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ORIGINAL ARTICLE

The relationship between workload and musculoskeletal complaints among opak factory workers in Sukaraya Bakti Village, Pancur Batu

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ABSTRACT

Based on industrial processes that still use semi-automatic processes, this often causes health problems, such as musculoskeletal problems or disorders in workers due to semi-automatic production processes and heavy loads. The aim is to find out the relationship between workload and musculoskeletal complaints in Opak Village factory workers. Sukaraya Bakti, District. Pancur Batu, Kab. Deli Serdang. The research method carried out here is quantitative descriptive research. Where this research tries to explore how and why this health phenomenon occurs. This descriptive research was carried out using observation and interview methods. Observations and interviews were carried out on several behavioral factors, which were then linked to musculoskeletal complaints in opak makers. It can be concluded that there is a significant relationship between workload and complaints of musculoskeletal disorders among Opak Factory Workers in Sukaraya Bakti Village, Pancur Batu District, Deli Serdang Regency.

Keyword: musculoskeletal, workload, factory

Introduction

The industrial sector, particularly in developing countries like Indonesia, often serves as the backbone of the economy. However, amidst the dynamism of production, there are serious challenges related to occupational health and safety, one of which is Musculoskeletal Disorders (MSDs).[1,2] MSDs refer to a range of complaints or conditions affecting the musculoskeletal system, from mild pain to severely debilitating conditions in joints, nerves, muscles, and the spine.[3] These conditions not only impact the well-being of individual workers but also have implications for productivity and the sustainability of company operations. The primary triggers for MSDs are often closely related to workload.[4,5] Workload is defined as every physical and mental demand placed on workers in carrying out their tasks.[6] The importance of adjusting workload to individual capabilities cannot be overlooked; an imbalance between job demands and worker capacity can lead to fatigue, stress, and ultimately, musculoskeletal injuries. Unergonomic working environments, such as unnatural postures, repetitive movements, and excessive muscle stretching, are key risk factors identified by various studies.[7]

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Global data underscores the urgency of this MSDs issue. Reports from the UK's Health and Safety Executive (HSE) in 2022/23 show that approximately 473,000 workers suffered from work-related musculoskeletal disorders, equivalent to 1,400 cases per 100,000 workers. The impact is significant, leading to an estimated loss of 6.6 million working days.[8] Proportionally, MSDs accounted for 27% of all work-related illnesses and 21% of total working days lost due to work-related diseases during that period. The distribution of injury locations is also concerning: the majority of cases affected the upper limbs or neck (41%) and the back (41%), while the remaining 17% involved the lower limbs.[9] Within the context of local industries, such as the opak factory in Sukaraya Bakti Village, Pancur Batu Sub-district, Deli Serdang Regency, the risk of MSDs is a serious concern. The opak production process, likely involving repetitive manual activities such as kneading dough, baking, cutting, or packaging in static or awkward positions, has a high potential to trigger musculoskeletal complaints among its workers. Understanding the relationship between the specific workload in this industry and the musculoskeletal complaints experienced by workers is crucial. This research aims to deeply analyze this relationship, providing necessary insights to formulate effective prevention strategies and improve the quality of life and productivity of workers in the opak factory.

Method

This research employs a quantitative descriptive approach with a cross-sectional design to delve into the phenomenon of musculoskeletal complaints among opak makers. The aim is to understand how and why these complaints arise in this workforce. The primary data collection methods used are observation and interviews. Through observation, researchers can directly assess working conditions, posture, and repetitive movements that might contribute to musculoskeletal complaints. Meanwhile, interviews are conducted to gather more in-depth information about behavioral factors of the workers, such as work habits, working duration, injury history, and their perception of the health risks they face. The data collected from observations and interviews will then be analyzed to identify the correlation between these various behavioral factors and the musculoskeletal complaints experienced by opak makers. The results of this study are expected to provide a comprehensive overview of the prevalence and risk factors for musculoskeletal complaints, serving as a basis for appropriate intervention recommendations to improve the health and safety of these workers.

Results

The characteristics of the respondents in this study include gender, age, education level, length of employment, working hours, musculoskeletal complaints, and workload, involving a total of 50 respondents who are opak factory workers. Based on the research that has been conducted, the following results were obtained.

