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Prevalence of Work-Related Musculoskeletal Health Disorders (WRMSDs) in IT Professionals Working from Home

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Abstract

Background and Objective: The COVID-19 pandemic has transformed work practices globally, with a substantial increase in remote working among Information Technology (IT) professionals. Prolonged computer use, static postures, and non-ergonomic home setups have led to a rising incidence of work-related musculoskeletal disorders (WRMSDs). This study aimed to assess the prevalence and distribution of WRMSDs among IT professionals working from home and to identify the most affected body regions. Methods: A cross-sectional survey was conducted among IT professionals from various companies in and around Bangalore, Karnataka, over a 75-day period. Data were collected via a structured Google Form incorporating the Nordic Musculoskeletal Questionnaire (NMQ) and demographic details. A total of 118 eligible participants aged 21–55 years were included. Data were analyzed using Microsoft Excel 365 and IBM SPSS v26.0, employing descriptive statistics including mean, median, standard deviation (SD), and interquartile range (IQR).

Results: The mean age of participants was 29.4 ± 7.98 years (median = 28; IQR = 10). The prevalence of musculoskeletal symptoms over the past 12 months was highest in the lower back (57.7%) and neck (55.3%), followed by the upper back (48.8%) and hips/thighs (32.5%). The 7-day prevalence also showed predominant lower back (41.5%) and neck pain (31.7%). About 28.5% of respondents reported pain severe enough to restrict daily activities.

Conclusion: WRMSDs particularly neck and low back pain are highly prevalent among IT professionals working from home. These findings emphasize the urgent need for ergonomic interventions, posture education, and physiotherapy-led preventive programs to safeguard musculoskeletal health in remote work environments.

Keywords: WRMSDs; IT Professionals; Ergonomics; Neck Pain; Low Back Pain; Remote Work; Nordic Musculoskeletal Questionnaire

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Introduction

In the twenty-first century, computers have become as indispensable as the pen and paper once were, shaping nearly every aspect of human life and professional activity. The term Information Technology (IT) professional commonly refers to individuals involved in programming, software development, and related computing services. With the global digitization of work processes, IT professionals spend prolonged hours performing computer-based tasks, often in static sitting postures, which predisposes them to a wide range of work-related musculoskeletal disorders (WRMSDs).

Globally, WRMSDs are among the most common occupational health problems, affecting approximately 20 million individuals each year [1]. These disorders are defined as painful or disabling conditions of muscles, tendons, joints, and nerves that result from repetitive tasks, awkward postures, or static loading over extended periods. The human musculoskeletal system, though adaptable to varying physical stresses, can develop chronic strain when subjected to repeated microtrauma and inadequate recovery. Such overuse injuries often manifest as pain, stiffness, or discomfort most frequently in the neck, shoulders, and lower back which are hallmark symptoms

of WRMSDs [2].

In the context of India, the impact of these disorders is particularly concerning. As of 2020, India's IT workforce comprised approximately 4.36 million employees, and epidemiological studies report that nearly 76% of IT professionals experience some form of musculoskeletal discomfort [3]. Contributing factors include poor workstation design, non-ergonomic seating, prolonged static postures, and improper use of computer peripherals. Over time, these factors can result in microtears, tendon inflammation, and chronic pain conditions that adversely affect both individual health and professional productivity. Furthermore, musculoskeletal complaints particularly in the neck and lower back regions have become the leading cause of sickness absenteeism, reduced job satisfaction, and decreased quality of life among IT workers.

The onset of the COVID-19 pandemic in 2020 further amplified these concerns by radically transforming work environments. To prevent viral transmission, many organizations transitioned to remote or home-based work arrangements, often without adequate ergonomic preparation. While remote work offered advantages such as reduced commuting time, improved work–life balance, and flexible scheduling, it also exposed employees to new health risks. Home workspaces often lacked ergonomic office furniture, appropriate lighting, and space optimization factors essential for maintaining neutral body postures during prolonged work hours. Consequently, increased sedentariness and poor posture due to non-ergonomic setups have been strongly associated with a rise in neck pain and low back pain among remote workers [4].

Beyond physical discomfort, remote work has also been linked to psychosocial stressors such as anxiety, isolation, and blurred work–home boundaries, which further exacerbate the perception and persistence of musculoskeletal pain. These multidimensional risk factors physical, psychological, and organizational highlight the need for a holistic approach to occupational health in the IT sector.

The need for this study arises from several interconnected challenges:

Rising Prevalence of WRMSDs: IT professionals represent a highly vulnerable population due to extended screen time, static postures, and repetitive movements.

