

Joint and Bone Exercises to Prevent Osteoporosis in the Elderly at the Tresna Werdha I Budi Mulya Social Home

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Abstract

Osteoporosis is a major non-communicable disease and the most common bone disease, affecting one in three women and one in five men over the age of 50 worldwide. The clinical consequence of osteoporosis is fragility fractures. With the rapid ageing of the population worldwide and the changes in lifestyle habits, the incidence of osteoporosis and related fractures has significantly increased and will continue to increase markedly in the future. Exercises such as walking, dancing, low-impact aerobics work directly on bones in the legs, hips and lower spine to slow bone loss. We provide osteoporosis prevention education to the elderly in nursing homes as an effort to prevent osteoporosis. We also provide training on joint and bone exercises to prevent osteoporosis.

Keywords: *Elderly, Gymnastic, Osteoporosis.*

Abstrak

Osteoporosis adalah penyakit tidak menular utama dan penyakit tulang yang paling umum, menyerang satu dari tiga wanita dan satu dari lima pria berusia di atas 50 tahun di seluruh dunia. Konsekuensi klinis dari osteoporosis adalah patah tulang karena kerapuhan. Dengan pesatnya penuaan penduduk di seluruh dunia dan perubahan kebiasaan gaya hidup, kejadian osteoporosis dan patah tulang terkait telah meningkat secara signifikan dan akan terus meningkat secara signifikan di masa depan. Berbagai latihan kebugaran seperti berjalan, menari dan *low impact aerobic* secara langsung bekerja untuk mencegah kerusakan tulang. Kami melakukan edukasi pencegahan osteoporosis kepada para lansia di panti werdha sebagai upaya untuk pencegahan osteoporosis. kami juga melakukan pelatihan cara senam sendi dan tulang untuk pencegahan osteoporosis.

Kata Kunci: *Lansia, Senam, Osteoporosis.*

INTRODUCTION

The elderly phase in human development is a phase of decline from the peak of human life. Humans develop from birth to maturity with good physical strength, then as they get older they decline. Reduced regenerative ability makes the elderly more vulnerable to various diseases. According to the literature, the rate of bone loss in the elderly increases with age, respectively, with a loss of 0.6%, 1.1%, and 2.1% per year for the age groups 60-69, 70-79, and > 80 year(1). In Asia, osteoporosis often goes undiagnosed, and is the main cause of bone fractures in the elderly. In the world, osteoporosis causes more than 8.9

million bone fractures every year or results in an osteoporotic fracture every 3 seconds(2).

By 2050, the worldwide incidence of hip fractures in men is projected to increase by 310% and 240% in women, compared with 1990 figures.(3). In Indonesia, the prevalence of osteoporosis for those aged over 70 years is 53.6% in women and 38% in men.(4). The large number of elderly osteoporosis sufferers shows a lack of attention from families, society and the government to overcome this disease. In fact, there is a lot of research showing that osteoporosis can be prevented. Several studies have reported very consistent results about the

beneficial effects of exercise on the formation of lumbar spine and femur density in the elderly(5–9). Optimal interventions in stimulating growth and maintaining bone mass are activities that provide mechanical stimulation to the bones, both through the application of weight and pressure applied to the muscles.(5–7). Intense, high-impact physical activity is effective in increasing bone mass at a young age, but is not indicated for some elderly osteoporosis subjects.(10). In elderly patients with severe osteoporosis, activities that involve flexion or rotation of the body should be avoided(11).So there is a need for physical training specifically for the elderly.

IMPLEMENTATION METHOD

The author conducted a literature review and discussions with experts regarding clinical evidence that supports physical exercise programs that help prevent osteoporosis. The journal review was carried out systematically with data sources in the form of online journals and printed books. The author also looked for several video sources related to special physical exercises for joints and bones to prevent osteoporosis. The author discusses the movements, tempo and sequence of exercises with a special instructor until the author formulates them into a series of exercise movements for osteoporotic joints and bones.

Community service activities were held on Friday, September 8 2023. The author carried out a series of joint and bone exercise events to prevent osteoporosis. Participants in this activity include elderly people who live at the Tresna Werdha Budi Mulia Social Home 1. The opening of the activity was carried out by Dr. Dr. Farsida, MPH, after that the elderly had a health check which included checking blood pressure and checking blood sugar. After checking blood pressure and blood sugar, the elderly filled out a questionnaire related to osteoporosis. After doing the exercise, blood pressure and general health checks were carried out again on the participants. After that, a short discussion was held to see the level of satisfaction of the participants and to find out whether the gymnastics movements could be carried out consistently in the future.

