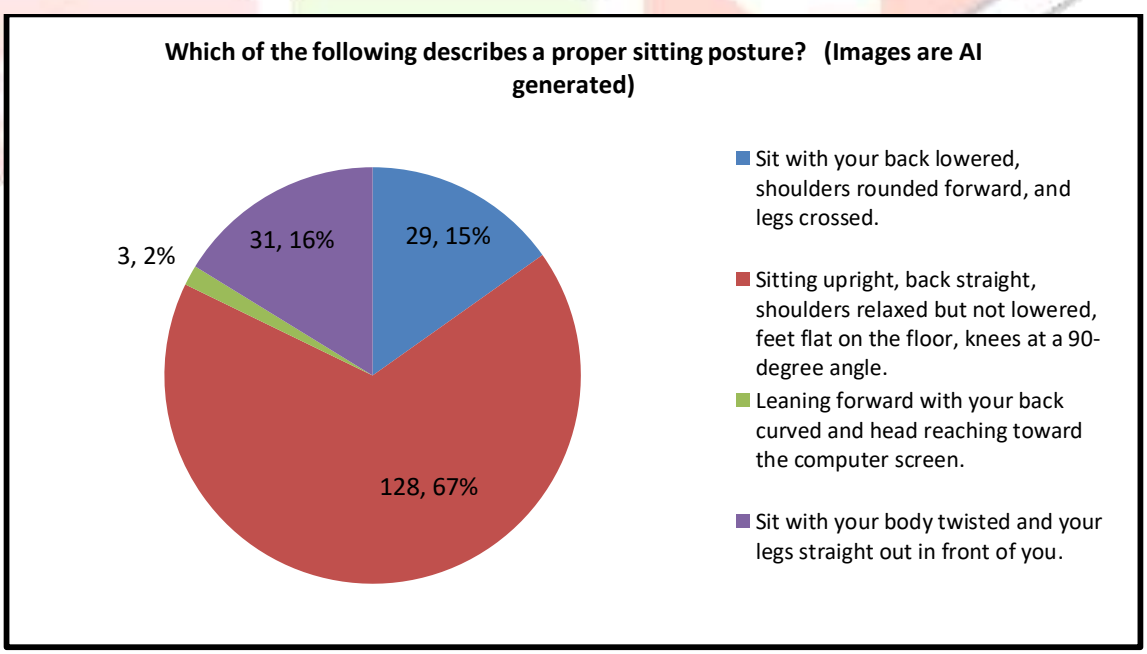

FIGURE-13: Showing result of the question, Which of the following describes a proper sitting posture? (Images are AI generated)

The pie chart **(FIGURE-14)** illustrates the frequency with which students practice good posture by keeping their device at eye level during use. The highest proportion, **64 students (33%)**, reported doing so **sometimes**, followed by **44 students (23%)** who indicated **often**, and **43 students (23%)** who reported

practicing this posture **rarely** while remaining **40 students (21%)**, stated that they **always** maintained the posture.

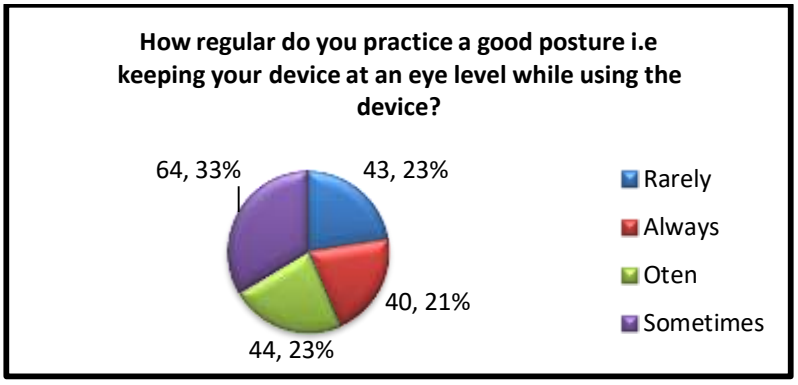

FIGURE-14: Showing result of the question, How regular do you practice a good posture i.e keeping your device at an eye level while using the device?

