The Relationship Of Work Attitude And Work Position Towards Workload On Tomato Fruit Sorting Workers In Semanding Village

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KEYWORDS
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INTRODUCTION
Agricultural activities are the largest source of livelihood for the world's population, including in Indonesia. Agricultural activity has a big influence in reducing unemployment in Indonesia, so it contribute to the growth and development of the country. Considering that Indonesia has fertile soil and rich in natural resources, it has high potential in developing agricultural businesses.

Tomato (Lycopersicum ecusien) is a fruit vegetable plant that is needed by humans to fulfill their daily food. The nutritional content of tomatoes consist of vitamins and minerals that useful for maintaining health and preventing disease. The Ministry of Agriculture's 2016 statistical data, stated that East Java province's tomato production reached 60,706 tons, higher 2.58% from the previous year. The land used for tomato cultivation in East Java province is 4,299 hectares, the productivity of tomato cultivation in East Java province is 14.36 tons/ha, increase of 6.51% from the previous year (BPS and the Indonesian Director General of Horticulture, 2017). Ponorogo Regency has an area of 1,371.78 Km² mostly for forestry areas and the rest is rice fields which are 1,023.11 Km² and 348.67 Km² respectively (BPS, 2013). So the major population work in agriculture. Based on statistics by BPS Ponorogo 2013, the number of agricultural businesses in Ponorogo Regency was 178,908, that managed by households. High market demand for tomato makes farmers in Semanding Village, Kauman District, Ponorogo Regency, East Java choose to cultivate tomatoes.

There are several processes in tomato cultivation, such as land preparation, planting, plant maintenance, and harvesting. The harvesting process can be done when the tomato fruit has reached 90-100 DAP (Days After Planting), or the tomatoes skin has changed from green to yellowish, the edges of the old leaves dry up, the stems turn yellow. The sorting process can be reviewed by three ergonomic aspects such as Task, Organization and Environment.

Task aspect, to select fruit in two categories, first is fruit that are good or worth for selling and the second is rotten fruit or damaged fruit. On average, the sorting process takes up to 6 hours per harvest. The sorting process is done by the workers in a squatting position, sometimes turning into a cross-legged sitting position. This work positions have affected the workload that figured out by numbers of pulse work. Based on the results of a preliminary study by researchers in 2017, musculoskeletal complaints were generally felt in the muscles of the calf and lower back. At the time of measurement, the average working pulse was 125 beats/minute.

From the organizational aspect, the harvesting of tomatoes is carried out by farmers every two days. Sorting is carried out at 10.00 a.m to 16.30 p.m, while the rest time at 12.00 p.m - 13.00 p.m. During the sorting process, several work pauses by workers were also found, such as standing up, moving the body, sitting relaxed and straightening the legs.

From the environmental aspect, the sorting process is carried out on the terrace floor of the garage with lighting from sunlight. Measurement the intensity of the light done by a Lux meter, the results showed in to 170 lux. Compare to the science of ergonomics recommendation, the light intensity found at the work station is too low, affect on eye fatigue.

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METHOD
Research design
This research was conducted by measuring the workload of workers by counted the pulse of the selected workers as a research sample before work (Pre Test) and when they were finish working (Post Test).

The population in this study were all workers who did the sorting work of tomatoes in Semanding Ponorogo Village, East Java, total 15 people. The sample in this study was calculated using the Colton formula (1985), a sample of 12 people was obtained. The research was conducted in Semanding Village, Kauman District, Ponorogo Regency, East Java.

RESULTS
1. Characteristics of Research Subjects
Table 1 Subject Characteristics Data

<table>
<thead>
<tr>
<th>Variabel</th>
<th>n</th>
<th>Rentara</th>
<th>Rentangan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>12</td>
<td>40,42</td>
<td>30-50</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>12</td>
<td>60,5</td>
<td>50-68</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>12</td>
<td>162,83</td>
<td>156-173</td>
</tr>
<tr>
<td>Body Mass Index (kg/m²)</td>
<td>12</td>
<td>22,84</td>
<td>20,5-25</td>
</tr>
<tr>
<td>Work Experience (years)</td>
<td>12</td>
<td>13,6</td>
<td>4-25</td>
</tr>
</tbody>
</table>

Based on Table 1, showed that the average of age is 44.4 years. Body mass index is the ratio of body weight (kg) to the square of height (m). The average of body mass index is 22.7, showed as normal category. While the work experience, has showed a minimum of 4 years of work experience.

2. Workload Normality Test
Workload is measured by calculating the work pulse. Workload was tested using the Shapiro-Wilk test at the level of significance (α = 0.05). The results of the workload data analysis before work (pre) and after work (post) in Period 1 and 2 are presented in Table 2.
Table 2 Analysis of Workload Normality Test

<table>
<thead>
<tr>
<th>Variabel</th>
<th>Mean</th>
<th>SB</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resting Pulse</td>
<td>66,00</td>
<td>1,04</td>
<td>0,033</td>
</tr>
<tr>
<td>Working Pulse Rate</td>
<td>126,91</td>
<td>0,79</td>
<td>0,018</td>
</tr>
<tr>
<td>Work Pulse</td>
<td>60,91</td>
<td>1,62</td>
<td>0,031</td>
</tr>
</tbody>
</table>

Description : CI : Correlation Index
Rest pulse, work pulse and work pulse show \( p < 0.05 \). Means that the data is not normally distributed.

