

RELATIONSHIP BETWEEN WORK POSTURE AND REPETITIVE MOVEMENTS WITH COMPLAINTS OF CARPAL TUNNEL SYNDROME (CTS) ON STONE-BREAKING WORKERS ON THE BANKS OF THE KALISETAIL RIVER. SETAIL VILLAGE, GENTENG DISTRICT, BANYUWANGI REGENCY

Hubungan Antara Postur Kerja Dan Gerakan Repetitif (Berulang) Dengan Keluhan Carpal Tunnel Syndrome (CTS) Pada Pekerja Pemecah Batu Di Pinggiran Sungai Kalisetail, Desa Setail, Kecamatan Genteng, Kabupaten Banyuwangi

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ABSTRACT

Background: Workers who perform repetitive movements and work in a manner that remains seated for a long time experience Carpal Tunnel Syndrome in stone-breaking workers. It can reduce worker productivity because CTS can cause disability. **Objective:** Analyzing the relationship between work posture and repetitive movements with Carpal Tunnel Syndrome in stone-breaking workers on the banks of the Kalisetail River, Genteng District, Banyuwangi Regency. **Method:** This study was included in an observational analytic study with a cross-sectional research design. The samples in this study were all stone-breaking workers, consisting of 30 people, along the Kalisetail River, Setail Village, Genteng District, and Banyuwangi Regency. **Results:** The results showed the relationship between work posture ($r = 0.420$) and repetitive movement ($r = 0.671$) with complaints of Carpal Tunnel Syndrome in stone-breaking workers on the banks of the Kalisetail River was sufficient or moderate until strong. **Conclusion:** This study concludes that the relationship between work posture and repetitive movements of Carpal Tunnel Syndrome was sufficient until strong in stone-breaking workers on the outskirts of Kalisetail River. The researcher suggests applying rest breaks or recovery times, physical exercise during break times, and workplace adjustment. **Keywords:** Work Posture, Recurrent Movements, Complaint Of Carpal Tunnel Syndrome

ABSTRAK

Latar Belakang: Pekerja yang melakukan gerakan *repetitif* dan bekerja dengan posisi tetap yaitu duduk dalam waktu yang lama merupakan penyebab terjadinya *Carpal Tunnel Syndrome* pada pekerja pemecah batu. Hal ini dapat menurunkan produktivitas pekerja karena CTS dapat menimbulkan kecacatan. **Tujuan:** Menganalisis hubungan antara postur kerja dan gerakan *repetitif* dengan *Carpal Tunnel Syndrome* pada pekerja pemecah batu di pinggiran Sungai Kalisetail Kecamatan Genteng Kabupaten Banyuwangi. **Metode:** Penelitian ini termasuk dalam penelitian analitik observasional dengan desain penelitian *cross sectional*. Sampel dalam penelitian ini adalah semua populasi pekerja pemecah batu di sepanjang Sungai Kalisetail Desa Setail, Kecamatan Genteng, Kabupaten Banyuwangi sebanyak 30 orang. **Hasil:** Hasil penelitian menunjukkan bahwa hubungan antara postur kerja ($r=0,420$ dan gerakan *repetitif* ($r=0,671$) dengan keluhan *Carpal Tunnel Syndrome* pada pekerja pemecah batu di pinggiran Sungai Kalisetail adalah cukup atau sedang sampai kuat. Kesimpulan dari penelitian ini adalah hubungan antara postur kerja dan gerakan *repetitif* dengan keluhan *Carpal Tunnel Syndrome* adalah cukup atau sedang sampai kuat pada pekerja pemecah batu di pinggiran Sungai Kalisetail Kecamatan Genteng Kabupaten Banyuwangi. Saran peneliti adalah penerapan jeda istirahat atau waktu pemulihan, latihan fisik di sela waktu istirahat, dan penyesuaian tempat kerja. **Kata kunci:** Postur Kerja, Gerakan *Repetitif*, Keluhan *Carpal Tunnel Syndrome*

INTRODUCTION

Every job has its risks, both formal and informal employment. These risks can occur in every workplace. Besides, all types of work can cause various diseases and interfere with workers' health. Most informal employees are slightly less aware of the dangers of the work environment.

