

EFFECTIVENESS OF STRETCHING EXERCISES ON MUSCULOSKELETAL COMPLAINTS IN WORKERS

Serly Amelia, Nova Mega Rukmana, Dian Utama Pratiwi Putri*

Program of Public Health, Faculty of Health, Universitas Mitra Indonesia, Jl. ZA. Pagar Alam No.7, Gedong Meneng, Bandar Lampung, Lampung 40115, Indonesia

*dian@umitra.ac.id

ABSTRACT

Musculoskeletal complaints are conditions in which part of the muscular and skeletal system experiences pain problems. In 2022, 20 out of 35 workers at the UPTD Forest Management Unit in South Lampung experienced musculoskeletal complaints, resulting in absenteeism and decreased work productivity. Objective: The purpose of this study was to determine the effectiveness of stretching exercises for musculoskeletal complaints in workers at the UPTD Forest Management Unit in South Lampung in 2023. Method: The study used a Pre-Experimental design using the One Group Pretest – Posttest Design. The population was 35 workers, and the sample was 35 workers. The independent variable was stretching exercises, and the dependent variable was musculoskeletal complaints. Analysis used univariate and bivariate methods, with the Paired Sample T Test for bivariate analysis. Results: The results showed that the effect of stretching exercises on musculoskeletal complaints at the UPTD Forest Processing Unit in South Lampung was statistically significant, with a p-value of $0.000 < \alpha = 0.05$. Conclusions: The study concludes that stretching exercises are effective in reducing musculoskeletal complaints among workers at the UPTD Forest Management Unit in South Lampung. The results are expected to be applied to prevent health problems in workers, especially musculoskeletal diseases, and can be used as a consideration for continuing the program regarding the prevention of musculoskeletal complaints for office employees with a stretching exercise program that can be done in the workplace.

Keywords: musculoskeletal complaints; stretching exercises; workers

INTRODUCTION

Data Global Burden Of Disease (GBD) in 2018 showed that around 1.71 billion people worldwide live with musculoskeletal conditions including lower back pain, neck pain, fractures and injuries. While the prevalence of musculoskeletal conditions varies based on age and diagnosis, person – person from all age in all over world affected. Country – country earning tall is Which most influential in matter amount that is 441 million person complaint musculoskeletal for country earning tall, complaint musculoskeletal for country – country in region Pacific west that is amount to 427 million person And complaint musculoskeletal in region Asia Southeast that is amount to 369 million person (WHO, 2018). In Indonesia, attitude Work No natural This more Lots due to by existence absence conformity between dimensions tool And station Work with size body worker. As country develop, until moment This Indonesia Still depends on development technology countries proceed, specifically in procurement equipment industry. Remember that dimensions equipment the designed No based on size body person Indonesia, so on moment worker Indonesia must operate equipment the, it happened attitude Work No natural. As example, operation machines production in a factory Which imported from American And Europe will become problem for part big worker We. Matter the due to Because country exporter in in designing machines the only based on on anthropometry from population worker country Which concerned, Which on the reality size his body more big from worker We. Already can confirmed, that condition the will cause attitude force on time worker operate machine. If matter This happen

in period time Which long, so will happen accumulation complaint Which on Finally can cause the occurrence injury muscle (Tarwaka, 2015).

Based on data Basic Health Research (2018), In Indonesia Prevalence complaint musculoskeletal on worker is most is Papua as big as 15.2%, Kalimantan middle as big as 13.4%, Riau as big as 13%, Bangka Belitung as big as 12.7% And Kalimantan West as big as 12.7% whereas Lampung as big as 10.9% And order to 8 highest complaint musculoskeletal on worker from 34 Province Which There is in Indonesia (Complaint Musculoskeletal National as big as 10.6%) (Basic Health Research, 2018). UPTD Hall Unity Management Forest is institution Which do supervision And processing forest conservation Which managed in a way efficient For protect system buffer life, preserve diversity biological And utilise diversity biological in a way sustainable. Based on results pre-survey in UPTD Hall Unity Management Forest. On year 2022 There is from as much as 35 Work as much as 20 worker Which experience complaint musculoskeletal Which result in they No enter Work And productivity Work decrease (Data UPTD Hall Unity Management Forest, 2020).Based on results pre-survey date 3 May year 2023 that is interview to 5 worker Which experience complaint musculoskeletal the, they emit fatigue in the body accompanied by flavor sore or Sick Which excessive because of factor work. Besides That Also they No Once existence activity stretching Which done, during This they Work almost 8 O'clock per day in front laptop, If experience complaint musculoskeletal worker always consume drug or sequence For remove complaint musculoskeletal. Based on results interview to head sexy complaint musculoskeletal This impact the descent performance worker. On year 2022 There is a number of work Which No reach target Which set. Matter This due to worker with amount work more Lots work, part worker age Already No young Again that is around 45 year to the top And existence complaint worker like complaint musculoskeletal. Place This chosen because of there is case musculoskeletal And existence impact to matter mentioned like the occurrence decline productivity worker.

