

ISSN 2597- 6052DOI: <https://doi.org/10.56338/mppki.v7i10.6178>**MPPKI****Media Publikasi Promosi Kesehatan Indonesia
The Indonesian Journal of Health Promotion****Review Articles****Open Access****Risk Factor for Musculoskeletal Disorder in Construction Worker: Literature Review****Arif Rahmat Abdullah^{1*}, Indri Hapsari Susilowati²**¹Departemen Keselamatan dan Kesehatan Kerja, Fakultas Kesehatan Masyarakat, Universitas Indonesia |
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indri@ui.ac.id* Corresponding Author: Ara.vaynard17@gmail.com**ABSTRACT**

Introduction: Musculoskeletal Disorders (MSDS) is a condition involving degenerative health problems or inflammation that occurs in workers, affecting joints, ligaments, muscles, tendons and blood vessels. Sufferers of muscle and skeletal disorders as an occupational disease are the largest number of cases of occupational disease in Europe compared to other diseases in 2017.

Objective: This research aims to identify factors Risk factors for muscle and skeletal disorders in construction workers.

Method: This research uses the method literature study using the PRISMA approach (preferred reporting items for systematic reviews and meta-analyses). When searching for journals that are relevant to the research topic, use a search engine Science Direct and ResearchGate using the keyword "Musculoskeletal Disorder" and "Construction Worker". A total of 868 journals were identified, but 8 journals met the inclusion and exclusion criteria.

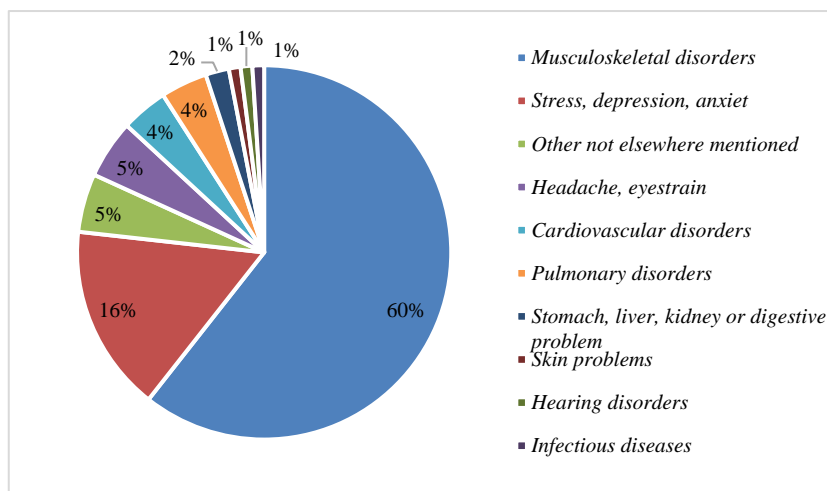
Result: Research instruments used Standard Nordic Musculoskeletal Questionnaire. It was found that construction workers generally experience pain in the legs, followed by pain in the back, head, hips, shoulders and other areas. The pain felt by workers is caused by behavioral factors (lifestyle, smoking behavior), place and work environment factors (work position, vibration and temperature, work experience, workload, wage system), worker psychological factors (level of fatigue after work, Job stress), Individual Factors (BMI, Exercise, Work experience, Age).

Conclusion: Risk factors for muscle and skeletal disorders in construction workers consist of behavioral factors, place and work environment factors, worker psychological factors, and individual factors.

Keywords: Muscle Disorders; Skeletal Disorders; Construction Workers

INTRODUCTION

Musculoskeletal Disorders (MSDS) is a condition involving degenerative health problems or inflammation that occurs in workers, affecting joints, ligaments, muscles, tendons and blood vessels (1) (2) (3). Sufferers of muscle and skeletal disorders as occupational diseases are the largest compared to other diseases. In accordance with data collected by the European Agency for Safety and Health at Work in (4), regarding the percentage of workers with work-related health problems, based on the type of problem, can be seen in Figure 1, as follows.