The pie chart **(FIGURE-15)** illustrates the proportion of students who engage in stretching exercises to relieve neck pain. Out of the total respondents, **106 students (55%)** reported practicing stretching as a method of pain relief, while **85 students (45%)** indicated that they do not stretch for this purpose.

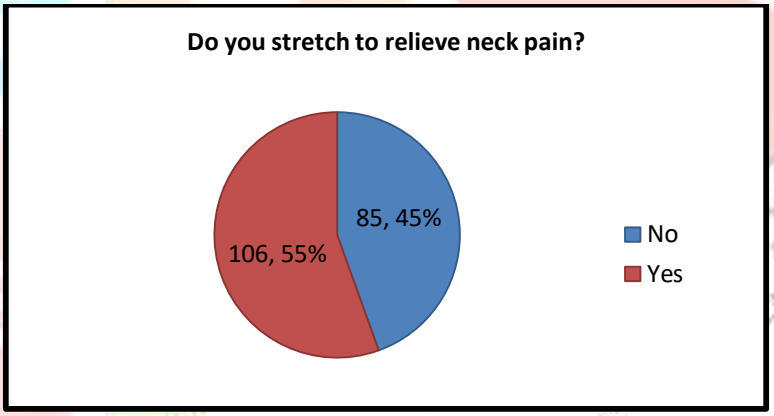

FIGURE-15: Showing result of the question, Do you stretch to relieve neck pain?

The bar graph **(FIGURE-16)** depicts the types of stretches performed by students to alleviate neck pain. The majority of respondents, **71 students**, reported stretching their **back**, followed by **41 students** who stretched their **chest and shoulders**. Additionally, **29 students** performed stretches involving the **arms, fingers, and calves**. A smaller number engaged in stretches directly targeting the **neck (1 student)** or **head movements (1 student)**, while **7 students** reported stretching the **calves**.

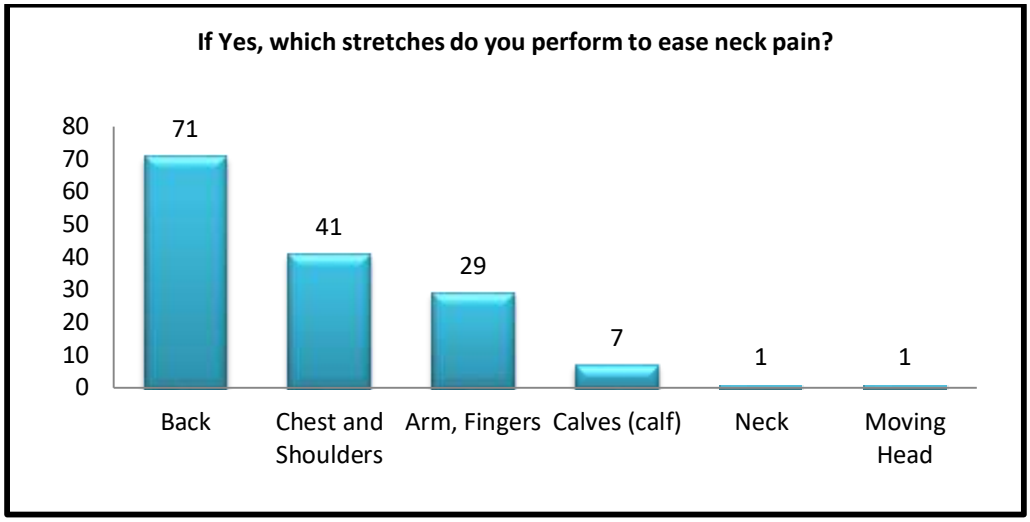

FIGURE-16: Showing result of the question, If Yes, which stretches do you perform to ease neck pain?

The chart **(FIGURE-17)** depicts the proportion of students who reported undergoing treatment to alleviate neck pain. A vast majority, **172 students (90%)**, indicated that they engage in some form of treatment, while only **19 students (10%)** reported not seeking treatment.

