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Psychosocial intervention role on musculoskeletal disorders: A systematic review

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Abstract

Background: Work-Related Musculoskeletal Disorders remain as a major global occupational health problem, with growing evidence indicating that controlling psychosocial factors in the workplace are important determinants alongside biomechanical exposures.
Purpose: To synthesize evidence on the effectiveness of psychosocial interventions in preventing and managing Work-Related Musculoskeletal Disorders among worker populations.
Method: A systematic search was conducted across PubMed, ProQuest, Google Scholar, and Science Direct for randomized controlled trials or intervention studies published in English within the last ten years. Six studies met the inclusion criteria.
Results: The population involving nurses, healthcare workers, slaughterhouse workers, assembly-line workers, and hospital orderlies. Interventions included work-related psychosocial coaching combined with physiotherapy, workplace physical exercise incorporating group participation and motivational coaching, social cognitive theory-based ergonomic education, and multifaceted participatory ergonomics programs combining physical, psychosocial, and case-management components. Workplace exercise performed collectively with colleagues consistently improved vitality, social climate, and pain-related coping compared with individual or home-based approaches, while multicomponent programs integrating participatory ergonomics and psychosocial support reduced neck, shoulder, and upper-back pain prevalence. Standalone psychosocial coaching produced only modest long-term benefits when not paired with organizational-level change.
Conclusion: Overall, this review indicates that psychosocial interventions contribute meaningfully to Work-Related Musculoskeletal Disorders prevention and management, particularly when embedded within multicomponent programs that combine physical, psychosocial, and organizational elements, supporting the biopsychosocial model as a framework for future workplace intervention design.

Keywords: Musculoskeletal Disorders; Occupational Health; Psychosocial Intervention.

INTRODUCTION

Work-related musculoskeletal disorders (WMSDs) remain one of the most prevalent occupational health problems across industrial sectors worldwide. According to the Global Burden of Disease Study 2021, the number of prevalent musculoskeletal disorder cases globally reached 1.686 billion, an increase of 95% compared to 1990, while these conditions contributed 6.7% of global Disability-Adjusted Life Years (DALYs), rising to 21.3% in high-income countries (Liu et al., 2025a). These figures confirm that WMSDs are not merely an individual physical complaint but a public health issue with substantial economic and social implications, given their association with reduced productivity, increased sickness absence, and, in severe cases, permanent disability.

The pattern of complaints is relatively consistent across worker populations. A recent scoping review mapping WMSD research published between 2021 and 2024 found a marked increase in the number of

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studies on this topic over that period—plausibly linked to changes in job tasks and working conditions brought about by the COVID-19 pandemic—with low back, neck, and shoulder pain reported as the most common complaints (Hassani & Karanikas, 2026). Similar patterns have been observed in specific occupational groups; for instance, a recent meta-analysis among steelworkers reported an annual WMSD prevalence of 69.2%, with the lower back, shoulders, and neck identified as the most frequently affected sites (Lan et al., 2026).

What distinguishes the contemporary understanding of WMSDs from earlier perspectives is the growing body of evidence indicating a multifactorial etiology, rather than one driven solely by biomechanical exposures such as heavy lifting, awkward posture, or repetitive movement. Psychosocial factors in the workplace are now recognized as determinants of comparable importance. A systematic review of longitudinal studies by Bezzina et al. (2023) concluded that social support, collaboration, job control, and job demands were statistically significantly associated with the risk and progression of MSDs, and further noted a bidirectional relationship between musculoskeletal disorders and effort–reward imbalance at work. Even among workers exposed to substantial physical loads, such as steelworkers, psychosocial vulnerability has been identified as a relevant risk factor alongside age, smoking habits, night-shift work, and long working hours (Lan et al., 2026).

This recognition of the psychosocial dimension has driven a paradigm shift in intervention design—from approaches centered solely on individual physical rehabilitation toward interventions that address the broader work organization. Several reviews suggest that multicomponent interventions tend to be more effective than single-component ones; a systematic review of participatory ergonomic interventions among nurses, for example, found that multicomponent programs—particularly those incorporating physical activity and exercise—produced stronger reductions in WMSD risk at 6 and 12 months post-intervention compared with single interventions (Krishnanmoorthy et al., 2025b). Consistent with this, a review on MSD risk management in the workplace emphasized that reducing the WMSD burden requires simultaneous identification and control of both physical and psychosocial hazards, although comprehensive approaches of this kind remain limited in practice. Implementation barriers are further compounded by organizational governance issues, including practitioners' limited knowledge of the need to manage psychosocial MSD risk factors, insufficient occupational safety and health (OSH) practitioner skills in this area, funding constraints, and competing priorities—factors that often lead psychosocial risk management to be fragmented and handled separately from general occupational safety programs (Macdonald & Oakman, 2024).

