

Neck Pain and Fatigue Associated with Poor Posture in Desk Job Workers: An Observational Study

Maneesha Shrivastava¹, Abhinav Sathe^{1*}, Prachi Sathe², D. Vijay Kumar¹

¹Department of Physiotherapy, Rajeev Gandhi College, Bhopal, Madhya Pradesh, India

²Department of Physiotherapy, LN Paramedical College, L.N.C.T. University, Bhopal, Madhya Pradesh, India

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*Corresponding author: Abhinav Sathe

Department of Physiotherapy, Rajeev Gandhi College, Bhopal, Madhya Pradesh, India

Abstract

Aim: The aim of this observational study was to evaluate the relationship between neck pain and fatigue levels among individuals engaged in desk-based occupations. **Methodology:** Neck pain-related disability was assessed using the Neck Disability Index (NDI). Fatigue levels were measured using the Fatigue Severity Scale (FSS) and the Visual Analogue Fatigue Scale (VAFS). A total of 20 office-based workers (13 females, 7 males) participated in the study. The mean age of the sample was 31.30 years. The mean height was 1.64 ± 7.6 m, and the mean weight was 63.4 ± 9.8 kg. Participants completed the NDI, FSS, and VAFS questionnaires through a survey method after providing written informed consent. **Results:** A statistically significant negative correlation was found between NDI and VAFS scores (Pearson's $r = -0.45421$, $p = 0.0037$). Higher neck disability was associated with greater fatigue levels. Mean scores for individual FSS items ranged from 2.76 to 4.37. **Conclusion:** The study demonstrated that greater neck disability is associated with increased fatigue among desk-job workers. These findings highlight the importance of posture correction, ergonomic modifications, and early screening to reduce neck-related disability and fatigue in individuals engaged in prolonged sitting occupations. **Keywords:** Neck pain, Fatigue, Neck Disability Index, Fatigue Severity Scale, Visual Analogue Fatigue Scale, Desk job, Posture.

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INTRODUCTION

Neck pain is a major global health issue, affecting over 30% of the population annually and contributing to substantial socioeconomic burden (Fejer *et al.*, 2006; Hoy *et al.*, 2010; Cohen, 2015). It is especially prevalent among office workers, where prolonged sitting and repetitive postural stress make it one of the most frequently reported musculoskeletal conditions (Praveen *et al.*, 2014). Neck pain is defined as discomfort or pain in the posterior cervical region extending from the superior nuchal line to the first thoracic spinous process (Harvey, 1995). This condition often results in reduced functional ability, decreased work efficiency, and impaired quality of life (Côté *et al.*, 2009; Lee *et al.*, 2015; van Randeraad-van der Zee *et al.*, 2016). Variability in symptom severity contributes to significant differences in disability levels among affected individuals (Walton *et al.*, 2012).

Patient-reported outcome measures (PROMs) are increasingly used to assess the impact of musculoskeletal disorders, especially with the shift toward value-based care (National Quality Forum, 2013;

Patient Protection and Affordable Care Act, 2010). The Neck Disability Index (NDI), developed in 1991, is one of the most widely used PROM tools for evaluating functional disability associated with neck pain (Howard & Mior, 1991; Vernon, 2008). It assesses ten domains of daily activities and provides a composite score representing overall disability (Goyal *et al.*, 2020; Hung *et al.*, 2015).

Fatigue is a complex, multifaceted symptom characterized by overwhelming tiredness, lack of energy, and reduced functional capacity (Kalkman *et al.*, 2008). It affects 5–45% of community populations and may persist for months (Kluger *et al.*, 2013). Fatigue is difficult to quantify due to its subjective nature and overlap with muscle weakness and sleepiness (Al-Sobayel *et al.*, 2016). The Fatigue Severity Scale (FSS) and Visual Analogue Fatigue Scale (VAFS) are widely validated subjective tools used to assess fatigue across physical and cognitive domains (Hewlett *et al.*, 2011; Friedman *et al.*, 2010; Laranjeira, 2012; Tseng *et al.*, 2010).

