

# Association between Psychological Stress and Neck Pain among Telecommuter's: A Questionnaire Based Cross Sectional Survey

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**Abstract:** ***Background:** Neck pain is one of the most reported musculoskeletal disorders. It is a major cause of illness that predisposes people to experience neck pain, making them a high-risk group for the development of any neck disorders. It causes greater physical, social and emotional impact on the patient's well being. In telecommuter's, the risk of leading a sedentary lifestyle, an excessive amount of screen time increases. Approximately 30 percent of patients develop musculoskeletal complications that interfered with their level of comfort. The Neck Disability Index (NDI) is a self-reported questionnaire used to determine how neck pain affects a patient's daily life and to assess the self-rated disability of patients with neck pain. The Perceived Stress Scale (PSS-10) is a measure of the degree to which situations in one's life are appraised as stressful. The NUMERICAL PAIN RATING SCALE is a subjective measure in which individuals rate their pain on a numerical scale. **Aim:** The aim of this study is to assess neck pain among telecommuter associated with psychological stress. **Objective:** To determine neck pain with Neck Disability Index (NDI) questionnaire. To determine stress with Perceived Stress Scale (PSS) questionnaire. To determine neck pain with Numerical Pain Rating Scale (NPRS). **Selection Criteria:** Inclusion criteria-Telecommuter, having neck pain in the past 1 month, age group 25 to 35years, both males and females, work related sitting >3h/day. Exclusion criteria-Neck surgery, patients having any history of psychological or psychiatric disorders, patients with history of fracture or dislocations of neck, on medications related to neck pain or stress. **Methodology:** 75 telecommuters was taken from Ahmedabad city and study duration was 1 month. **Procedure:** The Neck Disability Index, Perceived Stress Scale and Numerical Pain rating scale was taken as in a Google form. After that patient was screened for inclusion and exclusion criteria those patients who was meeting the inclusion criteria was included in the study. Written online consent form was obtained after explanation. The correlation was found between Neck Disability Index Scale and Perceived Stress Scale, Numerical Pain Rating Scale and Neck Disability Index Scale using Pearson's test. **Results:** Data was analyzed using SPSS version 20. The mean age of patients was (29.02±4.01) with involvement of 37 males and 38 females. Correlation of the Neck Disability Index Scale and Perceived Stress Scale, Numerical Pain Intensity Scale and Neck Disability Index Scale was found. Mean of NDI were 2.6 (SD=1.52), PSS were 1.28 (SD=0.16), NPRS were 6.6 (SD=2.4). The correlation between PSS and NDI was compared  $p < 0.001$ . The correlation between NDI and NPRS was compared  $p < 0.001$ . **Discussion:** This study examined the correlation between NDI and PSS, NDI and NPRS. It was found that there is correlation between NDI, PSS and NPRS. The results of the current study indicate that sitting for more than three hours a day that in a sustained awkward position is a risk factor for the development of neck pain. **Conclusion:** It was found that there is a correlation between psychological stress and neck pain among telecommuter's. There is association between psychological stress and neck pain which affects the telecommuter and can severe the neck pain or any neck related condition. **Limitation:** Study has smaller sample size. The cross-sectional, self-reported nature of the study constituted another limitation, as reporting may have been affected by current emotions or cognitions.*

**Keywords:** Telecommuter's, neck pain, psychological stress, musculoskeletal disorders, neck related conditions

## 1. Introduction

The term Musculoskeletal Disorders (MSD) encompass a gamut of inflammatory and degenerative conditions that affects the muscles, tendons, ligaments, joints, peripheral nerves and supporting blood vessels with consequent ache, pain or discomfort are defined as musculoskeletal disorders that results from a work-related event<sup>1</sup>. Neck pain is one of the most commonly reported musculoskeletal disorders<sup>2</sup>. These musculoskeletal disorders belong to a collection of health problems that are more prevalent among the working class than the general population<sup>1</sup>. It is a major cause of illness that predisposes people to experience neck pain, making them a high risk group for the development of any neck disorders. It causes greater physical, social and emotional impact on the patient's well being<sup>2</sup>. In telecommuter's, the risk of leading a sedentary lifestyle, an excessive amount of screen time increases<sup>7</sup>. The health and economic burdens due to neck pain are substantial, being the

