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Effect of Stretching Exercise on Reducing Musculoskeletal Disorders for Administration Staff at Hospital

Gurdani Yogisutanti[1], Riki Bagja Firmansyah[1,2], Fahmi Fuadah[1]
[1]Public Health Department, Health Faculty, Immanuel Institute of Health, Jl. Kopo 161 Bandung West Java, Indonesia 40234
[1,2]Rotinsulu Pulmonary Hospital Bandung, West Java, Indonesia, Jl. Bukit Jarian No.40, Bandung, West Java, Indonesia, 40141

ABSTRACT: Administrative staff worked with static body posture and repetitive work for more than eight hours a day. They were experiencing musculoskeletal disorders as a risk of using workstation and their posture at work. It is important to reduce the risk of injury caused by their working risks. The purpose of this study was to analyze the effect of stretching on the reduction of musculoskeletal disorders. This research used quasi-experiment approach with one group pre-test post-test only design. The number of research respondents was 60 employees taken by purposive sampling at Lung Hospital Bandung. Musculoskeletal disorders measured using the Nordic Body Map questionnaire before and after interventions. Stretching was giving to employees every day for 3 weeks simultaneously. The result shows majority of respondents were female, 33 respondents (55%), as many as 54 respondents (66.7%) were 24-30 years old. Most of respondents have BMI in obese level as may as 31 respondents (51.7%). Respondents who have worked for more than 2 years were 43 respondents (71.7%). Before the intervention, as many respondents experienced low complaints (86.7%). After the intervention, all respondents had decreaced in complaints become the low category (p=0,001). Recommendation for hospital was to carry out stretching exercise to prevent MSDs for administrative workers.

KEYWORDS: Administrative Staff, Exercises, Hospital, Musculoskeletal Disorders, Posture, Stretching.

INTRODUCTION

Musculoskeletal disorders (MSDs) occur due to heavy and repetitive loading, which causes the muscles to contract excessively, thereby exceeding the maximum muscle strength [1]. The risk factor that causes MSDs is repetitively work or monotonously and is done quickly while working. Two aspects of body position can contribute to injuries. The first relates to body position. When parts of the body are near the extremes of their range of movements, stretching and compression of tendons and nerves occur. The longer a fixed or awkward body position is used, the more likely we are to develop MSDs [2].

In Law number. 17 of year 2023 concerning Health, namely that occupational health efforts must be carried out in every workplace so that you can work healthily so as not to cause disease for yourself and the surrounding community [3]. As an effort to improve the health of their staff, the Ministry of Health of the Republic of Indonesia and several other institutions have begun implementing a stretching program twice while at work at 10.00 and14.00. The objectives in that Law is carried out to socialize the stretching exercise program and as an effort to improve the quality of workers [4].

In accordance with the research resulted before, it showed that there was an effect after being given stretching movement intervention on complaints of MSDs in snack workers and album makers, but there was no difference between the group of peddlers and album makers. Snack company workers experienced a greater reduction in complaints of MSDs in parts of the body than manufacturing industrial workers. Another study stated that providing stretching exercise interventions in the workplace was effective in reducing pain due to MSDs. stretching exercises at work, which is carried out 2 times a day for a period of 1 month is effective in helping to reduce levels blood uric acid in lecturers and educational staff [5].

Stretching exercises can affect musculoskeletal disorders for employees. Research that provides intervention in the form of stretching exercises carried out regularly has been proven to reduce musculoskeletal complaints in workers. If the results are visible then we can know how big the effect of stretching exercises is [6].

Lung Hospital in Bandung, West Java, Indonesia, is a special hospital under the Ministry of Health of the Republic of Indonesia, which has 389 employees. Consisting of 270 health officers and 119 administrative officers. Administrative employees are computer workers with static body postures and repetitive work for more than 6 hours. In the Regulation of the Minister of Health of the Republic of Indonesia Number 48 of year 2016, every 2 hours of work carried out interspersed with stretching for 10-15 minutes.