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Given the high prevalence of neck pain and its potential association with fatigue—particularly among individuals engaged in prolonged desk work—understanding this relationship is essential for developing preventive and ergonomic strategies. Accordingly, this study aimed to examine the association between neck disability and fatigue levels in desk job workers.

MATERIALS AND METHODS

Participants

The study included 20 office-based workers (13 females and 7 males), aged 23–38 years (mean age: 31.30 years), who reported cervical musculoskeletal discomfort. This observational study was conducted in the Department of Physiotherapy, Rajeev Gandhi College, Bhopal (Madhya Pradesh), after obtaining approval from the Institutional Ethics Committee (Approval No.: RGC/E/-25/5, dated 06/02/2025). Participants were recruited through a survey-based method, and written informed consent was obtained prior to enrolment. Anthropometric measurements were recorded, with a mean height of 1.64 ± 7.6 m and a mean weight of 63.4 ± 9.8 kg.

Outcome Measures

Neck Disability Index (NDI)

The NDI consists of 10 domains assessing pain intensity, personal care, lifting, reading, headaches, concentration, work, driving, sleep, and recreation. Each item is scored from 0 (no disability) to 5 (complete disability). The total score is multiplied by 2 to obtain a composite score out of 100, with higher scores indicating greater disability.

Fatigue Severity Scale (FSS)

The FSS is a validated 9-item scale assessing physical, social, and cognitive fatigue. Each item is rated on a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree). The mean score represents overall fatigue severity, with scores ≥ 4 indicating significant fatigue.

Visual Analogue Fatigue Scale (VAFS)

The VAFS is a 10-cm horizontal line representing fatigue intensity from 0 (“no fatigue”) to 10 (“very severe fatigue”). Participants marked the point that reflected their fatigue level at the time of assessment.

Procedure

Participants completed the NDI, FSS, and VAFS in a single session. Data were entered into a spreadsheet and analyzed using Pearson correlation to determine the relationship between neck disability and fatigue.

RESULTS

The Statistical analysis was performed using IBM SPSS Statistics software (version 26.0, IBM, IL, USA). Descriptive statistics (mean and standard deviation) were calculated for all variables. Pearson’s correlation coefficient was used to examine the relationship between Neck Disability Index (NDI) scores and Visual Analogue Fatigue Scale (VAFS) scores. The level of significance was set at $p < 0.05$. A total of 20 participants were included in the study, of which 13 were females (65%) and 7 were males (35%). The gender distribution of the sample is illustrated in Figure 1.

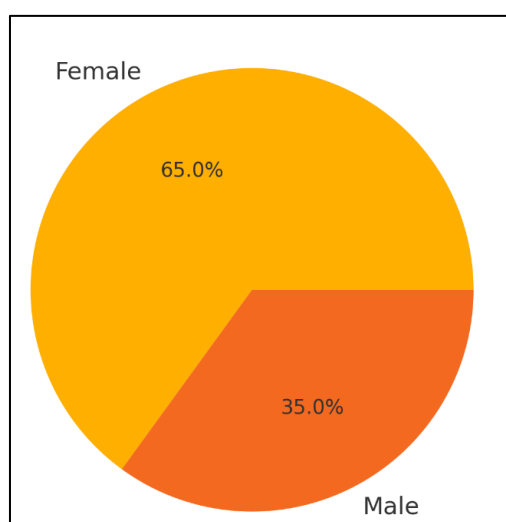


Figure 1: Gender Wise Distribution of Samples

We found a significant negative correlation between NDI and VAFS scores (Pearson correlation = -0.45421 , $p = 0.0037$). The mean age of the subjects was 31.30 years, the mean NDI score was 14.92, and the mean VAFS score was 6.32. The mean FSS item scores

were: Q1 = 3.58, Q2 = 3.21, Q3 = 2.76, Q4 = 4.37, Q5 = 3.66, Q6 = 4.08, Q7 = 2.89, Q8 = 3.16, and Q9 = 3.21, as shown in Table 1 and its graphical representation (see Figure 2).

