



The Effect of Educational Interventions and Stretching Practices on Musculoskeletal System Complaints (Case Study on Rice Porters at the Warehouse Department of Bulog GBB Kebonagung)

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Abstract. Occupational Diseases as written in Presidential Regulation Number 7 of 2019 is a diseases caused by work and/or work environment. One of the diseases that can occur in the work environment is musculoskeletal disorders. According to data from the Indonesian Ministry of Health in 2018, based on a doctor's diagnosis, the prevalence rate of musculoskeletal disorders is 7.3%. Meanwhile, the prevalence of musculoskeletal disorders based on the characteristics of workers' work is 6.12%. One of the jobs where workers have the potential to experience musculoskeletal complaints is lifting and transporting workers. This study was conducted with the aim of knowing the effect of providing educational interventions and the practice of muscle stretching on the complaints of the musculoskeletal system of coolies in the BULOG Kebonagung Warehouse based on pre-test and post-test scores. This study used a quasi-experimental method with a one group pre-test post-test design. The population in this study was 10 rice porters with the determination of the sample using the total sampling technique. The data collection stage was carried out by means of observation, interviews, and distributing questionnaires. The data analysis stage in this study was carried out using the Wilcoxon test using the SPSS program. Based on the results of the study, it was found that there was an effect of educational intervention and practice of muscle stretching on the complaints of the musculoskeletal system in the rice porters of the BULOG GBB Kebonagung Warehousing Department ($p = 0.007$).

Keywords: cMSDs Complaints · Stretching · Occupational Illness

1 Introduction

Based on data recorded on BPJS in 2020 for the period from January to October, The amount of work accidents cases in Indonesia is about 177,161 cases, while cases of occupational diseases amounted to 53 cases. Based on data from the Directorate General of Labor Supervision and Occupational Safety and Health (Directorate General of Binwasnaker and K3) Quarter IV of 2020 which has been processed by the Pusdatinaker, the number of work accidents in East Java province is 345 cases [1]. Data released by

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the World Health Organization (2018) shows that musculoskeletal disorder is a disease that contributes to the second largest disability at the world level, with the main cause of global disability being low back pain [2]. Referring to the results of the 2017 health development performance evaluation, it was found that lower back disease is a type of musculoskeletal disorder that ranks first, followed by other types of musculoskeletal disorders which is ranked sixth [3]. Research that has been conducted on 9482 workers in 12 regencies/cities in Indonesia shows that musculoskeletal disorders occupy the highest number with a percentage of 16% [4]. Based on data released by the Indonesian Ministry of Health in 2018, musculoskeletal disorders based on a doctor's diagnosis showed a prevalence rate of 7.3%. Meanwhile, the prevalence of musculoskeletal disorders based on the characteristics of workers' work is 6.12% [5]. Based on Riskesdas data from 2013 to 2018, there was an increase in the prevalence of musculoskeletal disorders in Riau (7.1%), Jambi (8.67%), Bengkulu (12.11%), and DI Yogyakarta (5.93%).

One of the jobs whose workers have the potential to experience musculoskeletal complaints is workers in the lifting and transport sector [6]. Tarwaka revealed that work done manually by workers can cause illness or complaints, such as back and waist pain, neck tension, wrist, arm and leg pain, and other parts [7]. The work activities carried out by porters use anaerobic metabolism. This is because at work, the porters lift the load quickly and repeatedly. Anaerobic metabolism used in the process of working porters produces lactic acid. Excessive accumulation of lactic acid results in reduced muscle elasticity, muscle fatigue, and muscle pain. This is what causes pelvic porters to often experience muscle pain [8]. Prevention of lactic acid buildup can be done by stretching the muscles, Yenni, et al. [9] in a previous study argued that the given muscle stretch was effectively able to reduce lactic acid levels in respondents.