The hierarchy-of-controls principle is also increasingly emphasized in recent literature, underscoring that interventions should target the source of risk at the organizational level rather than the individual worker alone. A recent review on the changes needed to reduce MSD risk affirmed that actions directed at hazard sources in the workplace—such as work organization and working conditions—are generally more effective than other types of intervention, consistent with the Hierarchy of Controls framework applied within the Total Worker Health approach (Macdonald & Oakman, 2024). At the policy level, the International Labour Organization has similarly noted that psychosocial risks such as work-related stress, bullying, violence, and burnout have profound effects on workers' physical and mental health, yet remain poorly captured in national statistics across most countries—signaling the need for greater attention to the psychosocial dimension in WMSD prevention (International Labour Organization, 2025).

More recent research has also begun to move beyond confirming the association between psychosocial factors and WMSDs toward testing the effectiveness of interventions that combine physical ergonomic components with psychosocial or structured physical-activity elements. A recent integrative review synthesizing seven studies from six countries found that combined ergonomic and physical activity interventions yielded meaningful pain reductions—approximately 38% for neck complaints and 37% for hand/wrist complaints—although effect sizes varied considerably and most evidence derived from quasi-experimental studies of moderate quality (Adebiyi et al., 2026). These findings reinforce the argument that single-component interventions, whether purely physical or purely psychosocial, tend

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to offer more limited benefits compared with multicomponent approaches that integrate both dimensions simultaneously.

At the same time, evidence on the effectiveness of conventional ergonomic interventions alone remains mixed. A recent systematic review and meta-analysis examining ergonomic interventions for work-related musculoskeletal pain across various occupational settings concluded that although ergonomic interventions—whether physical, cognitive, training-based, or multifaceted—provide benefits, substantial methodological heterogeneity among primary studies continues to hinder firm conclusions about which intervention components are most decisive for success (Santos et al., 2025). This underscores the need for reviews that specifically disentangle the contribution of psychosocial components from purely physical-ergonomic components in intervention design, rather than treating "multifaceted intervention" as a homogeneous category.

Another dimension increasingly addressed in the recent literature is the bidirectional relationship between musculoskeletal disorders and workers' mental health, particularly within return-to-work contexts. An evidence update on the effectiveness of workplace interventions for musculoskeletal, pain-related, and mental health conditions concluded that programs combining clinical, workplace-based, and care-coordination components tend to be more effective in facilitating return to work than single-domain interventions (Cullen et al., 2018). This is particularly relevant given that musculoskeletal disorders and common mental disorders frequently co-occur among working populations and are similarly influenced by organizational psychosocial conditions such as high job demands, low job control, and insufficient support from supervisors or colleagues.

Attention to worker groups with evolving job characteristics has also become a prominent feature of the literature over the past three years. The growing proportion of computer-based and sedentary work has prompted several studies to focus specifically on WMSDs among office workers. A systematic review of musculoskeletal disorders and their risk factors among computer users noted that, beyond static posture and device-use duration, psychosocial factors such as time pressure and cognitive workload also contribute to musculoskeletal complaints in this population (Demissie et al., 2024). In a similar vein, a systematic review and meta-analysis of resistance exercise training among sedentary office workers confirmed that structured physical interventions can yield dual benefits for both musculoskeletal and psychological outcomes, further reinforcing the notion that physical and mental health cannot be sharply separated when designing workplace prevention programs (Chandrasekaran et al., 2026).

Taken together, the accumulated evidence from primary studies and reviews published over the past three years converges on a single conclusion: effective prevention and management of WMSDs requires approaches that extend beyond purely biomechanical-ergonomic interventions to incorporate psychosocial strategies at both the individual and organizational levels. Nevertheless, syntheses that specifically focus on the effectiveness of psychosocial interventions in the workplace—as opposed to broader reviews of ergonomic or multifaceted interventions in general—remain relatively scarce and lack an up-to-date, focused synthesis. This gap underscores the rationale for conducting the present systematic review, which aims to provide a more focused account of the forms, mechanisms, and effectiveness of workplace psychosocial intervention approaches in preventing and reducing the risk of work-related musculoskeletal disorders among adult working populations.