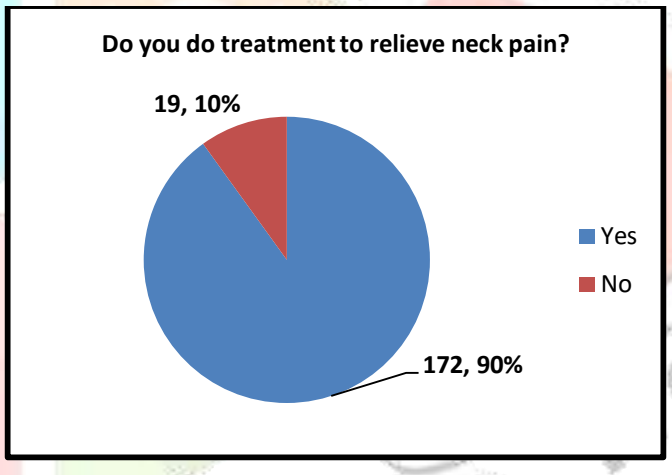

FIGURE-17: Showing result of the question, Do you do treatment to relieve neck pain?

The chart **(FIGURE-18)** demonstrates the types of treatments adopted by students to relieve neck pain. The most frequently reported strategies were **exercise and stretching (29%)** and **consultation with a doctor (29%)**. Meanwhile, **ointments (14%)**, **massage (14%)**, and **general remedies (14%)** were less commonly used.

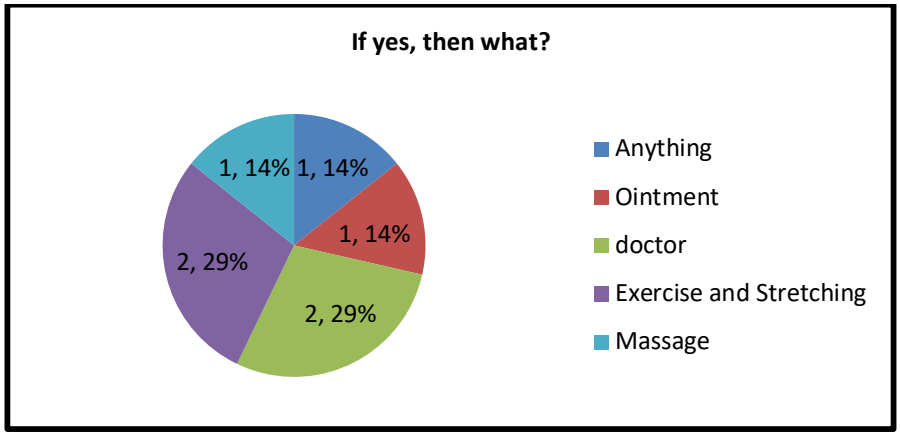

FIGURE-18 : Showing result of the question, If yes, then what?

The chart **(FIGURE-19)** illustrates the responses regarding **three preventive measures for Text Neck Syndrome (TNS)**. The majority of respondents (**178 participants**) did not suggest any preventive measures. Only **2 participants** provided one preventive measure, and **10 participants** were able to give all three preventive measures.

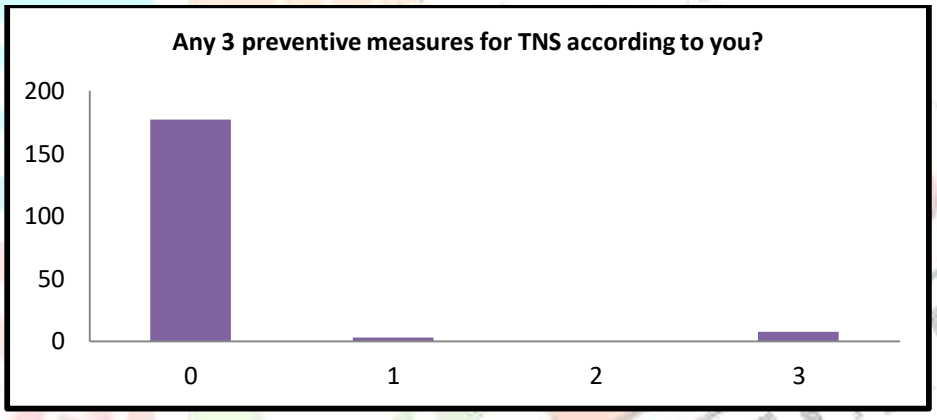

FIGURE-19: Showing result of the question, Any 3 preventive measures for TNS according to you?

