ERGONOMIC EXERCISES TO DECREASE JOINT PAIN SCALE AND MUSCLE STRENGTH IN ELDERLY

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ABSTRACT

Introduction : *Epidemiological data showed an increased prevalence of chronic pain and weakness in the elderly. One of the chronic diseases that can cause the sensation of pain in the elderly is Rheumatoid Arthritis (RA). In addition, the elderly are particularly susceptible of degenerative joint diseases such as osteoarthritis which has characterized by pain in the lower extremities, decreased muscle function, and mobility that can degrade the quality of life. Non-pharmacological modality therapy is a component of multimodal management that very important for pain management, including Ergonomic Exercises. The aims of the study was to determine the effect of activity therapy ergonomic exercises to decrease joint pain scale, and to increase muscle strength in elderly with joints degenerative at work area Kasihan II Public Health Center, Bantul, Yogyakarta.* ***Method :*** *Quasi-experimental with pretest-posttest control group design was carried out in this study. The study was done in three village of Bantul district (Padokan Lor, Jomegatan and Onggobayan). Purposive sampling was used to identify the study subjects. A sample of 50 elderly was included in the study for experimental (17) and control (33) groups. Sampling technique used purposive sampling. T-test, Wilcoxon, and two sample Wilcoxon rank-sum, tests were used to analysis the data.* ***Results :*** *During the four weeks intervention of ergonomic exercise, there were significant decreases in scale joint pain in elderly with degenerative joint by P value 0.000 (α <0.05), and increases in muscle strength by P value 0,002 for muscles pull and P value 0,0001 for muscles push.* ***Discussion :*** *Activity therapy of an ergonomic exercise has significant influence to decrease joint pain scale and to increase muscle strength in elderly with degenerative joints.*

Key Words: *joint degenerative,elderly, joint pain, muscle strength, ergonomic exercises*

INTRODUCTION

Aging is a characteristic of the dynamical physiological process and it experiences the irreversible differences in the physiological functions of the elderly (Rastogi & Meek, 2013). It will impact on various aspects, especially in terms of the health aspect. the epidemiological data support the prevalence of the enhancement of the chronic pain and weakness in the elderly. The elderly often have multiple chronic illnesses pathologies, the changes of body function, and weakness (Rastogi & Meek, 2013) .One of the chronic diseases that can cause the sensation of pain in the elderly is Rheumatoid Arthritis (RA) (Cooney et al, 2010) .In addition , the elderly are particularly susceptible to the degenerative joint disease (Fox et al., 2004).

Modality therapy in the elderly pain can be categorized in several aspects. A multidisciplinary approach is recommended to investigate the possibility of optimal pain management, such as pharmacotherapy (the most commonly used treatment), psychological support, physical rehabilitation, and interventional procedures. Pharmacological therapy which is often used are NSAIDs, muscle relaxants, opioids, and adjuvant therapy (Kaye et al, 2010).

Non-pharmacological modality therapy is the important component of multimodal management as it helps to cope the pain better by the improvements in daily functioning, which includes the physical therapy (Rastogi & Meek, 2013) .The physical exercise therapy can reduce joint pain intensity on the elderly (Permana, 2011).

The Ergonomics exercise is the therapy of physical activity (Fahmi, 2010) .the ergonomics exercises is inspired by the movement of sholat (prayers). The prayers movements contain autoregulation and adaptation of the human body with the brain as the central controller (Sagiran, 2006). The ergonomics exercise is a exercises movement which can immediately open, clean, and activate the entire systems of the body such as the cardiovascular system, urinary, reproductive (Wratsongko, 2010).