RESEARCH METHOD

This study was conducted as a systematic review to evaluate the effectiveness of psychosocial interventions in preventing and managing work-related musculoskeletal disorders (MSDs) among workers. The review focused on interventions addressing psychosocial risk factors in occupational settings and their impact on musculoskeletal health outcomes, psychosocial well-being, and work-related functioning. Eligible studies were identified according to predefined inclusion criteria. Searches were conducted in PubMed, ProQuest, Google Scholar, and Science Direct using combinations of the following keywords: *trial, musculoskeletal disorder*, *psychosocial*, *workers*, *occupational health*, and *intervention*. Only articles published in English during the last ten years were considered. The review included free full-text articles and prioritized randomized controlled trials (RCTs) and controlled intervention studies. Studies were included if

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investigated workers or occupational populations, evaluated psychosocial or psychosocially informed interventions, addressed musculoskeletal disorders, musculoskeletal symptoms, or chronic pain conditions, using randomized controlled trial, controlled trial, or intervention study designs and reported psychosocial, physical, or occupational outcomes. Studies focusing solely on epidemiological associations without intervention components were excluded from the primary effectiveness synthesis but were considered in the contextual discussion of psychosocial risk factors.

RESEARCH RESULTS

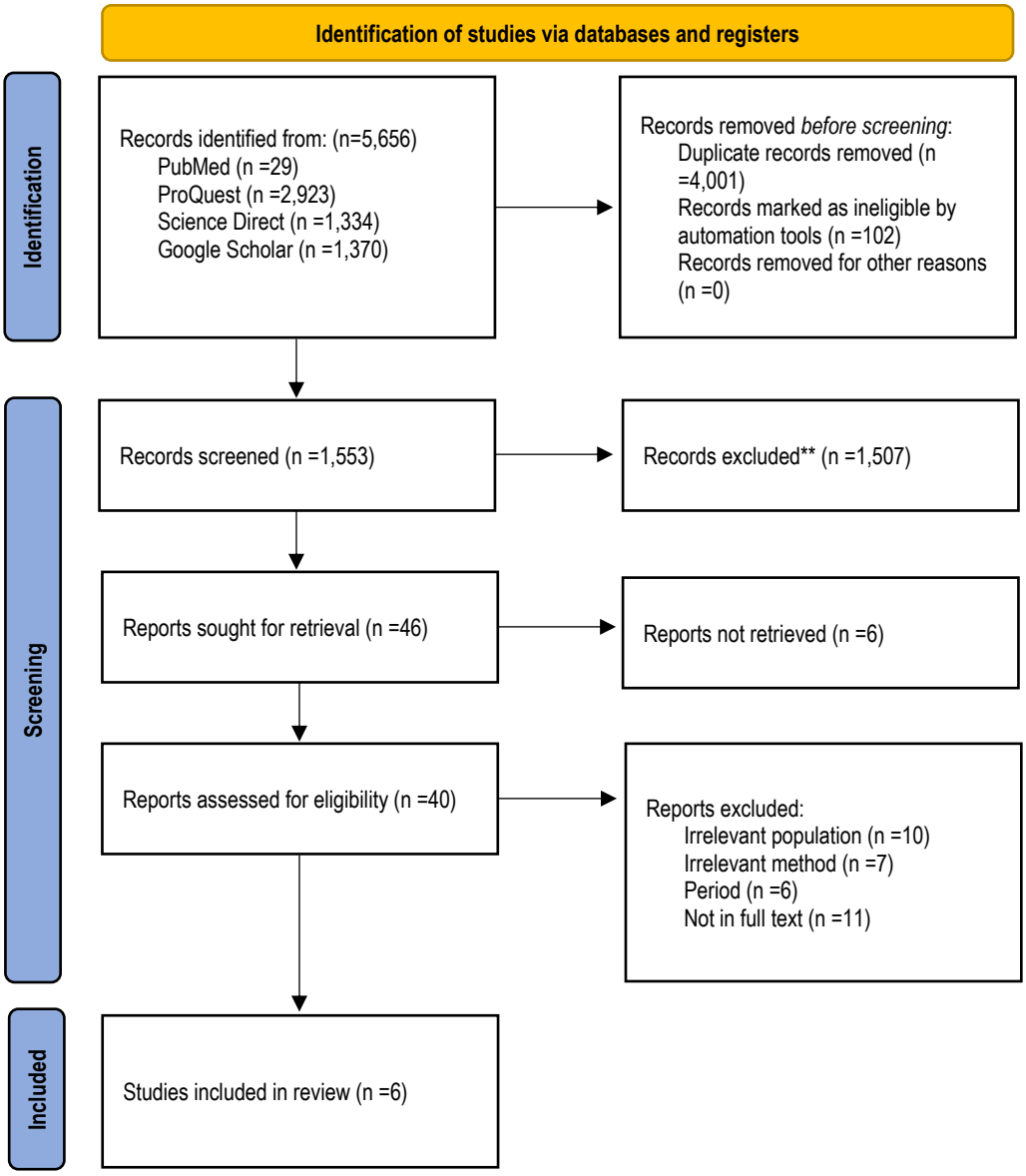


Figure 1. PRISMA Flow Diagram of the Study Selection Process

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Table 1. Characteristics of the Included Studies