For increase productivity worker so must placed in environment work Which fulfil standard health And safety Work as set up in Candy No 5 Year 2018 about Safety And Health Work Environment Work. If matter This No fulfilled, so will cause decline productivity, discomfort in Work, Sick, until with risk accident. Matter This can due to Because existence gap between burden Work And capacity Work (Candy No 5 Year 2018).Complaint musculoskeletal is condition Where part from system muscle And bone experience problem Sick. Disease This happen consequence part body stretch too Far experience error on muscle And bone. Complaint musculoskeletal disease consequence Work. Symptom in the form of sore or Sick muscle, bone And joints (Surya And Zuriati, 2019).In general line big complaint muscle can grouped become two, that is : 1) Complaint temporary (reversible), that is complaint muscle Which happen on moment muscle accept burden static, However thus complaint the will quick is lost if loading stopped, And 2) Complaint settle down (persistent), that is complaint muscle Which nature settled. Although loading Work has stopped, However flavor Sick on muscle Still Keep going to be continued (Tarwaka, 2015).Impact complaint musculoskeletal on worker Can cause complaint start from painful, muscle or joints rigid, until difficult move. There is Lots disturbance or disease Which Can happen on complaint musculoskeletal among them injury, broken bone, dislocation, injury muscle, sprain And painful the gang (Scholar, 2021).

Complaint muscle skeletal on generally happen Because contraction muscle Which excessive consequence giving burden Work Which too heavy with duration loading Which long like

Stretching muscle Which excessive, Activity repetitive, Attitude Work No natural, The occurrence pressure direct on network muscle Which soft, Vibration with frequency tall will cause contraction muscle increase, Exposure temperature cold Which excessive can lower agility, sensitivity And strength worker so that movement worker become slow, difficult move Which accompanied by with the decline strength muscle, age, type sex, habit smoke, freshness physical, strength physique And size body (TARWAKA, 2015). Exercise physique can become Wrong One strategy in overcome or prevent disturbance musculoskeletal disorders besides consume drug. Alternative exercise physique Which can done can in the form of exercise stretching or stretching. On moment do stretching, body capable correct Posture so that when body experience fatigue, contraction muscle excessive, until existence accumulation sour lactate so activity physique stretching capable speed up recovery from contraction muscle And accumulation remainder metabolism (Scholar, 2021).

A number of study about stretching muscle have benefit Which Good For reduce complaint musculoskeletal. Method stretching muscle Which can done employee office as step For prevent And reduce complaint musculoskeletal. According to study Which done by (Clever et al, 2018). about disturbance musculoskeletal on for worker office in Zonguldak, Türkiye obtained results from 528 Respondent Which has done inspection there is 55.1% Respondent experience complaint disturbance musculoskeletal on part back lower, 53% back on, And 52.5% on part neck. According to study (Tania, 2020) on employee administration BPOM Lampung Which always > 4 O'clock in front laptop, results his research show evaluation beginning complaint musculoskeletal on group treatment obtained 32% arm complaint light, 44% with complaint currently, 24% with complaint tall. complaint light, 44% with complaint currently, 16% with complaint tall. Evaluation end complaint musculoskeletal on group treatment obtained 12% with No There is complaint, 48% with complaint light, 40% with complaint currently. On group control obtained 28% with complaint light, 56% with complaint currently, And 16% with complaint tall. there is influence exercise stretching to complaint work related musculoskeletal disorders (WMSD) on employee administration BPOM Lampung. Based on description on, so researcher interested take title study “Effectiveness Exercise Stretching To Complaint Musculoskeletal On Worker in UPTD Unity Processing Forest Lampung South Year 2023”

