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Posture Analysis of Musculoskeletal Complaints on Marble Creators in Bintang Indah Marmer, Tulungagung Regency

Yusnia Ziana Zain[1], Amarin Yudhana[2]
Institut Ilmu Kesehatan Strada Indonesia
Corresponding Author : yusnia@gmail.com

ABSTRACT

Musculoskeletal disorders are the second largest contributor to disabilities globally, with low back pain being the leading cause of global disability. The purpose of this study was to analyze the influence work posture for musculoceletal complaints on marble craftsmen at Bintang Indah Marmer, Tulungagung Regency. The design of this research is an observational quantitative study with a cross sectional approach with the focus of the research being directed to analyze the effectwork posture for musculoceletal complaints on marble craftsmen at Bintang Indah Marmer, Tulungagung Regencywith a population of 52 respondents and a sample of 46 respondents who were drawn using the simple random sampling technique. The findings show that hnearly half of the respondents have a body posture with a high risk category of 18 respondents (39.1%). Half of the respondents had musculoskeletal complaints in the moderate category, 23 respondents (50%). The results of the study used the test *Linear Regression* indicates that the p-value is 0.000 <0.05, then H1 is accepted, so it is concluded that there is the effect of work posture on musculoceletal complaints in marble craftsmen at CV. Bintang Indah Marmer Campurdarat, Tulungagung Regency, with a magnitude of influence of 81.4%. Workers when doing work to do work in a safe way, starting from adjusting body posture while working so as not to bend too much and more ergonomics, to reduce the risk of musculoskeletal complaints.

Keywords : Marble, Musculoskeletal Complaints, Work Posture

INTRODUCTION

The development of industry in the handicraft sector encourages higher productivity, which is expected to meet local and global market demand. Even though the industrial development in the world is already in the advanced category and everything is fully automatic, the use of manual human labor cannot be avoided as a whole. Many industries in Indonesia in material handling also still use human labor. Human limitations are often a determining factor for the occurrence of health problems, one of which is the ergonomic hazard that can lead to occupational diseases (PAK).

According to the International Labor Organization (ILO) in 2013, every 15 seconds there is 1 incident when a worker dies as a result of a work accident. Every year more than 250 million workers experience work-related accidents and around 160 million workers experience illness due to hazards in the workplace. In addition, there are 1.2 million workers who died due

to accidents and illness at work. Figures show that the human and social costs of production are too high.

Health and Safety Authority (HSA) in 2015, that the PAK figure in 2012 affected 27.1 out of 1000 workers. Of the reported cases, it is known that approximately 32% are musculoskeletal injuries due to work activities. Musculoskeletal complaints can be aggravated if the position or attitude at work is not ergonomic. Ergonomic hazards that arise as a result of the incompatibility of work tools with body conditions, the resulting effect is complaints on the skeletal parts. The complaints that are felt in the skeletal muscle, both very mild complaints and severe complaints, are referred to as Musculoskeletal disorders (MSDs).

According to the World Health Organization (2018) musculoskeletal disorders are the second largest contributor to disabilities at the world level, with low back pain being the main cause of global disability. Studies on Musculoskeletal in various industries show that muscle complaints that are often felt by workers include the muscles of the neck, shoulders, arms, hands, fingers, back, waist and lower muscles. Most musculoskeletal events do not cause disability but cause disruption of work activities. In addition, according to some experts, individual factors such as age, gender, physical activity, physical strength and body size can also cause complaints of the musculoskeletal system (Tarwaka, 2010).

That the factors that can cause complaints of Musculosceletal Disorders (MSDs) consist of occupational factors, individual factors, environmental factors and psychosocial factors, which include body posture at work. The occurrence of complaints of Musculosceletal Disorders (MSDs) can also be caused by workers working with excessive stretching of muscles, repetitive activities and unnatural work postures (Russeng, et al, 2013). MSD complaints that often arise in industrial workers are back pain, neck pain, pain in the wrists, elbows and feet.

In Indonesia, based on the results of a survey by the Indonesian Ministry of Health in a health problem profile in 2011, it shows that about 40.5% of diseases suffered by workers are related to their work, health problems experienced by workers according to a study conducted on 482 workers in 12 districts / cities in Indonesia, generally in the form of MSDs disorders (16%), cardiovascular (8%), neurological disorders (6%), respiratory disorders (3%) and ENT disorders (1.5%), and laboratory study results of the Center for Health and Ergonomics Studies ITB in 2006-2007 , data obtained that as many as 40-80% of workers report complaints to musculoskeletal after work (Nurdian & Endang, 2017).