Author (Year), Country	Purpose	Design	Population	Findings
Becker et al. (2022), Germany	To determine the long-term effects on unspecific MSC by a combined physiotherapy and coaching intervention compared to physiotherapy alone	The subject was divided into 2 groups, the Intervention Group and Control Group. Both group nurses got Physiotherapy sessions. The Intervention group got additional work related psychosocial coaching session about reducing and managing work stress in the workplace. Then functional status of the locomotor system, work ability, and work-related psychological well-being were measured.	The subject of this study are nurses that worked in hospital. 32 nurses in Intervention Group and 31 nurses in Control Group	The results suggest that the combined intervention of work-related coaching and physiotherapy had only a marginally stronger long-term effect with respect to MSC than physiotherapy alone.
Jakobsen et al. (2017), Denmark	To evaluate the effect of workplace versus home-based physical exercise on psychosocial factors among healthcare workers.	The population was divided into two groups, HOME and WORK. HOME group given home-based physical exercise (HOME) performed alone during leisure time for 10 min 5 days per week. WORK group given workplace physical exercise (WORK) performed in groups during working hours for 10 min 5 days per week and up to 5 group-based coaching sessions on motivation for regular physical exercise. Then Vitality and mental health, psychosocial work environment, work- and leisure disability, control and concern about pain were assessed at baseline and at 10-week follow-up.	A total of 200 female healthcare workers from departments at three hospitals were cluster-randomized to (HOME) group (n= 111 subjects in 9 clusters) and (WORK) group (n= 89 subjects in 9 clusters).	Performing physical exercise together with colleagues during working hours was more effective than home-based exercise in improving vitality and concern and control of pain among healthcare workers. These benefits occurred in spite of increased work pace.
Andersen et al. (2017), Denmark	To investigate the effect of workplace physical exercise on psychosocial factors among workers with chronic musculoskeletal pain	33 participants from each group were given a screening procedure then separated into 2 groups. The intervention group received physical exercise together under professional supervision and the reference group was given the individualized ergonomic training and education based on a worksite analysis and a hazard prevention system. After 10 weeks of follow up, the participant then given a questionnaire concerning psychosocial factors using General Nordic Questionnaire for Psychological and Social Factors at Work	A total of 66 participants as workers from slaughterhouse were joined in this trial. 33 participants in group intervention and 33 participants in reference group.	Workplace physical exercise performed together with colleagues improves social climate and vitality among workers with chronic musculoskeletal pain. Mental health remained unchanged.

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Author (Year), Country	Purpose	Design	Population	Findings
Hosseini et al. (2025), Iran	To investigate the impact of a structured, theory-based educational intervention using the learning-by-doing approach to promote ergonomic behaviors and decrease MSDs subsequently.	80 Participant from the assembly line workers were divided into two group. The intervention group then received a structured training program based on Social Cognitive Theory (SCT). Both groups were then followed up at 3,12, and 24 weeks after intervention using the Ergonomic Behavior Evaluation Tool (EBET) and the Nordic Musculoskeletal Questionnaire (NMQ).	The subject of this study were assembly line workers among Iranian women. Total subject was 80 workers that were divided into 2 groups, intervention group 37 workers and 38 workers in control group.	Educational intervention, employing the LBD approach, significantly influenced Social Cognitive Theory constructs and Ergonomic Behavior, highlighting its efficacy in promoting proper posture and stretching movements.
Soler-Font et al. (2019), Spain	To evaluate a multifaceted intervention to prevent and manage MSP in two hospitals.	The intervention group received participatory ergonomics using ERGOPAR Method, healthy lifestyle promotion program using Nordic Walking, and a tailored case management program as secondary and tertiary prevention. The intervention lasted 1 year. The primary outcomes were prevalence of Musculoskeletal pain and absence from sickness. The secondary outcome was work functioning.	The subject of this study were nursing staff and divided into intervention group 211 nurses within 4 clusters and control group 111 nurses within 3 clusters.	The intervention was effective to reduce neck, shoulder and upper back pain. This research suggests that interventions to prevent and manage Musculoskeletal Pain need a multifactorial approach including the three levels of prevention, and framed within the biopsychosocial model.
Chanchai et al. (2016), Thailand	To evaluate the effects of an ergonomic intervention on musculoskeletal disorders and psychosocial risk factors	The subjects were randomly chosen then divided into group. The intervention group received 12 sessions of educational training sessions. These sessions were provided with education materials aimed at familiarizing with the principles of ergonomics, including disorders and workplace conditions, and the objectives of ergonomics intervention. Training sessions provided participants with the necessary skills to assess their work environment and make suggestions for improvement. The Nordic Musculoskeletal Disorders Questionnaire (NMQ) and the Copenhagen Psychosocial Questionnaire (COPSOQ) were used to evaluate the results from this trial.	The subject from this research were hospitals orderlies in Thailand. The subject the divided into intervention group and control group. 50 orderlies in both groups.	This research gives a positive result particularly in terms of reducing physical work environment risk factors for musculoskeletal disorders and increasing promotion factors of the psychosocial work environment

