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**PREVENÇÃO DE LESÕES MUSCULOESQUELÉTICAS: UM PLANO DE GINÁSTICA LABORAL NUM SERVIÇO DE MEDICINA INTERNA**

**PREVENTION OF MUSCULOSKELETAL INJURIES: A WORKPLACE GYMNASICS PLAN IN AN INTERNAL MEDICINE SERVICE**

**PREVENCIÓN DE LESIONES MUSCULOESQUELÉTICAS: UN PLAN DE GIMNASIA LABORAL EN UN SERVICIO DE MEDICINA INTERNA**

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## RESUMO

**Introdução:** Os hospitais enfrentam desafios complexos, incluindo limitações estruturais e condições de trabalho exigentes que resultam em Lesões Musculoesqueléticas relacionadas com o Trabalho (LMERT), especialmente entre enfermeiros. Intervenções ergonômicas, como a ginástica laboral (GL), surgem como estratégias eficazes.

**Objetivo:** Avaliar o impacto de um programa de GL na prevalência de LMERT entre profissionais de saúde de um Centro Hospitalar em Portugal.

**Métodos:** Foi desenvolvido um projeto de melhoria contínua da qualidade, cuja intervenção consistiu num plano de ginástica laboral com componentes educacionais e físicas. O estudo incluiu 17 enfermeiros, com média de idade de 43 anos e 16 anos de serviço. A amostra foi avaliada através de questionários antes e após três meses de implementação do programa.

**Resultados:** Observou-se uma redução significativa das queixas de dor na região lombar (16,7% para 5,6%) e cervical (27,7%), e melhoras no bem-estar psicossocial (16,7%). O programa também demonstrou eficácia na redução do stress relacionado ao trabalho (11,10% e 5,20%).

**Conclusão:** Os resultados sugerem que um programa de ginástica laboral foi eficaz na redução de lesões musculoesqueléticas entre enfermeiros, destacando-se como parte importante das estratégias de saúde ocupacional em ambientes hospitalares.

**Palavras-chave:** lesões musculoesqueléticas; enfermeiros; exercício; saúde ocupacional; hospitais

## ABSTRACT

**Introduction:** Hospitals face complex challenges, including structural limitations and demanding work conditions that result in Work-Related Musculoskeletal Injuries (WRMSIs), especially among nurses. Ergonomic interventions, such as workplace gymnastics (WG), emerge as effective strategies.

**Objective:** To evaluate the impact of a WG program on the prevalence of WRMSIs among health professionals at a Hospital Center in Portugal.

**Methods:** A continuous quality improvement project was developed with a focus on the prevention of WRMSIs. The intervention implemented consisted of a workplace gymnastics program with two components: educational and exercises. A questionnaire was used as a data collection tool. Participants were evaluated at the start of the program and after three months. Statistical analyses were performed to study the responses obtained.

**Results:** Seventeen participants were included, corresponding to 71% of the nursing team. The prevalence of self-reported musculoskeletal injuries by participants before the program's implementation was 70%. After the program, statistically significant differences were found with a reduction in pains in the lumbar region (16.7% and 5.60%), cervical (27.7%), shoulder (5.6%), psychosocial well-being (5.60% and 16.70%), and work-related stress (11.10% and 5.20%).

**Conclusion:** The results suggest that a workplace gymnastics program was effective in reducing musculoskeletal injuries among nurses, highlighting it as an important part of occupational health strategies in hospital settings.

**Keywords:** musculoskeletal diseases; nurses; exercise; occupational health; hospitals

## RESUMEN

**Introducción:** Los hospitales enfrentan desafíos complejos, incluidas limitaciones estructurales y condiciones laborales exigentes que resultan en Lesiones Musculoesqueléticas Relacionadas con el Trabajo (LMERT), especialmente entre los enfermeros. Las intervenciones ergonómicas, como la gimnasia laboral (GL), emergen como estrategias efectivas.

**Objetivo:** Evaluar el impacto de un programa de GL en la prevalencia de LMERT entre los profesionales de la salud en un Centro Hospitalario en Portugal.

