Comparative Analysis Of Preventive Strategies For Musculoskeletal Disorders In Nurses Across Different Health Systems- A Systematic Review

Authors:

Mohamed Ismail. S[1], Ph.D Scholar, Rani Meyyammai College of Nursing, Cuddalore District.

Dr. B. Sivagamy[2], Lecturer, Rani Meyyammai College of Nursing, Cuddalore District.

Address for Correspondence

Mohamed Ismail. S[1]

Ph.D Scholar

Rani Meyyammai College of Nursing, Cuddalore District, Tamil Naidu, India.

ABSTRACT

Introduction: The incidence of work-related musculoskeletal disorders have been consistently high in nursing sectors and are a significant cost to the health service due to absenteeism. Work-related musculoskeletal disorders are more common among healthcare workers in nursing homes due to the high dependency needs of older persons which often include need for help with self-care and mobility. Therefore, staffs are exposed to potential injury associated with moving and handling patients. Work-related musculoskeletal disorders significantly impact on the quality of life of affected individuals, can cause economic hardship and affect service provision. *Materials and Methods:* The comparative analysis of preventive strategies for Musculoskeletal disorders in Nurses across different health systems were selected as the area of interest, and search was conducted in online database PubMed-Medline, Science direct, Web of science and EBSCO Host to retrieve quantitative research articles published till November 2024. Only English language studies were included. *Results:* Ten studies met the criteria for inclusion in the review. Interventions reported in the literature were in four categories; (i) Specialized equipment (ii) Staff training (iii) Policies and procedures to reduce work-related musculoskeletal disorders and (iv) Support and follow up. A ceiling lift is the intervention

of choice to reduce work-related musculoskeletal disorders, as it reduces the stress associated with pushing and pulling. Risk assessment is vital to determine the individual needs of clients for safe handling. Train-the-trainer roles could be used to implement training interventions where resources limit the employment of a designated lead to facilitate injury prevention. A multifaceted approach to prevent and reduce work-related musculoskeletal disorders is recommended. Further research is required to ascertain the effectiveness of Cognitive Behavioral Therapy on injury reduction in nursing homes. ***Conclusion:*** These findings have the potential to inform the development and adherence to injury prevention policies and regulations by healthcare managers and staff which could reduce injuries. Identifying the appropriate interventions to prevent and reduce work-related musculoskeletal disorders.

Keywords: Preventive Strategies, Musculoskeletal Disorders, Nurses, Health Systems.

1. INTRODUCTION:

Work-related musculoskeletal disorders (WMSDs) are described as a variety of conditions and injuries that have destructive and inflammatory effects on muscles, tendons, ligaments, joints, nerves, and supportive blood vessels. They cause pain or discomfort and are affected by work conditions and the work environment of employees.

Work-related musculoskeletal disorders are known as an important occupational health problem among healthcare personnel. The negative consequences of musculoskeletal pain and injuries on the nurses' health and wellbeing can increase job dissatisfaction and impose high costs on healthcare centers due to lost workdays and compensation claims. Sickness absence due to musculoskeletal disorders can lead to shortage of nursing staff which is one of the major health systems challenges. Nurses have 30% more sick leave than other professions. Low back pain (LBP) is the reason of 16% of these absences, while this figure is 8% in other occupations. LBP with 30–60% prevalence is the most prevalent type of musculoskeletal disorders among nurses. Shoulder disorders with 43–53% prevalence and neck pain with 30–48% are in the next ranking.

The musculoskeletal disorders related to work (MDRW) are cumulative traumas resulting from the decompensation between the functional capacity of the muscle and its execution and frequency, which can lead to occupational diseases. Usually, their origin results from the combination of several categories, which adds complexity to the causal identification, as well as its association with work. The consequences for professionals are numerous, of which the following stand out: physical and psychological suffering, loss of income, increased risk of chronicity, the economic costs inherent to the treatment, and the underlying burnout.

