

The Importance of Ergonomics in Preventing Musculoskeletal Injuries in the Workplace

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Abstract- Ergonomics is essential for promoting health in the workplace, particularly in preventing musculoskeletal injuries (MSIs), which are common in professions involving repetitive movements, improper postures, or excessive physical exertion. Such injuries affect workers' well-being and directly impact organizational productivity and operational costs due to absenteeism and prolonged medical treatments. In this context, occupational nursing plays a crucial role in implementing ergonomic practices, such as risk assessment and promoting preventive measures, including posture correction, the use of appropriate protective equipment, and the reorganization of workstations. The role of occupational nurses also includes conducting educational campaigns and continuous monitoring of workers' health, identifying early signs of muscle overload. Studies such as those by Hoe et al. (2012) and Capodaglio (2020) demonstrate the effectiveness of ergonomic interventions, such as using arm supports and participatory ergonomics, in reducing musculoskeletal disorders. Additionally, promoting healthy habits such as regular breaks and stretching exercises is also fundamental in preventing these issues. The integration of ergonomics with occupational health not only improves workers' quality of life but also enhances productivity and company competitiveness. Ongoing research on ergonomics and the implementation of evidence-based practices are essential to mitigate the risk of injuries and ensure a safe and healthy work environment.

Indexed Terms- Ergonomics, Occupational Nursing, Musculoskeletal Injuries, Prevention, Occupational Health.

I. INTRODUCTION

Ergonomics is an essential discipline for promoting health in the workplace, especially regarding the

prevention of musculoskeletal injuries (MSIs), which are common in various professions, particularly those involving repetitive movements, improper postures, or excessive physical effort. These injuries not only affect workers' well-being but also directly impact the productivity of organizations and operational costs, as they result in absenteeism and prolonged medical treatments. In the context of occupational health, the role of occupational nursing is crucial in implementing ergonomic practices in the workplace. Nursing professionals are trained to assess working conditions, identify ergonomic risks, and propose measures to minimize the occurrence of MSIs. Preventive actions include conducting educational campaigns on proper posture, using appropriate personal protective equipment (PPE), and reorganizing workstations to ensure that tasks are performed with minimal physical impact. Additionally, occupational nurses continuously monitor workers' health, identifying early signs of muscular overload or other ergonomic-related issues.

One of the primary responsibilities of occupational nursing is the assessment of ergonomic risks. With the aid of specific tools, nurses can identify activities with a higher risk of causing injuries, such as heavy lifting or maintaining forced postures for extended periods. Based on this data, recommendations can be made for adjustments in the work environment, such as modifying chairs, tables, tools, and equipment to provide more comfort and safety for employees. Besides the direct prevention of musculoskeletal injuries, promoting occupational health also involves actions aimed at the general well-being of workers. This includes the implementation of stretching programs, regular breaks during work shifts, and promoting a healthy lifestyle to reduce the risks of occupational diseases.



Figure 1: Ergonomics.

Source: EHS Daily Advisor.

The proactive involvement of occupational nursing in promoting ergonomic practices significantly contributes to reducing injuries and improving workers' quality of life. By adopting preventive measures and continuously engaging in educational

activities and risk reassessment, it is possible to create a safer, healthier, and more productive work environment. The integration of ergonomics with occupational health not only preserves workers' health but also enhances performance and competitiveness within companies. Several studies, such as those conducted by Hoe et al. (2012), Capodaglio (2020), and Mansoor et al. (2022), emphasize the importance of ergonomics in reducing work-related musculoskeletal disorders. These studies highlight the need for ergonomic interventions, such as the use of modern ergonomic equipment, training on correct posture, and participatory ergonomics, as effective strategies for mitigating risks. Furthermore, studies like those by Takala (2018) and De Sio et al. (2018) underline the importance of understanding and addressing the specific risks of different professions, such as dentistry and healthcare, and point out the need for more high-quality research to solidify the effectiveness of these interventions in reducing MSIs. For example, the systematic review conducted by Hoe et al. (2012) assessed the effectiveness of ergonomic interventions in preventing musculoskeletal disorders in the neck and upper limbs, which are common in work environments, especially offices and healthcare units. The results revealed moderate-quality evidence, suggesting that the use of armrests with an alternative mouse can reduce the incidence of neck and shoulder disorders, but there was no significant reduction in disorders of the right upper limb. This study highlights the need for more quality research to evaluate the effectiveness of ergonomic interventions. On the other hand, Capodaglio's (2020) study investigates the effectiveness of participatory ergonomics in preventing musculoskeletal disorders in maintenance workers in an industrial environment. The project implemented in an Italian wool processing company involved workers in assessing risks and proposing improvements, which proved to be an effective strategy as it empowered workers to identify practical, targeted solutions for preventing disorders.