Source: European Agency for Safety and Health at Work, 2024

Figure 1. Percentage of Workers with Health Problems Based on Type of Problem

Based on the graph in Figure 1, the highest percentage of health problems are problems with musculoskeletal disorders by 60%. Meanwhile, the lowest percentage of health problems, namely skin problem, hearing disorders and infectious diseases, with a percentage of 1%. Research that has been carried out reveals that the main cause of the disorder Musculoskeletal Disorders (MSDS), namely work carried out long term with high loads and less ergonomic body postures, such as bending, squatting and kneeling (5) (6). Apart from that, muscle and skeletal disorders are a serious problem where the negative impacts that arise due to muscle and skeletal disorders are the inability to do work and ultimately reduce the level of work productivity (3). Meanwhile, more than 400 USD dollars were given as compensation to workers as a result of Musculoskeletal Disorders (MSDS) in construction workers in the United States (7).

Construction work is a job with a high probability of problems Musculoskeletal Disorders (MSDS) (1). Research has been conducted that within 12 months at least 1 symptom occurs Musculoskeletal Disorders (MSDS) in 77% of construction workers in the United States (1). Symptom Musculoskeletal Disorders (MSDS) felt by workers is generally felt by workers, followed by pain in the back, head, hips, shoulders and other areas (8) (9). These symptoms are most likely to occur if work is carried out with inappropriate body posture, machine vibrations, kneeling, stress, environmental risks, static forces, standing for too long, sitting, bending, twisting, and carrying and lifting heavy objects (3) (10) (11).

In order to reduce the level of symptoms Musculoskeletal Disorders (MSDS) through patterns preventive, for literature review aims to summarize factors that may influence the risk of musculoskeletal disorders in construction workers. Apart from that, preventive measures are taken to avoid the occurrence of symptoms in workers, in order to achieve work productivity.

METHOD

The research method used in this research is a literature study using the PRISMA approach (preferred reporting items for systematic reviews and meta-analyses) (12). When searching for journals that are relevant to the research topic, use a search engine ScienceDirect and Google Scholar using the keywords "Musculoskeletal Disorder" and "Construction Worker", with a limited journal publication year from 2019 to 2024. The inclusion criteria for this research are journals that are relevant to risk factors for muscle and skeletal disorders in construction workers and the research methods used are quantitative. The exclusion criteria in this study were research conducted before 2019, as well as with subjects other than construction workers. The following are the stages of the "PRISMA" method, which can be seen in Figure 2, as follows.