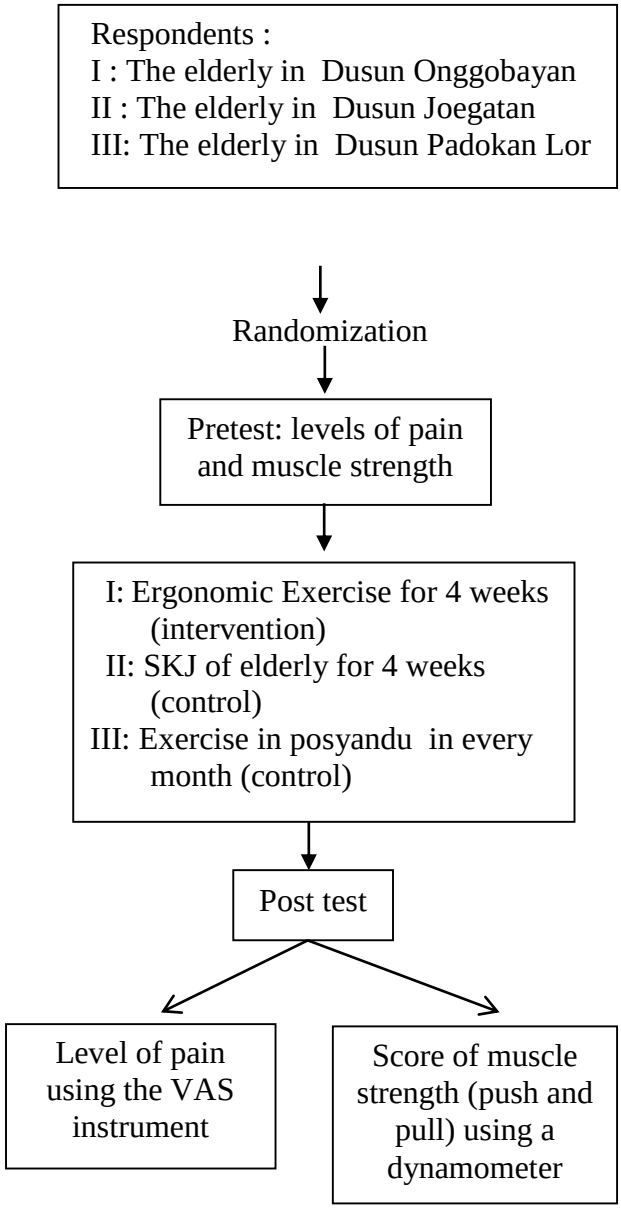
From the preliminary survey, it is obtained the highest number of elderly in 2012 were in the region of Health Center of Kasian II with 10 701 inhabitants with health services of 39.43% (Bantul District Health Profile, 2013). The number of elderly is quite large if it is compared with the health problems faced include degenerative joint problems. The survey of the health center of Kasian II shows the data obtained that the highest prevalence of degenerative joint are in the neighborhood health center of Aster Dusun Padokan Kidul, neighborhood health center of Flamboyan Dusun Onggobayan, and neighborhood health center of Menur I Dusun Jomegatan. The background of the problems and some researches related to this study direct the researcher to determine the effect of therapeutic activity of Ergonomics Exercises to decrease joint pain scale and increase the muscle strength in elderly with the degenerative joints in health center of Kasian II.

Based on the description of the background, the research question is formulated as "can the physical activity therapy of ergonomic exercises reduce joint pain scale and increase muscle strength in elderly with degenerative joint?". The purpose of this study is to analyze the effect of therapy of ergonomic exercise to reduce the scale of joint pain and increase the muscle strength in elderly with degenerative joints in health center of Kasian II Bantul, Yogyakarta.

MATERIALS AND METHODS

The research applies the quantitative research methods, namely the provision of Ergonomic Exercise activity therapeutic

interventions in elderly with degenerative joints. The research is designed as the intervention studies of Queasy Experiment Design: Pretest-Posttest Control Group Design. The schema of the research can be seen in the image below :



The population is the elderly who have degenerative joints. Based on the data in 2012 in Kasian II Health Center and the preliminary survey result, the numbers of elderly with degenerative joint in Kasihan II health center are 698 elderly. This is the overall number of men and women without considering the pain management which has been given previously.

