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Prevalence and risk factors of work-related musculoskeletal disorders among administrative staff in higher education institution

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Abstract

Background: Heavy lifting, and prolong sitting, all of which are known risk factors for musculoskeletal disorders (MSDs). These physical demands can cause long-term health problems, discomfort, and decreased productivity. Creating successful ergonomic interventions for this workforce requires examining the prevalence of MSDs and the risk factors that are linked to them.

Need of Study: The need of this study is to find prevalence and risk factors of work-related musculoskeletal disorders among administrative staff in higher education institution.

Method: This study recruited administrative staff aged 25-45 years to assess the prevalence and distribution of musculoskeletal disorders (MSDs) using the Nordic Musculoskeletal Questionnaire (NMQ) and Ergonomic risk was assessed onsite using the Rapid Office Strain Assessment (ROSA). A sample of 122 participants was selected through simple random sampling. Data were collected through direct observation and questionnaires. Descriptive statistics summarized the data, while logistic regression was used to test relationships. Only full-time staff employed for at least 6 months were included, and those with a history of cardiac or neurological conditions were excluded.

Result: In 122 participants, 59% were female. Mean age was 37.8 years, with an average of 9.7 years of service and 6.5 hours/day of computer use. Twelve-month WMSD prevalence was 64.8%, with the neck (55.7%), upper back (47.5%), lower back (41.8%), and shoulders (31.1%) most affected. In the past 7 days, 37.7% reported symptoms, especially in the lower back (24.6%). Mean pain intensity was 4.6/10.Average ROSA score was 5.0; 72.1% of workstations scored ≥5, indicating moderate to high ergonomic risk. Statistical Associations with WMSD Presence, Significant associations were found for age >35 ($p = 0.02$), computer use >7 hours/day ($p = 0.01$), and ROSA ≥5 ($p < 0.001$). Gender and service duration were not significant. (Multivariate Analysis) ROSA ≥5 (OR = 3.5), computer use >7 hours (OR = 2.3), and age >35 years (OR = 1.6) independently predicted WMSDs.

Conclusion: Due to aging, poor ergonomics, and extended computer use, WMSDs are a big worry for administrative staff in higher education. To improve well-being, productivity, and workforce resilience, preventive measures including ergonomic assessments, workplace redesign, and mobility breaks are crucial.

Keywords: Administrative staff, Musculoskeletal disorder, Nordic musculoskeletal questionnaire, Rapid Office Strain Assessment

Introduction

Worldwide, work-related musculoskeletal disorders (WMSDs) are among the most prevalent and incapacitating types of occupational health diseases, especially in sedentary work settings. A variety of inflammatory and degenerative problems that impact muscles, tendons, ligaments, joints, nerves, and supporting blood vessels are included in these disorders. These conditions are frequently brought on by prolonged exposure to biomechanical factors. WMSDs have become a major cause of morbidity and functional impairment in industries like office administration, where workers must sit for long periods of time and perform repetitive tasks like typing, data entry, document handling, and phone use. [1, 2]

The particular occupational restrictions faced by administrative staff in higher education institutions increase their likelihood of developing WMSDs. High cognitive demands, the demands of the academic calendar, and frequent use of digital devices all combine to cause physical and mental exhaustion, which worsens musculoskeletal pain. These workers frequently spend extended periods of time in static postures, usually without adequate ergonomic adjustments, which causes localized tiredness in the wrists, shoulders, upper back, and neck. Even while workstation design technology and ergonomic awareness have advanced over the past 20 years, their actual application is frequently uneven or lacking. [1, 2]

As a result, WMSDs still impact a significant percentage of office workers globally. Twelve-month prevalence rates among administrative staff range from 60% to 90%, according to epidemiological research, highlighting the scope of this public health concern in a variety of geographical and occupational situations. Beyond personal discomfort and impairment, the effects include missed workdays, decreased productivity, higher healthcare costs, and long-term employee attrition. Addressing the burden of WMSDs within this crucial workforce group becomes not just a health need but also a strategic organizational objective as higher education institutions depends more and more on administrative efficiency to sustain academic achievement and operational stability. [3, 4]

