Journal of Information Technology and Computer Science (INTECOMS)
Volume 6 Nomor 2, Desember 2023
e-ISSN : 2614-1574
p-ISSN : 2621-3249

FAKTOR ERGONOMIS MENCEGAH RISIKO GANGGUAN *MUSCULOSKELETAL* (MSDs) DAN MENINGKATKAN PRODUKTIVITAS KERJA

Ergonomic Factors Prevent The Risk Of Musculoskeletal Disorders (Msds) And Increase Work Productivity

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ABSTRACT

This article aims to reveal that ergonomic factors can prevent the risk of MSDs, which then increases work productivity optimally. The design of this article is descriptive. Various opinion data are taken from various literature, this is usually called literature study. Data processing was carried out using descriptive analysis. The method for making conclusions is done inductively. Conclusion: First, ergonomic factors as prevention of MSDs, namely individual factors, include: 1) Age, work at a productive age, not when you are already retired; 2) Gender, comply with the NAB threshold value, because for this type of lifting work, men and women have different (NAB) loads; and 3) psychosocial, namely aspects related to one's own psychology and society. The psychological aspect of course comes from within oneself, while the social aspect comes from outside (external). These two aspects are very influential during our growth period in our ability to work. Occupational factors: 1) muscles do not receive static loads repeatedly; 2) workload, avoid working overload and overtime; 3) working period, working for a long time has a long working period, this will lead to aging and weakening of skeletal muscles naturally; 4) work posture, appropriate work posture means that it is not monotonous, there is work relaxation, and the equipment is adapted to anthropometric dimensions of human size; 4) work climate, this is related to temperature, humidity and wind speed, all must be adjusted to NAB; and 5) working time, must have a work rhythm and work 8 hours per day or 40 hours per week. Factors before work/outside of work: 1) do light skeletal muscle stretching before work; 2) exercise once a week. Second, working with MSDs will accelerate total fatigue at work which will reduce work productivity. Suggestion: for companies to pay attention to several ergonomic factors, so that workers do not get tired quickly, so that work productivity can increase optimally.

Keywords*: Ergonomic Factors, Musculoskeletal Disorders (MSDs), Fatigue, Work Productivity*

INTRODUCTION

Various product designs should be ergonomic, so that when they are used/carried out there are no musculoskeletal disorders (MSDs). By not having MSDs interference, productivity will increase. What are some ergonomic factors that must be considered so that they can prevent MSDs from occurring.

As Anastasia Putu Martha Budgeti et al (2022) said, "based on research that has been carried out, the results obtained are that 88 (87.1%) respondents had a low risk of experiencing MSDs while 13 (12.9%) respondents had a moderate risk experiencing MSDs." In the same vein, Titik Yuwantri Lady Suratno, et al (2022) showed that "the results of research on Manikin Dam construction workers experienced the most MSDs complaints on the upper neck and waist, amounting to 47 respondents (92.2%) and the fewest complaints on the buttocks amounting to 8 respondents (15.7%)". Then, the results of research by Annisa Purbasari (2019) stated that "the body part of pillar printing operators with the most dominant level of severity of pain due to musculoskeletal disorders is the back at 66.67%". This shows that several cases of MSDs still occur.

In order to avoid MSDs, it is necessary to pay attention to the worker's age, lifting distance, and especially body posture when working. As David Kusmawan (2021) said, "there are significant variables regarding MSDs, namely worker age, work posture and

transportation distance. Meanwhile, in the final model, it can be seen that the work posture variable is the dominant variable in the occurrence of MSDs." Also, Ryan Wahyu Dwiseptianto et al (2022) agrees that "factors related to musculoskeletal complaints in informal sector workers at the Tirta Agung Ice Factory are age, length of service and work posture".

Ergonomic factors related to product design in accordance with skeletal muscle physiology (muscular-skeletal). Physiologically, the tip of the muscle (insertion) is moved by the base of the muscle (origo). This physiological work ensures that you don't get tired easily and have stronger power. This physiological work will occur if when the tool is used it causes physiological movements, has stronger skeletal muscle strength. Therefore, it is necessary to pay attention to ergonomic factors in order to create movements that do not cause musculoskeletal disorders when working

METHOD

This article was written to determine the prevention of musculoskeletal disorders (MSDs). Reducing MSDs is done by paying attention to ergonomic factors when working or working physiologically. The method of this article is a qualitative article. The design of this article is descriptive. Various opinion data are taken from various literature, this is usually called literature study. The data in this article comes from secondary data from various sources such as articles, books, the internet and other sources. Data processing was carried out using descriptive analysis. The way to draw conclusions is done inductively.

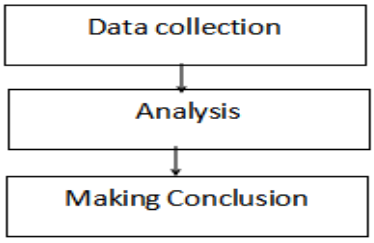

Figure 1. Research Flow

RESULT AND DISCUSSION

1. Ergonomic Factors Prevent Musculoskeletal Disorders (MSDs)

Ergonomics is a science that studies how people interact with work tools in their work nvironment. Work posture is the body position during work which is related to the design of the work area and task requirements. Various unergonomic work station conditions will give rise to unnatural working postures such as squatting, sitting hunched over, and so on. Work posture is a determining point in analyzing the effectiveness of a job. If the work posture of the workforce is ergonomic, it can be ensured that the results obtained by the workforce will be good. However, if the worker's working posture is not ergonomic, the worker will easily get tired. Working posture will be formed due to the suitability of the design of the tool used.