Inclusion criteria for this study is the aging population which are willing to be respondents and they experience pain or acute or chronic pain in the joints, aged <75 years because of the results of a preliminary survey of elderly >75 are more susceptible to injury. The assessment of pain scale is based on the results of interviews using a numeric scale (numeric rating scale). Meanwhile, the exclusion criteria in this study were elderly with degenerative joints that have heart disease, fractures, or severe pain and had to be hospitalized, the elderly who experience shortness of breath on exertion is also included in this criterion.

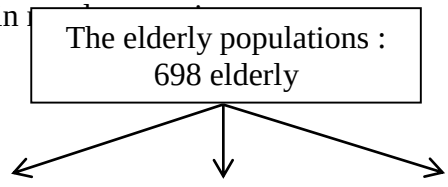
The study used three groups : the intervention group and 2 control groups. The sample was calculated using the formula of hypothesis testing against the mean of two independent populations (Sastroasmoro, 2011). The formula used is as follows:

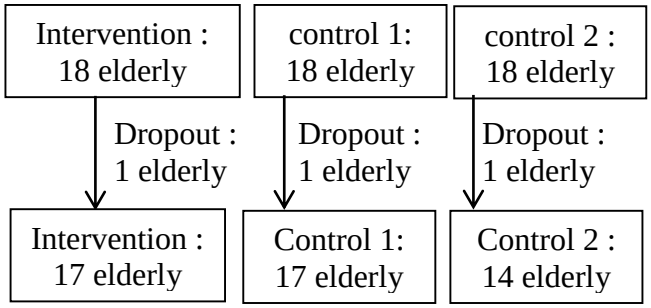
$$n_1 = n_{2=}\, n_3 = 2\left[\frac{(z\alpha + z\beta)s}{(x1 - x2)}\right]^2$$

$$= 2\left[\frac{(1{,}96 + 0.82)1{,}5}{(4{,}14 - 2{,}76)}\right]^2$$

$$= 18 \text{ persons}$$

The total numbers of samples in the intervention and control groups are 54 people who need to be re-validation. The drop out criteria in this study was the elderly with degenerative joints who passed away during the intervention period and the elderly degenerative joint resettled outside the district of Bantul. The sampling technique of the population uses the purposive sampling and the determination techniques for each group (randomization) uses random assignment. At the time of research, there are several participants who dropped out because they do not take part in





The variables in the study are the ergonomic exercise intervention in elderly degenerative joint and joint pain as well as the degree of muscle strength in the elderly. The ergonomic exercise is the physical activity therapy which is inspired from the prayer movement. This therapy is conducted twice in a week for 1 month at the elderly who experience the joint pain and it will be conducted directly by the researcher. The joint pain is a manifestation of degenerative joint joints as measured by the Numeric Rating Scale. Muscle strength is a measurement of the static strength of the muscle, which is the back extension strength and leg extension (back and leg dynamometer), force push and pull the shoulder (pull and push dynamometer), hand grip strength (handgrip dynamometer).

The measurement of the pain scale uses the NRS (Numeric Rating Scale, Perry & Potter, 2005) by way of interviews the samples and the muscle strength using a dynamometer. Module activities "Free activity with Sergo Therapy" assists the researcher in providing the intervention.

In this study, the data analysis is conducted by comparing the situation before and after treatment. In addition, a comparison was also made between the two groups (intervention and control). Then, the researcher focus on the differences in scale reduction in pain and muscle strength before and after the activity of ergonomic exercise and also focus on a decrease in pain in both groups. The data analysis uses the t-test statistical test that has a 95% confidence level. The t-test is used when there are two quantitative samples and the ratio of nominal scale, and it is used to see the difference (Nursalam, 2011). In addition to the t test, researchers also used parametric Wilcoxon test and the Mann Whitney test. The data were processed using SPSS.