The State-Owned Public Company which has activities in the field of food logistics in Indonesia is BULOG. One of BULOG's business scopes is the logistics/warehousing business [10]. In the work process, BULOG uses the services of porters to lift rice sacks both when entering and leaving BULOG. Research conducted by Rizkillah, [11] at Perum. Buduran BULOG shows that the majority of respondents who are porters have complaints of low back pain. Another study conducted by Syarifullah, et al. [12] to porters at Perum. BULOG Landasan Ulin shows that the majority of porters have experienced complaints of low back pain. Before the research was conducted, researchers conducted a research study conducted on workers, and it was found that at least every worker lifted a load of more than 50 kg. Interviews were conducted with 10 porters regarding musculoskeletal complaints and all of them stated that the work they did caused musculoskeletal complaints such as muscle cramps and aches, especially in the back and legs. In line with the research conducted by Riyanto, et al. [13] to rice transport workers, showed that the effect resulting from work activities of lifting and moving rice from the warehouse into the back of a truck with a maximum weight of 50 kg was the incidence of complaints on the right shoulder and waist, lower neck, and right hand with a percentage of a fairly high level of "sick" complaints.

So that complaints of musculoskeletal disorders do not have a more detrimental impact, prevention efforts should be made to overcome musculoskeletal disorders, one of which is to carry out administrative control with education and training in the form of muscle stretching techniques [14]. In a previous study conducted by Ernawati, et al.

[15] showed that there was a significant relationship between exercise habits and the level of low back pain in the porters at Bulog Buduran, so with this reference this study was carried out. Research to prevent musculoskeletal disorders with the form of intervention in the form of muscle stretching exercises at work was chosen because it is considered economical, simple, and has been proven in several previous studies to optimally prevent musculoskeletal disorders [3]. Research conducted by Satriadi et al. [16] showed that giving a stretching intervention to complaints of low back pain had a real effect. Stretching the muscles carried out will relax the muscles, thereby increasing flexibility (flexibility) in the muscles and reducing the incidence of pain in the muscles. In this study, the type of stretching carried out was static stretching and dynamic [17] stretching. Dynamic stretching is done with interconnected movements (turning the head up and down, stretching and shortening the arms). While static stretching is a stretch with movements carried out from head to toe, and vice versa [18].

Although there have been many studies conducted on complaints of the musculoskeletal system, no research has been found regarding the effect of providing education and practice of muscle stretching simultaneously on complaints of the musculoskeletal system in the porters, with this urgency, this research deserves to be followed up.

2 Method

This research was conducted using a quasi-experimental method or an impure experiment which still has to be tested on the research subjects. The research design used is a one group pre-test post-test design. The research was conducted in March 2022 at the GBB BULOG Kebonagung Malang Warehousing Department. The sample in this study were 10 rice porters who were also the total population. Respondents were chosen because the intervention was carried out on the same respondent in each treatment and also based on company data, respondents were freelance workers who had settled in the location to work as rice porters. Data on complaints of the musculoskeletal system were collected using the Nordic Body Map Questionnaire. Variables are nominal and ordinal data, and the amount of data is small, so using nonparametric methods and normality tests are not carried out. Data were analyzed univariately and bivariately using the Wilcoxon test.

Educational interventions and muscle stretching practices are given simultaneously, starting with providing education regarding the benefits of muscle stretching, things to consider in stretching muscles, as well as examples of muscle stretching movements. The education provided also aims to provide convenience for workers if there are obstacles and limitations in working [19]. After that, it was continued with the practice of muscle stretching by rice porters where the stretching movement referred to previous research conducted by Dewi H.A.P. [20]. The intervention was carried out for approximately five minutes, twice a day (before and after work) for seven meetings. Before the intervention was carried out, it was started by distributing the Nordic Body Map questionnaire to find out the complaints felt by each rice porter. After that, the questionnaire was distributed again after the last intervention was carried out to determine the effect of the intervention given on musculoskeletal complaints experienced by rice porters. This research has been conducted ethically by the Health Research Ethics Commission of the Health Polytechnic of the Ministry of Health of Malang with Ethical Approval Reg.No.: 331/KEPK-POLKESMA/2022.

3 Result and Discussion

3.1 Result

3.1.1 Respondent Characteristic

Referring to the data written in Table 1, the characteristics of respondents based on age, most are respondents with age 35 years as many as 7 people (70%). Then the characteristics of the respondents based on the level of education, the most with elementary education with a total of 6 people (60%), and junior high school as many as 4 people (40%). Furthermore, the characteristics of respondents based on years of service, at most have worked for 10 years with a total of 7 people (70%).

3.1.2 Types of the Musculoskeletal System Complaints

Based on Fig. 1, which shows a graph of the recapitulation of musculoskeletal system complaints, the type of complaints most felt by respondents, almost all respondents, namely as many as 9 workers (90%) experienced complaints of back pain, in addition some respondents also felt complaints in the lower neck, shoulders left, right shoulder, left upper arm, waist, upper buttock, lower buttock, right knee, left calf, and right calf.

