INTERNATIONAL JOURNAL OF
PHYSICAL THERAPY RESEARCH & PRACTICE
AN OFFICIAL JOURNAL OF SAUDI PHYSICAL THERAPY ASSOCIATION

Original Article

Association between chronic neck pain, disability, and Physical Activity among Healthcare Workers: A Cross-Sectional Study

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Article info

Received : **Aug. 01, 2025**
Accepted : **Aug. 22, 2025**
Published : **Aug. 31, 2025**

To Cite:

Abstract

Background: Chronic neck pain is a prevalent musculoskeletal condition among healthcare workers, often contributing to absenteeism, reduced productivity, and career dissatisfaction. Despite their vulnerability due to high occupational demands, the relationship between neck pain, disability, and lifestyle factors such as physical activity remains insufficiently explored in this group. **Objective:** This study aimed to investigate the association between chronic neck pain, disability, and physical activity levels among healthcare workers. **Method:** A cross-sectional survey was conducted among healthcare workers at Prince Sultan Military Medical City. Participants completed a structured questionnaire that included demographic and health data, the Numerical Pain Rating Scale (NPRS) for pain intensity, the Neck Disability Index (NDI) for disability, the extended Nordic Musculoskeletal Questionnaire, and the International Physical Activity Questionnaire (IPAQ). Descriptive statistics and Pearson correlation analyses were performed. **Result:** Thirty healthcare workers (83% female) from multiple professions participated. The mean chronic neck pain score was 5.10 (SD = 1.81), and the mean NDI score was 20.25 (SD = 9.73). A high physical activity level was reported by 70% of participants. Significant correlations were observed: a moderate positive correlation between neck pain and disability ($r = 0.64$, $p < 0.01$) and a fair positive correlation between neck pain and physical activity ($r = 0.45$, $p < 0.05$). **Conclusion:** Chronic neck pain appears prevalent among healthcare workers and is moderately associated with disability. Interestingly, higher pain levels were also correlated with higher physical activity, suggesting a need for further investigation. Given the small sample size, **the** findings should be interpreted cautiously. Larger, longitudinal studies are recommended to understand risk factors better and to guide preventive and occupational health strategies.

Keywords: chronic neck pain, healthcare workers, Neck Disability Index, physical activity, occupational health.

Introduction

Chronic neck pain is one of the most frequently reported work-related musculoskeletal disorders (WRMDs) among healthcare providers (Côté et al., 2016; Mirmohammadi et al., 2005) and is highly prevalent across various healthcare professions (Al-Juhani et al., 2015; Long et al., 2013; Muaidi &

Shanb, 2016; Sakzewski & Naser-ud-Din, 2015).

Dentists, physiotherapists, and surgeons are highly susceptible to WRMDs, with surgeons and dentists being particularly vulnerable, and the lower back and neck are shown to be the most commonly affected regions (Jacquier-Bret & Gorce, 2023; Suganthirababu et al., 2023). It has been suggested that surgeons, dentists, and nurses exhibit the highest prevalence in specific areas and awkward posture was identified as a primary risk factor, underscoring the need for ergonomic adjustments (Jacquier-Bret & Gorce, 2023).

Neck pain has been suggested to be the leading cause of WRMDs among dentists (Halkai et al., 2022) and the second leading cause among physiotherapists (Milhem et al., 2016). The prevalence of chronic neck pain among healthcare workers presents a significant occupational health issue, with global variation (Almogbil et al., 2023). Studies indicate that factors such as long hours, specific job roles, and demographic differences have a significant influence on the rates of neck pain across countries. Nonetheless, these figures suggest high prevalence rates that are likely to extend to healthcare settings (Von der Lippe et al., 2021). Similarly, a study in China reported a high prevalence of musculoskeletal pain among healthcare workers, with neck pain being common due to factors such as workload and ergonomic stress in patient handling (Dong et al., 2020). This finding aligns with data from Nigeria and Egypt, where healthcare workers also experience high rates of musculoskeletal pain, including neck pain, which is attributed to similar occupational hazards (El Far et al., 2020; Tinubu et al., 2010). In Saudi Arabia, the prevalence of neck pain among various healthcare occupations ranges from 27% in physical therapists to 82% in dentists (Muaidi & Shanb, 2016; Alzayani et al., 2021). These reports suggest that chronic neck pain among healthcare workers is a worldwide concern driven by shared occupational risk factors and demographic patterns.