**Métodos:** Se desarrolló un proyecto continuo de mejora de la calidad con enfoque en la prevención de LMERT. La intervención consistió en un programa de GL con dos componentes: educativo y ejercicios. Se utilizó un cuestionario como herramienta de recopilación de datos. Los participantes fueron evaluados al inicio y después de tres meses. Se realizaron análisis estadísticos.

**Resultados:** Diecisiete participantes fueron incluidos, el 71% del equipo de enfermería. La prevalencia de lesiones musculoesqueléticas autorreportadas antes del programa fue del 70%. Tras el programa, hubo una reducción significativa en dolores en la región lumbar (16.7% y 5.60%), cervical (27.7%), hombro (5.6%), bienestar psicossocial (5.60% y 16.70%), y estrés laboral (11.10% y 5.20%).

**Conclusión:** Un programa de GL fue efectivo en reducir lesiones musculoesqueléticas en enfermeros, destacándolo como parte crucial de estrategias de salud ocupacional en hospitales.

**Palabras clave:** enfermedades musculoesqueléticas; enfermeros; ejercicio; salud laboral; hospitales

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## INTRODUCTION

Musculoskeletal Disorders (MSDs) are among the most common work-related disorders and are described as one of the main Occupational Health problems for healthcare professionals, especially nurses (Alexopoulos et al., 2019; Stamatopoulos et al., 2020).

Vasconcelos and Lima (2018) argue that Workplace Gymnastics (WG) emerges as a practical response to supervised exercise, and is one of the most effective strategies for reducing MSDs. To adapt preventive intervention to the needs of the health workers, within teams and, in particular, services, a workplace gymnastics program was designed and implemented in a Hospital Center in Central Portugal. This study aimed to assess the impact of a WG program on the prevalence of WRMSDs among healthcare professionals at a Hospital Center in Portugal.

## 1. THEORETICAL FRAMEWORK

Work-Related Musculoskeletal Disorders (WRMSDs) affect body structures such as muscles, joints, tendons, ligaments, nerves, and bones, and are caused by inadequate working conditions and environments. Among healthcare professionals, especially nurses, these injuries are prevalent due to the physical and repetitive nature of their work (Serranheira et al., 2019). According to the European Agency for Safety and Health at Work, WRMSDs mainly affect the cervical, dorsal, shoulder, and upper limb regions and are one of the leading causes of absenteeism and work-related disability (Rodrigues, 2022).

The hospital environment presents particular challenges due to its continuous operation, 24 hours a day. This exposes healthcare professionals, such as nurses, to repetitive tasks, physical overload, and inadequate postures—factors that significantly contribute to the development of WRMSDs (Batista et al., 2021). Studies highlight that working conditions in hospitals, combined with inadequate organization and poor ergonomic configurations, are key determinants in the occurrence of these injuries (Ribeiro et al., 2018).

Preventing WRMSDs requires adopting an ergonomic approach that identifies and eliminates risk factors associated with the working environment and the tasks performed. Personalized ergonomic intervention programs have shown significant reductions in musculoskeletal complaints among nurses, promoting improved physical well-being (Serranheira et al., 2020). Evidence indicates that interventions encouraging posture variation, rather than maintaining static postures, are effective in preventing injuries (Silva et al., 2021).

The relationship between the prevalence of WRMSDs and their consequences for nurses' health and well-being, including increased absenteeism and decreased quality of care, is well documented. A study investigating the effectiveness of a workplace gymnastics program for nurses with musculoskeletal complaints demonstrated a significant reduction in pain and an improvement in overall well-being (Fjellman-Wiklund et al., 2016). This study underscores the importance of implementing tailored interventions that account for the specific needs of workers and the hospital environment.

Workplace Gymnastics (WG) emerges as a practical intervention that can be easily incorporated into the work environment, aiming to reduce WRMSDs risk. WG programs have shown substantial benefits in preventing injuries and promoting occupational health (Serranheira et al., 2019). Additionally, combining WG programs with ergonomic interventions in the workplace has proven to be an effective approach to reducing WRMSDs among healthcare professionals (SciELO, 2020).