This negative effect extends to the business level, in the present, with a reduction in productivity and an increase in absenteeism, and, in the long term, with the commitment of productive capacity and, consequently, an increase in costs.

Musculoskeletal disorders are a complex health problem transversal to all sectors of activity worldwide. The European institutions with responsibility for health and work have expressed their concern and provided guidelines for their control due to the risk of these injuries becoming pandemic, with repercussions on the economy of the different countries, including the increasing costs in the health systems.

The prevalence of WMSDs is high among the general population; however, it is more destructive in clinical staff. Some evidence indicated that healthcare workers confront more to WMSDs than workers in the construction, mining, and manufacturing industries. Among healthcare staff, those who directly take care of patients, especially nurses and nursing assistants, are more prone to have the issue with respect to the nature of their tasks.

The incidence of work-related musculoskeletal disorders have been consistently high in nursing sectors and are a significant cost to the health service due to absenteeism. Work-related musculoskeletal disorders are more common among healthcare workers in nursing homes due to the high dependency needs of older persons which often include need for help with self-care and mobility. Therefore, staffs are exposed to potential injury associated with moving and handling patients. Work-related musculoskeletal disorders significantly impact on the quality of life of affected individuals, can cause economic hardship and affect service provision.

The prevalence of MDRW in nurses at 12 months ranges from 71.85% to 84%, but only a small percentage (9.39%) is on sick leave due to MDRW. Many of MDRW's preventive intervention programs have been developed, such as: patient handling and mobilization programs, ergonomic intervention, psychosocial guidance on the work relationship, health promotion and prevention interventions, and exercise and physical therapy. However, the authors observe that the evidence on programs with isolated interventions is limited and we don't know the effectiveness of their operational results.

The design of a preventive intervention program for MDRW must be based on multidimensionality and the diagnosis of the specific needs of the target population, such as work characteristics, the type of ergonomic equipment existing, the environment, and the organizational culture implemented. These types of preventive programs can be more successful due to their direct relationship with the praxis and should include the assessment of risk perception, educational programs with ergonomic posture training of preventive clinical skills, physical activity at the workplace, cognitive-behavioral therapy for the treatment of physical, psychological, occupational, ergonomic risk factors, and the promotion of a safe environment.

A systematic review suggested that physical exercise at the workplace is considered an activity able to prevent occupational musculoskeletal disorders being able to enhance the physical capacity of workers.

However, some studies showed contrasting results about the reduction of low back pain symptoms following only physical exercise at the workplace. This is not a surprise since, considering the numerous and different variables in nurses' workplaces and the role of the onset of this disorder, it is likely that its prevention needs a multidimensional approach that uses the simultaneous adoption of technical, organizational, procedural, and training measures.

Another systematic review identified, based on their network meta-analyses, that low back exercises plus health education were the most effective procedures on the effects of non-drug intervention management in nurses, followed by single low back exercise intervention and yoga.

Changing an individual's behavior or reducing task-specific risks has been the focus of most interventions, but rather the broader contextual factors that are associated with the complex ethology of MDRW, such as risk, adhesion to the hierarchical chain in risk control, lack of commitment from management, culture and organizational conditions, understanding the importance of worker participation, regulated legislative practice, and competence in risk management.

The literature review shows that the studies focus essentially on the epidemiology of injuries and those that explore the interventions adopt one or two interventions, not systematizing all the effective interventions to control this occupational health problem.

In view of the above, the aim of this review was to identify the different interventions adopted in the prevention of musculoskeletal disorders related to work in nurses and to compare the effectiveness of these interventions, providing the appropriate and scientific basis for building an intervention to prevent musculoskeletal disorders in nurse's praxis.

1.1 Aim:

The aim of this review is to identify and discuss strategies that may be effective in reducing the prevalence and consequences of work-related musculoskeletal disorders.

1.2 Objectives:

- To identify strategies that may be effective at reducing the prevalence of musculoskeletal injuries and pain in nurses.

2. METHODOLOGY:

2.1 Search Strategy methods:

An initial step has been taken to find out that reviews based on key terms. So this is the reason a narrative review was undertaken.