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Here, the Lung Hospital does not carry out regular stretching exercises. The results of the preliminary study showed, that there were several problems, that felt and caused discomfort for employees, so this is what encouraged researchers to apply stretching exercise interventions in accordance with Minister of Health Regulation Number 48 of 2016 concerning Office Occupational Safety and Health Standards. The intervention was expected to reduce MSDs pain complaints in workers, so that workers can feel comfortable to be able to work optimally [7]. The muscle as a part of our body were often complained about was the musculoskeletal, which include the neck, shoulders, arms, hands, fingers, back, waist and lower muscles. Stretching exercises will improve muscles sensation that often complained and the muscles will not be stiff [8]. Based on this background, the researcher intends to conduct research by conducting an intervention in the form of stretching to reduce musculoskeletal complaints in employees in the Central Administration Building at the Lung Hospital.

METHODS

This research uses quasi experiment approached, using a one group pre-test post-test design with no comparison group or control group. Data analyzed based on the first measurement (pre-test) and then testing changes after giving the intervention (8). The success of the intervention based on the results of the respondents' pre-test and post-test scores. Respondents involved in the research were 60 people, taken using purposive sampling. The sample inclusion criteria are employees who are healthy and willing to take part in the research until completion. Exclusion criteria were employees who experienced muscle injuries or bone fractures and took anti-inflammatory medication during the research.

The instrument used to collect data on musculoskeletal complaints uses the Nordic Body Map (NBM). It has also been used in previous research [9]. Statistical tests use the Wilcoxon sign rank test. Intervention in the form of stretching is given for 10 minutes every day. It was observed for 3 weeks, with the hope that changes will occur if there are complaints. Complaint data was collected before the intervention was given and after 3 weeks of treatment. Stretching the muscles is done in gradual movements, each movement is held for 8 counts to feel a pull in the muscles that are focused on while working for 5-10 minutes [10].

Stretching steps taken as follows [11]:

a. Neck Stretch:
   1) Lift and lower your head, hold the head position for 8 counts for each movement.
   2) Tilt your head to the right and left, hold the head position for 8 counts for each movement.
   3) Turn your head for a count of 8, do the same in the opposite direction.

b. Shoulder Stretch
   1) Connect the palms of your hands then push them above your head and hold for a count of 8.
   2) Connect the palms of your hands then push them in front of your body and hold for a count of 8.
   3) Connect the palms of your hands then push them behind your body and hold for a count of 8.
   4) Connect the palms of your hands then pull your arms down until they touch the tips of your feet, hold for a count of 8.
   5) Pull your right elbow backwards parallel to your head and hold it with the help of your left hand for a count of 8, do the same with your left arm.
   6) Pull your right arm to your left parallel to your shoulder and hold it with the help of your left hand in a crossed position then hold for a count of 8, do the same with your left arm.
   7) Rotate your shoulders forward for 8 counts and do it in the opposite direction.

c. Waist and Back Stretching
   1) Sit facing forward, turn your waist to the right by moving both arms to the right of the chair so that your face faces to the right and hold for a count of 8, do the same to the left.
   2) Pull your right elbow to your left thigh and hold using your left hand for 8 counts. Do the same thing on the left arm.
   3) Lift your right arm up then push your body to the left side and hold for a count of 8, do the same with your left arm.
   4) Push your back forward using both hands and hold for a count of 8.

d. Leg Stretch
   1) Lift your right leg up then bend and hold using both hands for 8 counts, do the same with the left leg.
   2) Lift your right leg and bend it to the left, hold for 8 counts. Do the same thing on the left leg.
   3) Bend your right leg back in a standing position and hold using your right arm for 8 counts. Do the same thing on the left leg.