The chart **(FIGURE-20)** represents the **perceived risk factors for developing Text Neck Syndrome (TNS)** among respondents. The most frequently identified factor was **poor posture** (114 responses), followed by **prolonged use of devices** (76), **lack of physical activity** (67), and **stress** (59). Other less commonly reported factors included **genetics** (13) and **poor ergonomics** (17) and **25 respondents** believed that none of the given options were risk factors.

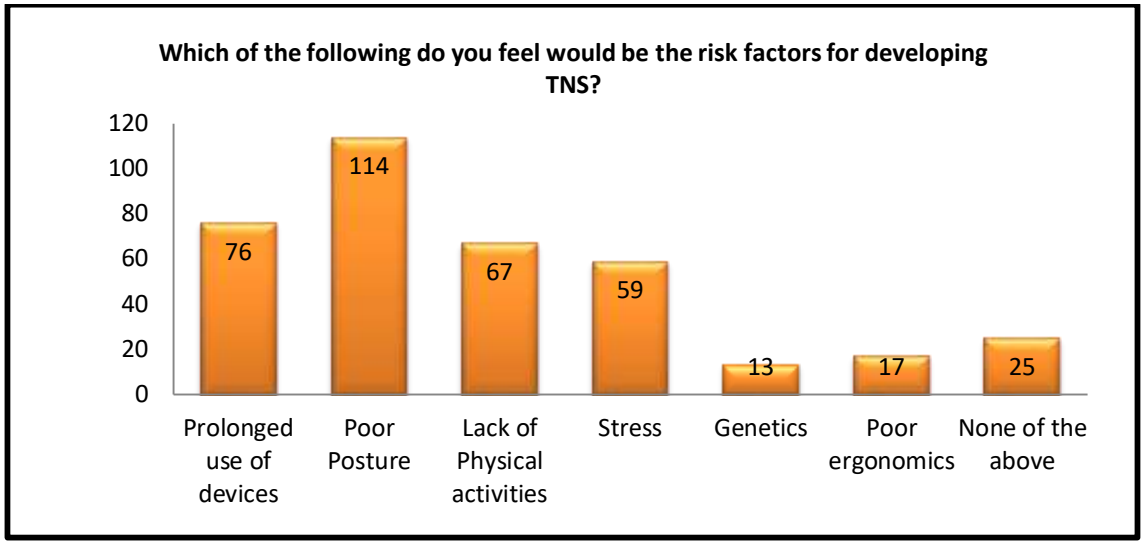

FIGURE-20: Showing result of the question, Which of the following do you feel would be the risk factors for developing TNS?

The chart **(FIGURE-21)** illustrates the **postures in which respondents regularly use their devices**. The most common posture was **sitting with the device below eye level** (79 responses), followed by **sitting with the device at eye level** (56). A smaller number reported using devices while **lying down with the device above the face** (29) or **lying down with the device on the side** (28)