The comparative analysis of preventive strategies for Musculoskeletal disorders in Nurses across different health systems were selected as the area of interest, and search was conducted in online database PubMed-Medline, Science direct, Web of science and EBSCO Host to retrieve quantitative research articles published till November 2024. Only English language studies were included. The search terms used in this review were Preventive Strategies, Musculoskeletal Disorders and Health Systems. The studies were conducted in many countries, such as the United States, Thailand, Iran, Germany, Canada and India.

2.1.1 Search strategy:

Mesh term	Non-mesh term
• Comparative Analysis • Preventive • Strategies • Musculoskeletal • Disorders • Nurses	• Health Systems

2.1.2 Types of Interventions:

- Presentations on Musculoskeletal Disorders, ergonomics, Physical exercises, Documents and training materials, Leaflets, Posters and instructional Videos.

2.1.3 Types of Studies:

- Quasi-experimental study, Randomized controlled trial.

2.1.4 Type of Participants:

- Nurses

2.1.5 Settings:

- Hospitals and Health settings

2.1.6 Outcome:

- The outcome of this narrative review is that reducing the prevalence and impact of musculoskeletal injuries and pain in nurses.
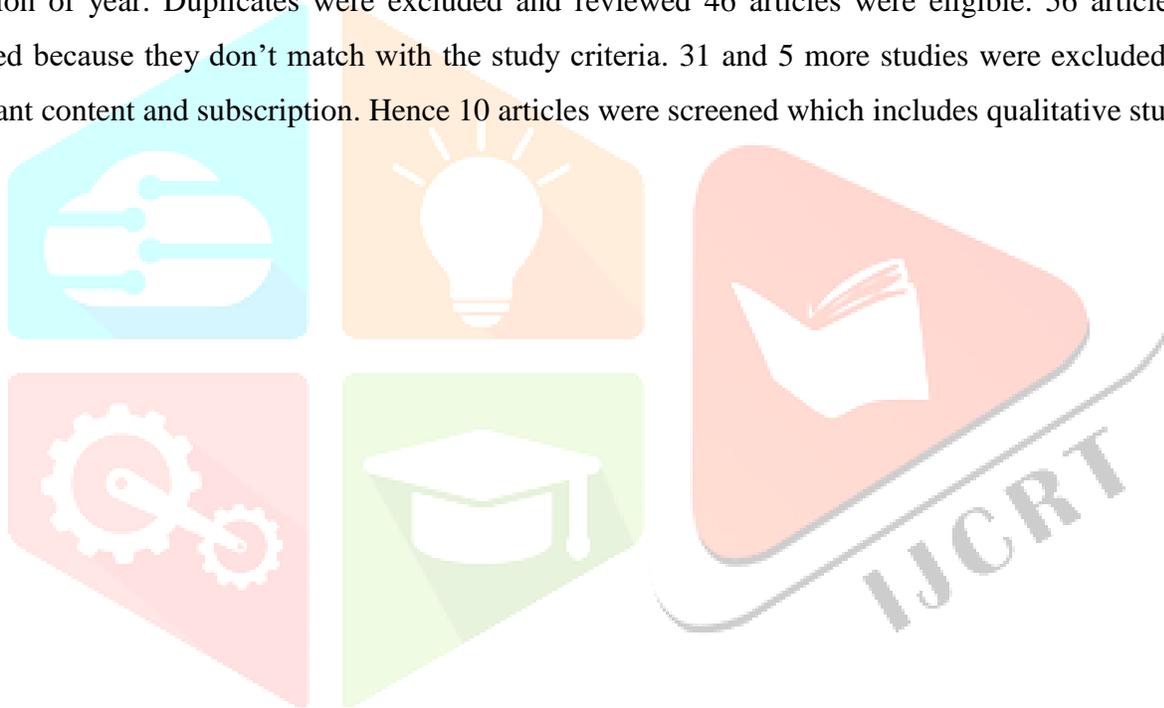
2.1.7 Delivery of Interventions:

- Training on MSDs, Ergonomics & Instructions for physical exercises.