3. Effect Test
The statistical test used is the Wilcoxon test. The results of data analysis on workload are presented in Table 3.
Table 3 Results of workload differences (beats/minute)

<table>
<thead>
<tr>
<th>Variabel</th>
<th>(beats/minute)</th>
<th>( p )</th>
<th>( \text{Nilai value} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resting Pulse</td>
<td>66,00</td>
<td>0,002</td>
<td></td>
</tr>
<tr>
<td>Working Pulse</td>
<td>126,91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work Pulse</td>
<td>60,91</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the results of the data analysis of the working pulse and work pulse in Table 3, stated that the working pulse and work pulse are valid, the \( p \) value = 0.002, showed that the workload change significantly.

DISCUSSION
1. Subject Characteristics
a. Age
The age of the subjects involved in this study was between 30-50 years, the mean is 40.4 years. According to Indonesian Ministry of Health (2009), the productive age is between the ages of 16-64 years. So it showed that the age of the workers is in the productive age.

A person's work capacity increases directly with increasing age to a certain extent. According to Tarwaka et al. (2004) a person's age is directly proportional to physical capacity to a certain extent and reaches its peak at the age of 25 years. The maximum limit can be achieved at the age of 25 (Manuaba, 1998). At the age of 50-60 years, person's muscle strength will decrease to 75-80%, during the increasing of age there is a decrease in the ability to see, reaction time, hearing, memory and decisions making (Phesant, 1991).

b. Weight, Height and Body Mass Index (BMI)
The body weight of the research subjects ranged from 50-68 kg with an average of 60 kg and height ranged from 156 to 173 cm with an average of 162,4 cm. Body weight and height are important aspects related to their capacity to carry out activities. Body weight and height become benchmarks in determining the BMI of workers. Assessment using BMI is associated with under- and over-nutritional status. According to Ganong (2008) undernutrition can increase the risk of infectious diseases, while overnutrition with excessive body fat accumulation increases the risk of suffering from degenerative diseases. Height, weight and BMI have a strong correlation with the risk of musculoskeletal disorders (Suputra, 2003).

A person with a BMI higher than 29 kg/m² (fat) has a 250% higher risk of developing musculoskeletal disorders compared to someone who has a BMI less than 20 kg/m² (thin) (Dhari, 2017). According to Arisman (2011) to determine the BMI value can be calculated by the formula BMI = Body weight (Kg) / (Height (m))². The results measurements made of the workers, the average BMI ranged from 20.5-25 with an average of 22.7. This indicates that the subjects in this study were in the ideal body weight category. Assumed that the subject's condition including age, weight, height and BMI on the risk of musculoskeletal complaints and fatigue can be controlled.

c. Workload
The workload is influenced by 2 factors. First, internal factors consist of somatic factors (gender, age, body size, health condition, nutritional status) and psychological factors (motivation, perception, belief, desire and so on). The two external factors consist of tasks that are carried out both physically and mentally. In addition, work organization and environmental factors also have an influence on workload (Marras and Karpwowski, 2006).

The decrease of workload caused by the paused-change in work position from sitting squat or cross-legged to sitting with a chair and work table, can reduce static and forced loading which cause blood flow blocked, that affect the oxygen supply to the muscles is not enough.

The results of the research on the redesign of the work station are in line with the research of Sutarna (2011), which states that the redesign of the work station in the form of adding an eser plate positioning device can reduce the workload by 10.4%. The results of the analysis showed that before using the eser plate positioning device (P0) the average sample workload was 104.4 beats/minute while
after using the eser plate positioning device (P1) it was 93.5 beats/minute.

According to Anderson (2010) which states that active stretching can reduce muscle tension and improve blood circulation, so the body will be better prepared to work. According to Kroemer (2008) with the improvement of blood circulation, oxygen will be transported to the muscles by blood. If there is sufficient oxygen, the aerobic system will take place because the metabolism is complete and affected more energy, oxygen needs are met and the pulse does not work faster.

CONCLUSIONS

Based on the results of the analysis and discussion that have been described previously, it can be concluded that:
1. Based on the characteristics of the subjects, the average age of the subjects was 44.4 years. The subject's mean body mass index is 22.7, this is included in the normal category. The work experience of subject has a minimum of 4 years of work experience.
2. Based on the results of the influence test, significant results were showed, the attitude and work position of the workers had an effect on the increase in workload

SUGGESTION

Based on the conclusions above, the following can be suggested:
1. Subsequent research is expected to provide interventions to reduce workload complaints caused by the sorting work process.
2. It is expected that workers can change their position and work attitude to be healthier, safer and more comfortable.

REFERENCES