3.1.3 Results of the Musculoskeletal System Complaints on Rice Porters in GBB BULOG Kebonagung Warehousing Department Before and After Educational Interventions and Stretching Practices Were Given

The data written in Table 2, it is known that from 10 respondents who have filled out a pre-test questionnaire on the musculoskeletal system complaint variable, most of the respondents (70%) namely 7 workers have low level musculoskeletal system complaints

Table 1. Frequency distribution of respondents based on age, education level, and period of work at the BULOG Kebonagung GBB Warehousing Department in 2022.

| Variable | Frequency | Percentage |
|----------------------|-----------|------------|
| 1. Age | | |
| – ≥ 35 years old | 7 | 70% |
| – ≤ 35 years old | 3 | 30% |
| 2. Education Level | | |
| – Elementary School | 6 | 60% |
| – Junior High School | 4 | 40% |
| – Senior High School | 0 | 0% |
| 3. Period of Work | | |
| – ≥ 10 years | 7 | 70% |
| – ≤ 10 years | 3 | 30% |

Source: Processed primary data (2022)

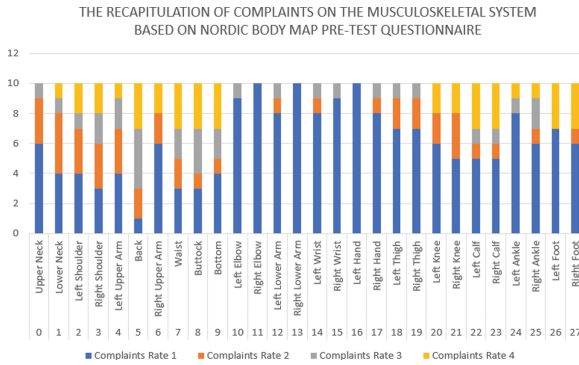


Fig. 1. Graph of types of Musculoskeletal System Complaints felt by respondents in the GBB BULOG Kebonagung Warehousing Department in 2022.

Table 2. Differences between pre-test and post-test results from the variable of Musculoskeletal System on Rice Porters at BULOG Kebonagung Warehouse Department before and after Educational Interventions and Stretching Practice were given.

| Variable | Categories | Pre-test | | Post-test | | Statistic Z | p-value |
|-----------------------------------|------------|----------|-----|-----------|-----|-------------|---------|
| | | N | % | N | % | | |
| Musculoskeletal System Complaints | Low | 7 | 0.7 | 10 | 1.0 | -2.705 | 0.007 |
| | Medium | 3 | 0.3 | 0 | 0 | | |
| | High | 0 | 0 | 0 | 0 | | |
| | Very High | 0 | 0 | 0 | 0 | | |

Source: Processed primary data (2022)

and a small proportion of respondents are 3 people. Workers have moderate level of musculoskeletal system complaints. Then for the post-test results, overall respondents have a low level of complaints. Based on the results which are also written in Table 2, it can be seen that there are differences and improvements in the post-test variable complaints of the musculoskeletal system, so it can be seen that there is an effect of educational intervention and practice of muscle stretching (stretching) on complaints of the musculoskeletal system.

3.2 Discussion

This research was carried out referring to a number of literatures that discussed complaints of the musculoskeletal system that occurred in rice porters at the GBB BULOG Kebonagung Warehousing Department. Based on the references obtained, the researcher seeks to collect data and additional information that is useful to support this research. Additional references referred to include the updated number of cases of work accidents and occupational diseases, prevalence rates of musculoskeletal system disorders, risk factors for complaints of the musculoskeletal system, as well as preventive measures for

musculoskeletal system complaints by carrying out administrative control in the form of education and training, namely muscle stretching (stretching). Work that has the potential to cause musculoskeletal complaints is work that has elements of bending, climbing, crawling, reaching, twisting, excessive activity or repetitive movements [21]. Workplace Stretching Exercise (WSE) was chosen to prevent MSDs from being able to reduce the risk of musculoskeletal injuries and fatigue, improve balance and muscle posture, and improve muscle coordination [22].