Age, gender, years of service, and prolonged daily computer use are among the major risk variables linked to WMSDs that have been discovered by a number of studies. Notably, it has been demonstrated that poor workstation ergonomics, such as an incorrectly positioned display or insufficient lumbar support, worsen musculoskeletal problems and decrease productivity. As a result, accurate measurement instruments are essential for both monitoring and planning interventions. [3, 4]

Nordic Musculoskeletal Questionnaire (NMQ), a standardized and extensively tested self-report tool used to evaluate the prevalence and distribution of musculoskeletal symptoms in work environments. Nine anatomical regions—the neck, shoulders, elbows, wrists/hands, upper back, lower back, hips/thighs, knees, and ankles/feet—are assessed for discomfort across certain time periods (such as the previous seven days and the previous twelve months). The NMQ has emerged as a key tool in occupational health research for determining symptom prevalence, assessing severity, and monitoring the temporal dynamics of work-related musculoskeletal complaints because of its reliability, simplicity of use, and cross-cultural adaptation. [1, 3, 5]

The Rapid Office Strain Assessment (ROSA), a structured observational instrument designed to assess ergonomic risk factors in computer-intensive work environments, is used to supplement self-report data. Workstation elements including posture, keyboard and mouse arrangement, chair support, and monitor height are all methodically scored by ROSA. The whole ergonomic risk is represented by the cumulative ROSA score, where higher numbers denote increased exposure to factors that cause strain. Its usefulness as a realistic and effective technique for ergonomic screening and intervention planning in administrative office settings has been reinforced by the numerous research that have shown strong associations between elevated ROSA scores and the prevalence, severity, and persistence of WMSD symptoms. [6, 7, 8, 9]

In order to provide thorough evaluations of musculoskeletal health in the workplace, the NMQ and ROSA work together to provide a complementary methodological framework that connects subjective symptom reporting with objective risk factor evaluation. Using them together improves workplace monitoring accuracy, directs focused interventions, and eventually helps prevent and manage WMSDs in sedentary occupational groups. [6, 7, 8]

In addition to determining important individual and environmental risk factors, the purpose of this study is to evaluate the prevalence of work-related musculoskeletal diseases (WMSDs) among administrative personnel in an Indian higher education institution. The study combines observational and subjective data by using the Rapid Office Strain Assessment (ROSA) to assess workplace ergonomics and the Nordic Musculoskeletal Questionnaire (NMQ) to collect self-reported complaints. The objective is to produce useful information that can direct ergonomic enhancements within institutions and advise occupational health regulations that are suited to the requirements of administrative staff. [10]

Methodology

An Observational study was conducted on 122 full time administrative staff with age 25-45 years. Consent was taken from the administrative staff. For this study, Ethical approval was obtained from the Institutional Ethics Committee (no. LJIPT/IEC/14/2024) of L.J. Institute of physiotherapy, L J University.

A total of 122 full-time administrative staff aged 25–45 years, with a minimum of six months' continuous service, were recruited using a simple random sampling method from the institutional employee registry. Exclusion criteria comprised a history of cardiac, neurological, rheumatologic, or musculoskeletal disorders predating employment. [1, 2, 8]

Musculoskeletal symptoms were assessed using the validated Nordic Musculoskeletal Questionnaire (NMQ), covering nine anatomical regions: neck, shoulders, upper back, lower back, elbows, wrists/hands, hips/thighs, knees, and ankles/feet. Participants reported 12-month and 7-day symptom prevalence. [1, 3]

Ergonomic risk was evaluated via the Rapid Office Strain Assessment (ROSA). ROSA generates a composite score (1–10), with higher values indicating increased ergonomic risk. [6, 7, 9]

Data were collected during work hours using paper-based NMQ forms. Concurrently, ROSA assessments at each participant's workstation, documenting chair, monitor, keyboard, mouse, and telephone configurations.(6),(7)

Ethical approval was obtained from the Institutional Ethics Committee, and all participants provided written informed consent prior to enrolment.