leading cause of years-lived-with-disability worldwide. The societal burden of these conditions is driven by the fact that many cases do not recover from acute episodes but go on to develop persistent or recurrent pain. Neck pain may arise as a consequence of traumatic injury, usually a motor vehicle crash (whiplash associated disorder-WAD) or be of a non-traumatic onset such as occurs in office workers (termed 'non-traumatic neck pain' in this review)<sup>8</sup>. Causal association of prolonged computer use and neck pain is already established. Factors such as awkward postures, repetitive work and aggravation of previous pain episodes are reported to contribute to Work related neck problems. Neck pain related disability has health and economic impact both at individual and community level<sup>9</sup>. Stress management systems play a significant role to detect the stress levels which disrupts our socio-economic lifestyle. As World Health Organization (WHO) says, Stress is a mental health problem affecting the life of one in four citizens. Human stress leads to mental as well as socio-fiscal problems; lack

of clarity in work, poor working relationship, depression<sup>9</sup>. Psychosocial stress is defined as organizational or interpersonal factors resulting in increased actual or perceived stress. Stress disorders are a common issue among working professionals in the industry today. With changing lifestyle and work cultures, there is an increase in the risk of stress among the employees. Though many industries and corporate provide mental health related schemes and try to ease the workplace atmosphere, the issue is far from control. 'Occupational Stress' or 'Workplace Stress' or 'Job Stress' is identified a serious medical problem, which has serious physical and psychological implications on individuals' wellbeing. Approximately 75%-80% of working professionals in India complain that they are experiencing stress and their organizations don't have any programme to manage and handle stress at work<sup>6</sup>. When work-related stress arises and it is not treated, it can cause big long-term physical and mental problems on the worker. While some level of stress is acceptable but chronic stress has become a common ailment for many professionals, issues such as anxiety, depression, insomnia, migraines, and heart problems start affecting employee wellbeing and productivity. Combating the stress appears to be a key focus for professionals and organizations<sup>6</sup>. Telecommuter's employees require strong organizational, interpersonal, and technical knowledge. They have to work in challenging environment characterized by long working hours with different time zones, tight deadlines, interaction with clients, and interdependency in teams which lead to stress and exhaustion<sup>7</sup>. Over the past decades, Neck Pain has become a prominent health problem, exerting a considerable socioeconomic impact on individuals, families, communities, and the healthcare system<sup>2</sup>.

In this cross-sectional study, we designed an online survey with the aim of evaluating the prevalence of neck pain among telecommuter's. We also aimed to assess the impact of psychological stress, socio-demographic factors, and lifestyle (such as physical activity and seated hours a day) on neck pain<sup>2</sup>.

The NECK DISABILITY INDEX (NDI) is a self-reported questionnaire used to determine how neck pain affects a patient's daily life and to assess the self-rated disability of patients with neck pain<sup>2</sup>.

The PERCEIVED STRESS SCALE (PSS-10) is a measure of the degree to which situations in one's life are appraised as stressful<sup>2</sup>.

The NUMERICAL PAIN RATING SCALE is a subjective measure in which individuals rate their pain on a numerical scale<sup>2</sup>.

### Aim

The aim of this study is to assess neck pain among telecommuter associated with psychological stress.

### Objective

- To determine neck pain with NECK DISABILITY INDEX (NDI) questionnaire.
- To determine stress with PERCEIVED STRESS SCALE (PSS) questionnaire.

- To determine neck pain with NUMERICAL PAIN RATING SCALE (NPRS).

## 2. Materials and Methods

### 1) Study Design:

A cross-sectional study was conducted in the form of an online, questionnaire-based survey. 75 telecommuters participated in the study from Ahmedabad city and study duration was of 1 month.

The inclusion criteria of the study:

- Telecommuter.
- Having neck pain in the past 1 month.
- Age group 25 to 35 years.
- Both male and female.
- Work related sitting >3h/day.

The exclusion criteria for the study are:

- Neck surgery.
- Patients having any history of psychological or psychiatric disorders.
- Patients with history of fracture or dislocations of neck.
- On medications related to neck pain or stress.

The survey was circulated to the telecommuter's. Their informed consent was obtained for use of their data for this study. To prevent multiple responses from the same participants, only one response was allowed per item.

### 2) Measurements

Socio-demographic and clinical questionnaire: The questions were related to socio-demographic variables such as gender, age, height, weight, and BMI (kg/m<sup>2</sup>). Participants were also asked about their health habits: smoking status and engagement in physical activity during their leisure time (yes/no). Physical activity was measured as hours per week. Participants were also asked to report their average seated hours per day, as determined by the sample item: "How many hours a day do you spend in a sitting position?"