RESULT

This research was conducted at the beginning of April until the early of May for 4 weeks in the Health Center of Kasian II Bantul. The data analysis which is used includes the univariate and bivariate analyzes which are described below:

1. **Results of Statistical Test Based on the Sample Distribution Characteristics**

Table 1. Frequency Distribution of Sample Characteristics by Sex and Occupation in the Intervention Group and Control Group

Characteristics	Sergo		SKJ		Elderly exercise		p value
	N	%	N	%	N	%	
Sex							0,11
Male	4	23,5	5	29,4	4	28,6	
Female	13	76,5	12	70,6	10	71,4	
Occupation							0,29
Worker	8	47,1	10	58,8	9	64,3	
Non-worker	9	52,9	7	41,2	5	35,7	
Ages Mean±SD	65,47±5,27		65,18±3,76		65,71±3,83		0,97

Source : Primary data, 2014

The sample characteristics of the three groups based on the gender, the women sample is bigger than men. The characteristics of the occupation, most of the control groups do not work, but the intervention group among the elderly who work and do not work are about the same. The distribution of the age characteristics between groups is almost the same. The different test results between groups showed no difference between groups Sergo, SKJ group and the group of the elderly exercisers with p value > 0.05

2. The Univariat Analysis

Table 2.Distribusi Mean Scale Level of Joint Pain In Sergo Group (Intervention), SKJ and the Elderly exercise (Control group)

Groups	Pain scale			
	Mean± SD	95%CI	Min	Maks
Sergo				
Pretest	3,76±3,65	(3,20, 4,36)	2,00	6,00
Posttest	1,06±1,25	(0,42, 1,70)	0,00	4,00
SKJ				
Pretest	4,53±1,18	(3,92, 5,14)	3,00	7,00
Posttest	3,88±1,41	(3,16, 4,61)	1,00	6,00
Elderly Exercise				
Pretest	4,57±1,22	(3,87, 5,28)	3,00	7,00
Posttest	3,71±1,38	(2,92, 4,51)	1,00	5,00

Source : Primary data, 2014

The intervention and control groups are equally seen a decrease in the pain scale, but in the intervention group, the elderly pain scale decreases more significantly.

Table 3. The Pull Muscle Strength Mean Distribution on Sergo Group (Intervention), SKJ and Elderly Exercise (Control group)

Groups	Pull Muscle Strength			
	Mean± SD	95%CI	Min	Maks
Sergo				
Pretest	8,06±3,65	6,18, 9,93	3,50	16,50
Posttest	9,15±3,66	7,27, 11,03	3,50	16,50
SKJ				
Pretest	5,91±2,59	4,58, 7,24	2,00	10,50
Posttest	6,12±3,11	4,52, 7,72	2,00	13,50
Elderly exercise				
Pretest	5,75±2,58	4,26, 7,24	2,00	10,50
Posttest	5,54±2,93	3,84, 7,23	2,00	13,50

Source : Primary data, 2014

The results of the analysis related to the average muscle strength indicates the strength of the pull of the muscle in the control group have a mean, minimum and maximum values which are almost, whereas in the group average Sergo pull muscle strength is 8-9. In the group of Sergo and SKJ, it is seen an increase but in the elderly exercise no increasing of the pull muscle strength.

Table 4. Muscle Strength Push Mean Distribution At Sergo Group (Intervention), SKJ and Elderly Exercise (Control group)

Kelompok	The Strength of the Muscle Push			
	Mean± SD	95%CI	Min	Maks
Sergo				
Pretest	10,68±3,86	8,69, 12,66	4,50	21,00
Posttest	12,00±3,65	10,12, 13,88	5,00	20,00
SKJ				
Pretest	7,24±2,76	5,82, 8,66	2,00	11,50
Posttest	7,11±2,65	5,76, 8,48	2,00	11,50
Elderly exercise				
Pretest	7,04±2,58	4,26, 7,24	2,00	10,50
Posttest	6,61±2,50	5,17, 8,05	2,00	10,50

Source : Primary data, 2014

The results of the analysis related to the mean of the push muscle strength showed an push in muscle strength in the control group had a mean, minimum and maximum values which are almost the same, whereas in the mean of the Sergo group, the push muscle strength is 10-12. In all three groups is seen an increase in push muscle strength.