Continuous variables are presented as mean ± standard deviation (SD); categorical variables as frequency and percentage. Bivariate associations between 12-month WMSD prevalence (yes/no for any region) and potential risk factors (age dichotomized at >35 years, gender, years of service, daily computer use >7 hours, ROSA score ≥5 were examined using chi-square tests, as appropriate. Variables reaching $p < 0.20$ in bivariate analysis were entered into a multivariate logistic regression model. Adjusted odds ratios (ORs) with 95% confidence intervals (CIs) were calculated; statistical significance was defined as $p < 0.05$.

Results

This Observational study included 122 participants, of whom 72 (59.0%) were female and 50 (41.0%) were male, with a mean age of 37.8 years (SD = 6.9). The average duration of occupational service was 9 years (SD = 5.8), and the mean daily computer usage was 6.5 hours (SD = 1.4), with 31.1% (n = 38) of individuals exceeding 7 hours per day. The 12-month prevalence of work-related musculoskeletal disorders (WMSDs) in any anatomical region was 64.8% (n = 79), with the neck (55.7%), upper back (47.5%), and lower back (41.8%) being the most frequently affected sites. The shoulders (31.1%), wrists/hands (28.7%), knees (22.1%), and ankles/feet (12.3%) were also commonly involved.

The 7-day prevalence data obtained using the Nordic Musculoskeletal Questionnaire (NMQ) reflects the recent occurrence of musculoskeletal discomfort among administrative staff. Of the 122 participants, 46 individuals (37.7%) reported experiencing symptoms in at least one anatomical region within the past seven days. The most frequently affected region was the lower back, reported by 24.6% of participants (n = 30). This was followed by the neck at 19.7% (n = 24), and the upper back at 16.4% (n = 20). Knee-related symptoms were also notable, affecting 9.8% (n = 12), while elbow discomfort was the least reported at 4.1% (n = 5).

Ergonomic risk, as assessed using the Rapid Office Strain Assessment (ROSA), showed a mean score of 5.0 (SD = 1.2), with 72.1% (n = 88) of participants scoring ≥5, suggesting moderate to high ergonomic risk. Key ergonomic deficiencies included non-adjustable seating, suboptimal monitor height, absence of lumbar support, and improper mouse placement.

Bivariate analyses revealed significant associations between 12-month WMSD prevalence and age >35 years (χ^2 (1) = 5.12, p = 0.02), daily computer use >7 hours (χ^2 (1) = 6.34, p = 0.01), and ROSA score ≥5 (χ^2 (1) = 14.78, p < 0.001). Gender (p = 0.18) and years of service (p = 0.15) were not statistically significant. In multivariate logistic regression, three variables remained significant independent predictors of WMSDs: ROSA score ≥5 (OR = 3.5; 95% CI: 1.9–6.5; p < 0.001), daily computer use >7 hours (OR = 2.3; 95% CI: 1.3–4.3; p = 0.01), and age >35 years (OR = 1.6; 95% CI: 1.0–2.8; p = 0.04). Gender and years of service did not contribute significantly to the final model.

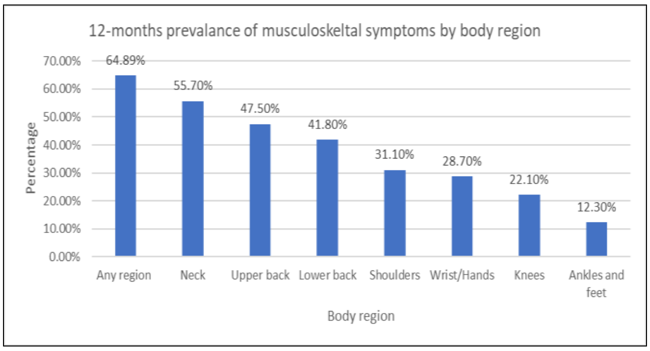

Fig 1: - This graph demonstrated the 12-monnth Prevalence of Work-Related Musculoskeletal Disorders (WMSDs) in Admin staff in higher education institution.