METHOD

The type of research is quantitative analytical design with Pre Experimental with One Group Pretest - Posttest Design approach. This research was conducted on June 7 - 27, 2023 in 2023 at UPTD Unity Processing Forest Lampung South. Population study This is as much as 35 worker sample study This as much as 35 Workers. Criteria Inclusion is willingness become Respondent with sign informed consent, worker in UPTD Unity Processing Forest Lampung South and has Complaint Musculoskeletal. While the criteria Exclusion is not present during study ongoing' and In progress sick. Processing data in study This There is 4 that is Editing Data, Coding, Processing, Cleaning And analysis data use program computer Which done 2 stage that is analysis univariate Processing data in study This There is 4 that is Editing Data, Coding, Processing, Cleaning And analysis data use program computer Which done 2 stage that is analysis univariate

RESULT AND DISCUSSION

UPTD KPH Way Pisang is a regional technical implementation unit of the Lampung Provincial Forestry Service which was established based on Governor Regulation Number 35 of 2021

concerning the Establishment of the Organization and Work Procedures of the Technical Implementation Unit of the Service at the Lampung Provincial Regional Service. Based on the Characteristics of Workers at the South Lampung Forest Management Unit UPTD, most of the workers are aged 36-50 years, namely 15 workers (62.9%), all workers have a bachelor's degree, namely 35 workers (100%), most workers work more than 8 hours/day, namely 21 workers (60%) and most workers have worked for more than or equal to 5 years, namely 27 workers (77.1%) the following is the tablefrequency distribution of worker characteristics in 2023.

Table 1.
Frequency Distribution of Worker Characteristics

Age	f	%
20 – 35 Years	13	37.1
36 – 50 Years	22	62.9
Education		
The Sajarna	35	100
Length of working		
More than 8 Hours/day	21	60
less than or equal to 8 hours/day	14	40
Years of service		
more than or equal to 5 years	27	77.1
Less than 5 years	8	22.9

Table 2.
Frequency Distribution of Musculoskeletal Complaints in Workers Before and After Being Given Stretching Exercises

Musculoskeletal Complaints	Category	f	%
Before stretching exercises	Tall	6	17.1
	Currently	29	82.9
	Low	0	0
After stretching exercises	Tall	0	0
	Currently	27	77.1
	Low	8	22.9

Table 3.
Average Musculoskeletal Complaints in Workers Before and After Being Given Stretching Exercises

Musculoskeletal Complaints	f	Mean	Min	Max
Average Before stretching exercises	35	33.54	21	47
Average After stretching exercises	35	25.49	16	37

Table 4.
Effectiveness of Stretching Exercises on Musculoskeletal Complaints in Workers

Musculoskeletal Complaints	Mean	f	SD	SE	p value
Before stretching exercises	33.54	35	4,929	0.833	0,000 (6,364 - 9,750)
After stretching exercises	25.49	35			
Difference	8.05				

Complaint Musculoskeletal on Worker Before Given Exercise Stretching

Based on results study show that before given exercise stretching from 35 worker there is 6 worker own complaint musculoskeletal tall And 29 worker own complaint musculoskeletal currently.

Study This in line with study with study Chica Tania (2019) in Administration BPOM Lampung before in give exercise stretching from 25 Respondent on group treatment known that complaint musculoskeletal before done exercise stretching (pretest) part big own complaint currently that is there is 11 Respondent And 6 Respondent with complaint tall. Study This in line with study Fatsiwi NA, Moh. Judge, Point Huria (2020) in Maker Can Aluminum before in give exercise stretching from 30 worker there is 9 worker own complaint musculoskeletal tall And 21 worker own complaint musculoskeletal currently. Complaint musculoskeletal Which Lots found on worker office especially in front of computer that is on part neck, lower back, And upper back. Complaint the happen Because on as big worker in front computer Work with tend corner head leaning 45o so that can cause complaint on part neck, lower back, upper back, besides That use mouse computer Which Far with keyboard Also can result in effect painful Which significant on shoulder, arm, And upper back (Ministry of Health Republic of Indonesia, 2020).