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4) Straighten your right leg forward and place it on the chair, hold for a count of 8. Do the same thing on the left leg.

e. Stretching the Fingers

1) Bend both palms 90 degrees up and down for 8 counts.
2) Stretch your fingers by grasping them first and then stretching them for a count of 8.
3) Push both palms facing each other for 8 counts.
4) Rotate the palms in a gripping position for 8 counts.
5) Relax your palms while shaking them for 8 counts

RESULT AND DISCUSSION

The research was involved 60 administrative employees at the Bandung City Pulmonary Hospital, West Java Province, Indonesia. This research has received an ethical certificate from the Health Research Ethics Committee of the Immanuel Health Institute number 132/KEPK/IKI/VII/2023. The results of research data collection are as follows:

Table 1. Frequency Distribution of Respondent Characteristics (n = 60)

Characteristics	Frequency (f)	Persen (%)
Gender		
Male	27	0.45
Female	33	0.55
Age		
25-45 years	54	0.90
46-65 years	6	0.10
Bassal Metabolisme Index		
Normal	29	0.483
Not Normal	31	0.517
Length of Work		
More than 2 years	43	0.717
Less than and until 2 years	17	0.283

Table 1 shows that the majority of respondents were female, 33 respondents (55%). Based on age, most of the respondents were 25-40 years old, 54 respondents (66.7%). Based on BMI, it shows that the majority of respondents have an abnormal BMI, 31 respondents (51.7%). Based on length of work, it shows that the majority of respondents have worked for more than 2 years, namely 43 respondents (71.7%).

The results of bivariate analysis to determine the difference in musculoskeletal complaint scores before and after being given intervention in the form of stretching exercises for 3 consecutive weeks are as follows:

Table 2. Differences in musculoskeletal complaints before and after intervention

Musculoskeletal Disorders	Kategori	Frequency	
		n	%
Before	Low	52	86.7
	Moderate	6	10.0
	High	2	3.3
After	Low	60	100.0
	Moderate	-	-
	High	-	-

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Table 3. Statistical Distribution before and after stretching exercise intervention (n = 60)

MSDs	Mean	SD	Minimal	Maksimal
Before	43.35	36	73	7.015
After	28.94	28	36	1.840

Table 4. Wilcoxon Sign Rank Test before and after stretching exercise intervention (n = 60)

Mean Rank		Z -Hitung	P value
Negative Rank	30,5	- 6,745	0,000
Positive Rank	0,00		

In all occupational groups, the prevalence rate of musculoskeletal problems is greater in women than in men. The results of this study indicate that the prevalence rate of musculoskeletal pain is higher for women than men. Gender also influences the risk level of musculoskeletal disorders. This is because women's muscle mass is lower than men. This results in the incidence of musculoskeletal disorders being more prevalent in women than in men [12]

In this study the majority of respondents were in the age range of 25-45 years. The older a person is, the higher the risk of experiencing musculoskeletal disorders. In general, musculoskeletal complaints begin to be felt at productive age. This results in a decrease in bone elasticity because bone degeneration begins to occur at the age of 30 years. However, the first complaints are usually felt at the age of 30 years and the level of complaints will continue to increase with age. This happens because in middle age, muscle strength and endurance begin to decline so that the risk of muscle complaints increase [13].

In this study, the majority of respondents were in the abnormal BMI category. There is damage to the musculoskeletal system which manifests as pain and discomfort in individuals who are obese or overweight. Complaints that can occur are caused by the influence of anthropometric measurements related to the balance and structure of the body frame when receiving loads such as body weight or workload. The results of this study are in line with previous research that carried out stretching for rehabilitation [14]. There is an increase in functional damage and disability in the obese population. There is an increase in functional damage and disability in the obese population. These complaints can hinder and interfere with physical activity. MSDs complaints that commonly occur in obese individuals include neck pain, rotator cuff tendinitis, knee osteoarthritis, leg pain, and achilles tendon injuries [15]. Normal BMI value range for Indonesians is 18.5-25 kg/m2. BMI is related to work fatigue. Increased work fatigue can occur in someone with a higher BMI value.