3. Bivariat Analysis

Before the hypothesis testing, the normality test of the variable is conducted with the following results :

Table 5.Test Normality Variable Push Muscle Strength, Pull And Pain Scale In Sergo Group (Intervention), SKJ and Elderly Exercise (Control group)

Variable	Shapiro-Wilk		
	Statistic	*df*	*Sig*
Sergo group			
- Pre-test of the pull of muscles	0,919	17	0,143
- Pre-test of the muscle push	0,933	17	0,244
- Post-test of the muscle pull	0,934	17	0,251
- Post-testof the muscle push	0,975	17	0,898
- Pre-test of the pain scale	0,930	17	0,219
- Post-Test of the pain scale	0,816	17	0,003
SKJ group			
- Pre-test of the the muscles pull	0,931	17	0,229
- Pre-test of the muscle push	0,971	17	0,834
- Post-test of the muscle pull	0,917	17	0,133
- Post-test of the muscle push	0,969	17	0,792
- Pre-test of the pain scale	0,828	17	0,005
- Post-test of the pain scale	0,895	17	0,057
Elderly exercise group			
- Pre-test of the the muscles pull	0,946	14	0,505
- Pre-test of the muscle push	0,980	14	0,976
- Post-test of the muscle pull	0,878	14	0,055
- Post-test of the muscle push	0,950	14	0,564
- Pre-test of the pain scale	0,853	14	0,025
- Post-test of the pain scale	0,847	14	0,020

Source : Primary data, 2014

Normality test of muscle strength shows the normal data, so the bivariate test which is used is t-test to determine the respective comparisons of pre-test and post-test. The test of the pain scale of normality for the data distribution is up normal so a non-parametric Wilcoxon test and Mann Whitney Test is applied.

Table 6. Analysis of the Wilcoxon Test Pain Scale In Sergo Group (Intervention), SKJ and Elderly Exercise (Control group)

Variable	Wilcoxon-test		
	Mean *Rank*	Z	p Value
Sergo Group			
- Pre-Post test of the pain scale	9,00	-3,65	0,0001
SKJ Group			
- Pre-Post test pain scale	5,88	-2,07	0,039
Elderly Exercise Group			
- Pre-Post test of pain scale	5,19	-2,34	0,020

The results of the analysis of the Wilcoxon test shows a decrease of pain scale in the three groups with P Value of <0.05.

Table 7. Analysis of Paired T-Test Muscle Strength Push and Pull In Sergo Group (Intervention), SKJ and Elderly Exercise (Control group)

Variable	Paired t-test		
	Mean±*SD*	t	p Value
Sergo Group			
- Pre-post test of the muscle pull	-1,09±0,91	-4,96	0,00001
- Pre-post test of the muscle push	-1,32±1,40	-3,89	0,001
SKJ Group			
- Pre-post test of the muscle pull	-0,21±1,75	-0,49	0,634
- Pre-post test of the muscle push	0,12±1,27	0,38	0,707
Elderly Exercise Group			
- Pre-post test of the muscle pull	0,21±1,64	0,49	0,633
- Pre-post test of the muscle push	0,43±1,14	1,41	0,183

The results of the analysis of Paired T-Test of the push and pull muscle strength shows an increase in muscle strength push to pull in ergonomic exercise group with P Value of <0.05, whereas in the SKJ and the elderly exercise no increase in muscle strength both in pull and push strength.

Table 8. Analysis of the Mann-Whitney Test Pain Scale In Sergo Group (Intervention), SKJ and Elderly Exercise (Control group)

Variable	Mann-Whitney test		
	Mean Rank	Z	P Value
Pain scale	31,60, 11,56	-4,83	0,0001

The results of the analysis of the Mann-Whitney test shows that there are differences in pain scale in all three groups with the P Value of <0.05. This indicates ergonomic exercises can reduce pain.