3. RESULTS:

3.1 PRISMA FLOW CHARTS:

The systematic framing search was done individually and in the combination with synonyms, also according to the online database. Additional to this, a manual PubMed-Medline search was done by using the keywords and synonyms were searched for already found articles. The remaining full text of 10 articles was included. Initial search found 154 over which 98 articles were selected according to limitation of year. Duplicates were excluded and reviewed 46 articles were eligible. 56 articles were removed because they don't match with the study criteria. 31 and 5 more studies were excluded due to irrelevant content and subscription. Hence 10 articles were screened which includes qualitative studies.
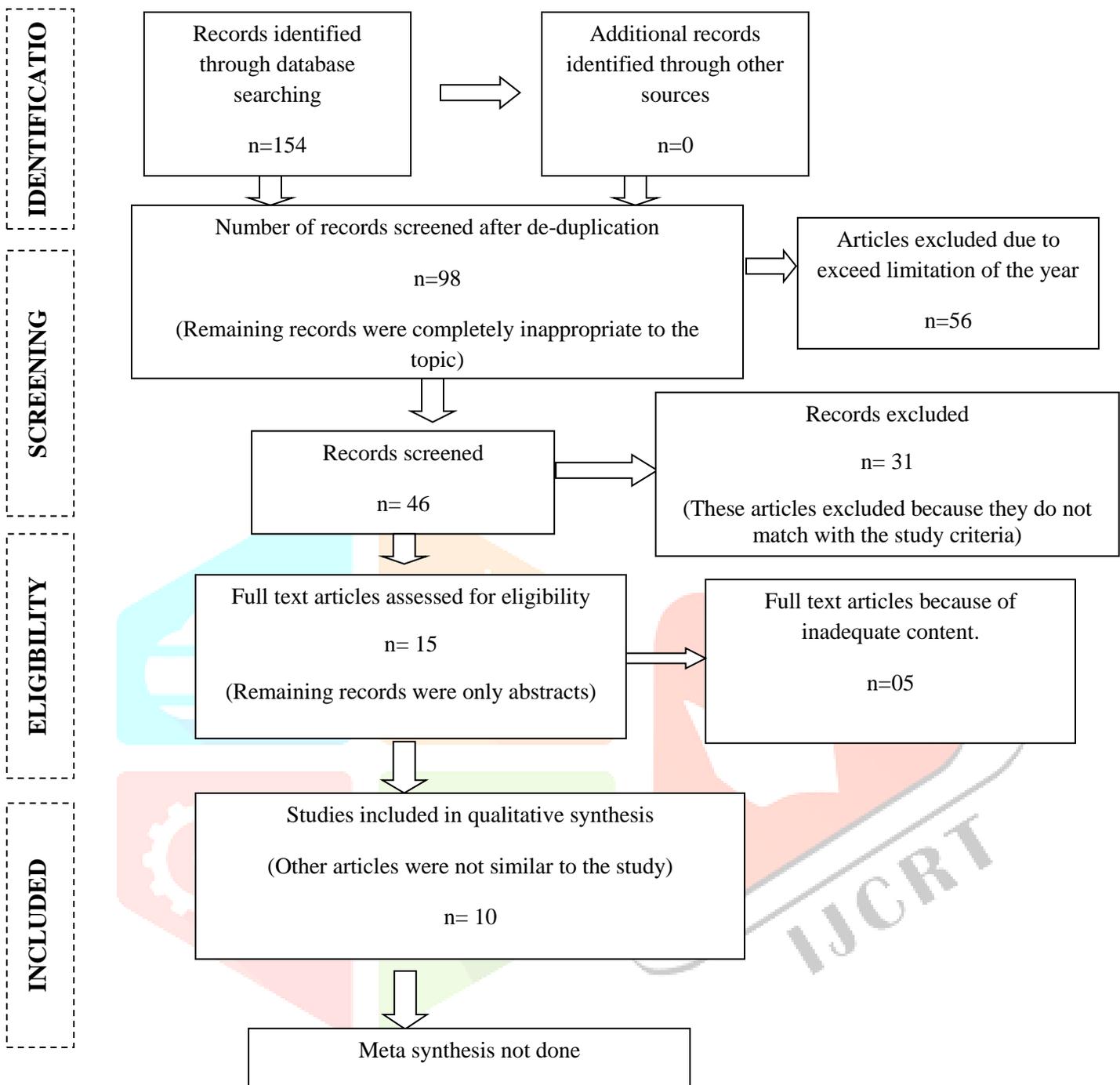
IDENTIFICATIO