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DISCUSSION

The modest-to-moderate effects observed across the six included trials (Andersen et al., 2017; Becker et al., 2020; Chanchai et al., 2016; Hosseini et al., 2025; Jakobsen et al., 2017; Soler-Font et al., 2019) align with a recent systematic review and meta-analysis by Santos et al. (2025), which pooled 24 randomized controlled trials involving 4,086 workers across diverse occupations and found that ergonomic interventions produced measurable reductions in pain intensity, with several studies also reporting positive changes in psychosocial risk factors, mirroring the pattern seen in Chanchai et al. (2016) and Soler-Font et al. (2019). Similarly, a 2025 meta-analysis of cognitive-behavioral therapy (CBT) for chronic musculoskeletal pain by Liu et al. (2025b), comprising 14 RCTs and 2,677 participants, reported significant reductions in pain catastrophizing, pain intensity, and functional disability, reinforcing the premise underlying the coaching component used by Becker et al. (2020)—that addressing cognitive and behavioral responses to work stress and pain can meaningfully influence musculoskeletal outcomes even when delivered as an adjunct rather than a primary treatment.

Consistent with these findings, a recent randomized controlled trial by Karatrantou and Gerodimos (2024) demonstrated that a six-month supervised workplace exercise program combining flexibility, strength, and balance training substantially reduced musculoskeletal pain and work absenteeism while improving functional capacity among office workers, reinforcing the value of structured, colleague-supported exercise programs observed in Jakobsen et al. (2017) and Andersen et al. (2017). Similarly, Grana et al. (2024) found that a workplace ergonomics and exercise program among office employees not only reduced musculoskeletal pain but also significantly decreased presenteeism and improved both physical and mental health scores, suggesting that combined ergonomic-psychosocial programs can yield measurable organizational as well as individual benefits.

Occupation- and Population-Specific Considerations

The included trials suggest that the optimal configuration of a psychosocial intervention may depend on occupational context. Among healthcare workers, participatory, multicomponent approaches integrating ergonomics, case management, and health promotion were favored (Becker et al., 2020; Chanchai et al., 2016; Soler-Font et al., 2019), whereas structured educational and group-exercise interventions were more prominent among manufacturing and industrial workers (Andersen et al., 2017; Hosseini et al., 2025; Jakobsen et al., 2017). This pattern is consistent with Bezzina et al.'s (2023) systematic review of longitudinal studies, which found that adverse psychosocial working conditions—such as low job control, high demands, and limited social support—are consistently associated with musculoskeletal disorder onset across occupational sectors, but that the strength and nature of these associations vary by job type. Likewise, the 2026 integrated review by Adebiyi et al. (2026), which synthesized seven studies across healthcare, manufacturing, and industrial settings, found that combined ergonomic and physical activity interventions produced clinically meaningful pain reductions (approximately 38% for neck pain and 37% for hand/wrist pain), supporting the rationale for combining psychosocial or educational elements with a physical component, as seen in Andersen et al. (2017) and Hosseini et al. (2025), rather than relying on psychosocial strategies alone.

