



Ergonomic Workplace Planning to Avoid the Occurrence of Musculoskeletal Disorders (MSDs)

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ABSTRACT

An ergonomic workplace to avoid musculoskeletal disorders (MSDs). An ergonomic workplace helps prevent musculoskeletal disorders (MSDs), which are disorders of muscles, bones, joints, and nerves due to incorrect work positions or movements. This paper is designed descriptively, meaning that this paper will be compared and will be presented. All data in the article is obtained from several expert opinions and from the results of research, or currently commonly called literature studies. Then, the analysis also uses deductives. Conclusion: that to create an ergonomic workplace, it starts from the work position. Then, arrange an ergonomic work environment. Next, arrange selfish tools and equipment. All of this so that the workforce remains good, safe, comfortable, healthy, and productivity increases. Suggestion: the Company should create an egoistic workplace so that employees can be healthy, safe, comfortable, and so that productivity increases.

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1. INTRODUCTION

An ergonomic workplace helps prevent musculoskeletal disorders (MSDs) which are disorders of muscles, bones, joints, and nerves due to incorrect work positions or movements.

Based on a 2022 WHO report written by Rusdani et al (2026) that "around 1.71 billion people in the world have musculoskeletal disorders, and 50–70% of these are workers from various sectors". Then, Rudani et al. (2026) said that "individual factors and occupational factors play an important role in influencing MSDs complaints in palm oil mill workers. Preventive efforts such as the application of ergonomic principles, workload reduction, and work duration regulation need to be carried out to reduce the risk of MSDs in workers. As according to Rahma Meliana (2024), "this study is that there is a relationship between working time and workload and complaints of musculoskeletal disorders (MSDs) in farmers in the Banjar Agung Inpatient Health Center Area, Jati Agung District, South Lampung Regency". Furthermore, laundry workers are also affected by MSDs, as Ratna Sekundaria Dewi (2025) stated that "there is a significant correlation between unergonomic work postures and musculoskeletal disorders. Ergonomic work postures and interventions are recommended to reduce the risk of MDs and improve the occupational health and safety of laundry workers".

Then, the danger of getting musculoskeletal disorders (MSDs) according to Putri Fathiah Rahmadani et al (2024) who found that "ergonomic risk is 96.0%, old age 77.3%, body mass index is not normal 70.7%, exercise habits are less than 62.7%, smoking habits are heavy 94.7%, long working period is 72.0%, and microkimal conditions are not eligible 61.3%". Microclimate is a climatic condition measured in local areas near the earth's surface including: temperature, light, wind speed, and humidity. According to Muhammad Syimmes Prastya et al (2023), "the respondents in this study mostly experienced musculoskeletal disorders (MSDs) in the neck, upper back, and lower back areas, due to



unergonomic positions and workstations". Tiara Putri Yosineba et al. (2020) said that "The most experienced MSD complaints by workers are 67.5% upper neck, 57.1% lower neck, 54.1% waist, and 42.9% hip complaints".

Therefore, an ergonomic workplace is needed to avoid musculoskeletal disorders (MSDs).

2. METHODOLOGY

This paper is designed descriptively, meaning that this paper will be compared and will be presented. All data in the paper is obtained from several expert opinions and from the results of research, or currently commonly called literature studies. Then, analysis also uses deductive. And, conclusions are deductive.

3. ANALYSIS AND DISCUSSION

Ergonomic Workplace Environment

As is known, the maximum limit of ego can be assumed with the limit of the threshold value (NAV). As stated by Ekawati Wasis Wijayati (2025) that "one of the important aspects of ergonomics is to create an optimal physical environment. Also in the turning room it is not in accordance with the standard because it exceeds the NAV". Also according to Widiastuti et al. (2008) that "the physical NAB factor in the workplace in the regulation determines the NAB temperature".

Maka, untuk tempat kerja ergonomi pada lingkungan gunakan NAB sebagai berikut: Lighting (threshold values rather carefully read at least 200 lux); Temperature and humidity (climate) (working 75% rest 25%, light work for 8 hours / day in door, the threshold value ISBB= 30.6 °); Noise (threshold value of 80-85 dB to work 8 hours / day); The level of vibration (exposure to vibration in the feet and hands less 4 hours and 4 hours, the threshold value= 4 m/detik²). Dan permenaker no.51/Men/1999, threshold values UV of 0.1 μWcm^2 to work 8 hours / day with Deviation Standart of 0.2281.

In the workplace, sometimes it is necessary to sit or stand. In envious or sitting work positions, avoid bending positions. Working standing position, a chair is used at any time for standing position, legs must be able to rest, and footrest must be present and adjustable, such components are needed at the workstation of standing work positions. When working in a standing position, the tag must be able to gaze around the body, so that the armpits do not open. For the work design of the sitting position, the wrist must be rested on the wrist will reduce fatigue in the hands.

Ergonomic Workplace

Ergonomic workplace design is the design of workspaces and work tools that are tailored to human physical capacity to improve comfort, health, and productivity. An ergonomic workplace is a work environment that is designed to adjust human physical abilities so as not to put excessive pressure on the body. The main goal is to improve the efficiency, comfort, and health of workers in the long term.

The ideal sitting position forms a 90-degree angle at the knees to keep blood circulation smooth. In long-term work, good posture will help the body stay healthy and prevent musculoskeletal disorders. Use *footrest* if necessary to keep the leg position stable.

According to *the Occupational Safety and Health Administration (OSHA)* led by Doni Morika (2026), "an ergonomic workplace is a work environment designed to adjust human physical abilities so as not to put excessive pressure on the body. The main goal is to improve worker efficiency, comfort, and health in the long term".

Maintaining the correct posture to create an ergonomic workplace, the first step is to focus on posture. Whether standing or sitting, proper posture can reduce the risk of injury. When sitting, pay attention to keeping your chin level with the floor, your shoulders level, your spine straight, and your knees and thighs parallel to the floor. The ideal sitting position forms a 90-degree angle at the knees to keep blood circulation smooth. In long-term jobs, good posture will help keep the body healthy and prevent musculoskeletal disorders. Use *footrests* if necessary to keep your feet stable.

To ensure an ergonomic workplace, to ensure an ergonomic workplace, make sure that work furniture such as desks and chairs are adapted to the height and posture of the user. If you want to buy a desk, choose a desk with a height of 70 to 85 cm depending on the height of the body. Choose a chair that has a backrest according to the shape of the spine (*lumbar support*), so that the spine remains in its natural position. Ergonomic chairs that are soft and have an adjustable height can reduce pressure on the back and increase productivity. The right chair also helps reduce fatigue when working for a long time in front of the computer.

4. CONCLUSION

Based on the analysis and discussion above, it can be concluded as follows: that to create an ergonomic workplace starts from the work position. Then, arrange an ergonomic work environment. Next, arrange tools and equipment that are selfish. All of this so that the workforce remains good, safe, comfortable, healthy, and productivity increases.



5. SUGGESTIONS

It is better for the Company to create an egoistic workplace so that employees can be healthy, safe, comfortable, so that productivity increases.

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