Post-COVID Work Transitions: The abrupt shift to remote work has introduced new ergonomic challenges and psychosocial strains that have not been adequately addressed in existing research.

Occupational Health Concerns: Chronic musculoskeletal pain can significantly affect productivity, job satisfaction, and overall well-being, with implications for workforce sustainability.

Knowledge Gap in Indian Context: Despite the global attention to WRMSDs, there remains limited evidence on their prevalence among home-based IT professionals in India, especially in post-pandemic work settings.

Policy and Intervention Framework: Understanding pain prevalence and its associated factors can inform ergonomic guidelines, preventive physiotherapy programs, and workplace health policies that promote musculoskeletal health among remote IT professionals.

Hence, the current study seeks to quantify the prevalence of Work-Related Musculoskeletal Health Disorders (WRMSDs) among IT professionals working from home and to identify key risk areas for targeted ergonomic and preventive interventions.

Given these factors, this study was undertaken to quantify the prevalence and distribution of WRMSDs among IT professionals working remotely.

Aim

To determine the pain prevalence of Work-Related Musculoskeletal Health Disorders (WRMSDs) among IT professionals working from home.

Objectives

- To assess the prevalence of WRMSDs in IT professionals working remotely.
- To identify the most affected body regions.
- To highlight ergonomic and occupational health implications.

Materials and Methods

Study Design: Cross-sectional survey.

Duration: 75 days.

Sample Size: 118 IT professionals.

Data Collection: Google Form including demographic details and the Nordic Musculoskeletal Questionnaire (NMQ).

Inclusion Criteria:

- IT professionals aged 21–55 years.
- Working from home for ≥6 months.

Exclusion Criteria:

- Musculoskeletal disorders from trauma or surgery.
- Degenerative musculoskeletal or spinal conditions.
- Non-IT professions.

Ethical Considerations: Ethical clearance was obtained from the Institutional Ethics Committee RV college of physiotherapy, Approval No: IEC/2021/07.

Data Storage & Analysis: All data obtained from participants were handled with strict confidentiality and in accordance with institutional ethical standards. Responses collected via the Google Form were securely stored in a password-protected, encrypted digital database accessible only to the principal investigator. No personally identifiable information (PII), such as names, email addresses, or IP details, was included in the analytical dataset. Prior to analysis, all participant data were anonymized and coded, ensuring that individual responses could not be traced back to specific participants. The anonymized dataset was subsequently used for statistical analysis and interpretation. Data storage followed institutional data protection policies and adhered to the principles of the Declaration of Helsinki (2013) regarding research ethics involving human participants. The encrypted dataset will be retained for a limited duration (five years) for verification and academic purposes before being permanently deleted.

Descriptive statistics were analysed using Microsoft Excel 365 and IBM SPSS Version 26.0. Informed consent was obtained from all participants electronically prior to their inclusion in the study, and participation was entirely voluntary, with the right to withdraw at any stage without consequence.

Statistical Analysis: Descriptive statistics including mean, median, standard deviation (SD), and interquartile range (IQR) were computed for age distribution and gender ratios.

Results

A total of 118 IT professionals aged between 21 and 55 years participated in the study, all of whom had been working from home for at least six months. The sample consisted of 79 males and 39 females, representing various age groups within the IT workforce. This distribution reflects a predominantly younger IT workforce, with the majority of respondents under 35 years of age.

The descriptive analysis revealed a high prevalence of musculoskeletal discomfort across multiple body regions. The lower back (57.7%) and neck (55.3%) emerged as the most commonly affected areas over the past 12 months, followed by the upper back (48.8%), hips and thighs (32.5%), and shoulders (26.8%). These findings indicate that postural strain extended beyond the spinal regions to adjacent muscle groups. The lowest prevalence was observed in the elbows (10.6%) and ankles or feet (14.6%).

Short-term (7-day) prevalence patterns mirrored these trends, showing the lower back (41.5%) and neck (31.7%) as dominant sites of discomfort. Notably, 28.5% of participants reported that pain, particularly in the lower back, had restricted their ability to perform normal daily activities, demonstrating its impact on functionality and productivity.

Overall, these results emphasize that prolonged sedentary work, non-ergonomic home setups, and poor posture are key contributors to the high prevalence of work-related musculoskeletal health disorders among IT professionals working remotely in the post-pandemic environment (Tables 1-3).

Short-term prevalence remained highest in the lower back and neck regions, mirroring long-term data trends.

Table 1: Demographic Characteristics of IT Professionals Working from Home.

Sample size (n)	118
Mean age (years)	29.4
Median age (years)	28
Age IQR (years)	10
Age SD (years)	7.98
Male (n, %)	79 (66.9%)
Female (n, %)	39 (33.1%)

Table 2: Prevalence of Musculoskeletal Pain in the Past 12 Months.