Recent evidence from other occupational sectors further supports this pattern. Among supermarket cashiers, Yaşar et al. (2025) found that combining ergonomic training with structured exercise significantly reduced musculoskeletal pain and ergonomic risk scores compared with ergonomic training alone, highlighting the added value of active physical components in retail settings. In the manufacturing sector, Jin et al. (2025) reported that a one-year ergonomic intervention program, comprising training, tool redesign, and educational materials, meaningfully reduced musculoskeletal disorder prevalence among vehicle assembly workers, corroborating the benefits observed among assembly-line workers in Hosseini et al. (2025). Within nursing populations specifically, Krishnanmoorthy et al. (2025a) demonstrated that a multicomponent participatory ergonomic intervention, incorporating workstation adjustment, patient-handling equipment training, and relaxation techniques, produced sustained reductions in musculoskeletal complaints

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and improved work performance among ward nurses over a six-month follow-up, closely paralleling the outcomes reported by Soler-Font et al. (2019).

Mechanisms Linking the Psychosocial Work Environment to Musculoskeletal Health

The consistent improvements in vitality, social climate, and coping-related outcomes observed in this review (Andersen et al., 2017; Becker et al., 2020; Chanchai et al., 2016; Jakobsen et al., 2017) support a biopsychosocial explanation of MSD development, in which psychosocial stressors are thought to increase muscle tension, alter pain perception, and reduce workers' capacity to cope with physical job demands. Farrell et al.'s (2023) systematic review and meta-analysis of psychological interventions delivered by physiotherapists for neck pain similarly found that integrating psychologically informed strategies, such as cognitive-behavioral techniques and graded activity, into physical treatment produced greater improvements in pain and disability than physical treatment alone—a pattern that parallels the superior outcomes of combined interventions over single-component interventions observed in Becker et al. (2020) and Soler-Font et al. (2019). Together, this body of evidence lends support to the biopsychosocial model as a useful conceptual framework for designing workplace musculoskeletal interventions.

Methodological Considerations and Limitations of the Evidence Base

Several methodological limitations temper the strength of these conclusions. Sample sizes across the six included trials ranged from 63 to 322 participants, and follow-up periods varied considerably, from 10 weeks (Andersen et al., 2017; Jakobsen et al., 2017) to 22 months (Becker et al., 2020), limiting comparability of effect durability. Five of the six studies were conducted in single-occupation samples (nurses, orderlies, slaughterhouse workers, or assembly-line workers), which may limit generalizability to other worker populations. In addition, self-reported outcome measures such as the Nordic Musculoskeletal Questionnaire and COPSOQ, used in several included studies (Andersen et al., 2017; Becker et al., 2020; Chanchai et al., 2016; Soler-Font et al., 2019), are susceptible to recall and social-desirability bias. These limitations are echoed in the broader literature: Bezzina et al. (2023) noted that much of the psychosocial-MSD literature remains cross-sectional rather than longitudinal, limiting causal inference, while Santos et al. (2025) and Adebiyi et al. (2026) both highlighted substantial heterogeneity in intervention duration, outcome measures, and occupational settings across the ergonomic-intervention literature, which restricts the precision of pooled effect estimates and necessitates cautious interpretation of comparative effectiveness.

Implications for Practice and Future Research

Collectively, the evidence suggests that workplace programs addressing musculoskeletal health should not rely on physical or ergonomic modification alone, but should incorporate psychosocial elements—such as coaching, participatory ergonomics, or structured education—to achieve more comprehensive and sustained benefits (Adebiyi et al., 2026; Becker et al., 2020; Chanchai et al., 2016; Santos et al., 2025; Soler-Font et al., 2019). Future trials would benefit from standardized outcome measures, longer follow-up periods, and inclusion of more diverse occupational groups, including office-based and precarious or informal-sector workers who remain underrepresented in the current evidence base (Bezzina et al., 2023; Farrell et al., 2023; Liu et al., 2025b). Cost-effectiveness evaluations and process evaluations, such as those increasingly reported alongside recent multifaceted trials, would further strengthen the translation of this evidence into sustainable workplace policy and practice.

CONCLUSION

This systematic review demonstrates that psychosocial interventions play a meaningful role in the prevention and management of work-related musculoskeletal disorders among diverse worker populations, including healthcare workers, manufacturing employees, and hospital support staff. Interventions that incorporated psychosocial elements, such as coaching, participatory ergonomics, structured education, or group-based physical exercise, were generally associated with improvements in vitality, social climate, ergonomic behavior, and regional musculoskeletal pain, particularly in the neck, shoulder, and upper back. However, the evidence also indicates that psychosocial strategies delivered in isolation tend to produce only modest and inconsistent benefits,

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whereas interventions embedding psychosocial components within a broader physical, ergonomic, or organizational framework achieve more comprehensive and sustained outcomes.