### Measuring Tools

- a) Neck Disability Index (NDI): Participants answered 10 questions regarding the NDI, each rated on a five-point scale, ranging from 0 = "painless" to 5 = "worst pain imaginable." The cut-off value of the NDI for detecting Neck Pain associated with disability was determined as 15, such that 0-14 indicated no disability, while a score of 15 and up pointed to disability.
- b) Perceived Stress Scale (PSS): Participants answered questions about their feelings and thoughts over the past month on a four-point scale (1 = "never"; 4 = "often"). The questionnaire score is calculated by averaging the item scores. The questionnaire includes eight positively worded items (items 4-10 and 13) and six negatively worded items (items 1-3, 11, 12, and 14). Higher scores indicate higher levels of perceived stress.
- c) Pain intensity: The Numeric Pain Rating Scale answered questions about their pain severity. (0-No Pain, 10-Worst Pain).

### Statistical Analysis

a) The data was analyzed using SPSS version 20. The background characteristics and study variables were described as means and standard deviations (SDs). The correlation between Perceived Stress Scale (PSS) and Neck Disability Index (NDI), and Neck Disability Index (NDI) and The Numerical Pain Scale (NPRS) was obtained by Pearson correlation coefficient. The significance level was set at 0.05. As a result of the online data-collection protocol, there were no missing data.

### 3. Results

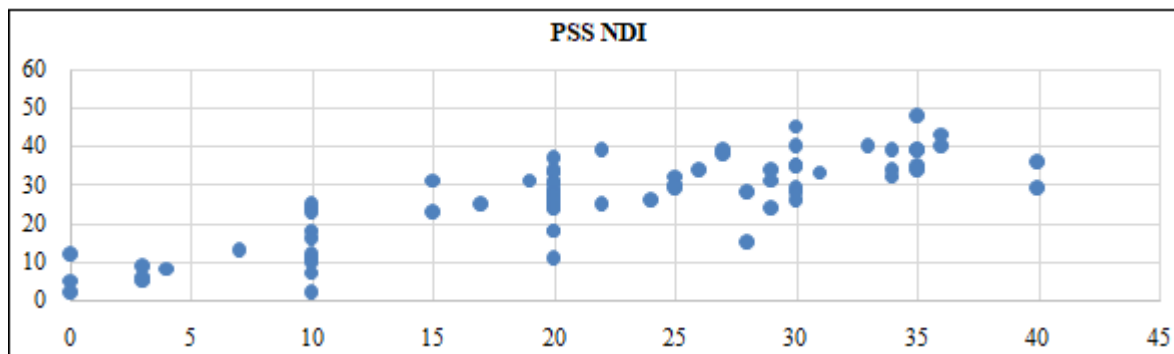
A total 75 telecommuter's participated in the study. The mean age of patients was  $(29.02 \pm 4.01)$  in which 37 males and 38 females were included. Mean of NDI were 2.6 (SD=1.52), PSS were 1.28 (SD=0.16), NPRS were 6.6 (SD=2.4). The correlation between PSS and NDI were compared  $p < 0.001$ . The correlation between NDI and NPRS were compared  $p < 0.001$ .

**Table 1:** Shows Mean and Standard Deviation of Age, Neck Disability Index, Perceived Stress Scale and the Numerical Pain Rating Scale

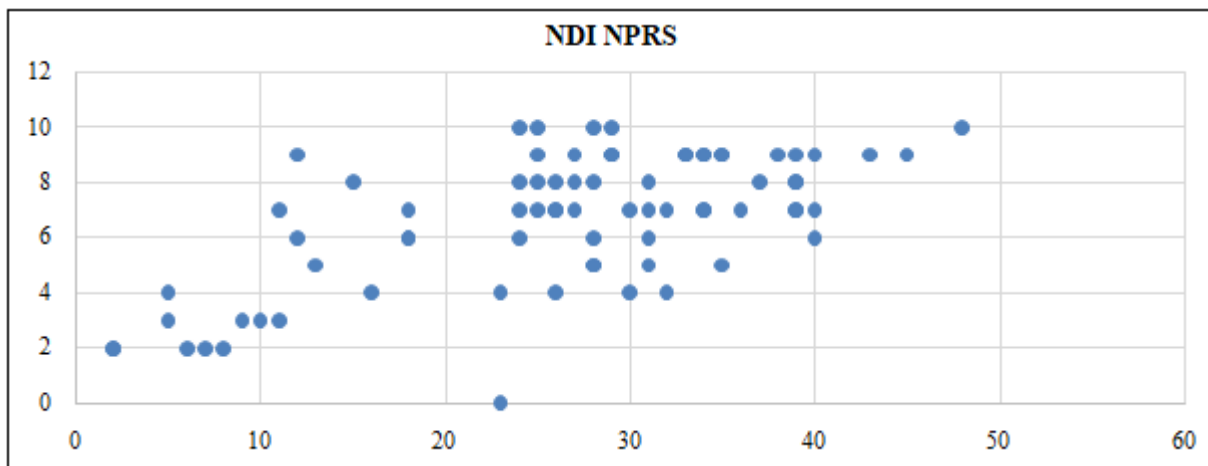
	Mean	SD
Age	29.02	4.01
NDI	2.6	1.52
PSS	1.28	0.16
NPRS	6.6	2.4