Chronic neck pain can have a negative impact on healthcare workers' daily activities, work performance, and overall ability to work, potentially leading to time off or even career changes (Lindegård et al., 2014). In recent decades, WRMDs have emerged as a major occupational issue, with studies indicating their significant impact on healthcare costs, productivity, lost work time and absenteeism and quality of life (Yasobant & Rajkumar, 2014). Research shows that healthcare providers are at an especially high risk of developing these disorders (Oude Hengel et al., 2011; Yasobant & Rajkumar, 2014).

Although physical activity is considered one of the most important strategies for preventing and managing musculoskeletal pain (Lin et al., 2020**).** Engaging in physical activity is essential for improving employees' quality of life, lowering stress levels, and increasing overall productivity (Rossi et al., 2025).

Multiple studies indicate that healthcare professionals often lack adequate exercise, consume unhealthy food, and may be at high risk of burnout (Anderson et al., 2011; Moustou et al., 2010; Saridi et al., 2019). In addition, hospitals present unique workplace challenges that can negatively affect employees' physical and mental health, such as extended exposure to patients with a range of medical conditions, rotating shifts, excessive workloads due to understaffing, and physical strain, which all contribute to a high-stress environment, making physical exercise crucial for healthcare providers (Pappa et al., 2005; Saridi et al., 2019; Stein et al., 2000; Triantafyllou, 2010). However, although the prevalence of WRMDs has been studied among healthcare workers, there is a need to examine the role of physical activity in mitigating neck pain.

The present study aims to examine the relationship between neck pain, related disability, and physical activity.

Methodology

This cross-sectional study was conducted at Prince Sultan Military Medical City (PSMMC), a major healthcare facility in Riyadh in Saudi Arabia. Using

convenience sampling, 30 healthcare workers from various departments were invited via central email, flyers were distributed to all departments and scanning physical therapy referrals were reviewed by the research team to identify potential participants.

Participants were eligible if they were aged 20 to 60 years and had reported a history of chronic nonspecific neck pain for at least 3 months. Exclusion criteria included cervical myelopathy, neoplastic conditions, vertebral artery insufficiency, and other conditions that might affect musculoskeletal function, ensuring that the sample focused on nonspecific chronic neck pain.

The study was approved by the Scientific Research Ethics Committee, College of Applied Medical Science at King Saud University (Ethics Number: CAMS 057-3839), and the Research Ethics Committee of PSMMC (Project No. 1032).

Data collection instruments

Demographic and health information for the participants was gathered using structured descriptive data. Musculoskeletal pain and physical activity levels were assessed using the extended version of the Nordic Musculoskeletal Questionnaire (NMQ-E) and the International Physical Activity Questionnaire (IPAQ), respectively.

Extended Version of the Nordic Musculoskeletal Questionnaire (NMQ-E)

The NMQ-E was administered as a self-completion survey and used to assess musculoskeletal pain across nine body regions. This instrument has demonstrated high reliability and validity for occupational and general populations and captures data on pain severity and its impact on work and activity levels (Dawson et al., 2009).

International Physical Activity Questionnaire (IPAQ)

The IPAQ short form, a tool validated for physical activity assessment, contains seven items measuring time spent in vigorous- and moderate-intensity activities, walking, and sedentary behavior over the previous seven days. Scores were categorized into low, moderate, and high activity levels as per IPAQ guidelines (Al-Hazzaa, 2007).

Numerical Pain Rating Scale (NPRS)

The NPRS, a reliable measure of subjective pain intensity, was used for average neck pain intensity ratings. Participants rated their pain on an 11-point scale from 0 (no pain) to 10 (worst imaginable pain).

Neck Disability Index (NDI)

The NDI assessed how neck pain affected daily functioning across domains such as pain intensity, work, and recreational activities. Scoring ranges from 0 to 50, with higher scores indicating greater disability. The validity and reliability of the NDI have been established in both clinical and research settings (Shaheen et al., 2013; Vernon & Mior, 1991).

Data collection

After confirming their eligibility for inclusion in the study, participants were scheduled for appointments at the physical therapy clinic. During their visit, the researcher (AH) obtained participants' consent and those who took part were then guided on how to complete the surveys. The participants' responses were collected immediately after completion to ensure accurate data collection.

Statistics

SPSS for Mac (version 21) was used to analyze the data. Data distribution was assessed prior to statistical analysis and showed that the study variables (i.e., neck pain, related neck disability) were normally distributed, as confirmed by the Shapiro-Wilk test ($p > 0.05$) (Razali & Wah, 2011) and by visual inspection of histograms and normal Q-Q plots.