The results of Riskesdas (2013) showed that the prevalence of musculoskeletal diseases diagnosed by health workers was 11.9% and based on diagnosis or symptoms was 24.7%. Musculoskeletal complaint data in Indonesia show that workers experience muscle injuries in the lower neck (80%), shoulders (20%), back (40%), back hips (40%), back hips (20%), buttocks (20%).), thighs (40%), knees (60%), and calves (80%) (ILO, 2018).

One of the Indonesian industries that still rely on human labor in the production process is the marble stone handicraft industry. Marble stone handicraft industry is a well-known industry in Tulungagung. Tulungagung itself is well-known as one of the largest marble producers in Indonesia.

Bintang Indah Marmer is a factory engaged in the marble handicraft manufacturing industry, located in the village of Gamping. At the time of the production process, almost all of its activities were carried out by human labor. The problems that exist in this company, workers often experience the wrong attitude or work posture

when doing productivity such as lifting, moving, and lowering stones and static muscle loads due to repeated and continuous movements for a long period of time can result in several disturbances in the form of skeletal muscle disorders and other disorders that can result in the production process not being optimal.

Based on the results of a preliminary survey conducted on 10 marble craftsmen, it can be seen that 10 workers experienced musculoskeletal complaints such as pain in the back, waist, neck, shoulders. The unnatural work posture carried out by workers is a compulsion due to environmental and workplace conditions. Based on the above conditions, the authors are interested in researching the work posture analysis of musculoceletal complaints in marble craftsmen at Bintang Indah Marble, Tulungagung Regency.

METHODS

In this study, researchers used a quantitative analytic design with a cross sectional approach, namely a study to study the dynamics of regression between risk factors and effects, by approaching, observing or collecting data at once (point time approach), that is, each subject. The research was only observed once and measurements were made of the character status or subject variables at the time of examination. This does not mean that all research subjects were observed at the same time (Notoadmojo, 2012). This research will analyzethe effect of work posture on musculoceletal complaints in marble craftsmen at Bintang Indah Marmer, Tulungagung Regency, with a population of 52 respondents and a sample of 46 respondents who were taken using the simple random sampling technique.

RESULTS

Table 1 Analysis Results *Linear Regression*analysis of work posture on musculoceletal complaints in marble craftsmen at Bintang Indah Marmer, Tulungagung Regency

No	Variable	B		Sig
1	Constand	21,126		0,000
2	Body Posture	4,716	814	

Based on the results of Linear Regression analysis, it shows that the p-value is 0.000 <0.05, then H1 is accepted, so it is concluded that there is the effect of work posture on musculoceletal complaints in marble craftsmen at Bintang Indah Marble, Tulungagung Regency

DISCUSSION

A. Work Posture of Marble Stone Craftsmen at Bintang Indah Marmer, Tulungagung Regency

The results showed that almost half of the respondents had a body posture with a high risk category of 18 respondents (39.1%). In addition, a number of 16 respondents (34.8%) have a body posture with a moderate risk category. Meanwhile, a number of 12 respondents (26.1%) had a low risk body posture. The

purpose of ergonomics is to get complete knowledge about the problems of human interaction with the work environment, besides that ergonomics has the aim of reducing the level of accidents at work and increasing productivity and efficiency in a production process. Ergonomics is the science, art and application of technology to harmonize or balance all facilities used for activities and breaks with human capabilities and limitations both physically and mentally so that the overall quality of work is better (Tarwaka, 2014).

In practice, if work becomes safe for workers or humans and work efficiency increases, human welfare will be achieved. The success of the application of ergonomics is seen from the improvement in productivity, efficiency, safety and the acceptance of the resulting design system (easy, comfortable and so on) (Pheasant, 2014). Ergonomics is the study of work harmony in a system (worksystem). This system consists of humans, machines and work environment (Bridger, 2013).

Ergonomics can be used in examining the complex human and production systems prevailing in the informal sector industry. By knowing these ergonomic principles, it can be determined what work is suitable for use in order to reduce the possibility of complaints and support productivity. The application of ergonomics can be done through two approaches (Anies, 2015).