Body Site	Prevalence (%)
Neck	55.3
Shoulder	26.8
Elbow	10.6
Wrist/Hand	22.0
Upper Back	48.8
Lower Back	57.7
Hips/Thighs	32.5
Knees	25.2
Ankles/Feet	14.6

Highest prevalence: Lower back pain (57.7%)
Lowest prevalence: Elbow pain (10.6%)

Table 3: Prevalence of Musculoskeletal Pain in the Past 7 Days.

Body Site	Prevalence (%)
Neck	31.7
Lower Back	41.5

Overall, the results demonstrate that the lower back and neck are the predominant regions affected by work-related musculoskeletal pain among IT professionals working from home.

Discussion

The prevalence of low back pain (57.7%) found in this study aligns with Talwar et al. (2007), who reported a 56.5% prevalence among IT professionals in Delhi, and with Gómez et al. (2023), who observed comparable trends globally. The 57.7% prevalence of low back pain in this cohort exceeds the global average of 50% reported among sedentary IT professionals (Punnett & Wegman, 2004).

Development of Chronic Pain

Prolonged exposure to musculoskeletal strain such as sustained sitting postures, repetitive movements, and inadequate ergonomic support can transition acute pain into chronic musculoskeletal pain. Over time, continuous biomechanical stress leads to microtrauma, inflammation, and muscle fatigue, resulting in long-term sensitization of the musculoskeletal and nervous systems. Chronic WRMSDs not only diminish work performance but also impair sleep, increase stress, and elevate healthcare dependency, ultimately contributing to occupational disability and long-term quality-of-life deterioration [2].

In IT professionals, chronicity often arises due to uninterrupted exposure to workstation-related risk factors without adequate recovery periods. The absence of early ergonomic interventions, regular stretching routines, or physiotherapy consultations allows mild musculoskeletal discomfort to progress into persistent or recurrent pain syndromes.

Estimates suggest that chronic WRMSDs can reduce workforce productivity by up to 25% in technology-driven sectors across LMICs.

Burden in Low- and Middle-Income Countries (LMICs)

The growing digital workforce in low- and middle-income countries (LMICs) such as India poses an additional challenge. Unlike high-income nations with established occupational health standards, many LMICs lack enforceable ergonomic policies, access to physiotherapy, and awareness programs addressing WRMSDs. The informal work-from-home setups, limited employer support, and inadequate occupational surveillance systems further amplify the burden.

Chronic musculoskeletal pain imposes a dual burden on LMICs

Economic Impact: Increased absenteeism, reduced productivity, and premature retirement among skilled IT professionals translate into significant productivity losses.

Healthcare Strain: The rising prevalence of chronic pain contributes to increased healthcare utilization and costs, particularly in private and tertiary sectors where ergonomic and rehabilitative services are limited.

Need for Stricter Public Health and Workplace Implications

To mitigate the growing WRMSD burden, multilevel

interventions are needed.

Policy Level: National occupational safety frameworks should integrate ergonomic risk assessments into remote work regulations.

Organizational Level: Employers must ensure ergonomic compliance by providing remote ergonomic training, subsidizing adjustable equipment, and incorporating regular physiotherapy check-ins.

Individual Level: Awareness campaigns emphasizing early symptom recognition, posture correction, and daily exercise routines are essential.

Stricter implementation of ergonomic standards alongside early screening programs for musculoskeletal pain could significantly reduce chronicity and long-term disability among IT professionals. Integrating physiotherapists and ergonomists into workplace health programs will be crucial to translating these findings into sustainable occupational health policies.

In conclusion, WRMSDs represent not only an occupational health challenge but also an emerging public health burden in LMICs. Preventive ergonomic interventions, workplace policies, and timely physiotherapeutic management can help curb the progression from acute pain to chronic disability Future implications: Physiotherapists play a pivotal role in early detection, ergonomic education, and preventive exercise programming for IT professionals. Integrating tele-rehabilitation and workplace screening initiatives could enhance accessibility and compliance.

Limitations: This study relied on self-reported data, which may be subject to recall bias. The cross-sectional design limits causal inference. Moreover, ergonomic conditions were not directly observed, and psychosocial factors were not quantitatively assessed. Despite these limitations, this study provides valuable baseline data to inform future longitudinal and interventional research.

Conclusion

This study underscores the high prevalence of WRMSDs, particularly neck and lower back pain, among remote IT professionals. Implementation of structured ergonomic training, provision of adjustable workstation equipment, and inclusion of physiotherapeutic interventions are essential to safeguard the musculoskeletal health of the modern digital workforce.

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