**Table 2:** Shows Correlation between PSS and NDI, NPRS and NDI

	P value
NDI and PSS	$= < 0.001$
NDI and NPRS	$= < 0.001$



**Figure 1:** Correlation between Perceived Stress Scale and Neck Disability Index Scale



**Figure 2:** Correlation between Numerical Pain Rating Scale and Neck Disability Index Scale

### 4. Conclusion

According to this study, there is negative effect on telecommuter's psychological stress as well as on musculoskeletal symptoms of neck pain. Neck pain seems to have been exacerbated in telecommuter's and was correlated to work-related stress and lifestyle factors (time seated per day). Research also found that various factors affecting stress, its influence on job performance and job satisfaction, health problems faced, and the coping strategies adopted by

them to overcome the stress. The association between neck pain and psychological stress factors highlight the need to develop interventions and preventive strategies to promote the physical and mental health of students.

### 5. Discussion

In this study, the impact of neck pain, physical activity, stress, and working style among telecommuter's was investigated. The study also indicates that sitting for more

than three hours a day is associated with a greater risk of experiencing at least a moderate level of neck pain related disability. The analyses found that telework, decreased physical activity, and increased psychological stress were associated significantly with pain augmentation. In addition, workers who participated in telework and experienced a decrease in physical activity comprised the highest proportion of those with augmented pain. Findings in this study indicate that physical activity, psychological aspects, and telework may need to be considered in pain management among workers. It can be considered that home environment, including the work equipment, was not adequate. Working while sitting on sofas or working for long hours on a notebook personal computer (PC) with a relatively small screen is likely to cause/exacerbate musculoskeletal pain. The use of mobile devices including laptop/notebooks or tablets, commonly used by teleworkers, can lead to poor posture, such as neck flexion, compared with the use of desktop PCs. Several studies have indicated that sitting with a poor posture can increase the risk of musculoskeletal disorders such as neck or low back pain. It was found that an increase in psychological stress was also associated with pain augmentation among workers suffering from pain. Oscar J. Pico-Espinosa said that most patients with disabling neck pain in one study experienced a decrease in pain intensity over 1 year; however, a quarter of them experienced no or minimal improvement. Yet it may also have negative effects on telecommuter's mental health and their musculoskeletal system. Kim et al. demonstrated a statistically significant positive correlation between psychological factors, such as a depressed mood and anxiety, and neck pain. Psychosocial stress can increase muscle activity, leading to a higher mechanical load and musculoskeletal pain. The common types of psychological stress included a fear of changes in lifestyles, financial problems, and problems with one's own health. Rogers et al. indicated that, compared to individuals without pain, those with pain reported significantly higher levels of psychological problems and sleep problems were associated with pain intensity. Psychological stress could have led to anxiety or depressive conditions, which may have been involved in pain augmentation. Psychological aspects have been recognized as an important factor in the chronicity of pain from the perspective of a biopsychosocial model. Given that it is well-recognized that pain and psychological problems have a bidirectional relationship. It was concluded that there is correlation between psychological stress and neck pain among telecommuter's. There is association between psychological stress and neck pain which affects the telecommuter and can severe neck pain or any neck related condition.

## 6. Limitations

This was a cross-sectional study of a small number of participants. Potential participants may have chosen not to respond to the online questionnaire. In addition, the recruitment of participants in web-based surveys, such as ours, causes concern regarding sampling issues, which have been described previously. Moreover, only workers who were interested in their own health may have tended to respond to our survey. There was a limitation in gender also because females may prone to stress because of family

issues or household works. This limited the generalizability of our results. The cross-sectional nature of the study prevents us from drawing conclusions about the direction and causal nature of the relationships under study. Work characteristics may affect employee wellbeing, but there might also be a reverse effect from well-being to perceptions of the work environment. Studies with more heterogeneous samples might further explore the generalizability of our findings, while controlling for multiple organizational telecommuting practices.

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