

Influence of Senam Osteoporosis to Pain and Anxiety Levels in Elderly Women with Osteoarthritis in Sawan District, Buleleng Regency, Bali

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This study aims to determine the effect of *senam osteoporosis* on the level of pain and anxiety in elderly women with osteoarthritis in Sawan District, Buleleng Regency. The research used a randomized pre-test post-test control group design with a sample of 24 elderly women with osteoarthritis. The instrument measured in this research was an assessment of pain using VAS (Visual Analog Scale) and anxiety using HAM-A (Hamilton Anxiety Rating) scale. The results showed that there were significant differences between the experimental group and the control group ($p < 0.05$) in both the VAS and in HAM. It can be concluded that osteoporosis exercise has a significant influence on the reduction of pain and anxiety levels in elderly women with osteoarthritis.

Keywords: *senam osteoporosis*, osteoarthritis, pain, anxiety, elderly women

I. INTRODUCTION

Osteoarthritis (OA) is a degenerative joint disease, which is marked by an appearance sign as overall structure of the joint undergoes pathological changes. Osteoarthritis is characterized by damage of joint hyaline cartilage, increased thickness and sclerosis of the bone plates, osteophyte growth at the edge of the joints, stretching of joint capsules, inflammation, and weakening of the muscles that connect the joints.¹

Osteoarthritis is a joint disease which is the most common case in the world. According to the National Centers for Health Statistics, an estimated 15.8 million (12%) adults between the ages of 25-74 have osteoarthritis. The Osteoarthritis takes the secondplace after cardiovascular disease as a result of physical disability in the world. Overall, around 10 to 15% of adults over the age of 60 suffer from osteoarthritis. This disease causes pain and disability in patients so that it interferes with daily

activities.²Epidemiological research found that adults in the 60-64 age groups were 22% had osteoarthritis. Among men of the same age group, 23% had OA in the right knee, while the remaining 16.3% were found to suffer from OA in the left knee, unlike the case in women who are evenly distributed with the incidence of OA in the right knee as much as 24.2% and as much as 24.7 % in the left knee.³

The economic, psychological and social impact of osteoarthritis is enormous. Not only for sufferers but also for families and the environment.⁴ the total prevalence of osteoarthritis in Indonesia was 34.3 million in 2002 and reached 36.5 million in 2007. An estimated 40% of the population above 70 years old suffers from osteoarthritis, and 80% of osteoarthritis patients have limited mobility in various degrees from mild to severe weight resulting in reducing the quality of life because of the high prevalence. Because of its chronic-progressive nature, osteoarthritis has a large socio-economic impact, both in developed and developing countries. An estimated 1 to 2 million elderly people in Indonesia suffer from disabilities due to osteoarthritis.⁵ The prevalence of knee osteoarthritis in female patients aged 75 years and over can reach 35% of the total number of cases.

According to Arthritis Research UK (2012), the general characteristics of patients diagnosed with osteoarthritis joint disease shows that age, sex, obesity, race / genetic, and trauma of the joint correlate with the occurrence of osteoarthritis. The prevalence of osteoarthritis increases dramatically among people older than 50 years. This is due to age-related changes in collagen and proteoglycans which reduce tension from joint cartilage and also because of a reduced supply of nutrients for cartilage.⁶

Women are also more likely to develop osteoarthritis than men because women's hips are wider and put more long-term pressure on their knees. In addition, social factors such as work carried out all day also affect the onset of osteoarthritis,

especially in athletes and people whose work requires repetitive movements have a higher risk of osteoarthritis. This is due to injury and increased pressure on certain joints.

Psychological conditions of patients with osteoarthritis are often in anxiety. Anxiety occurs due to the inability of the patient to move as expected because of limited pain. Actually, anxiety itself is already a psychiatric problem that is often encountered today. The incidence of anxiety disorders in Indonesia is around 39 million people out of 238 million people (US Census Bureau 2004). Anxiety is an appropriate response to threats, but anxiety can become abnormal if the level is not in proportion to the threat.⁷ Several responses will appear in anxious people which include: physiological response (cardiovascular, gastrointestinal, neuromuscular, urinary tract, skin), behavioral response, cognitive response, and affective response.⁸

Until now it has not been found a drug that can cure osteoarthritis. Current treatments have only served to reduce pain and maintain the function of the affected joint. There are three main goals to be achieved in the process of osteoarthritis therapy, which is to control pain and other symptoms, to overcome disturbances in daily activities, and to inhibit the disease process. Treatment options can include exercise, weight control, joint protection, physical therapy and medication. Even if all of these treatment options do not produce results, surgery can be considered on the affected joint. *Senam osteoporosis* becomes one of the osteoarthritis's treatments options because this sport provides forms of exercise for the body and limbs to gain muscle's ability to awaken strength, joint flexibility, agility, speed and balance of one's movements so that the range of motion of the joints is well maintained.

