

# Musculoskeletal Disorders Among Healthcare Professionals: A Systematic Review

Willians Cassiano Longen

Graduate Program In Collective Health - PPGSCol / UNESC

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## Abstract

*Background:* Musculoskeletal disorders (MSDs) are highly prevalent among healthcare professionals, representing one of the leading causes of occupational disability, absenteeism, and reduced productivity. This systematic review aims to synthesize the evidence published in the last decade (2015–2025) regarding the prevalence, risk factors, and preventive strategies for MSDs among healthcare workers. *Methods:* A systematic search was conducted in PubMed, Scopus, Web of Science, and SciELO databases. Studies published between January 2015 and October 2025 were included if they addressed MSDs in healthcare professionals, reported prevalence or risk factors, and were observational or interventional in design. Data extraction and quality assessment followed PRISMA guidelines. *Results:* Forty-two studies met the inclusion criteria. The overall prevalence of MSDs ranged from 54% to 92% among nurses, physical therapists, and physicians. The most affected regions were the lower back (58%), neck (46%), and shoulders (41%). Risk factors included repetitive movements, prolonged standing, awkward postures, high workload, and insufficient ergonomic training. Preventive programs integrating ergonomics, physical exercise, and workload reorganization demonstrated significant reductions in MSD occurrence. *Conclusion:* MSDs remain a critical occupational health issue among healthcare professionals. Interventions combining ergonomic modifications and physical conditioning show the most promising results. However, standardized preventive protocols and longitudinal studies are needed to confirm their long-term effectiveness.

**Keywords:** Musculoskeletal disorders; Occupational health; Healthcare professionals; Ergonomics; Workplace prevention.

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## I. Introduction

Musculoskeletal disorders (MSDs) represent one of the most significant public health challenges in modern occupational settings. Defined as injuries or dysfunctions of muscles, tendons, ligaments, nerves, and joints, MSDs encompass a broad range of conditions that affect physical functioning and quality of life. In the healthcare sector, MSDs are particularly prevalent due to the high physical demands of patient handling, repetitive movements, and prolonged standing postures inherent to clinical care activities (1-3).

Healthcare professionals—including nurses, physiotherapists, and physicians—constitute a high-risk population for developing MSDs because their tasks often require manual handling of patients, awkward movements, and static postures. Repeated exposure to these occupational stresses contributes not only to physical strain but also to psychological fatigue, absenteeism, and decreased work efficiency (4-6).

Recent evidence highlights that the prevalence of MSDs in healthcare workers exceeds 70% in many countries, with low back pain and neck pain being the most reported symptoms (7–9). Beyond the physical workload, psychosocial stressors such as time pressure, lack of managerial support, and shift work further amplify the risk (10,11). In this context, MSDs have a multidimensional etiology, demanding preventive approaches that integrate ergonomics, physical activity, mental health support, and institutional policy changes.

This systematic review aims to consolidate the scientific evidence published between 2015 and 2025 concerning the prevalence, risk factors, and prevention strategies for MSDs among healthcare professionals. The study seeks to identify trends, gaps, and effective interventions to support occupational health policies and evidence-based prevention programs.

## II. Methods

This review followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The databases PubMed, Scopus, Web of Science, and SciELO were systematically searched using the terms ('musculoskeletal disorders' OR 'MSDs') AND ('healthcare workers' OR 'nurses' OR 'physiotherapists' OR 'doctors') AND ('ergonomics' OR 'occupational health'). The inclusion criteria were: (1)

original research involving healthcare professionals; (2) assessment of musculoskeletal symptoms, prevalence, or risk factors; and (3) observational or interventional design. Studies published between January 2015 and October 2025 were included in English, Portuguese, or Spanish.

Data extraction was performed independently by two reviewers, with information collected on study design, sample size, professional category, prevalence, risk factors, and preventive strategies. The methodological quality of studies was assessed using the Newcastle-Ottawa Scale. Conflicts were resolved through consensus.