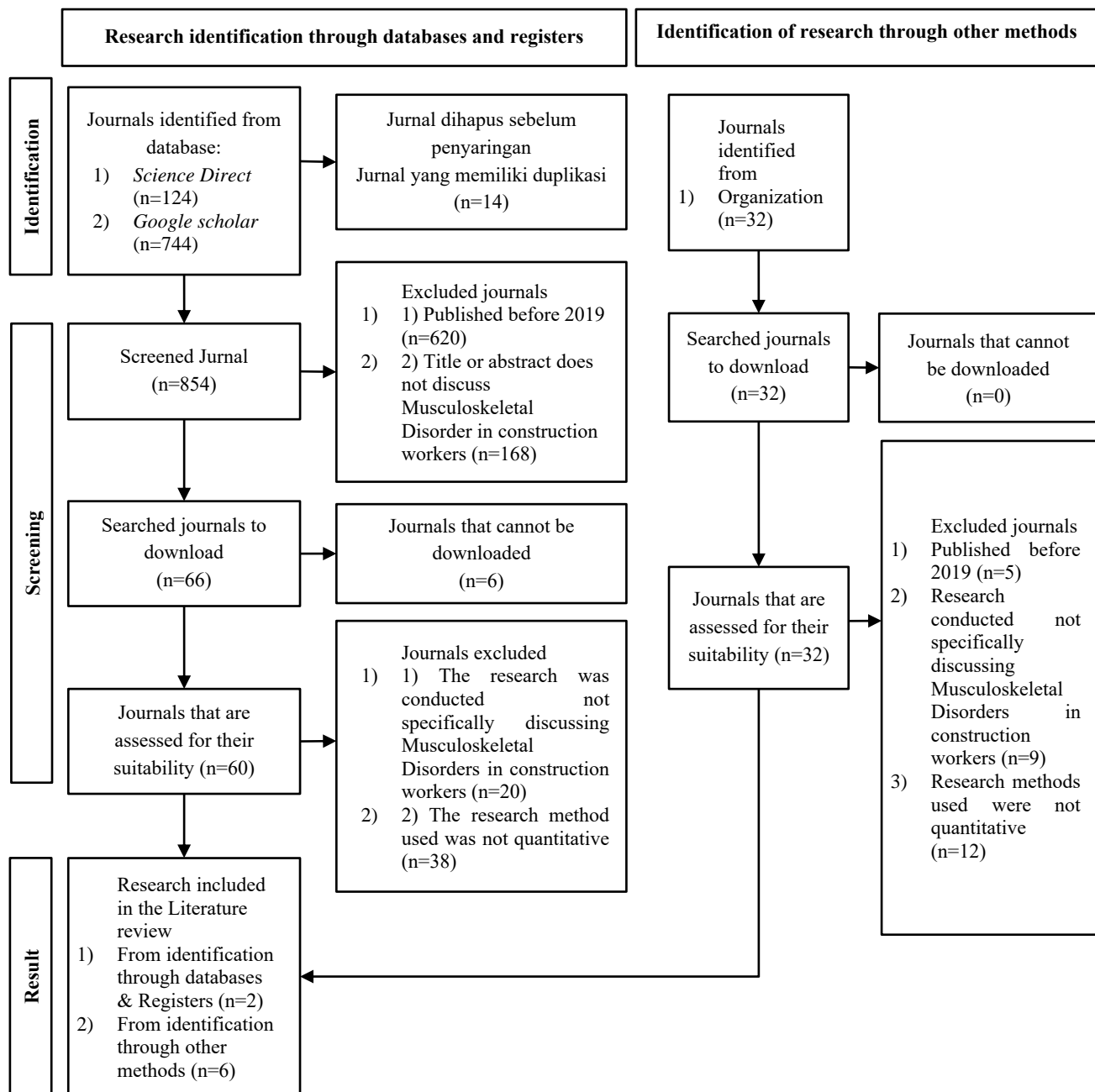


Figure 2. Stages of the "PRISMA" Method

Refer to Figure 2, the stages of the "PRISMA" method identify the journals contained in database science direct and google scholar. Obtained 124 journals from science direct and 744 journals from google scholar, but there were 14 duplications so that the number of journals identified was 854. Next, filtering was carried out using exclusion criteria, there were 788 journals that were excluded because they were published before 2019, 620 of which were journals and the titles or abstracts did not discuss Musculoskeletal Disorder for construction workers as many as 168, so the remaining 66. However, there are 6 journals that cannot be downloaded, so the remaining 60 journals. Screening was carried out using the inclusion criteria, 58 journals were excluded, because they were not specifically discussed Musculoskeletal Disorder on construction workers as many as 20 journals and the research methods used did not use quantitative as many as 38 journals. So that the journals are selected after the screening process on database science direct and google scholar as many as 2 journals.

There were 32 journals identified using other methods, which came from organizations National Library of Medicine, and all journals can be downloaded. Screening was carried out using exclusion and inclusion criteria, 26 journals were excluded because they were published before 2019, 5 journals did not specifically discuss Musculoskeletal Disorder on construction workers as many as 9 journals and the research methods used did not use quantitative as many as 12 journals. So the journals selected using other methods were 6 journals.

RESULTS

Based on the results of a literature review, 8 journals selected were the journals most relevant to the research topic and met the inclusion and exclusion criteria. It was found that 3 journals were indexed Q1, 3 journals were indexed Q2 and 2 journals were indexed Q3. The following is a summary of the selected journals, which can be seen in Table 1, as follows.