Descriptive statistics were used to describe the demographic, physical, and clinical characteristics

of the participants. Pearson's correlation was performed to explore the relationships between neck variables (pain, disability) and physical activity levels. Correlation strength was interpreted as follows: a good-to-excellent relationship was indicated by a correlation coefficient above 0.75; a moderate-to-good relationship between 0.50 and 0.75; a fair relationship from 0.25 to 0.50; and little-to-no relationship from 0.00 to 0.25 (Portney & Watkins, 2015). The significance level was set at $p < 0.05$.

Results

Of the 244 who filled out the participation survey (Figure.1), 30 participants met the eligibility criteria and were willing to participate in the study. The results of this study include descriptive statistics of the demographic characteristics and an occupational profile of the participants, in addition to their physical and clinical characteristics. The relationship between chronic neck pain, related disability, and physical activity level was also assessed.

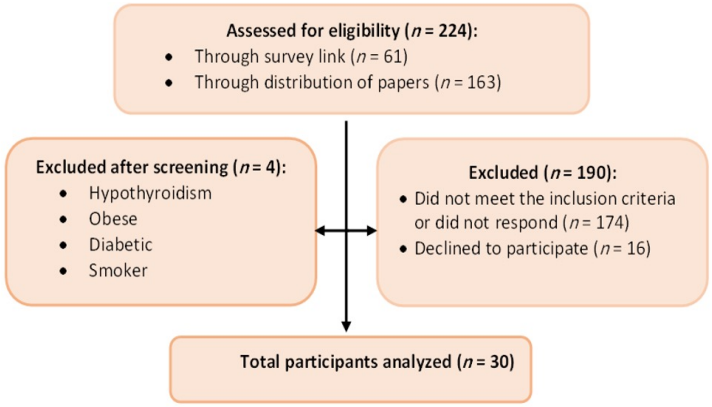

Figure 1. Flowchart of participants in the study

The majority of the participants were female (*n* = 25; 83%). Table 1 shows that the participants had a mean age (± *SD*) of 34.1 ± 6.9 years. Half of the participants were within the normal body weight range (18.6 to 24.9 kg/m^2) and the other half were overweight (25 to 29.9 kg/m^2). The occupational profile varied among the participants, with the largest group being physical therapists (*n* = 12; 40%). Most of the participants had more than 5 years of experience and 40% of them spent ≥4 hours of their working hours doing office work, sitting in front of their computers.

Table 1: Demographics and occupational profile of the participants

Category	Total (n = 30)
Demographic data	
Age (years), mean (SD)	34.1 (6.9)
BMI (kg/m2), mean (SD)	24.4 (2.8)
Occupational profile	
Occupation	
Physical therapist, n (%)	12 (40)
Dental professional, n (%)	4 (13.3)
Radiology professional, n (%)	4 (13.3)
Nurse, n (%)	4 (13.3)
Occupational therapist, n (%)	2 (6.7)
Physician, n (%)	2 (6.7)
Lab. technician, n (%)	1 (3.3)
Pharmacist, n (%)	1 (3.3)
Experience	
< 1 yr, n (%)	1 (3.3)
1–5 yrs, n (%)	9 (30)
6–10 yrs, n (%)	10 (33.3)
> 10 yrs, n (%)	10 (33.3)
Time spent during office hours in front of a computer	
1–3 h, n (%)	18 (60)
4–8 h, n (%)	10 (33.3)
> 8 h, n (%)	2 (6.7)

As shown in Table 2, the average pain intensity of participants with chronic neck pain was reported to be moderate, with a mean score (± *SD*) of 5.1 ± 1.8. Most participants (*n* = 22; 73%) reported having mild disability. Based on the NMQ-E, 28 (93%) participants experienced pain and discomfort in other body parts apart from their neck. The onset of neck pain began at a mean age (± *SD*) of around 30 ± 7 years. All participants reported having experienced pain during the previous 12 months, while the majority (*n* = 27; 90%) had experienced neck pain within the last 4 weeks, and many participants (*n* = 21; 70%) reported that their neck pain persisted on the measurement day.

Table 2 also shows descriptive data concerning the physical and clinical characteristics of the

participants. Eleven participants (37%) stated that their chronic neck pain was preventing them from performing their usual home and work activities.