Table 1. Characteristics of respondents

Variables	n	%
Gender		
Male	10	20
Female	40	80
Age		
<35 years	15	30
>35 years	35	70
Education		
Elementary School	25	50
Junior High School	22	44
Senior High School	3	6
Length of Employment		
≤10 years	31	62
>10 years	19	38
Working Hours		
≤8 hours	15	30

>8 hours	35	70
Workload		
Heavy	35	70
Light	15	30
Musculoskeletal Complaints		
High	37	74
Low	13	26

Table 2. Bivariate analysis

Variables	Musculoskeletal Complaints				Total		p-value	OR CI 95%
	High		Low					
	f	%	f	%	f	%		
Workload								
High Workload	29	58	6	12	35	70	0.04	4.229 (1.105-16,188)
Low Workload	8	16	7	14	15	30		

Based on the results of Table 1 above, it is known that out of 50 respondents who were studied, 80% of the respondents in this study were female and the remaining 20% were male. Furthermore, 70% of respondents were aged >35 years and 30% of respondents were aged <35 years. At the education level, 50% of respondents were at the elementary school level, then 44% at the junior high school level, and the remaining 6% at the high school level. For length of employment, it was found that 62% of respondents had a length of employment of ≤10 years and the remaining 38% had a length of employment of >10 years. Then, respondents who worked >8 hours were more numerous at 70% compared to respondents who worked ≤8 hours, who only comprised 30% of respondents. Respondents who experienced a heavy workload had a larger number at 70% compared to respondents who experienced a light workload at 30%. And for musculoskeletal complaints, the majority of respondents experienced high complaints (74%) and the remaining 26% experienced low musculoskeletal complaints.

Table 2 presents the results of a bivariate analysis showing a significant relationship between workload and musculoskeletal complaints among opak factory workers. Out of 50 respondents, 35 (70%) experienced a high workload, and the majority of this group, specifically 29 respondents (58% of the total), reported high musculoskeletal complaints. Meanwhile, among the 15 respondents (30%) who experienced a low workload, 8 respondents (16% of the total) still reported high musculoskeletal complaints, although in a smaller proportion. The statistical test results show a p-value of 0.04, which is below the significance threshold of 0.05, confirming a statistically significant relationship between these two variables. Furthermore, an Odds Ratio (OR) of 4.229 with a 95% Confidence Interval (CI) between 1.105 and 16.188 indicates that workers with a high workload are 4.229 times more likely to experience high musculoskeletal complaints compared to those with a low workload. This highlights that workload is a strong risk factor for the occurrence of musculoskeletal complaints in this working population.

Discussion

The significant relationship between high workload and musculoskeletal complaints found in the study is strongly supported by a body of previous research. This connection is well-documented across various occupations and work environments, with numerous studies corroborating the finding that a demanding workload is a significant risk factor for musculoskeletal complaints.

A study on informal workers in Indonesia, for example, found a direct correlation between both physical workload and work duration and the complaints of musculoskeletal disorders. The researchers concluded that high physical demands and long hours were proven risk factors in that population.[10] Similarly, research on nurses found a significant association between mental workload and musculoskeletal disorders, suggesting that the impact of a heavy workload is not solely physical but also involves psychological components.[11] Further support comes from a study on loading and unloading workers, which demonstrated that excessive workload and awkward work postures were significant causes of these complaints. The study found a clear effect of workload on musculoskeletal disorders, mediated by poor work posture.[12]

While this evidence is compelling, some research suggests the relationship is more complex and can be influenced by other factors. A large-scale cohort study on workers with occasional pain, for instance, found that while a high physical workload was associated with increased pain, other variables also played a significant role. After accounting for confounding factors, the link between some physical workload exposures and pain was no longer statistically significant in men. The study also noted that factors like low decision-making authority and psychological distress were strongly associated with increased pain, indicating that the impact of workload can be moderated by other workplace and individual characteristics.[13] Another study on computer workers found that while high job demands were linked to neck complaints, the strongest association was with the duration of working without a break. This highlights that specific aspects of work organization, such as rest periods, can be more influential than the general workload level itself.[14] These studies don't necessarily refute the initial finding but instead point to a more nuanced interplay of risk factors.

Conclusion

Based on the researcher's findings, it is known that the frequency of respondents with a heavy workload was 35 (70%), while respondents with a light workload were 15 (30%). Based on the research results, it can be seen that out of 50 working respondents, 37 (74%) workers experienced musculoskeletal complaints in the high category, and the remaining 13 (26%) workers experienced musculoskeletal complaints in the low category. Based on the chi-square test result, $p=0.04$ ($p<0.05$), this indicates that there is a relationship between workload and musculoskeletal disorders complaints among Opak workers in Sukaraya Bakti Village.

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