Work attitudes that are often carried out by humans in doing work include standing, sitting, bending, squatting, walking and others. The work attitude is carried out depending on the conditions in the existing work system. If the work system conditions are
wrong it will cause work accidents, because workers are doing unsafe work. Wrong, awkward and out of habit work attitudes will increase the risk of injury (Bridger, 2010).

According to researchers, work is an activity that is carried out repeatedly almost every day where workers tend to do static work and work postures. Based on the research results, it was found that most of the respondents hadposture with a high risk category, which is because the work attitude performed by employees tends to be static, thus accelerating the onset of fatigue and muscle aches involved. If this condition persists for a long time, it can cause continuous fatigue. Therefore, in order for the work to be maximized, employees are expected to stretch the muscles for a moment so as not to feel muscle and joint stiffness .

B. Musculoceletal Complaints on Marble Craftsmen at Bintang Indah Marmer, Tulungagung Regency

The results showed that half of the respondents had musculoskeletal complaints in the moderate category of 23 respondents (50%). In addition, a number of 14 respondents (30.4%) had musculoskeletal complaints in the high category. Meanwhile, 9 respondents
(19.6%) had musculoskeletal complaints in the low category.

Health problems that are often experienced by vegetable porters associated with the aging process (degenerative) with age including bone degeneration which has an impact on the increased risk of low back pain (low back pain). Besides that, the heavy workload and not paying attention to the weight of the load being lifted will cause complaints of pain in the lower back such aslimping, being dragged, stiff, pain, burning sensation, piercing, pain can radiate to both buttocks or even to the thighs or hip area, sufferers walk very carefully (possible infection, inflammation, tumors or fractures (Wardoyo, 2018).

Low Back Pain (LBP) is pain that occurs in the lower back area and can spread to the legs, especially the back and outer side (Maringan, 2017). Symptoms that are felt in people who suffer from LBP vary, such as burning pain, stabbing pain, sharp pain, and weakness in the legs. Low back pain is a clinical syndrome characterized by the main symptom of pain or other unpleasant feelings in the lower spine area (Meliala, et al 2015).

According to Harsono (2015) states that LBP is a feeling of pain in the lumbosacral and sacroiliacal areas. Lower back pain or boyok pain is pain that is felt in the lower back area, can be local or radiuclear pain or both. Pain originating from the lower back area can refer to other areas or vice versa.

The body is equipped with various monitoring, compensation and protection mechanisms to anticipate changes in the environment, both outside and inside the body. There are mechanisms that are based on and some are not. Pain is one of the body's important protective mechanisms. Pain stimuli can generate two reactions, namely a reaction that consciously experiences pain and an unconscious reaction in the form of reflexes that accompany pain such as avoidance, immoilization of damaged joints and muscle tension (Guyton, 2016).

To deliver pain, in the body there are afferent nerve endings (Never ending) as pain receptors (nociceptors) which convert physical, chemical and biological stimuli into three types of mechanical taste receptors (mechanoceptors), receptors for various unpleasant tastes (polymodal nociceptors). This process of change is called transduction. The three receptors are connected to afferent nerves consisting of A alpha nerves, A delta and C fibers. A alpha nerve is a myelinated nerve that inhibits pain, A delta nerve is a myelinated nerve that delivers a feeling of temperature and pain that is fast and sharp while C fiber is a nerve that delivers chronic slow pain (Guyton, 2016).

Lower back pain is a musculoskeletal disorder caused by poor body activity (Pearce, 2015). Guyton (2016) states that back pain is a common disorder involving muscles and bones, the source of the pain experienced by this individual is due to injury to the soft tissue structures that include muscles, fascia and ligaments.

According to researchers, some employees experienced musculoskeletal complaints in the severe category. The number of these incidents is due to the lack of awareness of employees with their own bodily abilities. Many of the employees force their bodies to do work in a way that is not ergonomic for a long duration, and even then it is not balanced with a good resting pattern and diet. Because most of the employees in the middle to lower economy with low education, so they are not wise in understanding work ergonomics to minimize the incidence of occupational diseases. Complaints of pain that are felt continuously cause discomfort to employees and if they are allowed to continue to do work without ergonomics at the same time, it is not impossible that a more severe musculoskeletal disease will occur.

CONCLUSION

1. Hnearly half of the respondents have a body posture with a high risk category of 18 respondents (39.1%).
2. Half of the respondents had musculoskeletal complaints in the moderate category, 23 respondents (50%).
3. There is an effect of work posture on musculoceletal complaints in marble craftsmen at Bintang Indah Marmer, Tulungagung Regency

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