Respondents selected in this study were rice porters who worked at the GBB BULOG Kebonagung Warehousing Department. This is based on the opinion expressed by Tarwaka that one of the jobs that have the potential to experience musculoskeletal complaints is workers in the lifting and transport sector [23]. Where in this case, the GBB BULOG Kebonagung Warehousing Department in the work process is assisted by rice porters who work manually, so that the rice porters at the BULOG Kebonagung GBB Warehousing Department have the potential to experience musculoskeletal system complaints.

Based on the results of a preliminary study conducted by researchers, at least every worker lifts a load of more than 50 kg. Interviews were conducted with 10 porters regarding musculoskeletal complaints and all of them stated that the work they did caused musculoskeletal complaints such as muscle tension and aches, especially in the back and legs. The researcher assumes that the complaints of the musculoskeletal system felt by the rice porters are caused by the work they do, so preventive measures need to be taken so that the complaints can be overcome. In this study, preventive measures were carried out by providing educational interventions and the practice of muscle stretching (stretching) to rice porters at the GBB BULOG Kebonagung Warehousing Department.

The results of the types of complaints of the musculoskeletal system as well as the results of educational interventions and muscle stretching practices were measured using an instrument in the form of a Nordic Body Map questionnaire. The NBM questionnaire is a method that aims to analyze body maps in each section [24]. In this questionnaire, the body is divided into several parts from the neck to the feet by numbering 0 (zero) to 27 (twenty seven). Based on the data collected from this questionnaire, it can be seen which part of the muscle has complaints with a level of complaints ranging from no pain to very painful levels, by providing a statement made with an assessment in the form of a score of 1 (one) to 4 (four) [25].

The types of musculoskeletal system complaints that were felt by respondents based on the pre-test that had been carried out included those felt in the lower neck, left and right shoulders, left upper arm, back, waist, upper and lower buttocks, right knee, and right calf. And left. The results of this study are the same as the previous research conducted by Riyanto et al. [13] to rice transport workers, showed that the effects resulting from work activities of lifting and transporting rice from storage (warehouses) into trucks weighing up to 50 kg were complaints on the right shoulder and waist, lower neck, and right hand. With a fairly high percentage of "sick" complaints. Complaints experienced by respondents on the neck, shoulders, and arms are caused by a long static work process when transporting goods with an unbalanced weight. Meanwhile, complaints that are felt on the back and waist arise due to an unergonomic working position when lifting goods [26]. Working in a walking position while carrying loads that exceed the capacity can cause pain in the legs [27].

The results of the pre-test and post-test were processed to determine the effect of educational intervention and practice of muscle stretching given to rice porters at the GBB BULOG Kebonagung Warehousing Department on the complaints of the musculoskeletal system they felt. Judging from the results of statistical tests using the Wilcoxon test (Table 2), it showed a decrease in complaints of the musculoskeletal system after the intervention was given in the workplace. Similar research conducted by Hutabarat et al. [28] to electric tower workers, it was found that the intervention in the form of stretching given before and after work was able to reduce complaints of the musculoskeletal system by about 50%. These results are corroborated by the results of research conducted by Nooryana et al. [29] on workers in the garment industry showed that dynamic stretching exercises had a significant effect on reducing musculoskeletal complaints to workers. In addition, based on the opinion given by 5 respondents, that they practice stretching movements at home before work, and this makes the work they do lighter so they no longer have complaints. In addition, the five respondents also thought that by stretching the muscles (stretching) could improve and improve the quality of sleep. Likewise, Anderson's theory states that one of the benefits of stretching is increasing mental and physical relaxation, increasing physical fitness, reducing the risk of injury and muscle pain [30].

4 Conclusion

Having done this research, it can be concluded that the types of musculoskeletal system complaints experienced by rice porters at the GBB BULOG Kebonagung Warehousing Department are felt in the lower neck, left and right shoulders, left upper arms, back, waist, upper and lower buttocks, right knee, and right and left calves. In addition, interventions in the form of education and practice of muscle stretching have been shown to have an effect on musculoskeletal complaints felt by rice porters at the GBB BULOG Kebonagung Warehousing Department.

Based on the results of this study, researchers recommend that workers do muscle stretching at work before and after doing work in an orderly and routine manner. To the Public Company. BULOG to identify occupational diseases in rice porters and provide ergonomically designed work equipment facilities that aim to prevent work accidents and occupational diseases. For further researchers, it is recommended to add variables that are other factors (BMI, gender, work environment, etc.) to strengthen the results of research with similar interventions.

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