Table 9. Analysis of the Independent T-Test Muscle Strength Push and Pull in Sergo Group (Intervention), SKJ and Elderly exercise (Control group)

Variable	Independent t-test		
	Mean Diff	t	P Value
The pull muscle strength	3,29	3,37	0,002
The push muscle strength	5,11	5,69	0,00001

The results of the Independent T-Test analysis of muscle strength push and pull shows there are differences in the three groups with a P Value <0.05. This indicates ergonomic exercises can increase muscle strength either pull or push.

DISCUSSION

1. Sample Characteristics

This research was conducted in April-May 2014. At the beginning of the research, there were 54 elderly as the sample with the distribution of 18 elderly per group, but due to the sample who dropped out, the sample size to 50 elderly were divided into one control group totaled 17 elderly, 2 control group as 14 elderly and intervention amounted to 17 elderly. The average age of the sample in this study was 65 years old. The age of 65 years old becomes one of the factors that led to the emergence of joint problems due to physiological changes in the elderly (Solomon, 2013).

Characteristics of female respondents are bigger than men, both in the control and intervention group. This is supported by studies Sugiura & Demura (2012) which states that the prevalence of degenerative joint pain especially in the joints, especially arthritis is more common in women than men. It is also supported with the demographic data where the number of elderly female due to the larger than life expectancy of women is longer than men (11.29 million versus 9.26 million). Therefore, the problem of the elderly in general in Indonesia is dominated by women (CBS, 2013). In addition, women prone to osteoarthritis which is caused by a decrease in the hormone estrogen during menopause, these hormones play a role in the loss of bone mass resulting in a sensation of joint pain in the elderly (Lukman & Ningsih, 2011).

Characteristics of elderly, generally, do bot work i.e. Housewife (IRT) in both groups. According to the Statistics Agency data, the average elderly already full of duty and more frequent to run the activity in domestic work. This limited activity can refer to the reduction in synovial fluid. Reduced synovial joints will cause pain and stiffness of the joints section (Sudoyo, 2006).

The results of the different test characteristics of the respondents shows no difference between groups Sergo, SKJ group and the group of elderly neighborhood health center. The result of this analysis shows three homogeneous groups. Homogeneity is possible because the elderly group comes from the environment with the same characteristics that are in the rural areas (rural) and it is under the guidance of Kasian II health center.

2. Univariat Analysis

In the intervention and control groups were equally seen a decrease in the pain scale, but in the intervention group, the elderly pain scale decreased more significantly. Both groups experienced a decrease in the possibility of behavior that can affect the decrease in perceived joint pain scale. The pain is still in the mild and moderate scale due to pain caused by arthritis which can still be controlled (Masyurrosyidi, 2012) .In the journal, Ayu (2012) explains that average of the elderly who experience joint pain knee pain scale ranging from 1-6. The range of joint pain scale is the same as the pain scale range in the study that the researchers conducted with an average of 3-4.

Joint pain in the elderly occur in almost all the elderly, especially due to degeneration of the joints and bones (Wahida & Khusniyah, 2012) .In the elderly, the decreased function of the musculoskeletal system is as a result of changes in collagen, the impact of these changes is a reduction in the flexibility of joint. Besides, the erosion of the joint capsules leads to decreased movement of joints and causes widespread pain (Azizah, 2011). Fox et al (2004) adds that in the musculoskeletal impairment caused due to age is a degenerative joint disease and a common complaint is pain and stiffness of the joints.