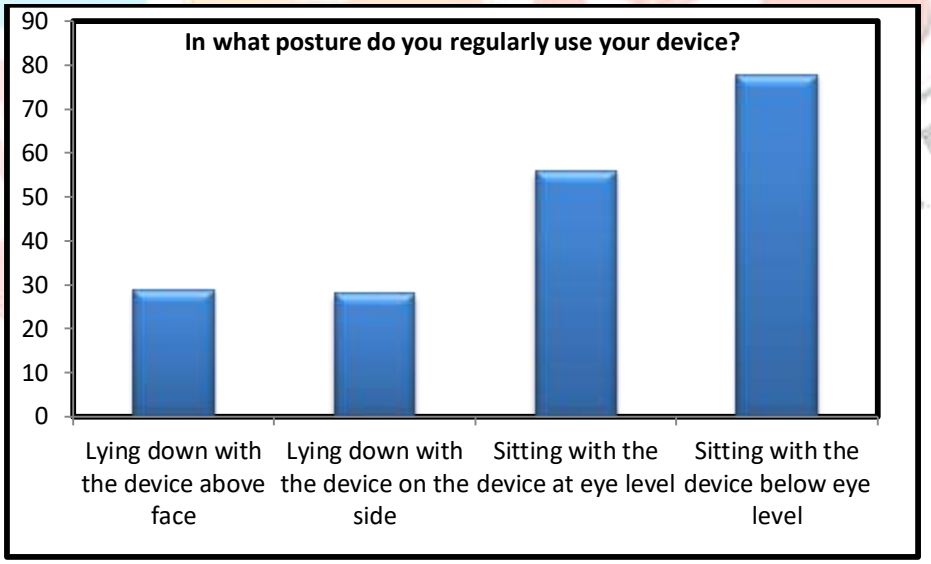

FIGURE-21: Showing result of the question, In what posture do you regularly use your device?

The chart **(FIGURE-22)** demonstrates the **symptoms experienced by respondents after prolonged device usage**. The most frequently reported issues were **eye strain (80)** and **headaches (78)**, followed by **neck pain (59)** and **back pain (49)**. A smaller proportion experienced **shoulder pain (29)** and **wrist pain (15)**. Interestingly, **41 respondents reported none of the above symptoms**.

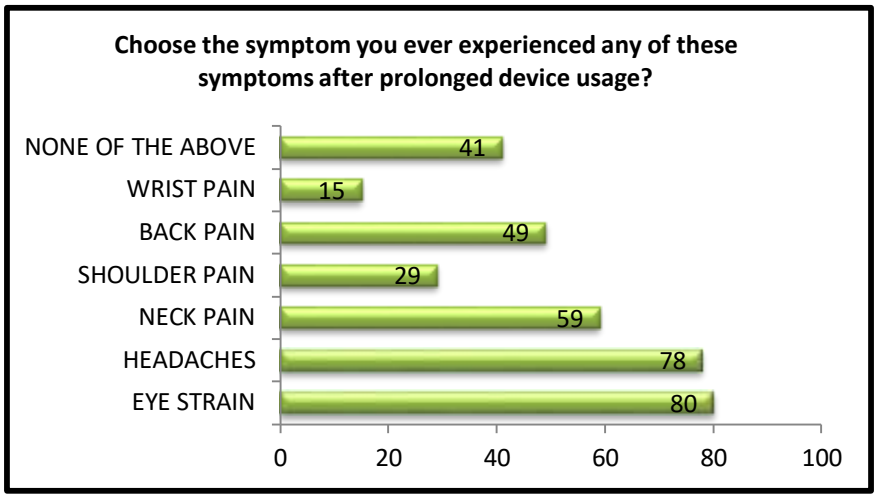

FIGURE-22: Showing result of the question, Choose the symptom you ever experienced any of these symptoms after prolonged device usage?

The pie chart (**FIGURE-23)** illustrates respondents perception of whether **physiotherapy plays a role in managing Tech Neck Syndrome (TNS)**. A majority of participants, **114 (59.7%)**, answered **"Yes"**, acknowledging the importance of physiotherapy in prevention and treatment. Meanwhile, **77 respondents (40.3%)** believed physiotherapy does not play a role.

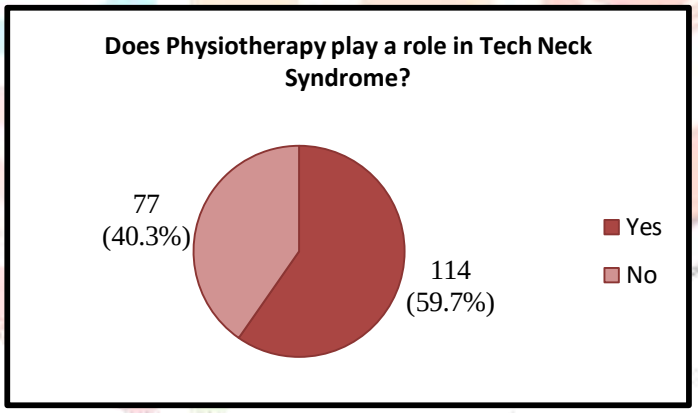

FIGURE-23: Showing result of the question, Does Physiotherapy play a role in Tech Neck Syndrome?