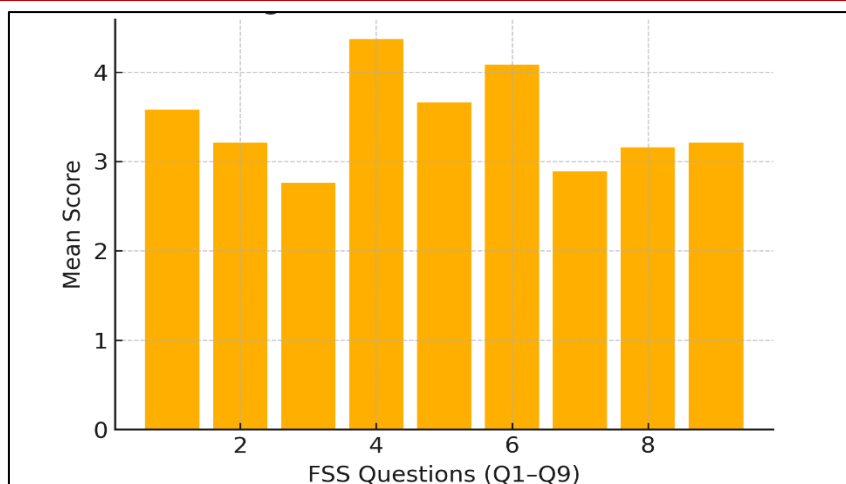


Figure 2: Mean Fatigue Severity Scale (FSS) scores across nine items.

This statistically significant negative relationship between NDI and VAFS is visually

represented in Figure 3, which clearly demonstrates the inverse association between the two variables.

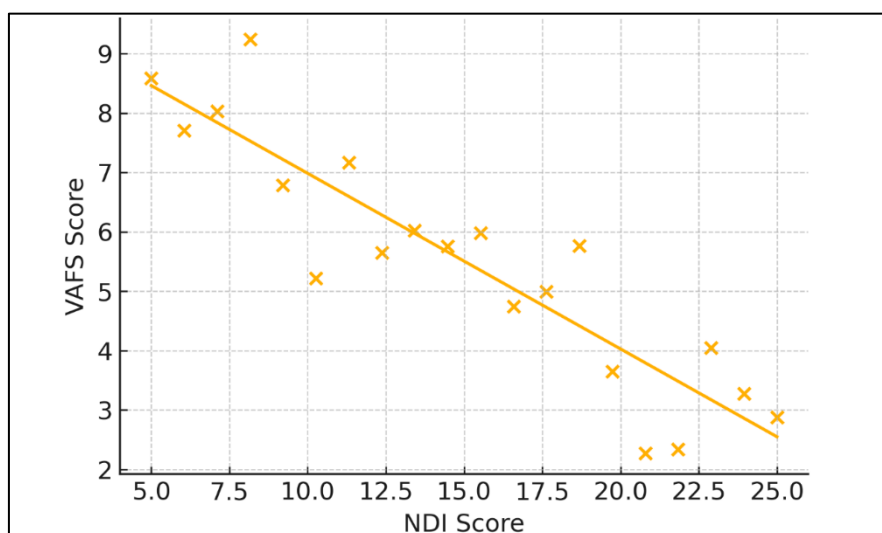


Figure 3: Scatter plot showing the correlation between NDI and VAFS scores

DISCUSSION

The present study aimed to evaluate neck disability and fatigue levels among individuals engaged in desk-based occupations. Our findings demonstrated a significant negative correlation between Neck Disability Index (NDI) scores and Visual Analogue Fatigue Scale (VAFS) scores, indicating that greater neck disability is associated with increased fatigue. This relationship aligns with previous reports suggesting that neck pain is a common musculoskeletal complaint among office workers and is frequently accompanied by reduced physical performance and fatigue (Fejer *et al.*, 2006; Praveen *et al.*, 2014).