Companies engaged in the informal sector tend not to be directly responsible for their employee's safety and health. In contrast, informal workers are also exposed to hazards in the workplace that can cause various diseases and disorders due to work accidents that can interfere with worker productivity (Kemenkes, 2016).

Carpal Tunnel Syndrome (CTS) is a type of Musculoskeletal Disorder (MSDs) that results in disorders of the nerves, hands, and wrists. The cause is repetitive movements and fixed work postures for a long time (Sekarsari, Pratiwi and Farzan, 2017). This syndrome often occurs due to increased pressure on the wrist and palms. In the wrist, it usually occurs at the wrist, which is limited by the presence of bone in the wrist or carpal bone and the carpi transversum ligament, which is slightly stiff so that there is pressure on the median nerve. The median nerve is particularly vulnerable when the resulting pressure can potentially narrow the tunnel (Rambe, 2004).

According to the International Labor Organization (ILO), it is estimated that there are as many as 2.78 million workers who die every year. Occupational diseases and work accidents are the causes. Meanwhile, more than 1.8 million workers died in Asia and the Pacific, and two-thirds occurred in the Asian region. Musculoskeletal disorders are one of the diseases caused by work. Even the ILO or International Labor Organization has stated that as many as 27 countries are part of the European Union affected by Musculoskeletal Disorders. This disease is often associated with workers' occupational health disturbances and is felt while working. WHO noted that in all cases of disability, more than 10% were due to MSDs in 2009. In South Korea, MSDs increased from 1634 cases in 2001 and 5,502 cases in 2010. CTS also represents as much as 59 percent of all diseases that have received recognition from the Central Statistics Agency as MSDs (ILO, 2018). BPJS Health noted that the most common occupational disease is back pain due to sitting too long at work. Workers feel stiff and tingling

in the wrist (Zuraya, 2018). The incidence of CTS in the adult population is estimated to be greater in women, namely 3%, compared to men, which is only 2%. Then, the highest number was women exceeding 55 years, around the age of 40–60 years (Bahrudin, 2017).

Stone crusher work is one of the jobs that has many potential hazards and uses very simple equipment. Blueuardi (2016) stated that in carrying out their work duties, employees use stools or small seats. Meanwhile, to get the stone according to the desired size, the breaking of the stone must be done repeatedly until it reaches that size and throughout the process the employees will perform repetitive movements or movements repeatedly to be able to break the stone in a period of about 7 to 8 hours per day with the same position which slightly bent.

As in the initial study, data was obtained that there were 30 workers at the stone-breaking site on the banks of the Kalisetail River, Setail Village, Genteng District. The tools used in the work are hammers and pits to beat pebbles into coral. The movement of breaking the stone is repeated. The working posture when breaking the stone is also not ergonomic with the legs and arms bent, the neck slightly bent down for long periods of time, and using the seat of a small chair or an uncomfortable chair. Of the 30 workers, 25 workers complained of pain and tingling in the wrists and palms. Most of them feel these complaints at night.

Based on the theory and also the preliminary studies that have been described previously, it can be seen that the symptoms of CTS often attack some stone-breaker workers who have non-ergonomic work attitudes and always make repetitive movements when breaking rocks. Therefore, researchers are interested in conducting research related to the relationship between work postures and repetitive movements with the occurrence of CTS in stone crushing workers on the outskirts of the Kalisetail River, Genteng District, Banyuwangi Regency. The purpose of this study was to analyze the relationship between work postures and repetitive movements with CTS in stone crushers on the outskirts of the Kalisetail River, Genteng District, Banyuwangi Regency.