This pattern reinforces the relevance of the biopsychosocial model as a guiding framework for occupational musculoskeletal health promotion. Given the heterogeneity in study populations, intervention duration, and outcome measures observed across the included trials, workplace stakeholders and occupational health practitioners are encouraged to design multicomponent programs tailored to specific occupational contexts rather than relying on single-strategy approaches. Future research employing standardized outcome measures, longer follow-up periods, and broader occupational representation, particularly among office-based and informal-sector workers, is needed to strengthen the evidence base and support the translation of psychosocial interventions into sustainable workplace policy and practice.

REFERENCES

Adebiyi, A. R., Sekhon-Atwal, A., Davis, E., Hansen, B. R., Baker, D. J., & D'Aoust, R. F. (2026). Combined ergonomic and physical activity interventions for preventing work-related musculoskeletal disorders: An integrated review. *Workplace Health & Safety*, *74*(4), 176-188. https://doi.org/10.1177/21650799251377465

Andersen, L. L., Persson, R., Jakobsen, M. D., & Sundstrup, E. (2017). Psychosocial effects of workplace physical exercise among workers with chronic pain: Randomized controlled trial. *Medicine*, *96*(1), e5709. https://doi.org/10.1097/MD.0000000000005709

Becker, A., Angerer, P., Weber, J., & Müller, A. (2020). The prevention of musculoskeletal complaints: long-term effect of a work-related psychosocial coaching intervention compared to physiotherapy alone—a randomized controlled trial. *International archives of occupational and environmental health*, *93*(7), 877-889. https://doi.org/10.1007/s00420-020-01538-1

Bezzina, A., Austin, E., Nguyen, H., & James, C. (2023). Workplace psychosocial factors and their association with musculoskeletal disorders: a systematic review of longitudinal studies. *Workplace health & safety*, *71*(12), 578-588. https://doi.org/10.1177/21650799231193578

Chanchai, W., Songkham, W., Ketsomporn, P., Sappakitchanchai, P., Siriwong, W., & Robson, M. G. (2016). The impact of an ergonomics intervention on psychosocial factors and musculoskeletal symptoms among Thai hospital orderlies. *International Journal of Environmental Research and Public Health, 13*(5), 464. https://doi.org/10.3390/ijerph13050464

Chandrasekaran, B., Bairapareddy, K. C., & Rao, C. R. (2026). Resistance exercise training on musculoskeletal, metabolic and psychological health in sedentary office workers–systematic review and meta-analysis: Strength training in sedentary workers. *Journal of Occupational Rehabilitation*, *36*(1), 23-42. https://doi.org/10.1007/s10926-025-10273-8

Cullen, K. L., Irvin, E., Collie, A., Clay, F., Gensby, U., Jennings, P. A., Hogg-Johnson, S., Kristman, V., Laberge, M., McKenzie, D., Newnam, S., Palagyi, A., Ruseckaite, R., Sheppard, D. M., Shourie, S., Steenstra, I., Van Eerd, D., & Amick, B. C., III. (2018). Effectiveness of workplace interventions in return-to-work for musculoskeletal, pain-related and mental health conditions: An update of the evidence and messages for practitioners. *Journal of Occupational Rehabilitation, 28*(1), 1–15. https://doi.org/10.1007/s10926-016-9690-x

Demissie, B., Bayih, E. T., & Demmelash, A. A. (2024). A systematic review of work-related musculoskeletal disorders and risk factors among computer users. *Heliyon*, *10*(3). https://doi.org/10.1016/j.heliyon.2024.e25075

Farrell, S. F., Edmunds, D., Fletcher, J., Martine, H., Mohamed, H., Liimatainen, J., & Sterling, M. (2023). Effectiveness of psychological interventions delivered by physiotherapists in the management of neck pain: A systematic review with meta-analysis. *Pain Reports, 8*(3), e1076. https://doi.org/10.1097/PR9.0000000000001076

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DOI: https://doi.org/10.33024/minh.v9i8.4433

Grana, E., Galanis, P., Velonakis, E., Tziaferi, S., & Sourtzi, P. (2024). Investigating the effectiveness of a workplace musculoskeletal disorders management program. *Healthcare, 12*(18), 1815. https://doi.org/10.3390/healthcare12181815

Hassani, M., & Karanikas, N. (2026). Scoping review of studies on work-related musculoskeletal disorders: Quality of evidence, coverage of risk factors and types of risk assessment tools used. *Work, 83*(2), 271–289. https://doi.org/10.1177/10519815251374641

Hosseini, Z. S., Tavafian, S. S., Ahmadi, O., & Maghbouli, R. (2025). Assessing the impact of a social cognitive theory-based educational intervention on ergonomic behaviors: a randomized controlled trial utilizing a learning-by-doing approach. *BMC Public Health*, *25*(1), 3304. https://doi.org/10.1186/s12889-025-24533-y

