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Prevalence and Impact of Work-Related Musculoskeletal Disorders: A Case Study from Perumbavoor Municipality, Kerala, India

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ABSTRACT

Musculoskeletal diseases and the pain they bring are among the most widespread and disabling chronic conditions worldwide. These enduring ailments profoundly affect the lives of individuals, families, communities, and healthcare systems, greatly diminishing mobility and manual capabilities. This frequently leads to early withdrawal from employment, diminished quality of life, and restricted social interaction.

The current investigation on work-related musculoskeletal disorders (WRMSDs) conducted in Perumbavoor Municipality; Kerala, India aims to comprehend the prevalence of these conditions within the local community. Out of 100 participants surveyed, 82 reported experiencing Work related musculoskeletal disorders. The socio-demographic profile of the respondents shows a clear majority of females (80.5%) and belonging to the age group 25-30years. Their work profile revealed that most of them had IT based jobs with an experience less than 10 years. 68.3% of the respondents worked 5 days a week for around 2-5 hours on computers. 84.1% of them didn't use any ergonomic aids. The respondents primarily experience pain in the back (47%), neck (34%), hand/wrist (22%), shoulder (20%), hips (15%), fingers (14%), and elbow (8%) which is likely due to excessive use of these areas for computer-based tasks and prolonged sitting.

Musculoskeletal disorders, often caused by physical or psychosocial factors, are preventable and manageable. Poor posture, prolonged static positions, and repetitive motions during work are common contributors. A comprehensive approach that includes education, physical conditioning, and ergonomic interventions is most effective for preventing or alleviating these disorders throughout one's professional life.

Keywords: Work Related Musculoskeletal Disorders, WRMSD, Respondents, Computer-Based

Introduction

Musculoskeletal disorders (MSDs) affect various parts of the musculoskeletal system, including bones, spinal discs, tendons, joints, ligaments, cartilage, nerves, and blood vessels. These injuries can result from repetitive motions, forces, and vibrations experienced during specific job activities. Factors contributing to musculoskeletal symptoms include previous injuries, physical condition, heredity, pregnancy, lifestyle, and poor diet. When there is a mismatch between the physical capacity of the human body and the physical demands of a task, work-related musculoskeletal symptoms can manifest. Although work activities and conditions significantly contribute to the development of MSDs, they are not the sole causes or significant risk factors (National Institute for Occupational Safety and Health, 2021).[1]

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The World Health Organization recognizes work-related conditions that result in pain and functional impairment affecting the neck, shoulders, elbows, forearms, wrists, and hands. These conditions are deemed work-related when work activities and conditions significantly contribute to their development. Work-related musculoskeletal disorders (WRMSDs) encompass a range of degenerative and inflammatory conditions affecting the supporting blood vessels, peripheral nerves, joints, ligaments, tendons, and muscles, often leading to functional impairment and pain in the upper extremities and neck (Korhan & Mackieh, 2010).[2] Biomechanical factors, such as repetitive motion, strenuous efforts, extreme joint postures, and psychosocial factors, play a crucial role in the development of WRMSDs (Aptel et al., 2012).[3]

Work-related musculoskeletal disorders (WRMSDs) are influenced by a combination of physical and psychosocial factors. Psychosocial risks include stressful job conditions, social pressure, and job dissatisfaction, which contribute to the onset of WRMSDs. When an injury occurs, factors like incongruous pain and depression can lead to disability and the transition from acute to chronic pain. Additional contributors include monotonous work, time pressure, high workload, unorganized work-rest schedules, complex tasks, career concerns, lack of peer support, poor relationships with supervisors, and poor organizational characteristics (Menzel, 2007).[4]

WRMSDs impair muscles, joints, tendons, ligaments, nerves, bones, and localized blood circulation, primarily caused or aggravated by work or workplace environment. These disorders are a significant burden for employees and employers, being the most prevalent work-related health issue today. WRMSDs decrease productivity due to sick leave, absenteeism, and early retirement, and incur high treatment costs and individual suffering. The shift from active to sedentary office work and increased computer use have heightened WRMSDs among office workers (Dagne et al., 2020; OSHA, 2000; Nunes & Bush, 2012; Amin et al., 2016; Erick & Smith, 2011; Azmi & Aziz, 2022).[5,6,7,8,9,10]

The severity of MSDs varies, with symptoms such as tenderness, aches, pains, tingling, stiffness, and swelling potentially interfering with everyday activities. Risks increase with age, and early diagnosis is crucial to alleviate pain and prevent further damage. Technological advancements, particularly in electronic data usage, have also impacted workers and workplaces, contributing to physical and psychosocial risk factors, especially affecting the neck and shoulder regions (Akrouf et al., 2010).

Methodology

This study was conducted in 2024 in Perumbavoor Municipality, Kerala, India. A self-administered questionnaire, adapted from the Nordic Musculoskeletal Questionnaire, was used to assess the prevalence of WRMSDs among participants. The study employed an observational cross-sectional design. Participants were shown a body map and asked to specify WRMSD symptoms at ten sites: neck, shoulders, upper back, elbows, lower back, wrists, finger joints, hips, knees, and ankles. Questionnaires and information about the study were distributed to 120 individuals engaged in computer-related jobs from various offices, educational institutions, and banks, of which 90 responded. Among these 100 respondents, 82 reported symptoms of WRMSDs.The selection criteria included:

Inclusion Criteria: Age above 20 years; all genders; all educational levels; more than one year of work experience; employees engaged in computer-related jobs during data collection; and willingness to participate.