The bar graph **(FIGURE-24)** represents respondents willingness to adopt **lifestyle changes** if taught **preventive measures through awareness sessions**. The majority, **76 participants (39.8%)**, stated they would **always** make changes, followed by **45 (23.6%)** who said they would do so **sometimes**. A smaller proportion reported they would adopt changes **rarely (36; 18.8%)** or **often (34; 17.8%)**.

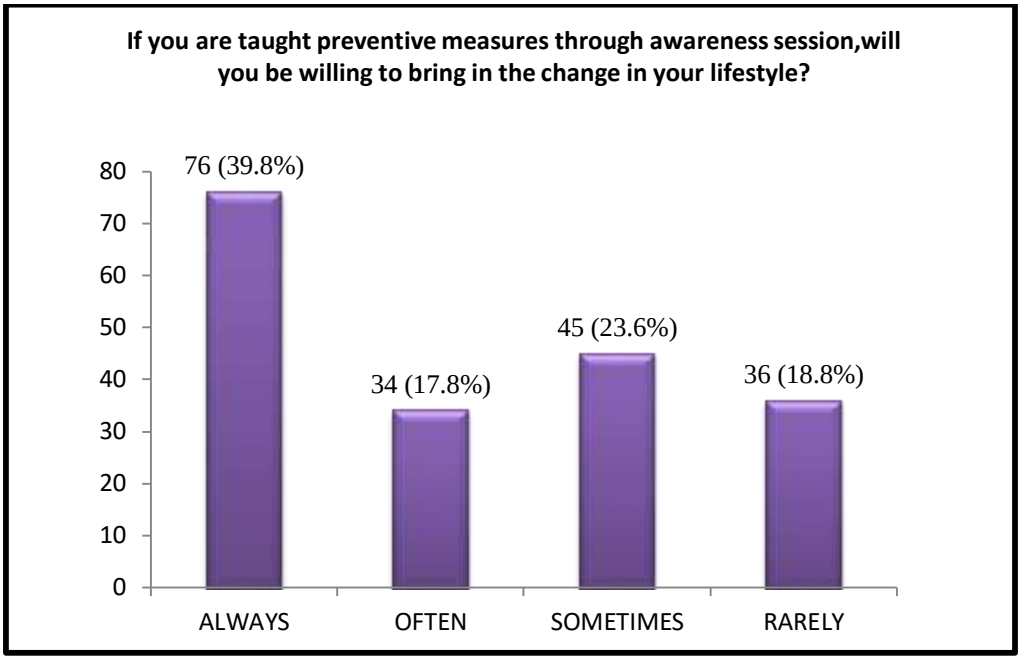

FIGURE-24: Showing result of the question, If you are taught preventive measures through awareness session, will you be willing to bring in the change in your lifestyle?

VIII. DISCUSSION

This study investigated BSc IT students' knowledge of ways to prevent Tech Neck Syndrome (TNS). This population is extremely vulnerable since they are dependent on cellphones and laptop computers for both academic and personal reasons. The result showed an interesting paradox: students spend a lot of time on devices and suffer from musculoskeletal issues, but they are still not very aware of or use preventive measures. When comparing these results to earlier research shows how TNS is becoming a bigger public health concern and highlights the necessity of systematic preventive measures.

Awareness of TNS and Preventive Measures

In the present study results showed that 83% of students had never heard of Neck Syndrome, and among those who had, only a few could correctly identify preventive strategies such as posture correction, stretching, or ergonomic device use. Even though 67% recognised upright sitting posture as correct (FIGURE-14), only 21% reported practising it regularly, and although 55% acknowledged stretching as beneficial, fewer incorporated it into their daily routine.