The results of the analysis related to the average muscle strength indicates the strength of the pull of the muscle pull in the control group had a mean, minimum and maximum values which are almost the

same, whereas in the group average Sergo pull muscle strength is 8-9. In the control group of elderly tug muscle strength is 5-6 with an increase of only 1-2. The same thing happened to the push muscle strength. Ambartana Research (2010) states the average value of the relative muscle strength of elderly aged 60-74 years is 3.87 to 4.01. It is in the causes of age-related musculoskeletal changes in the elderly include decreased height, redistribution of subcutaneous fat and muscle mass, increased bone porosity, muscle atrophy, slow movement, reduction in strength, and stiffness of the joints. Changes in the bones, muscles and joints resulted in a change of appearance, weakness, and slow movements that accompany aging (Stanley and Beare, 2006).

3. Bivariat Analysis

Based on bivariate analysis test control and intervention groups with the Wilcoxon analysis shows that the P value of the pre-test and post-test SKJ group is 0039, a group of elderly gymnastics P value of 0.020, while the pre-test and post-test in the intervention group is 0.0001, all of the groups show the P value of ≤0.05, so the results of the study in all three groups, the control and the intervention shows a decrease in pain. Handono and Richard (2013) states that some seniors seeking health provider when experiencing severe pain and responds to pain by using drugs at prescribed. The pain is often the elderly feel very disturbing daily activities due to pain which is disturbing the elderly often seek treatment by themselves.

Other factors affecting the joint pain in the elderly, among others, the level of education, BMI, and activity. The level of education will have an effect in the understanding of the knowledge acquired. The elderly with low levels of education are more at risk of arthritis pain (Jhun et al, 2013). Knowledge plays an important role in improving health in the elderly, including in relation to this arthritishal will affect the elderly in the treatment of arthritis management (Afriyanti, 2009). Body Mass Index (BMI) effect on joint pain due to arthritis, overweight BMI will improve arthritis symptoms including joint pain sensation. This happens because the heavier the load the foundation thus increasing the burden of friction in the joints (Wang et al, 2009). Another factor is physical activity or exercise that will train the body to move so as to give effect in the production of synovial fluid which serves as a lubricant and prevents friction in the joints that can lead to pain. Activities will also activate the immune system and prevent inflammation in the joints which have one of the signs and symptoms of joint pain (Robbins et al, 2009).

Movements in Ergonomic exercise is included in Non-Weight Bearing movement because the movement is designed to be simple, brief, and do not use a load that can be done in a short period of time (Griwijono & Finger, 2012). The Ergonomic exercise is practiced for 8 sessions in 4 weeks. The descriptive research Iversen et al, (2013) explains that the exercise of moderate intensity activity can be practiced regularly 2 times a week to reduce pain in the joints. According to Ayu (2012) 15 elderly who experience joint pain effectively decreased after elderly exercise within 15-45 minutes for 6 consecutive days. Peungsuwan et al (2014) suggest the opposite, that the exercise is practiced to reduce the pain of osteoarthritis can be effective if it is practiced in a long time that for 2 months. Wang et al (2009) also said that the 40 respondents in the form of Tai Chi exercise activity within 60 minutes effectively practiced for 2 times in 12 weeks.

Physical activity in the form of exercise will reduce the sensation of joint pain. The previous studies by Bennell et al (2012) describes physical activity can improve quality of life for people with

arthritis. In addition, physical activity will provide a positive effect on muscle strength and function, and mood in the elderly. Physical activity can be in a elderly exercise, which is proven to reduce joint pain, amounting to 86.7% of respondents had joint the pain scale and by 13:33 0% of respondents had joint the pain scale 1 after the intervention in the form of elderly exercise (Ayu, 2012). This is reinforced by the results of the study of Solomon (2013) states that there is influence of exercise on arthritis pain in the elderly.

Ayu and Solomon's research differs from research Fatkuriyah (2010) which states that there is no difference between the control and intervention groups after exercise in reducing arthritic joint pain scale. Fatkuriyah explains that there might be several factors that contribute to the failure of research include diet, activity, quality, and quantity of rheumatism exercise. In this study, researchers used a method of therapeutic activity in the form Ergonomics Exercise to decrease joint pain scale between the two groups of elderly which is obtained p-value of 0.0001 and -4.83 Z value then there is the effect of a decrease in joint pain scale after a given intervention of Ergonomics exercise for 8x meeting.