Exclusion Criteria: Postural deformities; recent injury/trauma or accident history; spinal or other surgeries; neurological disorders; limb length discrepancies; lower limb deformities; retired individuals; pregnant women; and those severely ill recently.

Results

Table-1 shows the socio-demographic profile of the respondents of the current study. It is clear that majority of them were females (80.5%) and belonged to the age group 25-30years. Majority of the respondents were graduates and earned between Rs.20,000 to Rs.40,000 per month.

Table-1: Socio-demographic profile of the respondents

Variable	Categories	Percentage
Gender	Male	19.5
	Female	80.5
Age (yrs)	20-25	7.3
	25-30	51.2
	30-35	28.0
	35-40	11.0
	40-45	2.4
Education	Higher Secondary	14.6
	Graduate	64.6
	Post-graduate	20.7
Monthly income	Less than Rs.20,000	22.0
	Rs.20,000 to Rs 40,000	59.8
	Morethan Rs.40,000	18.3

Table- 2 depicts the work profile of the respondents. Most of them had IT based jobs and with an experience less than 10 years. 68.3% of the respondents worked 5 days a week for around 2-5 hours on computers. 84.1% of them didn't use any ergonomic aids.

Table-2: Work profile of the respondents

Variable	Categories	Percentage
Domain	IT/ Call center/ Data Entry	37.8
	Teacher	19.5
	Banks/ Office	29.3
	Business	13.4
Years of experience	1-5 years	45.1
	5-10 years	40.2
	Above 10 years	14.6
Days of work/ week	5 days	26.8
	6 days	68.3
	7 days	4.9
Hours of Computer based work	2 hrs	30.5
	2 – 5 hrs	46.3
	More than 5b hrs	25.6
Ergonomics aids	No	84.1
	Yes	15.9

Table-3, shows the part of the respondent's body which was most affected due to WRMSDs. 34.6% of them reported to have neck pain. Back pain was mentioned by many of them in addition to pain in other regions.

Table-3: Region of Impact of WRMSD

Region	Percentage
Neck	34.6
Shoulder	19.9
Wrist	22.1
Fingers	13.8
Hips	15.4
Elbows	8.0
Back	47.2

Discussion

This case study on work-related musculoskeletal disorders (WRMSDs) conducted in Perumbavoor Municipality, Kerala, India, aimed to understand the prevalence of these disorders in the local community. Out of 100 surveyed individuals, 82 reported musculoskeletal disorders. Notably, 80.5% of those affected were females, aligning with Overstreet et al. (2023), who found that musculoskeletal conditions like neck pain, back pain, osteoarthritis, and rheumatoid arthritis are more prevalent and severe in females. Studies have shown that women perform more repetitive work and are more likely to sit for prolonged periods compared to men. They also engage in additional physical household work, contributing to stress on the wrist and hand (Gangopadhyay et al., 2003; Tittiranonda et al., 1999).

A significant portion of the affected individuals (52.5%) were aged 25-30, a peak income-earning period. Additionally, 67% of the affected cases were engaged in IT-based or automated office jobs, such as those in the banking sector. This finding supports Bernard (1997), who highlighted the significant impact of the work environment and performance on WRMSDs. In this study, 18 individuals with pre-existing musculoskeletal issues were excluded, underscoring that the nature of the work and work conditions contributed to the disorders. Furthermore, 84% of participants did not use or were not provided with ergonomic aids despite long hours of computer work, leading to postural distortion, prolonged static postures, and repetitive movements.

The study underscores the need for proper healthcare and stress management in workplaces to ensure fitness and recommends the greater utilization of ergonomic aids to prevent WRMSDs. The overall prevalence of WMSDs in this study was 90.3%, nearly triple the 33% prevalence reported in a Netherlands survey of neck and upper extremity symptoms among computer users (Eltayeb et al., 2007). Our findings, consistent with previous studies, show that respondents primarily experience pain in the back (47%), neck (34%), hand/wrist (22%), shoulder (20%), hips (15%), fingers (14%), and elbow (8%) (Jensen et al., 2002; Sharan et al., 2011). This is likely due to excessive use of these areas for computer-based tasks and prolonged sitting. Key job characteristics contributing to WRMSDs include high quantitative job demands, poor workstation ergonomics, limited rest breaks, and repetitive typing with variable force (Hagberg et al., 1996).

Younger employees in this study reported more symptoms than older employees, possibly due to more hours of computer use, inappropriate working conditions, and being new to the job. Younger individuals may also be better informed and more aware of these issues due to greater computer literacy and internet usage. Mechanical exposure to computer use, described by force intensity, repetitiveness, and duration, contributes to musculoskeletal symptoms. Evidence suggests that prolonged computer mouse and keyboard use can lead to muscle fatigue in the wrist and hand, resulting in problems (David, 2005; Lacerda et al., 2005; Wahlstro, 2005).

The higher prevalence of WMSDs on the right side of the wrist and hand could be attributed to the dominant use of the right hand for typing and mouse usage.

Conclusion

This study emphasizes the critical need for workplace interventions to mitigate the risk of work-related musculoskeletal disorders (WRMSDs) and improve worker well-being. Key strategies include reducing daily work hours and adding extra breaks to alleviate neck and shoulder issues without productivity loss. Technical and ergonomic interventions, such as using ergonomic tools, can reduce strain on the back, shoulders, arms, and hands, though their impact on absenteeism and issues from computer tasks or vibration requires further research. Incorporating dynamic exercises into training programs is essential, as training on work methods alone is insufficient to prevent back pain. Overall, more extensive studies are needed to explore these interventions comprehensively.

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