Similarly, Rathi et al. (2022) found that the adolescents had constrained awareness of posture-related risks, with the majority learning about symptoms only after experiencing pain [8].

These findings are consistent with previous research. Singh et al. found that only 35% of young adults had heard of TNS, and just 21% recognised preventive measures [12]. Alqahtani et al. similarly reported that in Jeddah, 31.9% of medical students were aware of TNS, yet only 18.5% could identify the preventive strategies [2]. Philip et al. also observed the poor knowledge levels in paramedical students, with 59.5% of students demonstrating inadequate awareness [13].

Importantly, preventive awareness is not just about knowing posture or stretches but also about understanding the ergonomic use of devices, screen time regulation, and the role of physiotherapy. In our study, although students were aware of posture, very few recognised the role of screen breaks or ergonomic setups.

This limited awareness may be due to the absence of structured campaigns. Patel & Gajera (2022) demonstrated that providing an educational brochure significantly improved students' knowledge of TNS prevention in Gujarat [14].

This pattern suggests that while TNS is increasingly prevalent, awareness regarding its prevention lags significantly behind. IT students, who spend extended hours using mobile phones (86.2%) and laptops (54.2%) daily in our study, remain particularly vulnerable to developing TNS without adequate preventive knowledge (FIGURE-3).

Device Usage and Risk Exposure

Our data confirmed that 86.2% of participants used mobile phones daily for assignments and 54.2% used laptops daily, often for prolonged durations (FIGURE-3). This aligns with Hassnain et al., who reported a strong association between excessive smartphone use for studying and musculoskeletal pain in medical students [2]. Similarly, Al-Hadidi et al. also found that over 80% of university students using mobile phones more than 4 hours daily developed neck pain and stiffness [16].

Neupane S. et al, show an average time of 5 to 7 hours daily on smartphones. The evidence clearly establishes that the use of heavy gadgets is directly correlated with increased TNS risk. For IT students, whose academic and professional future requires continuous screen exposure, this will impose a chronic risk if preventive measures are not emphasised early.

Symptoms and Functional Impact

The study also revealed a high prevalence of symptoms where 59 students reported neck pain, 78 reported headaches, and 80 reported eye strain, with additional reports of shoulder and upper back pain (FIGURE-5). Interestingly, 94% have denied any formal diagnosis, indicating that symptoms often go unrecognised medically despite their impact (FIGURE-6).

In our findings (Figure–9) shows that the typically reported symptom was neck pain (118 responses), followed by headaches (68) and shoulder pain (65). Fewer students reported vision problems (35) and arm/hand numbness (21), while 42 students reported no symptoms.

These findings are consistent with the earlier studies where neck pain and headaches were the most prevalent complaints linked to prolonged gadget use among students [2,3,6,16]

Similar research by Sathya & Tamboli (2020) has reported 67.4% prevalence of TNS symptoms among young adults[3]. Lee & Song (2015) found a significant correlation between smartphone hours and neck pain in university students[4]. According to research by Bhanderi et al. (2008), students who spend a lot of time on screens most frequently complain of headaches and eye strain[16]. According to Siddartha et al., 75% of medical students in Andhra Pradesh had TNS symptoms, with 30% describing sleep impairment and 45% reporting disruptions in their studies[4].

These results imply that visual and musculoskeletal complaints are already common among students, and long-term effects are anticipated if preventive awareness is not raised.

The Knowledge-Practice Barrier

One of the most concerning findings is the knowledge–practice barrier. While a significant number of students could identify correct posture (67%) (FIGURE-13) or recognised stretching as helpful in relieving the pain (55%) (FIGURE-15), only 21% practised posture consistently (FIGURE-14) and fewer engaged in regular stretching.

(Figure–9) shows that the typically reported symptom was neck pain (118 responses), followed by headaches (68) and shoulder pain (65). Fewer students reported vision problems (35) and arm/hand numbness (21), while 42 students reported no symptoms. These findings are consistent with the earlier studies where neck pain and headaches were the most prevalent complaints linked to prolonged gadget use among students [2,3,6,16]

Similarly, 33% reported maintaining devices at eye level regularly, while 23% rarely did so (FIGURE-21).

