The Correlation of Work Loads and Work Positions on Risk Occurrence of Myogenic Low Back Pain on Sand Mining

Safun Rahmanto*, Ali Multazam, and Anggun Retno Muninggar
Department of Physiotherapy, Faculty of Health Science, University of Muhammadiyah Malang
Jalan Bandung Nomor 1 Malang 65113 East Java Indonesia

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Abstract: Low Back Pain is a condition of pain that is felt in the lower back area, usually felt between rib bones to the lower fold of buttocks, and can reduce human work productivity. Workload and work position are the factors of concern in the incidence of Low Back Pain. This research was observational analytic using a cross-sectional method, and the study was conducted on 25-27 February 2019. Respondents in the study were sand mining workers in Kalimujur Lumajang Regency as many as 63 respondents. The technique of taking respondents uses purposive sampling. Based on the results of the Spearman correlation calculation ($\alpha < 0.05$) the workload relationship with the risk of back pain is below p-value 0,000, then H0 is rejected. The results of the study were correlation calculation work relationship with the risk of back pain below p-value 0,000, then H0 is rejected. From these results, it can be concluded that there is a relationship between workload and work position on the risk of low back pain in Kalimujur sand miners in Lumajang Regency. There is a relationship between workload and work position to the risk of low back pain in sand miners in Kalimujur Lumajang Regency.

1 INTRODUCTION

Lumajang district is one of the areas in East Java Province. Lumajang Regency has an area of 1,790.90 km2 and has 1,006,458 inhabitants. The majority of the people in the Lumajang area work as sand miners to meet the needs of their families. Sand miners in the Lumajang area, at the time of work, many of them did not use machines, but instead used simple methods, namely with hoes or shovels to collect sand.

In Lumajang the mining industry is one of the industries that is prioritized by the government of Lumajang Regency, where Lumajang Regency is known as one of the best sand-producing industries in Indonesia. Based on a preliminary study conducted by researchers at the Kalimujur sand miner in Lumajang Regency, which amounted to 73 active miners through interviews as many as 8 respondents stated experiencing low back pain.

Low back pain is a pain that is felt in the lower back area, in the form of local pain or radicular pain or both pain. Pain that is usually accompanied by pain radiates to the legs and feet. Pain that can reduce the productivity of human performance and can be caused due to muscle fatigue or other diseases such as malignant tumors (Rinaldi, Utomo and Nauli, 2015).

Research at Pasir Gintung Market in Bandar Lampung explained that there were 32 workers (66.7%) experiencing back pain and 16 workers (33.3%) not complaining of back pain. The results of this study indicate a relationship to the occurrence of low back pain, namely work period, workload, and work position. Whereas at age, IMT and smoking habits do not have a specific relationship to the occurrence of low back pain (Andini, 2015). Sand miners are one of the jobs that are very vulnerable to health. Every day the sand miners usually work for 6-8 hours per day carrying heavy loads and wrong body positions coupled with repetitive movements.

The workload is a job with a burden that must be borne by a person or group of people within a certain period with normal conditions. Sand miners, while doing their work by swinging the sand that has been collected into the truck in a bent and standing position. To load trucks in a day, sand miners can swing 1300 more swings. This condition can cause fatigue in the muscles of the waist, arms, and neck to become tense. The number of factors that influence complaints of low back pain such as heredity, age,

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sex, body posture deformity, physical activity, work period, and length of time at work. Other than that, other factors can affect the occurrence of low back pain, namely physical factors such as body tension at work, frequent lifting of weight, and body position that is not ergonomic when working. Smoking history and trauma can also cause a factor in the occurrence of *low back pain* (Kaur, 2016).

2 METHODS

This study used an observational analytic design with a cross-sectional approach where data collection from independent variables and dependent variables was taken at one time. In this study, researchers will look at the relationship between workload and work position to the risk of *low back pain* in sand miners in Kalimujur Lumajang Regency. Respondents in this study were sand miners in Kalimujur, amounting to 63 people with a sampling method that was purposive sampling.

In this study the researchers took the data in the form of sand miner's workload using the QEC (*Quick Exposure Check*) method, working position data collection using the REBA (*Rapid Entire Body Assessment*) method and data collection on the risk of Low Back Pain using NBM (*Nordic Body Map*). This study used the Spearman correlation test, and conclusions were carried out using SPSS to compare the P-value with (sig 2 tailed) with a value of α 0.05. H0 is accepted if p> 0.05 and H1 is accepted if p <0.05.

3 RESULTS AND DISCUSSION

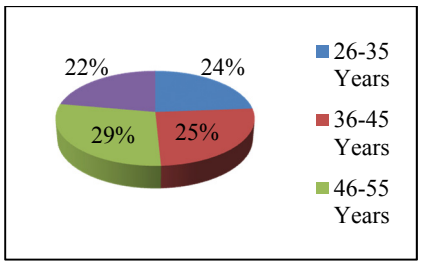

Figure 1: Characteristics of Respondents by Age

From Figure 1, it can be seen that those who work in the sand mining in Kalimujur, in terms of ages 26-35 years, there are 24% (15 miners), there are 25% (16 miners), ages 36-45, aged 46-55, 29% (18 miners), while 56-65 years old there are 22% (14 miners)of a total of 63 miners It can be concluded that respondents with ages 46-55 years are the highest number of respondents and age 56-65 years are the least number of respondents.