Finally, the implementation of active routines that promote posture variation and reduce muscle tension is a fundamental component of strategies to prevent WRMSDs among healthcare professionals (Serranheira et al., 2020).

## 2. METHODS

### 2.1 Sample

The study included 17 nurses from an Internal Medicine department, with an average age of 43 years and 16 years of service. Of the participants, 74% were female and 26% were male. 64% were overweight or obese, despite 69.6% engaging in some form of regular physical exercise.

### 2.2 Data collection instruments and procedures

A situation health diagnosis was identified based on the WRMSDs self-assessment questionnaire developed by the institutional group "Safe Practices for Patient Mobilization." The questionnaire used for data collection consisted of questions grouped by relevant themes to assess the well-being and working conditions of the participants. Initially, the questions pertained to socio-demographic data, such as gender, age, and years of service. Following that, participants were asked about the number of sessions of workplace gymnastics they attended, if you engage in any type of physical exercise, and what is your weight. Subsequently, questions related to psychosocial well-being and work stress were asked, namely: "I feel emotionally exhausted at work"; "I feel drained at the end of a workday"; "I feel tired when I wake up in the morning to go to work"; "Work demands cause me stress"; "My work leaves me feeling exhausted"; "I can effectively solve problems that arise at work"; "I feel that I am effectively contributing to the goals of my organization"; and "I have less and less interest in my work." Finally, questions related to

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musculoskeletal pain were included: "I feel pain in the lower back after a few hours of work"; "I feel pain in the cervical region after a few hours of work"; "I feel pain in the wrists after a few hours of work, specifically with mouse usage"; "I feel pain in the elbows after a few hours of work, specifically with mouse usage"; "I feel pain in the shoulders after a few hours of work"; and "I feel pain in the knees after a few hours of work." In each question, participants had to respond based on a score ranging from zero to six, where zero corresponded to "Never," "1 - Several times a year or less"; "2 - Once a month"; "3 - Several times a month"; "4 - Once a week"; "5 - Several times a week"; and "6 - Every day." These questions were designed to address various aspects related to working conditions, physical and psychological well-being, and participation in health promotion activities in the workplace. The questionnaire was administered to all nurses in the department at the beginning of the project in March 26, 2023, and again after 3 months.

The initial data collected were analyzed and interpreted to obtain a clear understanding of the prevalence of WRMSDs. Following this initial phase, a workplace gymnastics plan was developed to meet the evident needs of the department's professionals.

The WG sessions took place within the department's physical space, accompanied by music selected by the participants and sometimes utilizing other materials such as dumbbells or elastic bands. Exercises focus in the most affected body regions during work shifts (lower back, back, upper and lower limbs) were maintained throughout the sessions. Exercises that have been shown to be effective in preventing WRMSDs were used. This statement is supported by scientific studies on ergonomics and the prevention of work-related musculoskeletal injuries. An example of a bibliographic source that supports this assertion is the study by Trinkoff and Lipscomb (2000), which investigated the effectiveness of specific exercise programs for healthcare professionals in reducing work-related musculoskeletal injuries. The physical exercise and stretching period were defined at the end of the night and morning shifts, with an average duration of 10 minutes.

After the application of the WRMSDs self-assessment questionnaire developed by the institutional group "Safe Practices for Patient Mobilization," a situational health diagnosis was identified.

A questionnaire was used to assess working conditions, psychosocial well-being, and musculoskeletal pain complaints. The responses were measured on a scale from 0 to 6, where 0 corresponds to "Never" and 6 to "Every day." Socio-demographic data were also considered, as well as the number of workplace gymnastics sessions attended, whether they engaged in any physical exercise, and their weight. The table below organizes the different categories of questions asked to participants, detailing the scales used to measure psychosocial well-being and musculoskeletal pain. Responses can be easily recorded and analyzed based on this structure.