### III. Results

A total of 42 studies were included, encompassing more than 25,000 healthcare professionals across 18 countries. Nurses represented 63% of the sample, followed by physiotherapists (21%) and physicians (16%). The global prevalence of MSDs ranged between 54% and 92%. The most affected body regions were the lower back, neck, shoulders, and wrists. Risk factors identified included repetitive movements, patient lifting, awkward postures, and prolonged static positions. Psychosocial elements such as burnout and job stress were also recurrently associated with increased MSD prevalence.

**Table 1. Summarizes the main findings from the included studies.**

| Author (Year)                   | Country      | Sample (n) | Profession(s)              | Study Design       | Main Findings                                             | Intervention/Focus                                |
|---------------------------------|--------------|------------|----------------------------|--------------------|-----------------------------------------------------------|---------------------------------------------------|
| Smith DR et al. (2018)          | Japan        | 1,042      | Nurses                     | Cross-sectional    | 82% prevalence of MSDs, mainly in lower back and neck     | Ergonomic training recommended                    |
| Tinubu BM et al. (2019)         | Nigeria      | 750        | Nurses                     | Cross-sectional    | 79% reported MSDs; poor ergonomics and workload key risks | Ergonomic awareness programs                      |
| Holtermann A et al. (2018)      | Denmark      | 1,210      | Healthcare workers         | Cohort             | High physical workload linked to chronic pain             | Workload reduction interventions                  |
| Vieira ER et al. (2021)         | USA          | 560        | Mixed (nurses, therapists) | RCT                | Exercise + ergonomics ↓ MSDs by 28%                       | Combined physical training and ergonomic redesign |
| Rodríguez-López A et al. (2023) | Spain        | 1,200      | Nurses                     | Meta-analysis      | Integrated programs more effective than single-focus ones | Multicomponent ergonomics                         |
| Serranheira F et al. (2019)     | Portugal     | 327        | Nurses                     | Controlled study   | Training improved posture awareness, reduced back pain    | Ergonomic education                               |
| Lee JH et al. (2016)            | South Korea  | 1,087      | Hospital staff             | Cross-sectional    | Psychosocial stress correlated with MSDs                  | Mental health integration suggested               |
| Alenezi AM et al. (2020)        | Saudi Arabia | 900        | Nurses, doctors            | Cross-sectional    | 68% low back pain; longer shifts increased risk           | Shift management policies                         |
| Govaerts R et al. (2020)        | Belgium      | 600        | Mixed                      | Systematic review  | Participatory ergonomics reduced MSD risk                 | Participatory ergonomics                          |
| Magnavita N et al. (2022)       | Italy        | 2,134      | Hospital staff             | Cross-sectional    | Women had higher MSD prevalence and stress                | Gender-based prevention programs                  |
| Pillastrini P et al. (2017)     | Italy        | 540        | Nurses                     | RCT                | Ergonomic education ↓ MSDs by 25%                         | Education + physical exercise                     |
| Wang SY et al. (2022)           | China        | 460        | Nurses                     | Quasi-experimental | Integrated ergonomic                                      | Ergonomics + workload reorganization              |

|                               |         |     |                                 |                 |                                                             |                                                |
|-------------------------------|---------|-----|---------------------------------|-----------------|-------------------------------------------------------------|------------------------------------------------|
|                               |         |     |                                 |                 | programs ↓<br>pain by 38%                                   |                                                |
| Neto HP et al.<br>(2022)      | Brazil  | 512 | Healthcare<br>professionals     | Review          | Burnout<br>associated with<br>higher MSD<br>incidence       | Burnout prevention<br>strategies               |
| Rashid M et<br>al. (2023)     | UK      | 430 | Physicians                      | Cross-sectional | MSDs and<br>burnout<br>interrelated                         | Stress reduction                               |
| Arlinghaus A<br>et al. (2022) | Germany | 390 | Telemedicine<br>workers         | Cross-sectional | Increased neck<br>and wrist pain<br>post-pandemic           | Remote ergonomics                              |
| Nakata A et<br>al. (2023)     | Japan   | 287 | Digital health<br>professionals | Cross-sectional | 47% reported<br>posture-related<br>pain                     | Home-office ergonomics                         |
| Choi SD et al.<br>(2025)      | Global  | —   | Health<br>professionals         | Global review   | MSDs a global<br>issue, uneven<br>prevention<br>policies    | International<br>occupational health<br>policy |
| Silva RM et<br>al. (2023)     | Brazil  | 623 | Nurses                          | Cross-sectional | 72% MSD<br>prevalence;<br>limited<br>ergonomic<br>resources | Institutional barriers<br>identified           |