Factor Which influence the occurrence complaint musculoskeletal is factor individual like age, type sex, habit smoke, index time body, stretching And strength physique, factor work like activity muscle Which excessive, activity repetitive, attitude Work Which No natural And factor environment like pressure, vibration, microchemistry (Tarwaka, 2015) Based on results study describe that part big worker aged 36 – 50 year that is as much as 15 worker (62.9%). Matter This because of according to theory Tarwaka (2015), Complaint First usually felt on age 35 year And level complaint will increase in line with increase age. Matter This happen Because on age half age, strength And resilience muscle start decrease so that the occurrence complaint muscle increase. Part big worker Work more from 8 hours/day that is as much as 21 worker (60%). Matter This in accordance with theory Helmi (2021) the more long somebody work with increasing age so will happen degeneration Which in the form of damage network, replacement network become network scar, subtraction fluid Which will result to reduce stability on bone And muscle.

Part big worker Already Work more from or The same with 5 year that is as much as 27 worker (77.1%). Matter This one way with theory Helmi (2021) Time Work is range time Which has passed by a worker in operate activity his job. Time Work experience somebody in a work will influence incident fatigue somebody. Matter This because of the more experienced somebody in his job its efficiency in Work the more increase. Worker Which experience improvement time Work will do movement Which over and over again on finger hand in a way continously in term time Which long. time Work > 5 year can cause stress around network tunnel carpal And will cause syndrome tunnel carpal. Study Which done supported by theory Tarwaka Which mention that time Work is Wrong One factor risk complaint musculoskeletal Which related with the more duration Work According to results observation Which done researcher Still the amount complaint low back pain on worker in UPTD Unity Processing Forest Lampung South because of position Sit down Wrong. The wrong sitting position when working for a long time continuously every day will make the work in that position heavy and tiring. In a sitting work position, the back muscles will work hard to hold the weight of the upper limbs that are doing the work which causes the workload to rest on the waist area. The waist muscles will also easily become tired which leads to pain. Based on description on, researcher to argue reason main complaint low back pain on worker is position Work Which No Good like Sit down Which Wrong so symptoms Which can felt by worker is Sick neck, Sick shoulder, Sick back And back lower, wrist hand And Sick head. Symptom – symptom the will increase critical If age worker Already > 35 year due to physiological Already decrease Then duration work every day like Work > 8 hours/day And Already How many year Work Also make exposure risk complaint musculoskeletal increase.

Complaint Musculoskeletal on Worker after Given Exercise Stretching

Based on results study show that after given exercise stretching from 35 worker there is 27 own complaint musculoskeletal currently And 8 worker complaint musculoskeletal low. Study This in line with study with study Chica Tania (2019) in Administration BPOM Lampung after in give exercise stretching obtained results Respondent complaint currently decrease become 10 Respondent And No There is Which experience complaint tall. Study This in line with study Fatsiwi NA , Moh. Judge , Point Huria (2020) in Maker Can Aluminum after in give exercise stretching from 30 worker there is 17 worker own complaint musculoskeletal currently And 13 worker own complaint musculoskeletal low. Movement stretching Which given on worker UPTD Unity Processing Forest Lampung South This in the form of movement Which focus on neck, shoulder, waist, back, wrist hand, knee And foot Which functioning For flex muscles And remove stiffness body worker consequence Sit down in time long And with position static. Every movement done detention on position stretched during eight until ten second For can feel existence pull on muscles. Movement stretching This done in place Work And with time around 10 minute. Movement This very simple, easy done And used For worker office

Exercise physique can increase strength And flexibility muscle, lower risk injury on neck, shoulder, And back, as well as strengthen vertebral column Exercise physique like with do exercise stretching will practice muscle skeletal And Also muscle heart, so that will increase capacity metabolic And functional from muscle skeletal, metabolism aerobic, response peripheral And burden Work heart will decrease. Improvement from strength muscle heart will increase cardiac output so that will increase supply oxygen to network. Increasing troops supply oxygen to network in body will result in circulation blood become fluent so that hoarding sour lactate in body No happen And No cause painful muscle (Tania, 2020). Sort by researcher, the occurrence decline complaint musculoskeletal on worker because of exercise stretching Which done regular like done 4 O'clock after Work done exercise stretching during not enough more 15 until 30 minute per day can reduce complaint musculoskeletal. From results study show There is 35 worker everything experience decline complaint musculoskeletal.

