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Pilot Study: Ergonomic Risk Assessment of Musculoskeletal Injuries Among Healthcare Office Workers in Saudi Arabia

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ABSTRACT

Work related musculoskeletal injuries (WMSIs) represent a significant occupational health concern, particularly among office-based workers in healthcare settings. In Saudi Arabia, the increasing prevalence of these injuries among healthcare office workers drawn attention due to their impact on worker productivity, well-being, and the overall efficiency of healthcare delivery. The nature of office work, often involving prolonged sitting, repetitive tasks, and inadequate workstation ergonomics, contributes to the development of WMSIs, especially in the lower back, neck, and upper limbs. Office workers, who are frequently engaged in tasks such as data entry, administrative duties, and patient coordination, face unique ergonomic challenges that may predispose them to such injuries. This study aims to evaluate the ergonomic risk factors contributing to WMSIs among healthcare office workers in Saudi Arabia. By identifying and assessing these risk factors, this study seeks to provide valuable insights into the specific ergonomic challenges faced by this workforce. The Rapid Office Strain Assessment (ROSA) was used in this study to assess ergonomic risks associated with WMSIs among healthcare office workers in Eastern province of Saudi Arabia. ROSA is a widely recognized tool designed to assess ergonomic risks in office environments by evaluating factors such as workstation setup, posture, repetitive tasks, and environmental conditions. A sample of 20 healthcare office workers was selected from a major hospital in eastern province of Saudi Arabia. Each participant's workstation was observed and assessed using ROSA, focusing on key ergonomic risk factors including chair and desk height, screen positioning, keyboard setup, and the frequency of repetitive motions. During the ROSA assessment, participants were asked about their experience with musculoskeletal discomfort and injury, as well as their perceived ergonomic practices. The data collected were analyzed to identify common risk factors associated with WMSIs and to determine the areas requiring ergonomic intervention. The ROSA assessment revealed several critical ergonomic risk factors contributing to WMSIs among healthcare office workers. A significant portion of participants (25%) were found to have poorly adjusted workstation setups, with desk and chair heights not properly configured to support optimal posture. Furthermore, 35% reported performing frequent repetitive tasks, such as typing and extended mouse usage, without sufficient breaks, exacerbating the risk of upper limb strain. The overall ergonomic risk levels for most workers were classified as moderate (65%) to high (10%), highlighting the urgent need for ergonomic improvements.

The ROSA assessment findings specifically emphasize major ergonomic risks contributing to WMSIs among healthcare office workers in Saudi Arabia. Key factors such as lack of ergonomic awareness, insufficient break times, and repetitive tasks were identified as primary contributors to discomfort and injury. These results strongly indicate the necessity of targeted ergonomic awareness training within healthcare environments. This training should focus on proper workstation adjustments, posture improvement techniques, and the encouragement of regular breaks to mitigate strain. Addressing these ergonomic challenges is critical to improving worker well-being, reducing the prevalence of WMSIs, and enhancing overall productivity in healthcare settings. To further refine these interventions, additional follow-up study is recommended to assess their effectiveness in mitigating ergonomic risks.

Keywords: Ergonomics, Musculoskeletal injuries (MSIs), ROSA, Healthcare office workers

INTRODUCTION

Work-related musculoskeletal injuries (WMSIs) represent a significant occupational health concern, particularly among office-based workers in healthcare settings. These injuries are often attributed to poor ergonomic practices, prolonged static postures, repetitive motions, and inadequate workstation designs, all of which contribute to physical strain and discomfort (Alghadir et al., 2020). In Saudi Arabia, the prevalence of WMSIs among healthcare office workers has drawn attention due to their adverse impact on worker productivity, well-being, and the overall efficiency of healthcare service delivery (Mahmoud et al., 2021). The increasing reliance on digital documentation and electronic health records has further exacerbated these issues, as employees spend extended hours using computers, often without sufficient ergonomic interventions (Sharan et al., 2011).

