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The Effect of Osteoporosis Exercise on Post-Menopausal Women's Balance in Meteseh Village, Semarang

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Abstrak

Menopause is a time when a woman's reproductive ability decreases marked by the cessationof menstruation. This causes a decrease in the function of the hormone estrogen and progesterone in the body which causes various physical problems, including balance impairment. Giving osteoporosis exercises is one way to improve balance in postmenopausalwomen. Therefore, this study aims to investigate the effect of osteoporosis exercises on changes in the balance of postmenopausal women. This study uses the pre-experimental method with one group pretest posttest design. This study was conducted in a group of postmenopausal women who met the inclusion and exclusion criteria. Twenty people were given osteoporosis exercises treatment 3 times a week for 4 weeks. Balance measurements were carried out using the Time Up and Go Test (TUG). Based on the results of the paired t-test, it was revealed that p = 0.001 (p <0.05). Osteoporosis exercises can improve balance in postmenopausal women.

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1. INTRODUCTION

Menopause according to WHO is defined as the cessation of the menstrual cycle forever for women who previously experienced menstruation as a result of the loss of ovarian follicle activity. The average woman experiences menopause at the age of 50 years. According to Prawirohardjo (2008), the age of 50-51 years is the age at which menopause begins and is relatively the same between Indonesia and Western and Asian countries, namely around 50 years. Women usually experience menopause at the age of 40-58 years, with the average age being 51 years (Kasdu, 2002).

Menopause is accompanied by various physical and psychological changes in women. Psychological symptoms found in menopausal women are decreased memory, depression, fatigue, irritability and anxiety. Physical symptoms that accompany menopause include hot flushes (hot flushes from the chest to the face), night sweats (sweating at night), dryness vaginal (vaginal dryness), insomnia, urinary incontinence, obesity, and osteoporosis (Smart, 2010).

Apart from that, menopause can also cause balance disorders as a result of decreased muscle strength and proprioception. Balance is an important thing to pay attention to, especially in postmenopausal women because it is the main cause that often causes someone to fall easily (Astriyana & Wahyuni, 2012).

Based on a survey conducted in Indonesia by Basic Health Research (Riskesdas), it is stated that the number of falls in elderly people aged 60 years or more is around 70.2% (Riyadina, 2009 in Magdalena, 2017).

The prevalence of injuries based on Riskesdas data (2013) in South Sulawesi is 12.8% which is the highest prevalence, the most cases of injury are falls at 40.9%. The balance disorders that many postmenopausal women experience require efforts to help them improve their balance so they can achieve a prosperous life in old age. To improve balance,

one of the exercises that can be done is through providing osteoporosis exercises. Osteoporosis exercise is one of the exercises which is a combination of several types of aerobic exercise with light impact, strength training using weights on both hands, balance training and breathing exercises so as to improve balance in postmenopausal women (Sinaga, 2013).

Based on observations carried out in one of the work areas of the Antara Health Center, it was found that on average women who have entered the menopause phase experience balance problems. Osteoporosis exercise is an intervention given to overcome this problem. Therefore, this study aims to determine the effectiveness of osteoporosis exercises on balance in postmenopausal women.

2. RESEARCH METHOD

The research was carried out at the Antara Health Center, for 4 weeks. This research is pre-experimental research using a one group pretest-posttest design. The population of this study was all 40 elderly women in the Meteseh sub-district who regularly attended posyandu specifically for the elderly every week.

The sample for this study consisted of 20 postmenopausal women who regularly attended posyandu specifically for the elderly every week and met the criteria set by the researchers. The inclusion criteria in this study were: 1) Menopausal women; 2) Minimum age 50 years; 3) Understand instructions; 4) Take the pre-test and post-test; 5) Sign the consent form. Exclusion criteria include: 1) Undergoing special treatment (on bed rest or illness that makes it impossible to take part in the study); 2) Experiencing physical disability/disability; 3) Experiencing cognitive and hearing impairment; 4) Have a chronic disease (eg, post-vertebral surgery, HNP, congestive heart failure, stroke); 5) Grade 3 hypertension (>180/110 mmHg).

Osteoporosis exercises were given 12 times with a training dose of 3x/week (for 4 weeks), for 30 minutes per meeting using low impact aerobics techniques. Data collection was carried out directly by researchers through observation, respondent identity sheets, interviews/questionnaires, and balance measurements. Changes in balance were measured using the Time up and Go Test (TUG). The pre-test and post-test data were processed using SPSS statistical data editor 22 using the paired T test to determine the effect of the training given. The results of data analysis are presented in the form of tables and narratives.

3. RESULTS AND DISCUSSION

Table 1 shows the characteristics of respondents based on age and blood pressure.

Sample Characteristics	Frequency	Percentage (%)
Age		
50-60	8	40
61-70	11	55
71-80	1	5
Blood pressure		
Normal	7	35
Pre-hypertension	8	40
Hypertension (grade 1)	5	25
Hypertension (grade 2)	0	0
Total	20	100

Sample distribution according to age, the sample was divided into 3 groups, namely 50 - 60 years old, totaling 8 people (40%), 61 - 70 years old, totaling 11 people (55%), and 71 - 80 years old, totaling 1 person (5%). Meanwhile, based on blood pressure, it was divided into 4 groups, normal 7 people (35%), prehypertension 8 people (40%), hypertension (degree) 15 people (25%),
hypertension (grade) 2 none (0%).