The results of the analysis of Paired T-Test push and pull muscle strength shows an increase in muscle strength and push to pull ergonomic exercise group with P Value <0.05, whereas in the SKJ and elderly exercise group, there is no the increase in muscle strength both in pull and push strength . The results of Independent T-Test analysis of muscle strength push and pull shows there are differences in the three groups with a P Value of <0.05. This indicates ergonomic exercises can increase muscle strength either pull or push.

The Ergonomic exercise or physical activity can stimulate the increase activation of chemical neuromuscular and muscular. Stimuli which are carried by nerve cells and muscle fibers causes the release of Ca ions bind to molecules of small filaments which allows the interaction of actinic and myosin filaments in the sarcoma, resulting in a small shift then there is a contraction of myofibrils and muscle fibers. The mechanism through muscular when Muscles needs the energy to contract causing cellular oxidative metabolic processes to form adenosine triphosphate (ATP) which is used as energy when the muscles contract. The energy in different muscles need to be increased during the physical activity. In order to maintain muscle strength and function, it should always be trained. When muscle bears again reached maximum or near-maximum voltage for a long time and regularly, it will cause the muscle transverse incision which will be enlarged so as to increase the muscle mass and muscle strength (Sherwood, 2011; Brunner and Suddarth, 2001).

Other factors that affect the muscle strength in the elderly are physical activity, obesity, and muscle injury. Intense physical activity can maintain muscle strength in the elderly. Obesity in the elderly can affect the mobility and muscle strength, obesity predispose the elderly to undergo ligament instability, especially in the lower back and other joints that hold the weight of the body. Muscle injury can lead to immobilization, causing loss of muscle mass and strength (Brunner and Suddarth, 2001; Stanley and Beare, 2006).

Physical activity in the form of exercise can increase muscle strength in the elderly. Previous studies Safa'ah (2013) describes the effect of range of motion exercises which are carried out on a regular basis can increase the muscle strength in the elderly, collecting the data in this study using a checklist and sheets of observations which is made during the 3 months.

Jahagirdar Research (2010) EMG-biofeedback intervention and exercise balls for 12 weeks to improve morbidity, muscle strength and functionality. In this study, there are some significant improvements to

the power of the tibialis anterior muscle-muscle, thigh muscle strength, thus, the study of the training tibial sufficient causes effective force. Research Kawanabe et al (2007) on the effects of exercise body vibration (WBV) and muscle strengthening exercises which is practiced with a duration of 4 minutes can obtain hormonal profile and neuromuscular can improve the response performance immediately after the occurrence oculist exercises that stimulate blood vessel growth hormone testosterone which plays a role in the process anabolitik muscle action.

In this study, researchers uses a method of therapy in the form of exercise activities ergonomically to increase muscle strength in the elderly between the two groups by measuring muscle strength to push and pull with the P Value of dynamometer result of there is a significant influence on the improvement of both traction and push muscle strength in elderly after being given the intervention of the ergonomic exercises during meetings 8x.

CONCLUSION

Based on the results of research and discussion, then it is put forward some conclusions with the following description:

1. There is an ergonomic exercises therapy influence against the joint pain scale decline in the elderly with degenerative joints with p value of 0.000 (P value <0.05).
2. There is ergonomic exercises therapy influence against the increase of pull muscle strength in elderly with degenerative joint with a value of 0.002 (p-value <0.05).
3. There is an ergonomic exercise therapy effect to the increased push muscle strength in elderly with degenerative joint with the P-value of 0.0001 (P-value <0.05).

SUGGESTION

It is needed a program that trains physical activity of elderly in the form of exercises that can be used as support in reducing joint degenerative joint pain in the elderly. The elderly also must be active and independent in an effort to improve their health status.

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