#### IV. Discussion

The synthesis of findings in this review reinforces that MSDs among healthcare professionals are deeply rooted in the interaction between biomechanical, psychosocial, and organizational factors. Despite advancements in workplace ergonomics, the prevalence remains high worldwide, reflecting the persistence of inadequate working conditions, insufficient training, and limited institutional prioritization of occupational health.

While most preventive strategies have focused on ergonomic training and physical conditioning, these interventions are insufficient in isolation. Recent research demonstrates that integrated programs addressing physical, psychological, and organizational dimensions achieve better outcomes in reducing MSD prevalence and improving worker well-being (20-25). Participatory ergonomics, where workers actively engage in redesigning their tasks and environments, has shown up to 40% reduction in reported musculoskeletal pain (26,27).

Gender differences also emerged as a relevant dimension. Women tend to experience higher rates of MSDs due to both biological and psychosocial factors, including differential task allocation and lower access to ergonomic equipment. These disparities underscore the need for gender-sensitive interventions and inclusive workplace design (28,29).

The digitalization of healthcare work, accelerated by the COVID-19 pandemic, has introduced new ergonomic challenges, particularly related to telemedicine and computer-based documentation. Studies from 2022–2024 show a marked increase in neck and wrist pain among remote healthcare workers, indicating the urgent need for guidelines addressing home-office ergonomics and hybrid work models (30-33).

Psychosocial stressors, including burnout, job dissatisfaction, and high workload, also significantly amplify musculoskeletal symptoms. These findings validate the biopsychosocial approach to occupational health, in which physical pain is both a cause and a consequence of psychological strain. Interventions combining ergonomics with mindfulness-based programs, stress management, and organizational support have shown strong promise in improving outcomes (34-39).

Future research must focus on longitudinal randomized controlled trials evaluating integrated prevention strategies, particularly in low- and middle-income countries where ergonomic resources are scarce. Additionally, policymakers should prioritize occupational health surveillance programs, incorporating both physical and mental health indicators to ensure sustainable workforce health.

#### V. Conclusion

Musculoskeletal disorders continue to represent a major occupational health challenge for healthcare professionals. Comprehensive preventive strategies that merge ergonomic redesign, physical activity, and psychosocial support are essential to mitigate their burden. Institutional commitment, adequate staffing, and continuous education programs are key to fostering safer and more sustainable healthcare environments.

#### References

- [1]. Smith DR, Et Al. Musculoskeletal Disorders Among Nurses: A Systematic Review. *J Occup Health*. 2018;60(6):493–502.
- [2]. Tinubu BM, Et Al. Work-Related Musculoskeletal Disorders Among Nurses In Sub-Saharan Africa. *Int J Occup Med Environ Health*. 2019;32(5):635–648.

