
Analysis Of Work Posture On Musculoskeletal Disorders (Msd): *Literature Review*

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Abstract

Musculoskeletal Disorders (MSDs) are one of the most common work-related health problems and a major cause of reduced productivity and disability among workers in various industrial sectors. One of the main risk factors for MSDs is non-ergonomic work postures, such as bending, sitting or standing statically for long periods of time, repetitive movements, and excessive use of force that exceeds the body's physiological capacity. This literature review aims to analyze the relationship between work posture and Musculoskeletal Disorders (MSDs) complaints based on research results published in accredited scientific journals from 2021 to 2024. The method used was a literature review of articles that assessed work posture using ergonomic instruments such as the Rapid Entire Body Assessment (REBA), Rapid Upper Limb Assessment (RULA), Nordic Body Map (NBM), and PLIBEL Checklist. The results of the study show that most studies found a significant relationship between non-ergonomic work posture and increased MSD complaints, especially in the neck, shoulders, lower back, waist, and wrists. In addition to work posture, age and length of service also contribute to an increased risk of musculoskeletal complaints. Thus, improving work design and applying ergonomic principles are important steps in preventing and controlling MSDs in the workplace.

Keywords: *Work Posture, Musculoskeletal Disorders, Ergonomics, Occupational Safety And Health.*

INTRODUCTION

Musculoskeletal Disorders (MSDs) are disorders of the muscular and skeletal systems that include muscles, tendons, ligaments, joints, and nerves due to an imbalance between the workload and the physical capacity of the worker's body. This disorder is one of the most frequent occupational health problems and contributes to a decrease in labor productivity. Ergonomic risks such as unnatural posture, repetitive movements, long working durations, and excessive force use are known to trigger musculoskeletal complaints (Akbar et al., 2024). Unergonomic work postures, such as bending over long periods of time or working in a static position, cause strain on muscles and joints that if persistent can develop into chronic disorders.

Research on briquette industry workers at CV. Sada Wahyu Bantul showed that there is a significant relationship between work posture and complaints of Musculoskeletal Disorders (MSDs), with a p-value of 0.033 (<0.05), which means that a high-risk work posture increases the likelihood of musculoskeletal complaints (Wildasari & Nurcahyo, 2023). In the study, it was also explained that workers with high risk scores based on the Rapid Entire Body Assessment (REBA) method have a greater chance of experiencing complaints than workers with moderate risk. In addition to work posture factors, age ≥ 35 years and working period ≥ 5 years have also been shown to have a significant relationship with the incidence of MSDs (Wildasari & Nurcahyo, 2023). This suggests that long-term exposure to ergonomic risks can worsen the condition of the musculoskeletal system.

Another study in the furniture industry using the PLIBEL method also found that assembly, cutting, and sanding activities have a high risk of musculoskeletal injury due to bending postures and repetitive movements performed continuously (Akbar et al., 2024). Evaluations show that the percentage of injury risk at some workstations reaches more than 75%, which indicates the need to improve workstation design and the application of ergonomic principles. In addition, various studies summarized in ergonomics studies show that assessment methods such as REBA, RULA, and Nordic Body Map (NBM) consistently identify the parts of the body that experience the most frequent complaints, namely the neck, shoulders, back, waist, and wrists (Akbar et al., 2024).

Physiologically, an unnatural working posture causes excessive pressure on the soft tissues and spinal structures, causing muscle fatigue, pain, and impaired movement function. If this condition is not controlled through ergonomic interventions, the risk of MSDs will increase with age and working age (Wildasari & Nurcahyo, 2023). Therefore, a comprehensive study is needed that summarizes various research findings related to the relationship between work posture and MSDs complaints as the basis for the formulation of prevention strategies in the work environment. This literature review was conducted to systematically analyze the results of the latest research on the influence of work posture on complaints of Musculoskeletal Disorders (MSDs), so that it can provide a scientific basis in efforts to improve occupational health and safety.

RESEARCH METHODS

This study uses a *literature review* method with a descriptive approach to analyze the work posture towards complaints of musculoskeletal disorders (MSDs). Literature searches are conducted through Google Scholar, Scopus, and ScienceDirect. Articles reviewed are limited to the last five years of publication (2021–2025) to ensure the relevance and novelty of the research. The search strategy used keywords: "work posture" AND "musculoskeletal disorders" AND "ergonomics" AND "occupational safety and health". The selected article is a quantitative empirical study that discusses the influence or relationship of work posture on musculoskeletal disorders (MSDs) complaints and is available in full text form. The selection of articles is carried out in stages through the evaluation of the title, review of the abstract, and a full reading of the content of the article. Articles that met the criteria were then analyzed descriptively to identify patterns of findings related to the influence of work posture on musculoskeletal disorders (MSDs) complaints.

No	Author	Year	Title	Method	Result
1	Muhammad Aidil Akbar, Muhammad Dio Fitra, Winda Tulkhaira, Mohammad Farid	2024	<i>Evaluation of the Risk Level of Musculoskeletal Disorders of Assembly Workers in the Furniture Industry</i>	Quantitative research uses evaluative descriptive. Samples on furniture industry assembly workers. Instrument PLIBEL Checklist.	The results showed that assembly, cutting, and sanding workstations had a high risk of injury (75–82%). Bending posture and repetitive movements are the dominant factors.
2	Tatik Wildasari & Rizki Eko Nurcahyo	2023	<i>The relationship between work posture, age and working time with complaints of musculoskeletal disorders (MSDs) in workers in CV. Sada Wahyu Bantul Regency Yogyakarta</i>	Quantitative research with cross-sectional design. Sample of 42 CV briquette workers. And the Revelation. REBA instrument, Nordic Body Map (NBM) and analyzed using Chi-square test.	There was a significant relationship between work posture and MSDs complaints ($p=0.033$). Workers with a high postural risk were 5.4 times more at risk of developing MSDs. Age ≥ 35 years and working period ≥ 5 years were also significant ($p<0.05$).
3	M. Yusuf MF, Meliyana Febiyanti, Risman Kurnia, Gina	2023	<i>Ergonomics Risk Study and Work-Related Subjective Complaints Musculoskeletal Disorders</i>	Quantitative research uses quantitative descriptive. Sample on manufacturing	The results of the analysis showed that most of the work activities were at action levels 3–4 (need immediate improvement). Static and repetitive postures increase the