Another relevant study by Mansoor et al. (2022) focuses on the prevalence of musculoskeletal disorders among healthcare professionals, caused by the demands of the medical profession, including long working hours, prolonged procedures, and constant postures. Common disorders reported include neck, back, shoulder, elbow, wrist pain, repetitive strain

injuries, nerve injuries, and chronic pain disorders. The study highlights the importance of ergonomics in preventing these conditions by adapting work, equipment, and the environment to improve safety and productivity. The study suggests that raising awareness among healthcare professionals about physical conditioning, proper posture, ergonomic adjustments to equipment and work environments, as well as early recognition of problems, are essential measures to mitigate these risks.

In a broader context, the study by Marková et al. (2022) explores the relationship between accidents and occupational diseases, highlighting the consequences of insufficient application of ergonomic principles in business practices. The article suggests that integrating ergonomics into daily business operations, particularly in primary prevention, can prevent the onset or worsening of musculoskeletal problems, reducing the risk of occupational diseases and accidents. Additionally, research by Takala (2018) and the systematic review by Stock et al. (2018) discuss the importance of occupational safety and health in protecting workers from the negative consequences of work, questioning the effectiveness of some interventions and highlighting the need for more high-quality studies. These studies indicate that while some interventions, such as additional breaks, show moderate evidence of effectiveness, there is still a need for more solid data to prove the effectiveness of many ergonomic practices.

In the specific case of dental professionals, the study by De Sio et al. (2018) highlights the ergonomic risks faced by dentists, especially the musculoskeletal disorders caused by forced postures and repetitive movements. The study, based on a systematic review of the international literature, identified that static posture is the primary risk factor for the development of these conditions, with 87.5% of the reviews and 84% of the original articles analyzed emphasizing this aspect. Furthermore, the study stressed the importance of preventive practices, such as stretching after each work session and using ergonomic instruments, with 75% of the reviews and 61.5% of the original articles highlighting these measures. While the study showed the effectiveness of preventive practices such as the use of modern workstations and physical activity, it also acknowledged limitations, such as low

methodological quality and inadequate statistical analysis in several selected studies. This study reinforces the need for more rigorous research to determine the effectiveness of ergonomic interventions in the dental context and their practical application in reducing musculoskeletal injury risks.

These studies demonstrate that applying ergonomic principles is crucial for reducing workplace injuries, and occupational nursing plays a vital role in implementing these practices, promoting safer and healthier work environments. Furthermore, the importance of continuous monitoring and educational strategies to raise awareness about ergonomics and its preventive practices stands out. In the long term, adopting such practices not only protects workers' health but also promotes greater efficiency and competitiveness in organizations.

In conclusion, ergonomics plays a crucial role in promoting health and preventing musculoskeletal injuries in the workplace. These injuries, which are common in professions involving repetitive movements, poor posture, or excessive physical effort, can significantly affect both worker well-being and organizational productivity. Occupational nursing is essential in implementing ergonomic practices, as nurses are trained to assess work conditions, identify ergonomic risks, and propose preventive measures. Through proactive interventions such as education on proper posture, use of personal protective equipment, and workstation modifications, occupational nurses can help reduce the occurrence of musculoskeletal disorders.

Moreover, the integration of ergonomics into occupational health programs contributes not only to the prevention of injuries but also to the overall well-being of workers, promoting a healthier, more productive work environment. Research studies emphasize the effectiveness of ergonomic interventions, such as ergonomic tools, proper posture training, and participatory ergonomics, in reducing work-related musculoskeletal disorders. Continued efforts to raise awareness, refine ergonomic practices, and implement tailored interventions are essential in minimizing risks and improving workplace health. As organizations continue to prioritize ergonomic strategies, both worker health and organizational

performance will benefit, fostering a safer, more competitive workplace for all.

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