METHOD

Based on the terms of data collection, this research was classified into the type of

observational analytic research. However, if you look at the time of the study, this research was classified as a Cross Sectional study where in this study observations were made in a certain period and were carried out once during the research period.

In this study, the population used were workers who were tasked with breaking stones along the Kalisetail River, Setail Village, Genteng District, Banyuwangi Regency with a total of 30 people. In this study also used primary data by obtaining directly from employees who work as stone crushers on the Kalisetail River with using the Boston Carpal Tunnel Syndrome Questionnaire (BCTQ) and observations using the Rappid Entire Boddy Assessment (REBA), assessment of repetitive movements, and Phalen's Test. The primary data collected in this study were work attitudes, complaints of CTS, and the frequency of repetitive movements/minute for stone crushing workers. Secondary data obtained from the profile of Setail Village, namely the number of stone crushing workers which consist of 30 people and the location profile of Setail Village.

The analysis test in this study used the Spearman correlation test to determine the relationship between work postures and repetitive movements with CTS complaints on

stone crusher workers on the banks of the Kalisetail River, Setail Village, Genteng District, Banyuwangi Regency. This statistical test used a degree of confidence of 95% and an alpha of 5% (0,05).

This research has received ethical approval from Universitas Airlangga Faculty of Dental Medicine Health Research Ethical Clearance Commission No:165/HRECC.FODM/III/2020.

RESULTS

Based on the methods and analyzes that have been carried out, this study obtained results showing that the stone crusher workers on the Kalisetail Riverside, Genteng District, Banyuwangi Regency have an age range of 17-65 years. Most workers aged 56-65 years were 12 people (40,0%) while workers aged 17-25 years were only 1 person (3,3%). There were more female workers than male workers, namely as many as 17 people. In addition, there were also many workers who have been working as stone crushers for more than 10 years, as many as 15 people. More workers did work >8 hours/day, as many as 16 people out of 30 workers.

Table 1. Relationship between Work Posture and Complaints of Carpal Tunnel Syndrome on the Kalisetail Riverside, Setail Village, Genteng District, Banyuwangi Regency

Work Posture	CTS Complaint		Total	CC
	Yes	No		
Moderate Risk	11	0	11	0,420
High Risk	12	7	19	

Source : Primer Data

Table 2. The Relationship of Repetitive Movements with Complaints of Carpal Tunnel Syndrome in the Kalisetail Riverside Setail Village, Genteng District, Banyuwangi Regency

Repetitive Movements	CTS Complaint		Total	CC
	Yes	No		
≥ 30 times/minute	20	1	21	0,671
< 30 times/minute	3	6	9	

Source : Primer Data

The results of the study in Table 1 show that the correlation coefficient value is 0,420 where these results indicate that there is a moderate level of relationship between work posture variables and CTS complaints. There were 19 workers who work with high-risk work

postures and 12 of them experienced CTS complaints. Workers with moderate risk work postures all experienced CTS complaints, namely 11 people. Workers who work with high-risk work postures experienced more CTS complaints than workers with moderate work postures.

Meanwhile, Table 2 shows that the correlation coefficient value is 0,671 which indicates that the level of relationship between work posture and CTS complaints is quite strong. The workers who often performed repetitive movements more than 30 times per minute were 21 people. Furthermore, 20 of them experienced CTS complaints. While the workers with repetitive movements less than 30 times per minute only 3 people who experienced CTS complaints.

DISCUSSION

Correlation between Repetitive Movement with Complaints of Carpal Tunnel Syndrome (CTS)

Salawati, Liza and Syahrul (2014) stated that "Repetitive movements are movements that are carried out repeatedly while doing work. Repetitive or prolonged movements of the hands and wrists are one of the factors that cause Carpal Tunnel Syndrome.