Table 2: Descriptive data regarding neck pain and related disability, cervical posture, and physical activity

Category	Subcategory		Total (*n* = 30)
Neck pain and Disability	Numerical Pain Rating Scale (NPRS), mean ± *SD*		5.10 ± 1.81
	Neck Disability Index (NDI), mean ± *SD*		20.25 ± 9.73
	NDI categories		
	No disability (0–9%), *n* (%)		4 (13.3)
	Mild disability (10–29%), *n* (%)		22 (73.3)
	Moderate disability (30–59%), *n* (%)		4 (13.3)
Extended Nordic Musculoskeletal Questionnaire (NMQ-E)	Pain in 9 body regions	Had neck pain only, *n* (%)	30 (100)
		Had more than neck pain, *n* (%)	28 (93)
	Neck pain with 10 dichotomous related neck pain questions	1. The onset of neck pain at age, mean ± *SD*	29.7 ± 7.36
		2. Hospitalized due to neck pain, *n* (%): ○ No	 30 (100)
		3. Change job due to neck pain, *n* (%): ○ No ○ Yes	 28 (93.3) 2 (6.7)
		4. Pain in the previous 12-month period, *n* (%):	30 (100)
		5. Pain in the previous 4-week period, *n* (%): ○ No ○ Yes	 3 (10) 27 (90)
		6. Pain today, *n* (%): ○ No ○ Yes	 9 (30) 21 (70)
		7. Prevents from doing normal work (at home or away from home), *n* (%): ○ No ○ Yes	 19 (63.3) 11 (36.7)
		8. Had seen doctor or physical therapist due to neck pain, *n* (%): ○ No ○ Yes	 10 (33.3) 20 (66.7)
		9. Pain medications, *n* (%): ○ No ○ Yes	 9 (30) 21 (70)
		10. Had sick leave due to neck pain, *n* (%): ○ No ○ Yes	 29 (96.7) 1 (3.3)
Physical activity level	International Physical Activity Questionnaire (IPAQ)	Moderate physical activity, *n* (%)	9 (30)
		High physical activity, *n* (%)	21 (70)

Chronic neck pain led the majority of participants (n = 20; 67%) to seek medical advice, either from doctors or physical therapists, and 21 participants (70%) were taking pain medications for their neck

pain. About 70% of the sample (n = 21) reported a high level of physical activity based on the IPAQ. Of those who reported high physical activity, 71% reported mild disability (n = 15 out of 21). Furthermore, 62% of them (n = 13 out of 21) reported spending 1–3 hours at the computer, indicating less time spent sitting and more active engagement. The study showed a significant moderate correlation between neck pain and disability ($r = 0.64$, $n = 30$, $p < 0.01$) and a significant positive correlation between neck pain and physical activity ($r = 0.45$, $n = 30$, $p < 0.05$).

Discussion

The present study investigated the correlation between neck pain, related disability, and physical activity among healthcare workers. The results showed that 93% of the participants had multiple pain sites in addition to neck pain. This finding is significant, as previous research indicates that multiple pain sites can be a risk factor predicting persistent neck pain (Cohen & Hooten, 2017).

Although participants in this study exhibited a high prevalence of neck pain, it did not appear to have a significant impact in terms of absenteeism. Data collected using the NMQ-E revealed that the majority of participants (n = 29, 97%) did not take sick leave due to their chronic neck pain; however, many mentioned that neck pain affected their work productivity and caused stress from continuing to work while in pain. Notably, 11 (37%) of the participants reported that chronic neck pain prevented them from performing home and/or work activities. A majority (n = 20, 67%) sought medical advice from either doctors or physical therapists, and n = 21 (70%) were taking pain medications for their chronic neck pain. Frequent musculoskeletal pain appears to be directly related to decreased work ability and performance. Research (Lindegård et al., 2014; Jull et al., 2019) highlights that individuals with neck pain often continue to work (presenteeism) instead of taking leave, contrasting with individuals suffering from low back pain. Presenteeism is defined as being present at work while ill or not working at full capacity, which often negatively affects employee health (Johns, 2010; Vänni et al., 2017). Our findings reflect the concept of presenteeism, as the participants did not take sick leave despite feeling that they should have. Future studies could include the question: “Have you gone to work despite feeling that you should have taken sick leave due to your health?” (Al-Juhani et al., 2015). Various measures can assess presenteeism, including health-related work productivity loss, and some assessments focus on the impact of pharmaceutical needs on productivity loss associated with presenteeism (Johns, 2010).