Records identified through database searching
n=154

Additional records identified through other sources
n=0

SCREENING

Number of records screened after de-duplication
n=98
(Remaining records were completely inappropriate to the topic)

Articles excluded due to exceed limitation of the year
n=56

Records screened
n= 46

Records excluded
n= 31
(These articles excluded because they do not match with the study criteria)

ELIGIBILITY

Full text articles assessed for eligibility
n= 15
(Remaining records were only abstracts)

Full text articles because of inadequate content.
n=05

INCLUDED

Studies included in qualitative synthesis
(Other articles were not similar to the study)
n= 10

Meta synthesis not done

Figure 1: Flow chart showing study selection process:

3.2. TABLE NO. 1: DATA EXTRACTION TABLE:

S.No.	Authors and year	Research design	Findings of the study
1.	Kozak et.al. 2017	Quasi-experimental study	The finding of this study concludes that Staff maintained proper ergonomic measures with 29% reduction in time spent in sagittal inclination. - Reduction in stressful trunk postures from 2.5% to 1.0%.
2.	Brophy et.al 2019	Quasi-experimental study	The study finding shows that the Reports of lower back pain reduced from 15.7 to 11per 100 Healthcare Assistants. -Total number of lost workdays reduced from 1476 to 625 annually. - The annual cost related to lower back pain reduced from $201,100 to $91,800.
3.	Kushma et.al.2019	Quasi-experimental study	The findings of this study show that the Average number of sick leave days due to lumbar spine illness and back pain decreased. General state of health, quality of life and work ability indices improved. Back friendly behavior recorded more often.
4.	Kolu.et.al. 2017	Retrospective & Cross-sectional study	In this study it revealed Health-care costs, sick leave, productivity losses and also risk of disability pension decreased.
5.	Andersen et.al. 2015	Experimental study Randomized controlled trials	More participants from TPA (18) compared to reference group (15) had no sickness absence because of musculoskeletal troubles, the difference was not significant (p=0.40). Work ability and other outcomes showed significant improvements.
6.	Beckers et.al 2017	Experimental study Randomized controlled trials	Pain severity reduced significantly. Self-assessed work ability regarding the physical demands improved significantly in the intervention group compared to the control group (P=0.034). No intervention effects were observed on current work ability compared with

			lifetime best, or on work ability regarding to psychological demands.
7.	**Kurowski et.al. 2019**	Quasi-experimental study	Number of RH related lost time injuries, and lost time back injuries reduced length of first episode of disability also decreased significantly. 30000 avoided days of disability occurred during six years follow up, due to reduction in RH-related lost time recurrences. The impact sustained at long term.
8.	**Yang.et.al 2021**	Quasi-experimental cluster-randomized controlled trial	A meticulous planning is essential to make interventions compatible with the daily work routine. The multidimensional intervention program seems applicable from time, financial, and organizational perspectives, he helped to reduce the short-term reported incidence rate of WRMDs, improve the nursing risk perception and health behavior application, and promote a safe working environment.

4.0 FUTURE SIGNIFICANCE:

- Future studies should focus on identifying the specific areas affected by musculoskeletal disorders within each hospital, categorized by department.

- Preventing MSDs also reduces the need for worker's compensation claims, which can be financially burdensome for health systems. Fewer claims translate into saving for hospitals and health care providers.