The results of the descriptive analysis show that the vulnerable age of the sample is around 50 years – 80 years old. This is in accordance with the World Health Organization or WHO (World Health Organization) which states that menopause occurs in women over 50 years of age. Umamah, F et al, (2016) said that menopausal women aged 41-50 years experienced a decline in abilities, both physical abilities and intellectual abilities. This is due to the drastic decrease in estrogen levels during menopause which will affect the balance of postmenopausal women (Umamah & Rahman, 2016).

In the table above it is also found that the majority of the sample is aged 60 - 70 years. Previous research on identifying the risk of falls in the elderly stated that elderly people aged 60 years and older were at high risk due to balance disorders (Chaudhuri et al., 2014).

In this study, the respondent's blood pressure was also measured. Based on the table, it is known that the majority of respondents are in the pre-hypertension category. However, in the elderly, this is still within normal limits because the older a person is, the higher their blood pressure will be. There were 5 respondents who had grade 1 hypertension. However, during the research this did not hinder the progress of training.

Table 2. Paired T Test on the Effect of Osteoporosis Exercise on Balance

	N	**med**	**min**	**Max**	**P***
Pre-Test	20	14.5	21.00	21.00	00.001
Post-test	20	10	19.00	19.00	

p* = significant value of Paired T test

Based on the results of the normality test, it was found that the distribution of the pre-test data was p=0.492 and the post-test was p=0.224, which means the data was normally distributed (p>0.05). Next, a paired T test was carried out to determine the effect of osteoporosis exercises on balance. Table 2 shows that there is a significant difference in the level of balance between before and after giving osteoporosis exercises to postmenopausal women (p=0.001 or p. This is in line with the aim of the exercises contained in the osteoporosis exercises created by the Indonesian Osteoporosis Association (Perosi) where one of the core contents of the movement is balance training and muscle strengthening exercises, so as to improve balance. This is also in line with what was confirmed in the Public Health Reports, (1985) that doing osteoporosis exercises can also maintain body posture, improve balance, maintain flexibility and muscle movement. Repeated muscle contractions will stimulate motor and sensory nerve control. This will then cause the muscle to experience hypertrophy which results in an increase in muscle diameter. Increased muscle strength is also caused by changes in muscle biochemistry, namely increased creatine concentration, increased creatine phosphate and ATP concentrations and increased glycogen, thereby affecting the ability of the aerobic and anaerobic metabolic systems which can increase muscle energy and strength. When muscle strength increases, it will maintain a stable body position so that it can improve balance

(Kisner et al., 2017).

Gymnastics has many benefits for the human body. Postmenopausal women experience many physical and psychological disorders. Decreased estrogen levels cause a high risk of bone loss which can affect balance due to reduced muscle strength and joint range of motion due to osteoporosis as well as a decrease in motor and sensory function.

According to Marwoto (2008), gymnastics can have a good effect on balance because exercise increases autooblastic activity, thereby reducing bone loss. Apart from that, stretching in gymnastics causes muscles to become flexible and increases synovial fluid so that joints are smooth and prevents injury in menopausal women. Improving physical fitness (good physical fitness) which consists of several elements, namely muscle strength, (2) joint flexibility, (3) movement agility, (4) flexibility, (5) Cardiovascular fitness, and (6) Neuromuscular fitness. After 12 times giving osteoporosis exercises, it was found that there was a significant difference in balance values between before and after exercise.

According to Irfan (2010), increasing muscle strength and increasing proprioception in the somatosensory system can channel proprioceptive information to the brain via the dorsal column of the spinal cord. Most of the proprioceptive input goes to the cerebellum. Impulses coming from the sensory organs are synovial and ligament-adapted nerve endings. Impulses from these sensory organs from receptors in the skin and other tissues and muscles are processed in the cortex which will provide awareness of body position when moving to achieve and maintain body balance. This is what is believed to cause changes in balance levels after osteoporosis exercise treatment.

In accordance with the theory put forward by the American College of Sports Medicine (2010), that exercise carried out for 3-4 weeks with a training frequency of 3 times a week will increase muscle strength and improve postural balance in the elderly.

4. CONCLUSION

This research found that giving osteoporosis exercises 12 times has benefits for balance for postmenopausal women. This is indicated by an increase in balance measurement scores between before and after giving osteoporosis exercises.

5. SUGGESTION

The researchers' suggestions from the results of this research are:

1. It is recommended that osteoporosis exercises can be applied as one of the selected modalities in physiotherapy management to reduce and minimize the risk of falls due to balance disorders in postmenopausal women.
2. It is recommended that postmenopausal women pay attention to things that influence the quality of recovery, such as physical, psychological and motivational conditions to support maximum results.
3. It is hoped that in future research to control the factors that influence changes in balance.
4. It is recommended that health workers at hospitals or health centers provide osteoporosis exercises as an effort to reduce balance disorders in women.

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