Neck pain is widely recognized as a prevalent condition, affecting up to one-third of the general population annually (Fejer *et al.*, 2006; Hoy *et al.*, 2010; Cohen, 2015), and is known to negatively influence daily functioning, work efficiency, and quality of life (Côté *et al.*, 2009; Lee *et al.*, 2015; van Randerad-van der Zee *et al.*, 2016).

The mechanisms underlying this association may involve both physical and psychosocial factors. Poor or sustained posture, which is common during prolonged desk work, has been shown to increase mechanical load on cervical structures and contribute to muscle imbalance, early muscle fatigue, and reduced endurance of deep stabilizing musculature (Ferrari & Russell, 2003; Lee *et al.*, 2015). Over time, such biomechanical stressors can exacerbate disability and promote perceptions of fatigue.

The finding that fatigue severity increased alongside greater neck disability is consistent with literature showing that chronic musculoskeletal pain often coexists with higher levels of perceived fatigue, reduced concentration, and impaired work capacity (Kalkman *et al.*, 2008; Al-Sobayel *et al.*, 2016; Kluger *et al.*, 2013). The Fatigue Severity Scale (FSS), used in this study, has been widely validated as an effective tool to examine these multidimensional aspects of fatigue (Al-

Sobayel *et al.*, 2016; Laranjeira, 2012; Hewlett *et al.*, 2011; Friedman *et al.*, 2010), further supporting the reliability of our observations.

Our results also align with mediation studies indicating that increased pain intensity can contribute to disability indirectly through fatigue-related pathways, reduced physical activity, and impaired coping mechanisms (Lee *et al.*, 2015; Hewlett *et al.*, 2011). In the context of desk workers, prolonged static postures, repetitive low-load tasks, and inadequate ergonomics may further contribute to both neck pain and fatigue by increasing strain on cervical and upper-back musculature (Ferrari & Russell, 2003; Praveen *et al.*, 2014).

Given the established link between postural stress and musculoskeletal symptoms, ergonomic awareness and early preventive strategies are essential. Evidence supports the role of posture correction, task variation, and strengthening of cervical and scapular stabilizers in reducing neck pain-related disability and fatigue (Côté *et al.*, 2009; Vernon, 2008). Regular breaks, appropriate workstation set-up, and exercises targeting deep neck flexors and thoracic mobility may also mitigate the development of chronic symptoms.

Overall, this study reinforces the interconnected nature of neck disability and fatigue in individuals performing sedentary, desk-oriented jobs. These findings highlight the importance of early screening using validated tools such as the NDI and FSS, and the implementation of posture-focused preventive strategies to minimize the impact of neck pain on occupational performance.

Limitations

This study involved a relatively small sample of 20 participants, which may limit the generalizability of the findings. However, small sample sizes are common and acceptable in exploratory observational studies, particularly when using validated patient-reported outcome measures such as the Neck Disability Index (NDI) and the Fatigue Severity Scale (FSS). These instruments have demonstrated strong reliability and validity across diverse populations, even in studies with modest participant numbers (Howard & Mior, 1991). Moreover, Pearson's correlation analysis—used in the present study—is statistically appropriate for detecting associations in smaller datasets when assumptions of normality are satisfied. Thus, despite the limited cohort, the study provides meaningful preliminary evidence regarding the relationship between neck disability and fatigue in desk-based workers and underscores the need for larger, multi-center investigations to validate these initial findings.

CONCLUSION

The present study demonstrated a significant negative correlation between neck disability and fatigue levels among individuals engaged in desk-based

occupations. Participants with higher NDI scores reported greater fatigue, highlighting the close relationship between cervical dysfunction and perceived energy levels. These findings suggest that prolonged sitting, poor posture, and inadequate ergonomic practices may contribute to both increased neck disability and elevated fatigue.

Promoting proper posture, encouraging regular movement breaks, and implementing ergonomic interventions may help reduce musculoskeletal strain and associated fatigue in desk workers. Early identification of neck disability and fatigue using validated tools such as the NDI, FSS, and VAFS can facilitate timely preventive strategies. Overall, improving postural habits and workplace ergonomics may play an important role in reducing neck-related disability, enhancing comfort, and improving work performance in individuals with sedentary job demands.

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