RESULTS AND DISCUSSION

Joint and bone exercises to prevent osteoporosis in the elderly are given directly by professional instructors, with the expectations of staff and the elderly. Tresna Werdha Budi Mulia Social Home 1 can repeat the exercise at a later date. Based on the results of the interview, the response given was very positive, the elderly felt that the exercises provided were useful and needed to repeat the exercises regularly in an effort to prevent osteoporosis.



Figure 1. Joint and Bone Exercises to Prevent Osteoporosis in the Elderly



Figure 2. Checking blood pressure in the elderly



Figure 3. Checking blood sugar in the elderly

Osteoporosis is a bone disease characterized by a decrease in bone mass and structural changes in bone tissue which causes increased bone vulnerability accompanied by a tendency to fracture, especially in the proximal femur, spine and radius. The word osteoporosis comes from the Greek words meaning 'bone' and 'hole', showing us that the affected bones become riddled with holes in their structure.(12). Osteoporotic fractures cause a significant reduction in quality of life, with increased morbidity, mortality, and disability. Risk factors for osteoporosis include increasing age, obesity, smoking, family history of osteoporosis, white or Asian race, early menopause, low physical activity, history of fractures due to falls from the ground or minor and trauma after the age of forty.(13).

Bone tissue is continually lost through resorption and rebuilt through formation. Bone loss occurs if the rate of resorption is greater than the rate of formation. Bone mass is modeled (grows and takes its final shape) from birth to adulthood. Bone mass reaches its peak (referred to as peak bone mass (PBM)) at puberty, and the next period is when bone mass loss begins. PBM is largely determined by genetic factors, growth health, nutrition, endocrine status, gender, and physical activity. Bone remodeling, which involves removing old bone to replace it with new bone, is used to repair micro fractures and prevent them from becoming macro fractures, thereby helping maintain skeletal health. Menopause and increasing age cause an

imbalance between the rate of resorption and formation (resorption being higher than absorption), thereby increasing the risk of bone fractures(14).

One way to prevent osteoporosis is to exercise or do physical activity. However, just any exercise can actually cause a greater risk of falls in the elderly, therefore special exercise movement formulations are needed for the elderly to prevent osteoporosis. The important points in joint and bone exercises for the elderly are strength training, postural and balance training. One of the most common and best forms of aerobic exercise that older people can do is walking, because it is harmless and easy to do. Meta-analysis showed no significant effects on the lumbar spine or femoral neck of walking alone(15,16).

Strength training determines increases in bone density in specific locations, particularly at the neck of the femur and lumbar spine, which are maintained in the short to medium term. At least 3 sessions a week are recommended, for a year. Studies have examined the effects of strengthening upper and lower extremity muscles, versus specific groups such as the iliopsoas and spinal extensors. From evidence gathered by Zehnacker et al, the effectiveness of strength training on the hip and spine is related to training intensity; This exercise requires a high load (70-90% maximum repetitions) of 8-10 repetitions of 2-3 sets carried out for a minimum of 1 year, 3 times a week for 45-70 minutes per session. In particular, several types of exercise can increase bone mineral density(8).

Posture exercises train the muscles in the back that help you stand up straight. In the elderly, these muscles weaken, which can cause a hunched posture (arched back). These muscles can help lengthen the back, improve posture, and protect the spine. Giangregorio et al, emphasize the importance for individuals with osteoporosis and osteoporotic vertebral fractures to engage in a multicomponent exercise program with resistance training combined with balance. Balance training is very important to reduce the risk of falls which can cause bone fractures in the elderly(17). Research conducted at the Posyandu in Tempukrejo Village, found that elderly people who were given osteoporosis exercise treatment

12 times with an exercise dose of 3 times/week (for 4 weeks), with a duration of 30 minutes, experienced an increase in quadriceps muscle strength and balance with a significance of $p=0.046$ and $p=0.043$ ($p<0.05$)(18).

CONCLUSION

Osteoporosis is a common disease and goes undetected until it is exacerbated by bone fractures which become commonplace. Osteoporosis can be diagnosed and prevented with effective treatment, before a fracture occurs. Therefore, prevention, detection, and treatment of osteoporosis should be the mandate of primary healthcare providers. A safe joint and bone exercise program for the elderly plays a very important role in preventing osteoporosis. This method is safe, easy and cheap to do consistently for all ages, especially the elderly.

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