Table 1. Summary of the Selected Journals

No	Author Name ,Year	Title	Research methods	Research Instruments	P- value	Research result
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Krishna P Kisi, Rujan Kayastha, 2024	Analysis of Musculoskeletal Pains and Productivity Impacts Among Hispanic Construction Workers	Quantity research with analysis regresi linier	Questionnaire survey	0.01	1) Leg pain is a common pain felt by workers, followed by back pain, head, hips, shoulders, and other areas. 2) Causes of pain standing too long, and choice of footwear. MSP disorders cause decreased work productivity.
2	Stanley Njaka, Dariah Mohd Yusoff, Siti Marwanis Anua, Yee Cheng Kueh , Chuks Oswald Edeogu, 2021	Musculoskeletal disorders (MSDs) and their associated factors among quarry workers in Nigeria: A cross- sectional study	Cross- sectional study with analysis regresi linier	Standard Nordic Musculoskeletal Questionnaire	0.003 0.049 0.001 0.002 0.007	1) Lower back and elbow pain are common pains felt by workers. 2) Causes of pain are sociodemographic and workplace factors. In addition, internal factors a) Age, b) Work Experience, c) BMI d) Vibration e) Working Hours. 3) MSP disorders cause decreased work productivity.
3	Yu-Chi Lee, Xinye Hong, Siu Shing Man, 2023	Prevalence and Associated Factors of Work- Related Musculoskeletal Disorders Symptoms among Construction Workers: A Cross-Sectional Study in South China	Cross- sectional study	Workrelated survey and the Nordic musculoskeletal questionnaire	0.001 0.017 0.001 0.004 0.001 0.001	1) Neck pain is a common pain felt by workers followed by the shoulders, upper back and lower back. 2) Causes of pain are 1) Job characteristics 2) BMI 3) exercise 4) work experience 5) work position 6) level of fatigue after work
4	Soo Jeong, Byoung-Hee Lee, 2024	The moderating effect of work- related musculoskeletal disorders in relation to occupational stress and health-related quality of life of construction workers:a	Quantity research with Simple linear regression analysis	Musculoskel- etal symptoms questionnaire	0.001 0.001	Work-related musculoskeletal disorders are influenced by work stress and affect health related quality of life.

No	Author Name ,Year	Title	Research methods	Research Instruments	P- value	Research result
(1)	(2)	(3)	(4)	(5)	(6)	(7)
		crossectional research				
5	Shuai Yang, Li Li, Liqian Wang, Jiaqi Zeng, Yinglan Li, 2020	Risk factors for work-related musculoskeletal disorders among workers in Brazil: A structural equation model approach	Quantity research with analysis Structural Equation Model (SEM) technique	Questionnaires	0.001	1) Pain is commonly felt by workers in the thighs, legs and feet 2) The cause of pain is the wrong working position
6	Muhammad Kashif, Abdulaziz Albalwi, Abdul Raqib, Maryam Farooq, Rafi Ullah, Mudassar Sakoor, Zaid Kamran, 2022	Work-related musculoskeletal disorders among Pakistani construction workers: Prevalence, characteristics, and associated Risk factors	Cross- sectional study	Questionnaire	0.001 0.010 0.002 0.001	1) Common pain felt by workers is lower back pain 2) Causes of pain are a) Age b) Lifestyle c) Smoking behavior d) Work experience 3) Absenteeism from work and inability to perform normal daily activities as a result of musculoskeletal disorders
7	Anindita Mandal Majee, Sutanu Dutta, 2022	Pulmonary Functions and Work-Related Musculoskeletal Disorders of Road Construction Workers of West Bengal, India	Cross- sectional study	Questionnaire	0.01	1) As many as 33.3-50% of workers experience musculoskeletal disorders, 2) this is caused by exposure to high temperatures and heavy workloads, especially among asphalt strippers and paver operators.
8	Jeppe Zielinski Nguyen Ajslev , Roger Persson , Lars Louis Andersen, 2019	Associations between Wage System and Risk Factors for Musculoskeletal Disorders among Construction Workers	Cross- sectional study	Questionnaire	0.01	Hourly/daily based wage systems can increase the occurrence of musculoskeletal disorders, compared to monthly systems.

DISCUSSION

Results of a literature review of 8 journals consisting of 3 journals indexed Q1, 3 journals indexed Q2 and 2 journals indexed Q3, regarding risk factors for muscle and skeletal disorders in construction workers. This research revealed that pain in the legs is pain that is generally felt by construction (8) (14), other research that has been conducted shows that apart from pain in the legs, construction workers generally experience pain in the back, thighs, legs, head and shoulders (9) (15). Causing factors of musculoskeletal disorders (MSDS) is divided into several factors, namely individual factors, behavior, place and work environment and worker psychology.

