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Potential for Musculoskeletal Disorders of Buruh Gendong in Legi Market

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Abstract

The people in Solo are still going to the traditional market. One of the traditional markets that is classified as class 1 in the city of Solo is Legi Market. Legi Market which is located at Banjarsari is the main market in the city of Solo. *Buruh gendong* is a person who help others to carry the goods. *Buruh gendong* have an important role in Legi Market. They bring goods from outside to be brought inside market or they bring goods from buyers to be taken outside to the parking area. There are around 200 *Buruh gendong* in Legi Market, with an average age of over 40 years old. The weight of the load is approximately 30 kg to 100 kg. The distance from inside to outside is about 50 meters. Almost of them do not aware with the impact of their duty to the skeletal system called musculoskeletal disorders (MSDs). Mapping the potential for MSDs is very helpful for the government for reducing the incidence of skeletal muscle injury. Based on data on the physical complaints experienced by the carrying laborers of Legi Market showed that the most common complaints in the last 12 months were the knees, upper back and shoulders. and lower back. The results of the calculation of lifting index (LI) to 30 respondents show that the whole value of LI is more than 1 (LI> 1). Therefore, the work of *Buruh gendong* has potential to cause risk of spinal injury.

Keywords: musculoskeletal disorders, *buruh gendong*, legi market, recommended weight limit

Potensi Keluhan Muskuloskeletal pada Buruh Gendong di Pasar Legi

Abstrak

Keberadaan pasar tradisional di Kota Solo masih diminati oleh masyarakat sekitar walaupun saat ini sudah mulai bermunculan pasar modern. Salah satu pasar tradisional yang tergolong kelas 1 di kota Solo adalah Pasar Legi. Pasar Legi yang terletak di Banjarsari merupakan pasar induk yang menjadi pusat perkulakan. Buruh gendong mempunyai peran penting di Pasar Legi yaitu membawa barang para pedagang dari luar untuk dibawa masuk atau membawa barang dari pembeli untuk di bawa ke luar menuju tempat parkir. Buruh gendong di Pasar Legi ada sekitar 200 orang dengan rata – rata usia di atas 40 tahun. Berat beban yang diangkat mulai dari 30 kg hingga 100 kg. Jarak yang ditempuh oleh buruh gendong rata – rata 50 meter yaitu dari Jalan S.Parman ke dalam pasar atau sebaliknya. Sebagian besar buruh gendong belum mengetahui dampak dari pekerjaan terhadap sistem rangka. Sehingga potensi terjadinya cidera otot rangka atau dikenal dengan Musculoskeletal Disorders (MSDs) sangat tinggi. Pemetaan potensi terjadinya MSDs sangat membantu pemerintah dalam mengurangi kasus terjadinya cidera. Berdasarkan data keluhan fisik yang dialami oleh buruh gendong Pasar Legi menunjukkan bahwa keluhan yang paling sering dialami dalam 12 bulan terakhir adalah lutut, punggung atas dan bahu. dan punggung bawah. Hasil perhitungan lifting index (LI) terhadap 30

Vol.8, No.2: 31-12-2022
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responden menunjukkan bahwa nilai LI keseluruhan lebih dari 1 (LI > 1). Oleh karena itu, pekerjaan buruh gendong berpotensi menimbulkan risiko cedera tulang belakang.

Kata kunci : musculoskeletal disorders, buruh gendong, pasar legi, recommended weight limit

INTRODUCTION

Traditional markets in Surakarta that classified as first category are Klewer, Singosaren, Legi, Gede, Notoharjo, Harjodaksino, Jongke, Nusukan, Depok, and Nongko markets (Nugraha, Musiyam and Sigit, 2013). Pasar Klewer, Pasar Legi, Pasar Gedhe and Pasar Harjodaksino are the traditional markets that have carrying labor or *Buruh gendong* (Sumantyo and Sari, 2015). *Buruh gendong* is a person who help others to carry the goods in market activities. Pasar Legi that located at Jalan S. Parman No. 19 Setabelan, Banjarsari, is the main market that provides vegetables, spices, fish, meat, chicken and basic need. The existence of Buruh Gendong in Legi Market is like a mutualism symbiosis for traders or buyers (Ira, 2020). In Legi Market, there are more than 200 *Buruh gendong* (Cahyono, 2018). They are on average over 40 years old. Based on information obtained from Lurah or Leader who manages Legi Market, the population of female *Buruh gendong* is actually more than male. The service fee for them is about Rp. 4,000 for 100 kilograms. The average distance from inside the market to Jalan S. Parman in front of the market is more than 50 meters. The operating hours of *Buruh gendong* in Legi market were 09.00 WIB to 16.00 WIB.