Effectiveness Exercise Stretching to Complaint Musculoskeletal on Worker

Based on results study show that There is influence exercise stretching to complaint musculoskeletal in UPTD Unity Processing Forest Lampung South with results suji statistics got p value as big as 0,000 ($p \text{ value} < \alpha = 0.05$) Study This in line with study with study Chica Tania (2019) in Administration BPOM Lampung Which state that There is influence exercise stretching to complaint work related musculoskeletal disorders on employee administration with results test statistics obtained results there is difference complaint musculoskeletal on group treatment with mark $p=0.030$ Study This in line with study Fatsiwi NA , Moh. Judge , Point Huria (2020) in Maker Can Aluminum show that There is Influence Stretching Exercise Ergonomic to Score Painful Musculoskeletal Disorders on Worker Maker Can Aluminum with results test statistics obtained results there is difference complaint musculoskeletal on group treatment with mark $p=0.025$ On generally, complaint muscle more seldom found on somebody Which in activity his daily life have Enough time For Rest. On the contrary, for Which in his daily life do work Which need mobilization power Which big, in side other No have time Which Enough For Rest, almost can confirmed will happen complaint muscle. Level complaint muscle Also very influenced by level freshness body. For level freshness body Which low, so risk the occurrence complaint is 7.1 %, level freshness body currently is 3.2 % And level freshness body tall is 0.8 %. Level freshness body

Which low will to heighten risk the occurrence complaint muscle. Complaint muscle will increase in line with increase activity physique (Helmi, 2012)

Exercise stretching dynamic can lower complaint musculoskeletal Because cause the occurrence improvement circulation blood on muscle Which in a way gradually will lower spasm muscle, so that degrees painful decrease. Exercise stretching can reduce spasm muscle Because activated proprioceptor muscle or muscle spindle. Muscle spindle on duty For arrange signal to brain about change long muscle And change tone Which sudden excessive. Stretching Which done opposite direction with position static can prevent imbalance on muscle And prevent the occurrence complaint musculoskeletal. Besides That, stretching can cause a number of effect on body like increasing flow blood going to muscle so that increase supply nutrition And oxygen on muscle And discus vertebral, increasing production fluid synovial on joints, reduce the occurrence trigger points, guard scope motion joints, can cause response relax on system nerve center, heat muscle before start work, as well as can identify structure Which tense Which can leading on injury. At least required contraction from 50% muscle on body For maintain posture. Stretching Which done during 15-30 second in a way slowly can reduce tension on muscle. Besides That, Wrong One factor Which play a role in the emergence complaint musculoskeletal that is decrease flow nutrition And oxygen on muscle. Stretching can done For increase flow blood going to network so that can increase its efficiency in deliver nutrition And oxygen to network muscle. Based on physiology, fatigue Work accumulation substance remainder metabolism can cause performance muscle decrease as well as make it easier the emergence fatigue. Movement stretching Which done aiming For help relaxation muscle, so that muscle more flexible in move Because improvement supply oxygen, as well as Alan increase flexibility that is ability For to move muscle along with joint on all over area movement (Tarwaka, 2015).

Based on description on researcher to argue that exercise stretching prove can lower complaint musculoskeletal on worker Which own complaint musculoskeletal. Matter This because of exercise stretching is a action administrative Which done For minimize risk disturbance in place Work. Benefit from exercise stretching that is can to improve fitness in a way physique with method to smoothen metabolism And transportation substances Which required by body as well as throw away the remains substance Which No Again required. Besides That benefit exercise stretching Also can optimize movement, with method to prolong muscles ligaments, tendons, And joint so that can Work in a way optimal And motion on muscle become more wide And elastic so that possibility For the occurrence injury on joints And muscle become more small And can minimized. Exercise stretching in place Work own a number of benefit among them that is can reduce tension muscle, increase flexibility network muscle, reduce risk injury muscle (cramps), reduce risk pain/injury back And optimize activity daily.