Healthcare office workers commonly engage in administrative tasks such as data entry, patient coordination, and documentation, which involve repetitive keyboard and mouse usage, forward head posture, and prolonged sitting. These factors significantly contribute to musculoskeletal injuries WMSIs, particularly in the lower back, neck, shoulders, and wrists (Alghadir et al., 2019). Research suggests that improper desk and chair height, lack of lumbar support, and incorrect monitor positioning further increase the risk of WMSIs, leading to chronic pain and reduced work performance (Al-Eisa et al., 2020). Moreover, psychological stress and job demands may amplify the physical strain experienced by workers, highlighting the need for a holistic approach to ergonomic risk management (Smith et al., 2018).

A lack of awareness and implementation of ergonomic principles in office environments within healthcare settings has been identified as a key factor in the persistence of WMSIs. Studies have shown that targeted ergonomic interventions, including workstation modifications, posture training, and the incorporation of micro-breaks, can substantially reduce the incidence of musculoskeletal discomfort (Punnett and Wegman, 2004). Additionally, the integration of standing desks, adjustable chairs, and ergonomic input devices has demonstrated positive effects in mitigating WMSIs (Karwowski et al., 2012). However, despite the availability of ergonomic guidelines, compliance

and proper application remain inconsistent across various workplace settings in Saudi Arabia (Alghadir et al., 2020).

This study aims to evaluate the ergonomic risk factors contributing to WMSIs among healthcare office workers in Saudi Arabia, with a focus on identifying workplace deficiencies and proposing practical solutions. By conducting a comprehensive assessment of workstations, postural habits, and ergonomic awareness, this research seeks to provide valuable insights into the specific challenges faced by this workforce. The findings will serve as a foundation for evidence-based interventions, policy recommendations, and workplace modifications aimed at improving occupational health standards. Furthermore, the study highlights the importance of integrating ergonomics into workplace culture to promote long-term musculoskeletal health and productivity among healthcare professionals.

METHODOLOGY

This study used a cross-sectional observational design to assess ergonomic risks associated with work-related musculoskeletal injuries (WMSIs) among healthcare office workers in the Eastern Province of Saudi Arabia. The research was conducted in a major hospital setting, where employees engaged in administrative and clerical tasks were the primary subjects of the study.

A purposive sampling technique was used to select a sample of 20 healthcare office workers. Inclusion criteria required participants to be engaged in office-based work for a minimum of six hours per day and to have at least six months of experience in their current role. Exclusion criteria included individuals with pre-existing musculoskeletal disorders unrelated to workplace ergonomics or those who had undergone recent ergonomic training interventions.

The Rapid Office Strain Assessment (ROSA) tool was utilized to evaluate ergonomic risks associated with workstation setups. ROSA is a validated and widely recognized tool designed to systematically assess ergonomic risk factors in office environments by analyzing workstation components, worker posture, repetitive tasks, and environmental conditions.

Each participant's workstation was individually observed and assessed by a trained evaluator using the ROSA tool. The assessment focused on key ergonomic risk factors, including:

- *Seating arrangement:* Chair height, lumbar support, armrests, and seat depth.
- *Work surface setup:* Desk height, clearance, and accessibility of work materials.
- *Monitor positioning:* Screen height, distance, and glare issues
- *Keyboard and mouse placement:* Wrist support, typing posture, and reach distance.
- *Task repetition and posture:* Frequency of repetitive motions, static postures, and awkward movements.

During the assessment, participants were also surveyed regarding their experiences with musculoskeletal discomfort and self-reported ergonomic

practices. They were asked about the frequency, intensity, and location of any discomfort they experienced during work activities.

Data Analysis: The collected data were analyzed using descriptive statistics to identify common ergonomic risk factors contributing to WMSIs. The ROSA scores were categorized based on risk levels, with higher scores indicating a greater need for ergonomic intervention. Additionally, patterns and trends in musculoskeletal discomfort were examined to determine correlations with workstation setups and ergonomic risk factors.