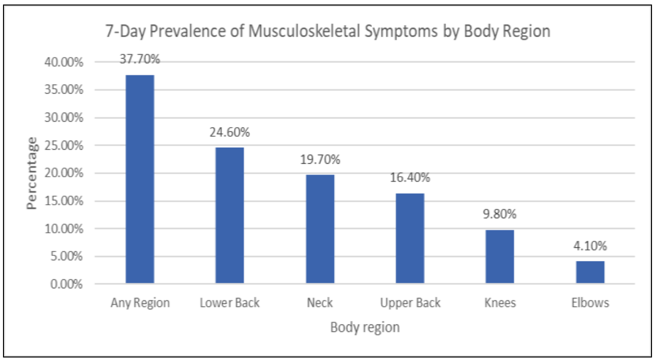

Fig 2: - This graph demonstrated the 7day Prevalence of Work-Related Musculoskeletal Disorders (WMSDs) in Admin staff in higher education institution.

Table 1: Association Between Variables and 12-Month WMSD Prevalence

Variable	χ^2 (df = 1)	p-value
Age > 35 years	5.12	0.02
Daily computer use > 7 hours	6.34	0.01
ROSA score ≥ 5	14.78	<0.001
Gender	–	0.18
Years of service	–	0.15

Table 2: Multivariate Logistic Regression 12-Month WMSD Prevalence

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
ROSA score ≥ 5	3.5	1.9 – 6.5	<0.001
Daily computer use > 7 hours	2.3	1.3 – 4.3	0.01
Age > 35 years	1.6	1.0 – 2.8	0.04
Gender	–	–	0.18
Years of service	–	–	0.15

Discussion

The current study found that 64.8% of administrative staff had work-related musculoskeletal disorders (WMSDs) within a 12-month period. This percentage is comparable to prevalence rates for other office-based occupational groups around the world. The persistent occupational health risk that sedentary work conditions represent is highlighted by this significant burden.

Interestingly, the most often reported symptoms were restricted to the neck, upper back, and lower back—areas that are especially susceptible to repetitive motions and prolonged static postures, which are common during desk-based occupations and extended computer use. These results highlight the ergonomic flaws and biomechanical requirements present in many modern office setups. [6, 8]

With an odds ratio (OR) of 3.5, the Rapid Office Strain Assessment (ROSA) score was the most significant predictor of WMSD occurrence among the factors analysed. This strong correlation emphasizes how important workstation ergonomics are for musculoskeletal health outcomes. Numerous risk factors, such as poor sitting posture, a misaligned display, insufficient lumbar support, and a poorly aligned keyboard and mouse, are reflected in high ROSA scores. These variables all add up to musculoskeletal strain. Age-related decreases in tissue resilience and recovery ability, as well as continuous daily exposure to computer-based tasks, were found to significantly increase the risk of WMSD. These factors are probably related to prolonged periods of musculoskeletal loading.

These observations highlight how urgently proactive ergonomic changes are needed in administrative contexts in higher education. Risk can be significantly reduced by implementing very inexpensive but effective remedies, such as ergonomic keyboards, monitor risers to raise displays to eye level, adjustable chairs with adequate lumbar support, and scheduled micro-breaks to lessen static muscle loads.

Additionally, desk configuration and posture awareness training for employees could improve these initiatives even more. Importantly, in order to evaluate the long-term effects of these interventions on symptom reduction, worker well-being, and workplace productivity, future research should use a longitudinal design. This will strengthen the body of data supporting institutional workplace health policy and ergonomic planning.

Conclusion

A major occupational health concern among administrative staff in higher education institutions are work-related musculoskeletal disorders (WMSDs), which are highly prevalent and closely linked to prolonged computer use, poor ergonomic conditions, and aging, all of which led to cumulative biomechanical stress and decreased physical resilience. In order to reduce the burden of WMSDs and to improve overall employee well-being, productivity, and job satisfaction, it is imperative that institutions implement proactive measures that include regular ergonomic risk assessments, workplace redesigns, and staff-cantered interventions like ergonomic training, task variation, and scheduled movement breaks. Encouraging a healthier work environment is not just a preventive measure; it is an essential investment in maintaining a functional, motivated, and resilient administrative workforce.

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Ethical approval
Approved by Institutional Ethical Committee.

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