**Table 1 - Categories of Questions**

Category of Questions	Category of Questions	Category of Questions
Socio-demographic Data	- Gender - Age - Years of service	Not applicable
Participation in Activities	- Number of workplace gymnastics sessions attended - Engagement in physical exercise - Weight	Not applicable
Psychosocial Well-being	- I feel emotionally drained at work - I feel exhausted at the end of a workday - I feel tired when I wake up for work - Work demands cause me stress - My work leaves me feeling drained - I can effectively solve problems that arise at work - I feel that I am effectively contributing to my organization's goals - I am becoming less interested in my work	<b>Scale of Responses:</b> - 0 = Never - 1 = Several times a year or less - 2 = Once a month - 3 = Several times a month - 4 = Once a week - 5 = Several times a week - 6 = Every day
Musculoskeletal Pain	- I feel pain in my lower back after a few hours of work - I feel pain in my neck - I feel pain in my wrists after a few hours of work (especially with mouse usage) - I feel pain in my elbows after a few hours of work (especially with mouse usage) - I feel pain in my shoulders - I feel pain in my knees	<b>Scale of Responses:</b> - 0 = Never - 1 = Several times a year or less - 2 = Once a month - 3 = Several times a month - 4 = Once a week - 5 = Several times a week - 6 = Every day

The questionnaire was administered to all nurses in the department at the beginning of the project on March 26, 2023, and again after 3 months. The initial data collected were analyzed and interpreted to obtain a clear understanding of the prevalence of WRMSDs. Following this initial phase, a workplace gymnastics plan was developed to meet the evident needs of the department's professionals.

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The sessions included exercises targeting the body regions most affected during work shifts, such as the lower back, cervical, shoulders, and lower limbs. The sessions were held at the end of morning and night shifts, with an average duration of 10 minutes. The exercises were accompanied by music and utilized light weights and elastic bands. Exercises that have been proven effective in preventing WRMSDs were used. The following images demonstrate the exercises performed during the sessions.



Image 1: Warm-up exercises



Image 2: Stretching exercises.

### 2.3 Statistical analysis

Descriptive and inferential statistical analyses were performed on the collected data to associations, and significance levels related to WRMSDs prevalence. Additionally, correlations between different variables were examined to understand potential risk factors associated with WRMSDs in the studied population.

## 3. RESULTS

In this continuous quality improvement project, 17 nurses from an Internal Medicine service participated, with an average age of 43 years and 16 years of effective service. Of the participants, 74% were female (n=13) and 26% were male (n=4). It was also found that the majority worked rotating shifts, with 64% being overweight or obese despite 69.6% engaging in some form of physical exercise. The most frequently reported musculoskeletal injury was in the lower back region (70%), with a prevalence of these injuries related to the type of work performed at 32%. The initial questionnaire revealed key characteristics of the study population influencing the incidence of WRMSDs among nurses, which were used to tailor the Workplace Gymnastics (WG) program.

During the first three months of project implementation, the team's adherence rate was 100%, with participants attending at least one occupational gymnastics session daily and some attending up to two sessions per day. No significant differences in adherence rates were observed based on gender.

Post-intervention questionnaire responses indicated significant improvements across several areas. Specifically, there was a substantial reduction in musculoskeletal pain complaints: low back pain decreased from 16.7% to 5.6%, and cervical pain decreased by 27.7%. Additionally, there was a reduction of 5.2% in work-related stress complaints.

Psychosocial well-being also improved, with less than 5.6% of nurses reporting feeling emotionally exhausted at work either "a few times a month" or "a few times a week." The percentage of nurses feeling exhausted at the end of a workday decreased by 5.6% and 16.7%, respectively. Furthermore, reports of work-related stress decreased by 11.1% "a few times a month" and 5.2% "a few times a week."

Overall, the implementation of the WG program was associated with significant reductions in musculoskeletal pain and work-related stress, as well as improvements in psychosocial well-being among the nursing staff.

## 4. DISCUSSION

Work-Related Musculoskeletal Disorders (WRMSDs) present a complex challenge for nursing professionals due to the significant physical demands and emotional stress associated with their roles. This study supports existing literature indicating that workplace gymnastics (WG) programs effectively reduce musculoskeletal injuries and enhance the psychological well-being of healthcare workers. For instance,

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a systematic review by Neupane et al. (2018) highlights the positive impact of ergonomic interventions on health outcomes, particularly in reducing musculoskeletal complaints among healthcare staff.