Musculoskeletal is an occupational risk regarding muscle disorders caused by incorrect work posture when carrying out a work activity. Musculoskeletal complaints are complaints in parts of the skeletal muscles (musculoskeletal) that are felt by a person ranging from very mild complaints to very painful. According to Muchlisin Riadi Juni (2014) "if muscles receive static loads repeatedly and for a long time, it can cause complaints in the form of damage to joints, ligaments and tendons. "Complaints of damage are usually termed complaints of musculoskeletal disorders (MSDs) or injuries to the musculoskeletal system."

There are several risk factors that can influence MSDs. As Bagus Aprianto, et al (2021) said, research results showed that "there were 2 (two) risk factors that could seriously influence MSDs in workers, namely individual and work factors. Individual factors include age, gender, and psychosocial factors. Meanwhile, work factors include workload, work period, work posture, work climate, work time, and repetitive work movements."Work posture is related to MSDs, and before working you need to do stretching movements to avoid the occurrence of MSDs, as Rani Pratiwi, 2020) from the results of her research stated

that "there is a significant relationship between work posture based on the wrist body part felt by respondents and Musculoskeletal complaints Disorders MSDs. To reduce the risk of working posture which can cause MSDs complaints, door manufacturing workers are advised to do stretching movements before carrying out work activities. "Door making workers are advised to take advantage of their rest hours by doing muscle relaxation movements for around 5-10 minutes to improve blood circulation throughout the body."

In line with this opinion, Nurdian Evadarianto, et al (2017) stated that "there is a very strong relationship between work posture and MSDs complaints. Working postures that are not ergonomic or natural can cause MSDs complaints. The worse the work posture, the greater the musculoskeletal complaints. The company redesigned the layout, one of which was by avoiding multi-story floors. Carry out routine supervision of activities that pose a risk of injury, and regularly hold sports activities once a week."

Based on the various opinions above, to prevent musculoskeletal disorders (MSDs) from occurring, it is necessary to pay attention to several ergonomic factors as follows:

Individual factors include: 1) Age, work at a productive age, not at a retired old age; 2) Gender, comply with the NAB threshold value, because for this type of lifting work, men and women have different (NAB) loads; and 3) psychosocial, namely aspects related to one's own psychology and society. The psychological aspect of course comes from within oneself, while the social aspect comes from outside (external). These two aspects are very influential during our growth period in our ability to work.

Occupational factors: 1) muscles do not receive static loads repeatedly; 2) workload, avoid working overload and overtime; 3) working period, working for a long time has a long working period, this will lead to aging and weakening of skeletal muscles naturally; 4) work posture, appropriate work posture means that it is not monotonous, there is work relaxation, and the equipment is adapted to anthropometric dimensions of human size; 4) work climate, this is related to temperature, humidity and wind speed, all must be adjusted to NAB; and 5) working time, must have a work rhythm and work 8 hours per day or 40 hours per week.

Factors before work/outside of work: 1) do light skeletal muscle stretching before work; 2) exercise once a week.

2. MSDs, Fatigue and Work Productivity

Improvement of working conditions is recommended to reduce musculoskeletal problems and fatigue and increase productivity. Furthermore, MSDs cause total fatigue, as the results of research by H. Daneshmandi, et al (2017) stated that "the highest prevalence rates of musculoskeletal symptoms in the last week were related to the neck (41.6%), lower back (41.6%), and shoulder (40.6%). The mean discomfort/pain scores were 1.67, 1.55, and 1.31 in the neck, lower back, and shoulders, respectively. Additionally, the severity of discomfort/pain in the neck, shoulders, lower back, and thighs correlates with total fatigue."

Fatigue due to MSDs complaints must be prevented so that productivity does not decrease. As Peppy Mayasari, et al (2016) stated that "fatigue is a condition of decreased efficiency, work performance, reduced strength and physical endurance of the body to continue the activities that must be carried out, especially in Industrial Centers. Physical fatigue is usually related to parts of the human body, for example muscle, hand and back fatigue. Meanwhile, non-physical fatigue is usually characterized by a reduced willingness to work. This must be followed up immediately to prevent a decline in work productivity in Industrial Centers."

Experiencing complaints of low MSDs, work productivity is quite good. "As the results of research by Lailiya Mukhadiroh (2019), the risk of musculoskeletal disorders (MSDs) is low (96.2%) and most complaints occur in the neck and upper right arm, and the level of productivity is quite good (63.5%)." Based on several opinions above, experiencing MSDs will accelerate total fatigue at work. Working tired quickly will reduce work productivity

CONCLUSION

Dataset that collects data of Ergonomic factors prevent MSDs, namely: Individual factors include: 1) Age, work at a productive age, not at a retired old age; 2) Gender, comply with the NAB threshold value, because for this type of lifting work, men and women have different (NAB) loads; and 3) psychosocial, namely aspects related to one's own psychology and society.

The psychological aspect of course comes from within oneself, while the social aspect comes from outside (external). These two aspects are very influential during our growth period in our ability to work. Occupational factors: 1) muscles do not receive static loads repeatedly; 2) workload, avoid working overload and overtime; 3) working period, working for a long time has a long working period, this will lead to aging and weakening of skeletal muscles naturally; 4) work posture, appropriate work posture means that it is not monotonous, there is work relaxation, and the equipment is adapted to anthropometric dimensions of human size; 4) work climate, this is related to temperature, humidity and wind speed, all must be adjusted to NAB; and 5) working time, must have a work rhythm and work 8 hours per day or 40 hours per week.

Factors before work/outside of work: 1) do light skeletal muscle stretching before work; 2) exercise once a week. That working with MSDs will accelerate total fatigue at work which will reduce work productivity

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