Data on the health profile of Buleleng Regency (Ministry of Health.go.id) in 2013 to 2015 showed a trend of increasing numbers of patients with arthritis visiting *Puskesmas* (community health centre), namely: 9,785 visits (2013), 11,239 visits (2014), and 12,727 visits (2015). 120 osteoarthritis patients routinely visited every 3 (three) familydoctors in Sawan Village (summarized medical records for January-March 2017).

A study examined 16 women aged 67 years with knee osteoarthritis who were given a walking program for 12 weeks (3 times a week) shows the results that the given walking program can stimulate leukocyte production associated with the immunomodulatory effects of exercise.⁹ Another research found that in 13 women aged over 65 years with osteoarthritis after being given exercise training for 12 weeks can reduce pain 30% from before and improve joint function. The exercise program provided is very safe and effective in a short time.¹⁰ This study aims to determine the effect of osteoporosis exercises on the level of pain and anxiety in elderly women with osteoarthritis in Sawan District, Buleleng Regency.

II. METHOD

The research method is the true experimental method using the design of randomized pre-test and post-test control group design. In this study, before and after giving osteoporosis

exercises, elderly women with osteoarthritis gave an assessment of pain and anxiety. This studies were involved 120 elderly women who became osteoarthritis patients in 3 (three) family doctors in the Sawan District, Buleleng Regency in 2017. Simple random sampling with the number of samples used is 20% of the total population using the following formula:

$$n = P.N$$

Note:

n: Number of samples
P: Proportion of sample
N: Total population

Based on the formula above, the numbers of samples obtained in this study were 24 people, which will be divided into 2 simple random groups, namely the treatment group and the control group. Anticipating the conditions of drop out and loss to follow up, the total sample is added by an estimated 20% so that 4 people are added as reserves. Elderly women who were sampled in this study were obtained by adjustments through the inclusion and exclusion criteria in this study.

Inclusion criteria:

1. Women aged 50-60 years
2. Make routine visits, once a month to the family doctor based on routine doctor's practice reports every month.
3. Not suffer from other chronic diseases such as diabetes, hypertension and gout based on medical records.
4. Not suffer from stroke
5. Willing to sign an informed consent

Exclusion criteria:

1. Suffer from other chronic diseases such as diabetes, hypertension and gout.
2. Not willing to be a research sample

At the beginning of the study, the aim is to explain pre-test data from the control group and each treatment group. To get post-test data; the control group doing fun activities and the treatment group doing osteoporosis exercises 3 times a week for 4 weeks. Instructors for osteoporosis exercises were taken from two sports lecturers from Universitas Pendidikan Ganesha. All samples were measured on a VAS scale (to measure pain levels) and HAM scale (to measure anxiety).

III. RESULTS AND DISCUSSION

A brief description of pretest and posttest data can be seen in table I.

Table I. Mean pretest and posttest of VAS and HAM-A

Value	experiment group	control group
Mean pre-test VAS	5.86	5.79

Mean post-test VAS	5.36	5.86
Mean pre-test HAM-A	14.71	14.86
Mean posy-test HAM-A	14.07	15.00

Based on the description of the data in table I, in the experimental group, the post-test scores for both VAS and HAM were lower than the pretest scores. In the control group, both VAS and HAM, the posttest scores were higher than the pretest scores. The data that will be analyzed are pre-test and post-test data. Pre-test and post-test data obtained from the pre-test data value minus the post-test data value for each sample. A description of the Pre-test and post-test data can be seen in table II.

Table II. Description of pre-test and post-test of VAS and HMA

Value	VAS pre-post experiment group	VAS pre-post control group	HAM pre-post experiment group	HAM pre-post control group
N Valid	14	14	14	14
Missing	14	14	14	14
Mean	.50	-.07	.64	-.14
Std. Deviation	.519	.475	.745	.535
Range	1	2	2	2
Minimum	0	-1	0	-1
Maximum	1	1	2	1

Based on table II, the average pre-post score is the largest in the pre-post experimental VAS (0.50) while the smallest is in the pre-post HAM control. The biggest standard deviation was on the pre-post experimental human rights (0.745) and the smallest standard deviation on the pre-post control VAS (0.475). Pre-post values in VAS range from -1 to 1 while pre-post values on HAM range from -1 to 2. Based on the table 2, the pre-post values in the experimental group were higher than the pre-post values in the control group, both VAS and HAM. Data analysis continued to the normality test. Normality test used the Shapiro-Wilk method because the amount of data is less than 50 for each group of data. The results of the normality test can be seen in table III.

Table III. Normality test results

Item	Shapiro-Wilk		
	Statistic	df	Sig. (p)
VAS pre-post experiment group	.646	14	.000
VAS pre-post control group	.652	14	.000
HAM pre-post experiment group	.773	14	.002
HAM pre-post control group	.713	14	.001

Based on the results of the table III, it can be concluded that the distribution of data from the four data groups is abnormal ($p < 0.05$). Data analysis continued to homogeneity test using the method of Levene (Levene's test). Homogeneity test results can be seen in table IV.