CONCLUSION

Respondents Which experience complaint musculoskeletal most before given exercise stretching is category currently there is as much as 29 Respondent (82.9%) And Respondent Which experience complaint musculoskeletal after given exercise stretching is category currently with 27 Respondent (77.1%). Average – flat (mean) mark complaint musculoskeletal before in give exercise stretching is 33.54 with mark complaint musculoskeletal highest as big as 47 And lowest as big as 21. Whereas flat – flat (mean) mark complaint musculoskeletal after in give exercise stretching is 25.49 with mark complaint musculoskeletal highest as big as 37 And lowest as big as 16. there is difference score flat - flat before and after given exercise stretching that is 8.05. There

is influence exercise stretching to complaint musculoskeletal in UPTD Unity Processing Forest Lampung South with results test statistics got p value as big as 0,000 (p value $<\alpha = 0.05$).

REFERENCES

- Anugradilla. 2021. Effectiveness of Work Stretching Exercise on Preventing Upper Extremity Injuries in Office Workers: Narrative Review. *Journal of 'Aisyiyah University of Yogyakarta*, 8(3), 306–312. <https://doi.org/10.33854/jbd.v8i3.820>
- Arikunto. 2018. *Research Procedures*. Jakarta: Rineka Cipta
- Cendikia, 2021. *Nursing Care for Clients with Musculoskeletal System Disorders*. Jakarta: Rineka Cipta
- Cendikia and Lestantiyok. 2021. The Effect of Providing Exercise on Musculoskeletal Complaints in German Unit Workers. *Diponegoro University Journal*
- Ekawati & Wahyuni. 2015. *Occupational Diseases*. Jakarta: Elex Media Computindo
- Fatsiwi. 2020. The Effect of Ergonomic Gymnastics Stretching on Musculoskeletal Disorders (MSDs) Pain Scores in Aluminum Can Makers. *Andalas Dental Journal*, 5(1), 31–39. <https://doi.org/10.25077/adj.v5i1.68>
- Ginting. 2020. The Effect of Stretching on Musculoskeletal Complaints in Minang Traditional House Chip Factory Workers in Tadukan Raga Village, Deli Serdang in 2020. *Darma Agung Journal*, 15(1), 102–109. <https://doi.org/10.33024/hjk.v15i1.3809>
- Harrianto, Ridwan. 2018. *Occupational Health Textbook*. Jakarta: EGC
- Ministry of Health of the Republic of Indonesia. 2020. *Stretching in the Office Prevents Occupational Diseases*. Jakarta: Ministry of Health of the Republic of Indonesia
- Noor Helmi, Zairin. 2019. *Musculoskeletal Disorders*. Jakarta: Salemba Medika
- Notoatmodjo Soekidjo. 2018. *Health Research Methodology*. Jakarta: Renika Cipta
- Nurnlena. 2021. Effectiveness of Work Stretching Exercise on Preventing Upper Extremity Injuries in Office Workers: Narrative Review. *Journal of Medicine, Baiturrahmah University*, 8(3), 306–312. <https://doi.org/10.33854/jbd.v8i3.820>
- Regulation of the Minister of Health No. 70 of 2016 Concerning Standards and Requirements for Industrial Work Environment Health
- Lampung Riskesdas. 2018. *Lampung Basic Health Research 2018*. Jakarta: Lampung Riskesdas
- Riskesdas. 2018. *Indonesian Basic Health Research 2018*. Jakarta: Riskesdas
- Sugiyono. 2018. *Quantitative and Qualitative Research Methods and R & D*. Jakarta: ALFABETA
- Sujarweni, V Wratna, 2015. *Research Methods*. Yogyakarta: Pustaka Baru Press
- Suriya and Zuriyati. 2019. *Medical Surgical Nursing Care for Disorders of the Respiratory System Musculoskeletal*. Yogyakarta: New Library Press
- Susilo. 2014. *Epidemiological research methodology in the field of medicine and health*. Yogyakarta: Bursa Ilmu
- Tania. 2020. The Effect of Stretching Exercises on Work-Related Musculoskeletal Disorders (WMSDs) Complaints in BPOM Lampung Administrative Employees. *Health Journal*, 2(2), 679.
- UPTD Forest Management Unit Center. 2020. *Profile of UPTD Forest Management Unit Center. South Lampung*. UPTD Forest Management Unit Center
- Tarwaka, 2015. *Ergonomics for Occupational Safety, Health and Productivity*. Surakarta: UNIBA PRESS.