Behavioral factors, namely lifestyle and smoking habits, are one of the factors that cause this musculoskeletal disorders (MSDS) in construction workers (15). Smoking itself can reduce blood flow to the body's tissues, including muscles, tendons and ligaments, because of the effect of nicotine which can narrow blood vessels and can reduce the supply of oxygen and nutrients to tissues (8). The impact is due to lack of concentration of workers doing work without considering position and ignoring the capacity for heavy physical activity, which triggers symptoms. musculoskeletal disorders (MSDS).

Other causal factors that influence the appearance of symptoms are musculoskeletal disorders (MSDS) namely place and work environment factors. Using inappropriate footwear and standing for too long is one of the consequences of foot pain felt by construction workers (8). This is possible because the use of footwear that does not support the arch of the foot and is too narrow in size will cause uneven pressure and tend to put a lot of pressure on one part of the foot such as the toes, heel or arch of the foot. Inappropriate footwear can change the way you stand and walk. This change in posture can cause muscle and ligament tension in the legs, which ultimately causes pain. Plus, construction workers' work areas that have poor walking terrain can certainly increase the likelihood of symptoms of muscle and skeletal pain in the legs (16).

Besides that, the wrong working position or lack of ergonomics is one of the causes of musculoskeletal disorders (MSDS) perceived by construction workers (14) (18). Lifting heavy materials with poor body position, such as with a curved back or an unbalanced load, can increase pain symptoms in construction workers. Other studies that have been conducted reveal that symptoms musculoskeletal disorders (MSDS) is likely to occur if work is carried out with inappropriate body posture, such as; kneeling, standing for too long, sitting, bending, twisting, and carrying and lifting heavy objects (3) (10) (11).

Construction equipment that causes vibrations, such as jack hammers and drills, can trigger excessive vibration, which is a contributing factor to musculoskeletal disorders (MSDS) in construction workers (9) (18). Worsened if the condition is left for a long period of time, the vibrations can trigger damage to muscles, tendons, ligaments and joints, especially in the hands, arms, shoulders and back. One of the symptoms that often appears in construction workers is hand-arm vibration disorder (HAVS) (16).

Excessive working hours and fatigue levels can trigger symptoms of musculoskeletal disorders (MSDS) (9) (18). In conditions of fatigue, workers can reduce muscle strength and endurance. Plus, workers with an hour/day wage system can reduce workers' concentration while working (19). Other research that has been conducted states that work stress can influence worker behavior and reduce workers' ability to work (Putra 2024). Workers who do work in these conditions cause unergonomic work techniques at times and poor posture, which conditions can cause tension in muscles and ligaments, thereby increasing the risk of injury (8).

Musculoskeletal disorders (MSDS) experienced by construction workers can cause workers to lose their ability to do a job, thereby reducing work productivity (3). It will be made worse if this condition is allowed to result in loss of company profits as a result of decreased productivity (Putra et al. 2024). Other research that has been conducted states that companies are obliged to provide compensation to workers as a result of musculoskeletal disorders (MSDS) in construction workers in the United States (7).

Prevention needs to be implemented to prevent symptoms from occurring musculoskeletal disorders (MSDS) for construction workers. Stretching activities and adequate rest during work to relax their muscles and actively restore the worker's physical condition. Apart from that, several auxiliary equipment for lifting heavy loads needs to be added to reduce excessive burden on construction workers' bodies (9).

CONCLUSION

Based on the results of the study, it was concluded that there is a high prevalence of muscle and skeletal disorders in construction workers, pain is generally felt in the legs, followed by pain in the back, head, hips, shoulders and other areas. The pain felt by workers is caused by behavioral factors (lifestyle, smoking behavior), place and work environment factors (work position, vibration and temperature, work experience, workload, wage system), worker psychological factors (level of fatigue after work, Job stress), Individual Factors (BMI, Exercise, Work experience, Age). The causes of the prevalence of muscle and skeletal disorders are not just multifactorial but are complex and these factors can have a direct and indirect impact on symptoms. These findings serve as reference material to provide understanding and steps to prevent work-related muscle and skeletal disorders.

SUGGESTION

The research data showed that to find out the causes of the prevalence of muscle and skeletal disorders in construction workers, it was not only assessed from activity factors. However, an assessment must also be carried out on organizational factors, leadership and environmental aspects.

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