Figure 1 shows posture and body position of *Buruh gendong* in Legi Market during lifting process. Novianti (2015) and Waryani (2017) said that the mildest effect that appears in the long term due to the habit of carrying heavy load is the incidence of postural kyphosis. Lifting of goods by *Buruh gendong* can result in Musculoskeletal Disorders. Musculoskeletal Disorders is skeletal muscle complaint caused by excessive and repetitive loading. MSDs begin with complaints of pain in the affected area. If this pain is not treated immediately it can result in changes in the anatomy of the body such as a hunchback or even fractures. To map the potential for MSDs, the Indonesian Ergonomics Association (PEI) has compiled a Survey of Skeletal Muscle Disorders which was released in 2016. The survey data can be used as a basis for consideration in designing ergonomic interventions that are effective in reducing the risk of skeletal-muscle injury.

Figure 1 Posture of *buruh gendong* during lifting process (Source: Wulandari, 2022)

Mapping of potential for MSDs is very helpful for the government in reducing cases of skeletal muscle injury. Based on Indonesia's health profile sourced from the Ministry of Health's 2018 Basic Health Research shows that the percentage of injuries to worker is 10.1%. This percentage is the second largest after the percentage of injuries in school environment. In this research, data will be obtained by using the Skeletal Muscle Disorders Survey. After that, the research will calculate Recommended Weight Limit to find out the load which is safety for *Buruh gendong*.

METHOD

The research conducted in Legi Market, Surakarta, involves 30 workers as research samples. Determination of the sample is done by using a non-probability sampling technique, namely quota sampling. The quota sampling is a method to take samples that have certain characteristics until the desired number or until quota is reached (Saleh, 2017). The steps of research are held as follows:

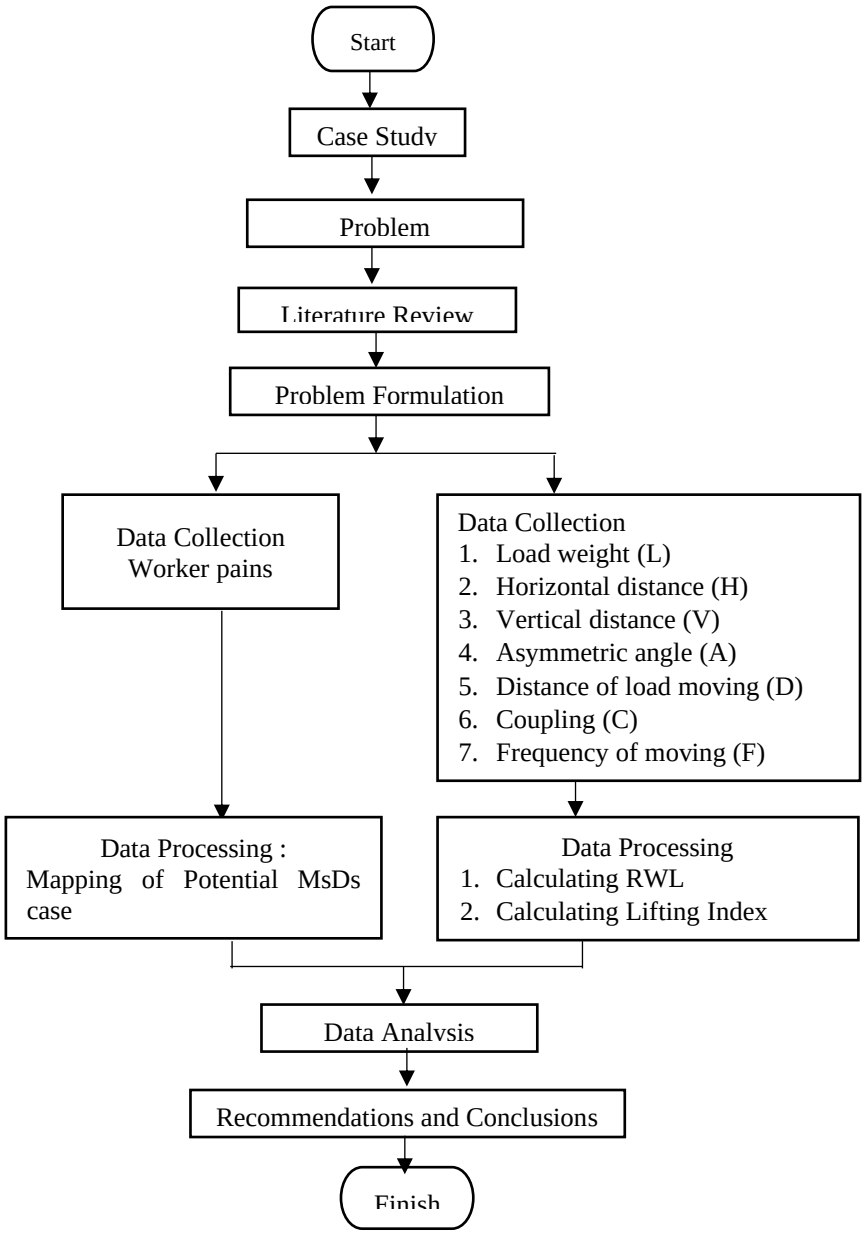

Figure 2 Research method

Data was collected by distributing survey of skeletal muscle complaints. The survey is used for mapping the part of body that a workers feel pain after their activities. This survey was designed by the Indonesian Ergonomics Association (Perhimpunan Ergonomi Indonesia - PEI). The instrument used in this survey is the Skeletal Muscle Disorders Survey. By applying the instrument designed by PEI, it is hoped that data of musculoskeletal disorders from various types of work can be obtained.

After mapping potential musculoskeletal disorders, the research is continued by calculating Recommended Weight Limit (RWL). The RWL was established by NIOSH in 1991 in the United States. RWL is revised NIOSH lifting equation to evaluate lifting task in order that incidence rate and severity of low back injuries among workers can be reduced. The RWL defines the weight of the load that a healthy worker can withstand over a fixed duration under specific task conditions (Tang, 2020). RWL is the recommended load that can be lifted by humans without tools, without causing injury to the human skeletal system (Mayangsari, Sunardi and Tranggono, 2020). Other definition, RWL is the limit of the load that can be lifted by humans without causing injury even though the work is done repetitively and over a long period of time (Anggraini and Daus, 2016). The equation to calculate RWL is:

RWL = LC x HM x VM x DM x AM x FM x CM……. (1)

Description: LC: Lifting Constanta, HM: Horizontal Multiplier, VM : Vertical Multiplier : Distance Multiplier, AM : Asymmetric Multiplier, FM : Frequency Multiplier, CM: Coupling Multiplier. The multiplier can be calculated by those equations.

Table 1
Components RWL Equation

Components	Metric
LC = Load Constant	23 kg
HM = Horizontal Multiplier	25/H
VM = Vertical Multiplier	1-0,00326 IV-75l
DM = Distance Multiplier	0,82+ 4,5/D
AM= Frequency Multiplier	from table
CM = Coupling Multiplier	from table

Source : (Herwanto, Purnama, Prianto, Adi, *et al.*, 2016)

Notes:
H = horizontal distance of the load from the center of the body
V = vertical distance of the load from the floor
D = Distance of vertical load transfer between origin and destination
A = The angle of the body rotation

The next step after calculating RWL is calculating Lifting Index (LI). Lifting Index is the comparation of actual load with Recommended Weight Limit. LI states a relative value of the physical stress level in a manual lifting activity. The equation of Lifting Index is :

$$LI = \frac{Load\ Weight}{Recommended\ Weight\ Limit} = \frac{L}{RWL} \quad \ldots (2)$$

Notes :
L : Weight of the load to be moved
RWL : Recommended Weight Limit

According to Soleman (2011) it is concluded that: If LI > 1, the weight of the load being lifted exceeds the recommended lifting limit, then the activity carries a risk of spinal injury.

Vol.8, No.2: 31-12-2022
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Else, if LI < 1, the weight lifted does not exceed the recommended lifting limit, then the activity does not carry a risk of spinal cord injury.

RESULTS AND DISCUSSION

The result of mapping the potential for Musculoskeletal Disorders through Skeletal Muscle Disorders Survey Instrument from the Indonesian Ergonomics Association is as follows:

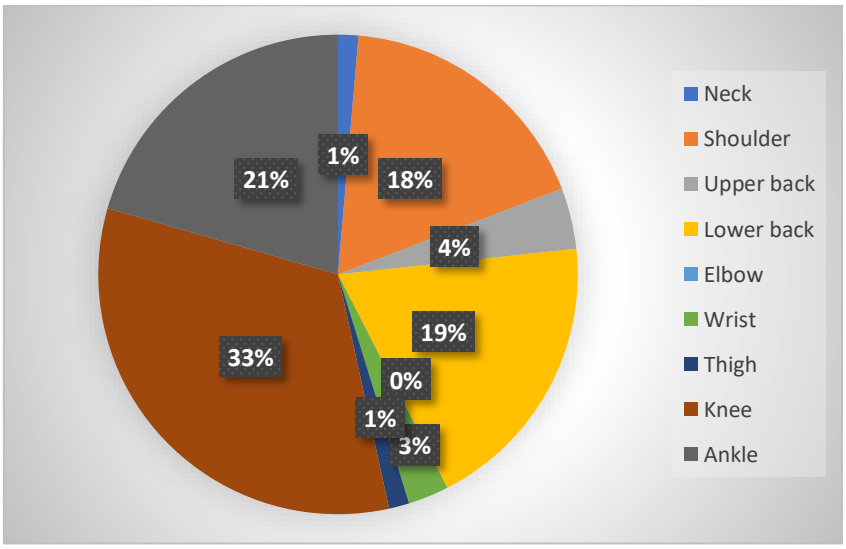

Figure 3 Data on Skeletal Muscle Complaint

Through a questionnaire distributed to 50 female carrying workers, data on the physical complaints experienced by the carrying laborers of Legi Market were obtained as shown in Figure 3. The most common complaints in the last 12 months were the knees, ankle, lower back and shoulders.

Knee and ankle injury are caused by excessive and repetitive lifting. Besides that, *Buruh gendong* also has to walk from market to the parking area, and reverse. The heavy loads cause big pressure to the bones and tendons at knee. This pressure can cause bursitis. Bursitis is inflammation of the bursa that causes pain of the joint. Bursa is like a small pouch filled by fluid to protect bones, joints, muscles, and connective tissue between muscles and bones. Bursa is used to reduce friction, friction and irritation during movement. In addition, activities of *Buruh gendong* can cause a disease called tendinitis. Tendinitis is inflammation of the tendon. Tendon is connective tissue between muscles and bones.

The injury of lower back occurs because *Buruh gendong* lifts load from the floor by bending down and then carries load by upper back. This kind of work attitude can lead to low back pain. Low back pain is a pain that has impact on the bones, tendons, nerves, ligaments, and intervertebral discs of the spine (Mayasari and Saftarina, 2016). Pain is felt between the lower border of the 12th rib to the folds of the buttocks. This pain will spread to the legs and feet (Hanifa, Koesmayadi and Susanti, 2020). This disorder is caused by the muscles receiving a continuous load. This load causes damage to the muscles, nerves, and other tissues in the lower back area. One of the causes of low back pain is the shifting of the spinal cushions so that they press on the spinal nerves. In addition, another cause of back pain is spondylosis, which is damage to the spinal joints due to erosion of the cartilage that protects the vertebrae. In addition, the work attitude of *Buruh gendong* can cause Lordosis. Lordosis is a spinal disease that causes the lower part of spine curve excessively.

The injury of shoulder could be caused by bursitis and Thoracic Outlet Syndrome. About bursitis, it has been explained before. Thoracic Outlet Syndrome is the occurrence of compression of the brachial plexus, subclavian arteries and veins in the upper extremities. Symptoms that will appear include pain in the shoulder or arm, numbness and tingling in the fingers.

The calculation of the Recommended Weight Limit is done with equation 1. Data for calculating RWL are taken from 30 workers. After calculating recommended weight limit (RWL), the next step is to calculate lifting index (LI) with equation 2. The highest value of RWL is 31.89 and the lowest value is 8.35. And then the results of the calculation of lifting index (LI) to 30 respondents show that the whole value of LI are more than 1 (LI> 1). Therefore, the work of *Buruh gendong* has potential to cause risk of spinal injury. It means that the work by *Buruh gendong* is very dangerous and should any repair of work system.

From the mapping of potential MsDs and the calculation of Lifting Index, this research gives some recommendations to minimize injury occurs, there are: providing counseling on a regular schedule to the worker, improving the ergonomic facilities and infrastructure tools for lifting goods (loads), providing a special clinic for workers who feel injury after doing their daily work, cooperating with city health office in order to monitor the health of worker regularly, doing warm up before working.

CONCLUSION

Based on research conducted on carrying laborers at Legi Market, the following conclusions can be drawn: The most common complaints felt by workers include pain in the knees, upper back and shoulders. and lower back. Calculation of the Recommended Weight Limit obtained the highest RWL value of 31.89 and the Lifting Index value of all workers more than 1. Recommendations for further research are to improve the work system with macro ergonomics so that there is an involvement of market organizations and the government in dealing with the problem of carrying workers.

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