Duration is the length of time of exposure to a risk factor. The longer the duration of work, the greater the risk of injury that will occur. Long periods of work and incorrect work posture will result in musculoskeletal complaints that get worse day by day. Working period is a risk factor that can influence a person to increase the risk of developing MSDs, especially for types of work that use high work forces [16]. The length of service can influence both positive and negative performed, it will have a positive effect on personal performance because as the length of service increases, the experience in carrying out their duties increases. On the other hand, it will have a negative effect if the length of service increases, habits will emerge in the workforce.

After given the stretching exercise intervention, the research results showed that there was a significant difference in the MSDs scores of employees at the Administration Building of Lung Hospital Bandung before and after being given intervention with p value = 0.000. These results are in accordance with what was stated that stretching exercises can reduce MSDs. In this study, this condition was proven by a decrease in the individual score, average, minimum value and maximum value of the respondent's MSDs score, which was also followed by categorization, after being given stretching exercise intervention [6].

MSDs complaints are complaints that occur in skeletal muscles. These complaints occur when the muscles receive a long-term static load which can cause complaints in the form of severity in the tendons, ligaments and joints. Musculoskeletal pain or better known as joint pain is a disorder that arises as a result of positioning oneself in conditions that are not ergonomic for a long period of time. Research on musculoskeletal disorders conducted on office workers in Turkey, results showed that from 528 respondents who had been examined, 55.1% of respondents experienced complaints of musculoskeletal disorders in the lower back, 53% in the upper back, and 52.5% in the neck [17]. Another study conducted by there was a decrease in the average MSDs pain score in the

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intervention group after ergonomic exercise stretching exercises, and there was a difference in changes in MSDs pain scores between the intervention group and the control group [18].

Musculoskeletal pain is at risk for employees, especially administrative employees, who work using computers with static body postures and repetitive work for more than 6 hours of work [19]. The majority of employees often experience health problems related to musculoskeletal disorders, especially in the shoulders, neck, wrists, elbows and spine. Sitting too long in front of a computer screen can trigger pain, especially in the neck and back, which is caused by stiffness in the body's muscles. Therefore, stretching was needed to restore flexibility to the body's muscles so that they stay fit during activities in the office. Efforts to overcome MSDs complaints are with preventive measures which can be done with exercise, good posture and diet [20].

The results of this research are in line with research conducted, where stretching exercises were proven to have an influence in helping reduce MSDs in lecturers and educational. Stretching exercises can be used as physical exercise to reduce pain. MSDs have a positive effect on muscle strength and function and can also reduce the sensation of pain in the joints [5]. Physical exercise can also impact the immune system, especially to reduce pain. Stretching exercises at work are stretching activities carried out while working (which is a habit of physical activity in the workplace) which functions to improve blood circulation to train muscles to be stronger, less tense and less tired when working.

One of the stretching exercises carried out in the workplace is stretching the waist and thighs. This movement can activate the muscles of the ankles, shins, knees, thighs and muscles and joints in the waist area which can increase blood circulation. The more normal blood flow to parts of the body, the lower the risk of muscle damage. Apart from that, regular exercise can also reduce pain due to musculoskeletal disorders [4].

Employees who complain of MSDs pain can apply ergonomic exercise regularly before or after work to reduce the MSDs pain they feel so they can feel comfortable at least twice a week. The benefits of stretching exercises according to the Health Service are increasing muscle tissue flexibility, reducing the risk of muscle injury (cramps), reducing muscle tension, reducing the risk of back pain/injury, controlling body posture and also optimizing daily activities.

CONCLUSION

Providing interventions in the form of stretching during work to administrative workers in hospitals has been proven to reduce musculoskeletal complaints. Stretching efforts for employees can be carried out together using instructions from the administration center at the hospital.

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