	Dwi Nur Kusuma		<i>(WMSDs) in Tailors in the City Tanjungpinang</i>	workers. BILL Instrument.	risk of musculoskeletal disorders.
4	Rizkia Lisma Melinda, Tarwaka, Dwi Astuti, Sri Darnoto	2023	<i>The Relationship of Ergonomic Risk Factors with Musculoskeletal Complaints in Convection Workers</i>	Quantitative research uses observational analytics. Sample on industrial sector workers. REBA & NBM instruments.	The results show that the majority of workers are in the medium-high posture risk category. The most complaints are in the neck, lower back, and shoulders. There was a significant association between unergonomic posture and complaints of MSDs ($p<0.05$).
5	Bagus Apriyan Trio Afandy, Merry Sunaryo, Husnul Kirom Rmadhani, Abdul Rozzag Muizzu Crisyanto, Muslikha Nourma Rhomadhoni	2023	<i>Overview of Musculoskeletal Disorders (MSDs) Complaints in Manual Handling Workers at UD. Griya Berkah</i>	Quantitative research with ergonomic evaluation of REBA. Sample on production workers.	The results of the study found a high risk of ergonomics in activities with a long bending and standing position. The parts of the body that most often experience complaints are the back, waist, and wrists.

RESULTS AND DISCUSSION

Based on the results of an analysis of five journals, it was found that unergonomic work posture is consistently associated with an increase in complaints of Musculoskeletal Disorders (MSDs) in various occupational sectors. Research on briquette industry workers showed a significant relationship between work posture and complaints of MSDs with a $p=0.033$ (<0.05) value, and workers with high posture risk were 5.4 times more likely to experience complaints than workers with moderate risk (Wildasari & Nurcahyo, 2023). These findings reinforce that bent working positions, prolonged static, and repetitive activity are important determinants in the occurrence of musculoskeletal disorders.

Similar results were also found in studies in the furniture industry using the PLIBEL method, where the risk of musculoskeletal injury in some workstations reached 75–82% due to assembly, cutting, and sanding activities with bending postures and repetitive movements (Akbar et al., 2024). This suggests that biomechanical factors such as excessive spinal flexion angle and static load on muscles over long durations cause increased pressure on soft tissues and spinal structures. This condition, if it persists, can trigger inflammation, muscle fatigue, and chronic disorders.

Other studies using the REBA, RULA, and Nordic Body Map (NBM) methods also showed that most workers were in the medium to high risk category and required immediate corrective action (Journal 16247, 2023; Journal of Applied Industrial Technology & Management, 2023). Activities with action levels 3–4 in the RULA method indicate that the work posture carried out has the potential for significant danger if ergonomic intervention is not carried out. The parts of the body that most often experience complaints in various studies are the neck, shoulders, lower back, waist, and wrists, which are the areas with the highest static and repetitive load during work.

In addition to work posture factors, age and working period were also found to play a role in increasing the risk of MSDs. Workers with the age of ≥ 35 years and a working period of ≥ 5 years had a significant relationship with an increase in musculoskeletal complaints (Wildasari & Nurcahyo, 2023). Physiologically, muscle strength and elasticity tend to decrease with age, so tolerance to static and repetitive workloads also decreases. Long-term exposure to ergonomic risks accelerates degenerative processes in the musculoskeletal system, thereby increasing the likelihood of pain and discomfort.

Overall, the results of this literature review show a consistent pattern that unergonomic work posture is the main risk factor for MSD complaints, regardless of the type of industry. Ergonomic assessment methods such as REBA, RULA, NBM, and PLIBEL have proven effective in identifying the level of risk and affected body parts. Therefore, the implementation of ergonomic interventions such as improving workstation design, adjusting the height of desks and chairs according to worker anthropometry, providing active rest time (stretching), and correct work posture education are strategic steps in efforts to prevent MSDs. These efforts not only have an impact on improving worker health, but also contribute to increasing productivity and work efficiency in a sustainable manner.

CONCLUSION

Based on the results of a literature review of five research journals, it can be concluded that unergonomic work posture has a consistent and significant relationship with the increase in complaints of Musculoskeletal Disorders (MSDs) in various work sectors. Stooping positions, working in static postures for long periods of time, repetitive movements, as well as incongruous workstation design have been shown to be major risk factors that trigger complaints in the musculoskeletal system, especially in the neck, shoulders, lower back, waist, and wrists. Assessments using ergonomic methods such as REBA, RULA, Nordic Body Map (NBM), and PLIBEL show that most work activities are in the medium to high risk category and require corrective action.

In addition to work posture factors, age and working period variables also play a role in increasing the risk of MSDs due to long-term ergonomic exposure. Repeated exposure to biomechanical loads without adequate ergonomic intervention can accelerate the occurrence of disorders in muscle and skeletal tissue. Therefore, preventive efforts are needed through improving the design of workstations, adjusting work facilities according to ergonomic principles, and educating workers about the correct working posture. The implementation of this strategy is expected to reduce the incidence of MSDs while improving the health and productivity of the workforce in a sustainable manner.

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