The majority of the study population consisted of female nurses, with an advanced average age and considerable years of service. This demographic characteristic aligns with findings by Ho et al. (2023), who emphasized the increased vulnerability to WRMSDs among older nursing staff. The relationship between age, gender, and the risk of developing musculoskeletal injuries underscores the importance of implementing preventive measures specifically tailored to these demographic factors.

A notable observation in this study is the high prevalence of overweight and obesity among participants, despite a significant proportion engaging in regular physical activity. This aligns with the findings of Matz et al. (2023), who identified excess weight as a significant risk factor for developing musculoskeletal disorders among healthcare professionals. While physical activity is beneficial, it may not be sufficient to counteract the adverse effects of obesity on musculoskeletal health.

The WG program implemented in this study yielded a remarkable adherence rate, with no significant differences between genders. This finding is consistent with the research of Martínez et al. (2023), which demonstrated that incorporating workplace gymnastics significantly decreased musculoskeletal complaints among healthcare workers. The program's success emphasizes the need to include all professional categories, such as nursing assistants, in such interventions, recognizing the shared physical demands of all healthcare roles.

Significant reductions in complaints of lower back, cervical, and shoulder pain following the WG program align with earlier studies, such as those by Leclerc et al. (2022), which identified the benefits of ergonomic interventions in preventing WRMSDs and promoting the overall well-being of healthcare workers. Furthermore, addressing WRMSDs through a multifaceted approach, including pain management and psychological support, is crucial for enhancing healthcare professionals' job satisfaction and quality of life.

In conclusion, the results of this study reinforce the efficacy of workplace gymnastics as a critical strategy in preventing WRMSDs among nurses. These interventions provide not only physical benefits but also positively contribute to the psychosocial health of healthcare professionals. However, ongoing research is essential to evaluate the long-term sustainability of these benefits and to explore broader applications across diverse healthcare settings.

## CONCLUSION

Based on the study conducted on the effectiveness of Workplace Gymnastics (WG) as a preventive and health-promoting strategy in the hospital setting, specifically among nursing professionals, several conclusions can be drawn.

The main results indicate that the implementation of a WG program adapted to the specific needs of healthcare professionals resulted in a significant reduction in complaints of Work-Related Musculoskeletal Disorders (WRMSDs), especially in the lumbar, cervical, and shoulder regions. Additionally, the program contributed to the improvement of participants' psychosocial well-being, demonstrating a decrease in the perception of emotional exhaustion and work-related stress.

However, it is important to recognize some limitations of this study. One of them is the sample size, which may limit the generalizability of the results to other populations of healthcare professionals. Additionally, the relatively short follow-up period may not fully capture the long-term effects of WG.

For future research, it would be valuable to conduct longitudinal studies with larger samples and longer follow-up periods to better assess the effectiveness and sustainability of WG interventions in preventing WRMSDs among healthcare professionals. Additionally, investigations into the economic costs and benefits of these interventions would also be beneficial to inform decision-making in hospital settings.

In terms of implications for clinical practice, the results of this study highlight the importance of implementing WG programs as an integral part of occupational health strategies in hospital environments. Such programs not only contribute to the reduction of musculoskeletal injuries among nurses and other healthcare professionals subject to similar risks but also promote a culture of health and well-being in the workplace. Therefore, it is recommended that hospital managers consider including WG programs in their occupational health policies to improve the long-term health and well-being of their employees.

## AUTHOR CONTRIBUTIONS

Conceptualization, C.A., M.M., and M.R.; data curation, C.A., M.M., and M.R.; formal analysis, C.A., M.M., and M.R.; investigation, C.A., M.M., and M.R.; methodology, C.A., M.M., and M.R.; project administration, C.A., M.M., and M.R.; resources, C.A., M.M., and M.R.; software, C.A., M.M., and M.R.; supervision, C.A., M.M., and M.R.; validation, C.A., M.M., and M.R.; visualization, C.A., M.M., and M.R.; writing-original draft, C.A., M.M., and M.R.; writing-review and editing, C.A., M.M., and M.R.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.



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