This gap has been observed elsewhere. According to Neupane et al. (2017), behavioral reinforcement is necessary for prevention because awareness alone does not translate into preventative practice (5). In Malaysia, Al-Hadlaq et al. (2020) discovered that while 70% of students were aware of ergonomic posture, less than 30% practised it. According to Joshi et al. (2019), despite awareness, only 40% of physiotherapy students regularly stretched.[17]

This demonstrates that in order to close the knowledge–practice barrier, awareness efforts must be supported with organized interventions, prompts, and behavior modification techniques.

Global Prevalence and Comparative Findings

Several studies emphasise the global nature of TNS. Khattak et al. (2020) reported a high prevalence of TNS and smartphone addiction among doctors, illustrating that even medical professionals are not exempt (6). Medani et al. (2021) found that medical students in Saudi Arabia exhibited low awareness and poor

preventive behaviour, echoing our findings.[7] Toshniwal & Borkar (2023) observed that TNS is widespread among adults in India, with prevalence continuing to rise annually[9].

These parallels have strengthened the validity of our findings and have demonstrated that BSc IT students are part of a larger global trend where awareness is inadequate despite increasing prevalence.

Role of Awareness Interventions

The willingness of our students to adopt lifestyle changes if guided (76 participants said that they would "always" change) is encouraging (FIGURE-24). This shows readiness for behaviour modification, which is supported by the literature. Patel & Gajera (2022) demonstrated that providing educational brochures significantly increased knowledge of TNS and preventive measures[14]. also showed that structured educational programs improved awareness and corrective behaviours significantly compared to controls[6].Such interventions if tailored correctly to the BSc. IT students, could yield similar positive outcomes.

Physiotherapy and Preventive Role

Our study revealed that 59.7% of students acknowledged physiotherapy's role in prevention (FIGURE-24). Shah et al. (2024) confirmed through an RCT that awareness combined with physiotherapy exercises significantly reduced pain and disability compared to exercises alone [18]. Physiotherapists play a key role in addressing TNS as one of the growing risk among young people, according to Pais et al. (2021). This exemplifies that physiotherapy is not only curative but also preventive, able to lower student's risk of developing musculoskeletal issues in the future.

Technological Innovations in Prevention

Considering that BSc. The IT students are highly knowledgeable in technology, and taking preventive measures could prove to be a valuable investment. A wearable hearable-based posture monitor called NeckCare provided real-time corrective feedback and accurately detected forward head posture with 99% accuracy[19]. Youssef et al, in 2023, presented the Necknasium, a VR-based rehabilitation system that has been shown to improve compliance with corrective exercises. Integrating these tools into physiotherapy treatment and awareness campaigns may make preventive strategies more engaging for students.[20]

IX. CONCLUSION

This study demonstrates that awareness of preventive measures of TNS among BSc. IT students is extremely low, despite high levels of device use and symptom prevalence. There is a distinct knowledge-practice gap, as students are not consistently committed to taking proactive steps. National and international

studies confirm the low rates of TNS awareness and high prevalence among young adults. The positive aspect is that students are open to alterations and acknowledge the value of practicing physiotherapy.Therefore, structured awareness programs, physiotherapy-led interventions, and technology-based preventive tools are essential to address this gap.

X. LIMITATIONS

- The study was based on self-reported survey data, which could have been due to recall or response bias.
- Long-term changes in awareness or behaviour cannot be assessed unless cross-sectional design is used.
- There was no assessment of awareness strategies before or after intervention.
- The sample was exclusively made up of BSc IT students, which may not reflect the awareness levels of other student groups.

XI. FUTURE SCOPE

- Enable the implementation of awareness initiatives like leaflets, workshops or online courses and the tracking of changes over time.
- Use technology-enabled posture sensors or VR-based training as potential prevention tools.
- Conduct comparative analyses across disciplines to identify groups with the highest risk and those with minimal knowledge.
- Integrate physiotherapy-based preventative education into university-level wellness programs.

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