International Labour Organization. (2025). Issue Paper: OSH Statistics. Supporting the review and update of the international OSH statistical standards at the 22nd ICLS in 2028. https://www.ilo.org/sites/default/files/2025-11/TWG_OSH_Issue_Paper_2025_10_22.pdf

Jakobsen, M. D., Sundstrup, E., Brandt, M., & Andersen, L. L. (2017). Psychosocial benefits of workplace physical exercise: cluster randomized controlled trial. *BMC public health*, *17*(1), 798. https://doi.org/10.1186/s12889-017-4823-9

Jin, X., Dong, Y., Yang, L., Huang, W., Cao, L., Zhang, Z., & He, L. (2025). Ergonomic interventions to improve musculoskeletal disorders among vehicle assembly workers: a one-year longitudinal study. *BMC Public Health*, *25*(1), 824. https://doi.org/10.1186/s12889-025-21798-1

Karatrantou, K., & Gerodimos, V. (2024). A comprehensive workplace exercise intervention to reduce musculoskeletal pain and improve functional capacity in office workers: A randomized controlled study. *Healthcare, 12*(9), 915. https://doi.org/10.3390/healthcare12090915

Krishnanmoorthy, G., Krishna, R., Baharudin, F., Nizamuddin, M. A. S., Nik Hassan, N. H., Danaee, M., Hoe, V. C. W., & Rampal, S. (2025a). Development and evaluation of a participatory ergonomic intervention for the reduction of work-related musculoskeletal disorders among nurses. *AIMS Public Health, 12*(4), 1240–1264. https://doi.org/10.3934/publichealth.2025063

Krishnanmoorthy, G., Rampal, S., Karuthan, S. R., Baharudin, F., & Krishna, R. (2025b). Effectiveness of participatory ergonomic interventions on work-related musculoskeletal disorders, sick absenteeism, and work performance among nurses: Systematic review. *JMIR Human Factors, 12*, e68522. https://doi.org/10.2196/68522

Lan, Y., Zhan, X., Wang, Z., Jiang, D., Li, X., & Peng, C. (2026). Global prevalence and associated risk factors of work-related musculoskeletal disorders among steelworkers: A systematic review and meta-analysis. *Frontiers in Public Health, 14*, 1718101. https://doi.org/10.3389/fpubh.2026.1718101

Liu, M., Rong, J., An, X., Li, Y., Min, Y., Yuan, G., Yang, Y., & Li, M. (2025a). Global, regional, and national burden of musculoskeletal disorders, 1990–2021: An analysis of the global burden of disease study 2021 and forecast to 2035. *Frontiers in Public Health, 13*, 1562701. https://doi.org/10.3389/fpubh.2025.1562701

Liu, X., Yuan, W., Gao, X., Zhao, Z., Leng, R., & Xia, Y. (2025b). Efficacy of cognitive behavioral therapy for musculoskeletal pain: A systematic review and meta-analysis. *Frontiers in Psychology, 16*, 1705679. https://doi.org/10.3389/fpsyg.2025.1705679

Macdonald, W. A., & Oakman, J. (2024). Changes needed to reduce risk of musculoskeletal disorders. *American Journal of Industrial Medicine, 67*(7), 575–581. https://doi.org/10.1002/ajim.23613

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DOI: https://doi.org/10.33024/minh.v9i8.4433

Santos, W., Rojas, C., Isidoro, R., Lorente, A., Dias, A., Mariscal, G., Benlloch, M., & Lorente, R. (2025). Efficacy of ergonomic interventions on work-related musculoskeletal pain: A systematic review and meta-analysis. *Journal of Clinical Medicine, 14*(9), 3034. https://doi.org/10.3390/jcm14093034

Soler-Font, M., Ramada, J. M., van Zon, S. K. R., Almansa, J., Bültmann, U., Serra, C., & INTEVAL_Spain Research Team. (2019). Multifaceted intervention for the prevention and management of musculoskeletal pain in nursing staff: Results of a cluster randomized controlled trial. *PLOS ONE, 14*(11), e0225198. https://doi.org/10.1371/journal.pone.0225198

Yaşar, D., Safran, E. E., & Şevgin, Ö. (2025). The effect of combined ergonomic training and exercises on musculoskeletal pain and ergonomic risks in supermarket cashiers: A randomized controlled trial. *International Archives of Occupational and Environmental Health, 98*(2), 255–265. https://doi.org/10.1007/s00420-025-02132-z

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