- Data analytics can be used to identify patterns of musculoskeletal injuries and predict which staff members are at risk. This data can inform personalized and targeted interventions to prevent injuries before they occur.

- Preventing musculoskeletal disorders in nurses are important because it can help avoid negative physical, psychological, socioeconomic and working aspects.

4.1 LIMITATIONS:

- Computerized data bases were limited.

- Search strategy was refined to Musculoskeletal disorders only.

CONCLUSION:

This systematic review of MSDs poses a significant challenge to the nursing profession, affecting both the physical well-being and professional performance of nursing staff. The combination of physically demanding tasks, irregular work schedules, and psychological stress creates a high-risk environment for the development of these disorders. As the prevalence of MSDs in nursing staff is alarmingly high, especially affecting the lower back, neck, and shoulder, it becomes clear that proactive measures must be taken to mitigate these risks. Ensuring proper ergonomic practices, providing education on safe patient handling techniques, and offering access to assistive devices can reduce the strain on nurses' musculoskeletal system. Additionally, fostering a supportive work environment that promotes regular exercise, healthy work-life balance, and addresses psychological stressors is crucial for improving nurses' overall QoL and work ability. By prioritizing the prevention and management of MSDs, healthcare organizations can enhance not only the health and well-being of their nursing staff but also the quality of patient care provided.

ACKNOWLEDGEMENTS:

CONFLICTS OF INTEREST:

There are no conflicts of Interest.

REFERENCES:

1. Asuquo, E. G., Tighe, S. M., & Bradshaw, C. (2021). Interventions to reduce work-related musculoskeletal disorders among healthcare staff in nursing homes; An integrative literature review. International Journal of Nursing Studies Advances, 3, 100033.

2. Richardson, A., McNoe, B., Derrett, S., & Harcombe, H. (2018). Interventions to prevent and reduce the impact of musculoskeletal injuries among nurses: A systematic review. International journal of nursing studies, 82, 58-67.

3. Sepehrian, R., Hashjin, A. A., & Farahmandnia, H. (2024). A systematic review of programs and interventions for reduction of sickness absence in nursing staff with work-related musculoskeletal disorders. Journal of Education and Health Promotion, 13(1), 205.

4. Nguyen, T. T., Nguyen, T. H., Hoang, D. L., Hoang, T. G., & Pham, M. K. (2022). Effectiveness of interventions to prevent musculoskeletal disorders among district hospital nurses in Vietnam. BioMed research international, 2022(1), 1539063.

5. Sousa, A. D., Baixinho, C. L., Presado, M. H., & Henriques, M. A. (2023). The effect of interventions on preventing musculoskeletal injuries related to nurses work: systematic review. Journal of Personalized Medicine, 13(2), 185.

6. Richardson, A., Gurung, G., Derrett, S., & Harcombe, H. (2019). Perspectives on preventing musculoskeletal injuries in nurses: A qualitative study. Nursing open, 6(3), 915-929.

7. Mitseas, P., Naoum, S., & Konstantinidis, T. (2023). Risk Factors for Musculoskeletal Disorders in Nursing Personnel and Prevention Strategies. Romanian Journal of, 126(1), 63.

8. Weiner, C., Alperovitch-Najenson, D., Ribak, J., & Kalichman, L. (2015). Prevention of nurses' work-related musculoskeletal disorders resulting from repositioning patients in bed: comprehensive narrative review. Workplace health & safety, 63(5), 226-232.

9. Nguyen, T. T., Nguyen, T. H., Hoang, D. L., Hoang, T. G., & Pham, M. K. (2022). Effectiveness of interventions to prevent musculoskeletal disorders among district hospital nurses in Vietnam. BioMed research international, 2022(1), 1539063.

10. Sousa, A. D., Baixinho, C. L., Presado, M. H., & Henriques, M. A. (2023). The effect of interventions on preventing musculoskeletal injuries related to nurses work: systematic review. Journal of Personalized Medicine, 13(2), 185.