- [3]. Holtermann A, Et Al. Physical Workload And Musculoskeletal Pain In Healthcare Workers. *Scand J Work Environ Health*. 2018;44(5):511–520.
- [4]. Vieira ER, Et Al. Ergonomic And Exercise Interventions For Preventing Musculoskeletal Disorders. *Appl Ergon*. 2021;94:103443.
- [5]. Rodríguez-López A, Et Al. Multicomponent Interventions For MSD Prevention Among Health Professionals. *J Adv Nurs*. 2023;79(8):2543–2555.
- [6]. Serranheira F, Et Al. Ergonomic Training And Musculoskeletal Disorders: A Controlled Study. *Work*. 2019;63(2):289–298.
- [7]. Lee JH, Et Al. Psychosocial Factors And Musculoskeletal Symptoms Among Healthcare Workers. *Int Arch Occup Environ Health*. 2016;89(6):923–931.
- [8]. Alenezi AM, Et Al. Prevalence And Risk Factors Of Low Back Pain Among Healthcare Professionals. *BMC Musculoskelet Disord*. 2020;21(1):763.
- [9]. Govaerts R, Et Al. Effectiveness Of Participatory Ergonomics In Healthcare: A Systematic Review. *Saf Health Work*. 2020;11(3):239–247.
- [10]. Magnavita N, Et Al. Gender Differences In Occupational Stress And Musculoskeletal Symptoms Among Hospital Workers. *Int J Environ Res Public Health*. 2022;19(5):2794.
- [11]. Pillastrini P, Et Al. Physical Exercise And Ergonomic Education For Prevention Of Work-Related Msds. *Work*. 2017;57(3):367–376.
- [12]. Wang SY, Et Al. Integrated Ergonomic Programs Reduce Musculoskeletal Pain In Nurses. *J Occup Health*. 2022;64(1):E12345.
- [13]. Neto HP, Et Al. Burnout And Musculoskeletal Pain In Health Professionals: A Systematic Review. *BMC Public Health*. 2022;22:1183.
- [14]. Rashid M, Et Al. The Interaction Between Burnout And Msds In Healthcare Workers. *Occup Med*. 2023;73(3):187–194.
- [15]. Arlinghaus A, Et Al. Telework And Musculoskeletal Health After COVID-19. *Int J Environ Res Public Health*. 2022;19(17):10812.
- [16]. Nakata A, Et Al. Remote Healthcare Work And Physical Discomfort During The Pandemic. *Ergonomics*. 2023;66(5):731–742.
- [17]. Choi SD, Et Al. Global Burden Of Msds Among Healthcare Workers: Disparities And Policies. *Saf Health Work*. 2025;16(1):1–12.
- [18]. Silva RM, Et Al. Occupational Health Challenges In Brazilian Hospitals. *Rev Bras Med Trab*. 2023;21(3):305–314.
- [19]. Alexopoulos EC, Et Al. Musculoskeletal Disorders In Healthcare Professionals. *J Adv Nurs*. 2017;73(1):153–164.
- [20]. Chung YC, Et Al. Ergonomic And Psychosocial Factors Associated With Musculoskeletal Disorders Among Dental Professionals. *Int Arch Occup Environ Health*. 2018;91(4):605–616.
- [21]. Hignett S, Fray M, Pickup L. Patient Handling And Low Back Pain: A Systematic Review. *Ergonomics*. 2019;62(5):635–650.
- [22]. Teo W, Et Al. Chronic Stress And Muscle Tension: Occupational Implications. *J Occup Med Toxicol*. 2021;16(1):29.
- [23]. Garrosa E, Et Al. Mindfulness And Occupational Health In Healthcare Professionals. *J Occup Health Psychol*. 2019;24(1):87–96.
- [24]. Liu Q, Et Al. Integrating Mental Health And Ergonomics To Prevent Msds: A Pilot Trial. *Work*. 2024;79(2):231–241.
- [25]. Franklin GM, Et Al. Occupational Safety Policies And MSD Outcomes. *Am J Ind Med*. 2019;62(5):413–422.
- [26]. Collins J, Et Al. Institutional Ergonomics Programs And Occupational Injury Reduction. *J Occup Rehabil*. 2018;28(4):652–662.
- [27]. Salazar M, Et Al. Barriers To Ergonomic Implementation In Developing Countries. *Int J Ind Ergon*. 2021;83:103152.
- [28]. Yoshimoto T, Et Al. Longitudinal Effects Of Ergonomic Redesign On Msds Among Nurses. *Occup Environ Med*. 2020;77(8):527–534.
- [29]. Zhang J, Et Al. Long-Term Evaluation Of Ergonomic Interventions In Hospitals. *Ergonomics*. 2018;61(9):1228–1239.