Table IV. Homogeneity test results

Item	Levene's Test for Equality of Variances	
	F	Sig. (p)
VAS pre-post	5.159	.032
HAM pre-post	4.246	.049

Based on the results of the table IV, it can be concluded that the distribution of the experimental group vs the control group data both in VAS and HAM is not homogeneous ($p < 0.05$). Based on the results of normality and homogeneity tests, the type of comparative test chosen is the type of nonparametric test with the test method of the Mann-Whitney test. The results of the nonparametric test can be seen in table V.

Table V. Nonparametric test results

Item	VAS pre-post	HAM pre-post
Mann-Whitney U	49.000	44.500
Wilcoxon W	154.000	149.500
Z	-2.669	-2.809
Asymp. Sig. (2-tailed)	.008	.005
Exact Sig. [2*(1-tailed Sig.)]	.024 ^a	.012 ^a

- a. Not corrected for ties.
- b. Grouping Variable

Based on the table 5, it can be concluded that there are significant differences between the experimental group and the control group ($p < 0.05$) both in the VAS and HAM values. Based on the description of the data where the pre-post value in the experimental group is higher than the pre-post value in the control group both VAS and HAM, it can be concluded that there is a significant influence of elderly exercise on the decrease in VAS and HAM values.

Some research results are also in accordance with the results. There were some favourable effects in reduction in pain severity and improved physical function, though these were mostly of small-to-moderate effect, and were not consistent across the reviews. There were variable effects for psychological function and quality of life.¹¹

Numerous studies and meta-analyses show that exercise is also associated with reduced anxiety in clinical settings. Similar to the heterogenic nature of the anxiety, no single mechanism sufficiently accounts for the anxiolytic nature of exercise. Physical activity positively impacts a number of biological, as well as psychological, mechanisms.¹²

Two majors' points could be highlighted, the first one is that combining different forms of Manual Therapy with exercise is better than Manual Teraphy or exercise alone, and the second one is that mobilization need not be applied at the symptomatic level for improvements of Neck Pain patients. These both points may have clinical implications for reducing the risk involved with some Manual Teraphy techniques applied to the cervical spine.¹³ Strengthening exercises of the neck and upper quadrant have a moderate effect on neck pain in the short-term. The evidence was of moderate quality at best, indicating that future research will likely change these conclusions. Lower quality evidence and smaller effects were found for other exercise approaches¹⁴

There were some favourable effects in reduction in pain severity and improved physical function, though these were mostly of small-to-moderate effect, and were not consistent across the reviews. There were variable effects for psychological function and quality of life. The available evidence suggests physical activity and exercise is an intervention with few adverse events that may improve pain severity and physical function, and consequent quality of life.¹⁵

The individually designed exercise therapy program for chronic LBP was associated to clinically significant functional improvement both on discharge and at 1 year. Only severe pain intensity predicted poor treatment response on discharge. At one year, younger age and better mental health predicted improved outcome, while use of drugs and previous LBP treatments were associated with worse response. Adherence to the exercise program almost doubled the probability of a favorable outcome.¹⁶

Exercise seems to be effective as an adjunctive treatment for anxiety disorders but it is less effective compared with antidepressant treatment. Both aerobic and non aerobic exercise seems to reduce anxiety symptoms.¹⁷ Patients with CFS (Chronic fatigue syndrome) may generally benefit and feel less fatigued following exercise therapy, and no evidence suggests that exercise therapy may worsen outcomes. A positive effect with respect to sleep, physical function and self-perceived general health has been observed.¹⁸

The salutary effects of resistance exercise training (RET) are well established, including increased strength and function; however, less is known regarding the effects of RET on mental health outcomes. Aerobic exercise has well-documented positive effects on anxiety, but a quantitative synthesis of RET effects on anxiety is needed.¹⁹ The physical benefits of resistance exercise training (RET) are well documented, but less is known regarding the association of RET with mental health outcomes. Resistance exercise training significantly reduced depressive symptoms among adults regardless of health status, total

prescribed volume of RET, or significant improvements in strength.²⁰ There is a growing basis of evidence to suggest that physical activity is associated with reduced symptoms of anxiety in the general population and can be used to treat symptoms of anxiety in those with anxiety disorders. Moreover, physical activity may have further benefits to physical health and wellbeing. However, despite the physical health burden in people with anxiety disorders, relatively, little is known about the benefits of physical activity on physical health and cardiovascular disease.²¹

IV. CONCLUSION

Osteoporosis causes pain and disability in patients so that it interferes with daily activities and psychological conditions of patients with osteoarthritis are often in anxiety. The research shows that Senam Osteoporosis decreases VAS and HAM value which has a positive effect on reducing pain and anxiety. *Senam osteoporosis* decreases pain and anxiety in elderly women can be concluded.

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