Winata (2014) research, cases in low back pain are very rare at 0-10 years of age, low back pain often occurs at the age of 20 years, and up to the age of 50, this can occur because of etiological factors in the old age group. In line with the research conducted by Idyan (2008), as we get older, there will be degeneration in the bones and this condition can occur from the age of 30 years.

At the age of 30, there is a degeneration that can damage the tissue; there is a change in scar tissue, a reduction in the fluid, which causes reduced bone and muscle stability. Getting older and increasing age, the flexibility of the muscles decreases so that it can cause stiffness in the muscles and joints. In addition to stiffness, the narrowing of the space between the vertebral bones results in a lack of flexibility in the spine.

The following are the results of data analysis the correlation of workloads and work positions on risk occurrence of low back pain myogenic on sand mining in Kalimujur Lumajang District.

Table 1: Correlation between Workload and Risk of *Low Back Pain*

Sig. (2-tailed)	Correlation Coefficient
0.000	0.622

Sig. (2-tailed) Of 0,000 or less than 0.05 (p <0.05) means that H1 is accepted, so it can be concluded that there is a significant relationship between workload and the risk of low back pain. Correlation coefficient of 0.622 means the level of strength of the relationship between workload and the risk of *low back pain* including strong correlation. The number of correlation coefficients in the table shows positive numbers, which means the relationship between the two variables is in the same direction. This shows that the higher the workload, the higher the risk of *low back pain*.

Table 2. Correlation between Work Position and Risk of *Low Back Pain*

Sig. (2-tailed)	Correlation Coefficient
0.000	0.668

Sig. (2-tailed) Of 0,000 or less than 0.05 (p <0.05) means that H1 is accepted, so it can be concluded that there is a significant relationship between work positions and the risk of low back pain. The

correlation coefficient of 0.668 means the level of strength of the relationship between work positions and the risk of low back pain including strong correlations. The number of correlation coefficients in the table shows positive numbers, which means the relationship between the two variables is in the same direction. This result shows that the higher the position of work, the higher the risk of *low back pain*.

Andini (2015) explains that work with heavy loads can cause a large burden on muscles, tendons, ligaments, and joints that can cause muscle fatigue, muscle damage, tendon damage, and damage to other tissues. Physical loading that the body receives during work can result in musculoskeletal injury to the body. The burden received by the correct body is not to exceed 30-40% of the maximum ability of workers in 8 hours a day and pay attention to the prevailing clock regulations (Suma'mur, 1989).

The research conducted by Risdianti (2018) about the relationship between workload and complaints of *low back pain,* which has a significant relationship to complaints of low back pain in the female pelvis in Pasar Legi Surakarta. Whereas, the research conducted by Nurzannah, Makmur, and Umi (2015), which is about the relationship between workload and low back pain events, also has a significant relationship with the occurrence of low back pain in unloading workers in Belawan Port, Medan. Also, research conducted by Al Miqdam (2017) on sawmill workers also shows a connection between wood lifting and the incidence of *low back pain*.

Sand miners at work tend to be bent and in a dynamic state. The position of the head and back of the sand miner also tends to bend because the position when taking sand to be transferred to the sand transport truck is lower than his body position. Work that is bent and repetitive will cause spasm and pain in the back area muscles because of the emphasis on excessive muscle in the back area. Research conducted by Samara (2005), which is about the attitude of work bending and turning during work, can increase the risk of occurrence of low back pain of 2.68 times compared to the work attitude of the upright body.

The research conducted by Kusuma, Hartanti, and Hasan (2014), which is about the Influence of Working Position of the Genesis of *Low Back Pain* in The Workers at Kampung Sepatu Miji, has a significant relationship to the risk of low back pain. The correlation between work attitude standing on the waist segment of workers who work in the cleaning service section with musculoskeletal complaints has a significant relationship to complaints of *low back pain*. Where some officers complained of *low back pain* when cleaning the bathroom with awkward positions such as rotating position and sideways movement and each position had a high risk for *low back pain*.

Work positions carried out by miners with the wrong position (too bent) and out of habit will increase the risk of injury to the musculoskeletal system. High-risk work positions also have a high risk of low back pain. On sand miners in Kalimujur Lumajang Regency, while working with a dynamic and repetitive back position, especially in the lumbar region, can cause spasm and pain. If excessive contraction, the circulation of blood to the muscles decreases, it can result in decreased oxygen supply, which eventually occurs accumulation of lactic acid, and this is one of the causes of the emergence of pain in muscles (Tarwaka and Andi, 2004).

4 CONCLUSIONS

Based on the research conducted, it can be concluded that: There is a correlation between workload and work position to the risk of occurrence on low back pain to sand miners in Kalimujur Lumajang Regency.

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