Neck pain and related disability

In this study, a moderate-to-good correlation was found between pain intensity and disability, consistent with previous studies. Marchiori and Henderson (1996), for example, in a sample of 700 patients referred for cervical radiographs found a moderate correlation ($r = 0.65$) between pain intensity and NDI. Pain was measured using a visual analogue scale (VAS). Chiu et al. (2005) used VAS and the Northwick Park Neck Pain Questionnaire (NPQ) in a study of 218 patients with chronic neck pain recruited from two physiotherapy departments. They reported moderate correlations ($r = 0.55$ and 0.63). Also, a moderate correlation between VAS and the Neck Pain and Disability Scale (NPDS) was found in a study of 71 patients with non-acute neck pain. They were referred to a hospital-based physiotherapy department (Wlodyka-Demaille et al., 2004) .

Finally, the correlation was investigated between the VAS score and three different measures of functional disability in 71 patients with neck disorders lasting about two weeks. They reported fair-to-moderate correlations (NDI: $r = 0.46$; NPDS: $r = 0.47$; NPQ: $r = 0.55$). However, using different disability scales and in the sample sizes might be the cause of the small differences between the present study and the previous ones ((Wlodyka-Demaille et al., 2004; Aljinović et al., 2023).

Neck pain and physical activity

Although neck and shoulder pain can have an

impact on work and leisure activities (Hallman et al., 2017; Peterson & Pihlström, 2021) by reducing the ability to engage in general physical activity and exercise, physical activity is crucial for good health, sleep quality, general fitness, and physical functioning (Bull et al., 2020; Peterson & Pihlström, 2021). Maintaining a physically active lifestyle is recommended in clinical guidelines to manage neck pain (Côté et al., 2016; Kjaer et al., 2017). In addition, physical activity has a positive effect on the reduction of reported disability, especially given that many healthcare workers' occupations require them to remain active (Liu et al., 2014; Alqhtani et al., 2023). Systematic reviews over the last decade have reported conflicting results regarding the relationship between physical activity and neck pain. Some reviews indicate that moderate or high leisure-time physical activity is associated with a reduced risk of neck pain or low back pain (Shiri & Falah-Hassani, 2017; Kim et al., 2018; Alzahrani et al., 2019), while others have found no association (Bakker et al., 2009; Jun et al., 2017; Øiestad et al., 2020; Paksaichol et al., 2012; Sitthipornvorakul et al., 2011). Self-reported physical activity is susceptible to bias and misclassification (Gupta et al., 2017; Lagersted-Olsen et al., 2014; Pedersen et al., 2016). Therefore, it is strongly recommended that objective measurements (e.g., accelerometry) be implemented in cohort studies to obtain more valid estimates of physical activity in relation to health outcomes (Brug et al., 2017; Perruchoud et al., 2014).

Study clinical implications

This study highlights the need for workplace interventions, such as ergonomic modifications and tailored physical activity programs, to address chronic neck pain and associated disability among healthcare workers.

Study limitations and future recommendations

This study has several limitations that should be addressed in future research. First, the cross-sectional design prevents causal inferences between neck pain, disability, and physical activity. Second, the study does not examine the impact of chronic neck pain on patient outcomes and safety, which is crucial for understanding the broader implications for healthcare. Third, the small sample size limits the generalizability of the findings. Fourth, reliance on self-reported data may introduce bias or inaccuracies in the results. Lastly, the unequal distribution of healthcare worker roles in the sample may have influenced the outcomes and reduced representativeness. Addressing these issues in future studies will strengthen the evidence and provide more actionable insights. Further research is recommended to explore causal pathways and broaden findings to enhance occupational health policies and preventive strategies globally.

Conclusions

Chronic neck pain appears to be common among healthcare workers in this sample and was found to be moderately associated with disability and reasonably associated with physical activity levels. These findings suggest that neck pain may influence both functional performance and lifestyle behaviors, though the small sample size and cross-sectional design limit generalizability and causal inference. Future research using larger, representative cohorts and longitudinal or interventional designs is warranted to clarify these relationships and inform targeted workplace health strategies.

Author Contributions

The author solely contributed to the conception, design, data acquisition, analysis, drafting, and critical revision of the manuscript, agreed on the journal submission, and accepted accountability for all aspects of the work.

Acknowledgment

The authors would like to thank the participants.

Data Availability Statement

The authors will transparently provide the primary data underpinning the findings or conclusions of

this article, without any unjustified reluctance. If need from editorial team.

Funding

The authors have not received any funding for this study.

Conflicts of Interest

The authors declare no potential conflicts of interest related to the research, writing, or publication of this work.

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