RESULTS

The ROSA assessment revealed several critical ergonomic risk factors contributing to work-related musculoskeletal injuries (WMSIs) among healthcare office workers. A significant portion of participants (25%) were found to have poorly adjusted workstation setups, with desk and chair heights not properly configured to support optimal posture. Many workers also lacked adequate lumbar support, leading to increased discomfort and potential long-term spinal issues. Furthermore, 35% reported performing frequent repetitive tasks, such as typing and extended mouse usage, without sufficient breaks, exacerbating the risk of upper limb strain. Additionally, 20% of workers indicated that their monitor positions were either too high or too low, causing neck strain due to prolonged awkward postures. The assessment also identified issues related to insufficient lighting, contributing to eye strain and headaches, which can further impact productivity and overall well-being. The overall ergonomic risk levels for most workers were classified as moderate (65%) to high (10%), highlighting the urgent need for ergonomic improvements. These findings emphasize the necessity of implementing targeted interventions, such as workstation adjustments, ergonomic training, and scheduled micro-breaks, to mitigate risks and enhance worker comfort and efficiency.

DISCUSSION

The ROSA assessment findings specifically emphasize major ergonomic risks contributing to WMSIs among healthcare office workers in Saudi Arabia. Key factors such as lack of ergonomic awareness, insufficient break times, and repetitive tasks were identified as primary contributors to discomfort and injury. These results strongly indicate the necessity of targeted ergonomic awareness training within healthcare environments. This training should focus on proper workstation adjustments, posture improvement techniques, and the encouragement of regular breaks to mitigate strain. Additionally, incorporating ergonomic equipment, such as adjustable chairs, sit-stand desks, and wrist supports, can further aid in reducing physical strain and promoting comfort.

Moreover, fostering a workplace culture that prioritizes employee well-being by implementing ergonomic policies and conducting regular risk assessments is essential. Healthcare administrators should consider integrating ergonomic best practices into workplace guidelines and ensuring

that staff receive continuous education on injury prevention strategies. Addressing these ergonomic challenges is critical to improve worker well-being, reduce the prevalence of WMSIs, and enhance overall productivity in healthcare settings.

To further refine these interventions, additional follow-up study is recommended to assess their effectiveness in mitigating ergonomic risks. Future research should focus on long-term outcomes, employee feedback, and the impact of ergonomic improvements on job performance and satisfaction. Implementing a structured evaluation process will help in identifying areas for further enhancement and ensuring that ergonomic interventions remain relevant and effective in dynamic healthcare environments.

CONCLUSION

This study emphasizes the importance of addressing ergonomic risk factors to minimize the prevalence of work-related musculoskeletal injuries (WMSIs) among healthcare office workers in Saudi Arabia. The findings from the Rapid Office Strain Assessment (ROSA) reveal key areas where ergonomic interventions are needed, particularly in workstation design, seating arrangements, and task-related modifications. Many healthcare office workers spend prolonged hours in static postures, often using improperly adjusted chairs, desks, and computer screens, which contribute to discomfort and musculoskeletal strain. The ROSA assessment highlights the necessity for targeted improvements, including the adoption of adjustable workstations, ergonomic chairs with adequate lumbar support, and proper positioning of computer monitors and keyboards to promote a neutral posture. Moreover, the study emphasizes the role of workplace training in enhancing employees' awareness of proper ergonomic practices, such as maintaining correct posture, taking regular breaks, and incorporating stretching exercises into their daily routines. Employers should prioritize ergonomic interventions to create a healthier work environment, which can lead to increased productivity, reduced absenteeism, and overall employee well-being. Future research should focus on evaluating the long-term impact of these ergonomic modifications and identifying best practices tailored to the specific needs of healthcare office workers. Additionally, implementing workplace policies that integrate ergonomic assessments as a routine practice will be instrumental in sustaining improvements and preventing WMSIs. By continuously refining ergonomic strategies, healthcare organizations can foster a safer and more comfortable work environment, ultimately benefiting both employees and the quality of patient care.

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