The stone crusher workers mostly perform repetitive movements, which are more than 30 times per minute. This research is in line with research from Selviyati, Camelia, and Sunarsih who obtained the results of the study that there was a significant relationship between repetitive movements and the incidence of CTS where workers with the frequency of working to break stones carried out repeatedly for more than 30 times per minute in a period of half to one hour had an impact of 1.42 times more likely to suffer from CTS complaints when compared to workers whose repetition of breaking stones less than 30 times per minute with a duration of half to an hour. Based on these differences, where the frequency of repetitive movements increases, the impact will be seen when done with heavy loads and pressure (Selviyati, Camelia and Sunarsih, 2016). When performing repetitive movements, stone crusher workers on the banks of the Kalisetail River also grip the hammer firmly so that the blows on the stones are perfect. According to Michael in (Mariana, Wijayanti and Wahyuni, 2018) "the level of risk of CTS complaints will be even greater if the repetitive movements that are performed require a lot of energy, fast time and less recovery. Meanwhile, for stone crusher workers, it requires a lot of energy to be able to break stones into smaller sizes and the imbalance between recovery time and the time to start hitting stones again increases the risk of

CTS." Based on the description above, it can be concluded that repetitive movements performed 30 times per minute can increase the risk of CTS.

Correlation between Working Posture and Complaints of Carpal Tunnel Syndrome (CTS)

Tarwaka (2015) stated that "Work posture is a work position that occurs naturally formed by the worker's body as a result of interacting with the work tools used or due to habits at work". Moreover, he added that in his research conducted in (2011) together with Solichul and Lilis where he got the results that "Unergonomic work postures on the shoulders, arms, and wrists for a long time will cause inflammation in muscle tissue, nerves, or both. ." Then Muthoharoh, Basri and Nuraeni (2018) added that if there is swelling of the nerves, then the swelling will put pressure on the median nerve of the hand, and it can be the cause of CTS.

This study is in line with research conducted by Selviyati, Camelia and Sunarsih (2016) which obtained the results that there is a relationship between work posture and the incidence of CTS, especially hand posture. Based on the research, the stone crusher workers on the banks of the Kalisetail River mostly have high-risk work postures (scores 8-10) because they carry out the work process or break rocks in a slightly bent position and sit statically for a long period of time accompanied by movements that are slow repeated. The stone crusher often performs several extension or flexion movements with the wrist more than 15 degrees. This odd work posture is carried out by workers repeatedly with a long portion of time so that it accelerates muscle fatigue, and this automatically becomes the beginning of CTS if this continues to be used. This happens because the part of the body that tries to maintain this awkward work posture will continue to get pressure caused by the workload that is accommodated continuously and continues without any opportunity to stretch (Septiawati, Hasyim Hamzah, and Najmah, 2013). While research conducted by (Setyoaji D et al., 2017) obtained the results that this CTS case often occurs in several workers who carry out work activities with non-ergonomic body postures, which is as much as 56.7 percent.

CONCLUSION

Based on the results of research conducted on stone crusher workers on the Kalisetail River, Setail Village, Genteng District, Banyuwangi Regency, it can be concluded that repetitive movements and work postures are related to Carpal Tunnel Syndrome (CTS) complaints that have been experienced by crusher workers. Stone on the banks of the Kalisetail River, Setail Village, Genteng District, Banyuwangi Regency. Work postures with high risk have more complaints of CTS than workers with moderate risk work postures. Workers with repetitive movement frequency 30 times/minute are more likely to experience CTS complaints. The higher the frequency of repetitive movements, the higher the chance of experiencing CTS complaints.

SUGGESTION

Based on the research above, it is recommended that workers apply rest breaks or recovery time between breaking one stone until it reaches the desired shape with another stone, this is so that these stone crushers can minimize the risk of Carpal Tunnel Syndrome (CTS) complaints caused by repetitive movements. Undertake over a long period of time.

It is recommended that workers can also adjust the workplace such as the height of the hands and wrists can be more comfortable and slightly ergonomic. So that every worker can avoid the risk of injury to the hands and wrists which can increase the risk of CTS. Place to break the stone so that the position of the worker at work is not too bent and the position of

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