



Range of Motion (ROM) Exercise Reduce Joint Pain in the Elderly

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Abstract. Introduction – Elderly is a time when a person will experience a decrease in body functions both physically, mentally and socially. One of the physical declines felt by the elderly is the decline in joint movement. The reduced elasticity of the joints will make stiffness in the joints resulting in joint pain. Range of motion (ROM) is one of the activities that can be used to relieve joint pain.

Purpose – The purpose of this study was to determine the effect of joint motion exercises (ROM) on joint pain felt in the elderly.

Methodology/Approach – This study used a quasi-experimental pre-post-test in the treatment group and the control group. The number of subjects was 52 people with 26 people in the treatment group and 26 people in the control group. The treatment group was given joint motion exercises 3x/week for 6 weeks. The statistical test in the treatment group used the paired sample T-Test, the control group used the Wilcoxon signed rank test and for the comparison test, the Mann Whitney test was used.

Results – The results of the study in the treatment group showed that ROM had an effect on reducing joint pain in the elderly ($p = 0.001$), in the control group there was no significant change ($p = 0.265$) There was a difference in the effect of reducing joint pain in the treatment group and the control group ($p = 0.001$).

Conclusion – ROM exercises can decrease joint pain in the elderly.

Keywords: Range Of Motion (ROM) · joint pain · elderly

1 Introduction

Aging is a natural process that cannot be avoided, runs continuously and continuously. Increasing age will cause changes in the structure and physiology of various cells/tissues/organs and systems that exist in the human body, causing some of the elderly to experience physical, psychological, and social setbacks or changes [1–3].

The results of a study on the socioeconomic conditions & health of the elderly carried out by the National Commission for the Elderly, it was found that the most chronic diseases suffered by the elderly were joint disease (52.3%), hypertension (38.8%), and cataracts (23%). These diseases are the main diseases in the elderly. The data shows

that chronic disease is a type of disease that mostly affects the elderly. In Indonesia, approximately 70% of the elderly suffer from chronic diseases [4–6].

Pain is a health problem that often occurs in the elderly (elderly). The prevalence of pain in the elderly based on several studies is 65–80% and most of them require hospitalization because they suffer from pain. The current management of joint pain is still not optimal, it is often ignored and not immediately addressed. Joints in the elderly experience a decrease in elasticity, this occurs not only due to lack of movement but also due to various degenerative diseases they have. The deterioration of joint cartilage mostly occurs in weight-bearing joints, namely the joints of the lower extremities, such as the hip joints. Joints that are less movable can result in contractures, which result from a lack of blood supply. Contractures that occur in the hip can make the client less stable and tend to fall [7, 8].

General pain management with pharmacology and non-pharmacology. Currently, many non-pharmacological studies have been developed to treat joint pain, the other being physical therapy. ROM (range of motion) is a physical exercise that can be used to improve joint mobility. In addition, joint motion exercises are the easiest and cheapest exercise, because they can be done independently at home without interfering with daily work. However, the effect of this joint movement exercise still needs further research. This study examines the effect of the range of motion, especially the range of motion intervention (passive and active) on joint pain in the elderly [8–10].

2 Methods

This study uses the Quasy Experiment research method. Subjects are elderly who have complaints of joint pain. The treatment and control groups were divided based on the characteristics of mild, moderate, and severe pain levels with the same composition in each group and met the inclusion criteria. Inclusion criteria included elderly women aged 45–59 years who can move with the Katz S index, do not receive pain medication, the elderly can perform a range of motion (ROM) independently, the elderly experience joint pain (mild, moderate, severe), and can communicate well. Exclusion criteria from this study were elderly with fractures/broken bones, suffering from heart disease (myocardial infarction, coronary heart disease), kidney failure, very severe pain due to trauma, and chronic joint swelling. The independent variable of this study was range of motion (ROM) exercise. The dependent variable in this study was complaints of joint pain in the elderly. This study used a purposive sampling technique.

2.1 Research Instruments

Collecting data in this study using instruments in the form of observation sheets and questionnaires (Garrison J Susan, 2001). Basics of Medical Therapy and Rehabilitation, to determine the level of joint pain in the elderly, pre-post test treatment in two groups (control and treatment) using the Pain Intensity Scale.

The initial step of the study, the researchers chose the elderly based on the inclusion and exclusion criteria that had been determined. The first data collection was through questionnaires which were distributed to respondents in both the treatment and control

groups. Respondents were asked to fill out an informed consent form to become a respondent. The researcher explained to the elderly (treatment group) the benefits of doing joint physical exercise (ROM). Observations were made before the joint exercise (ROM) and the last day of the joint exercise (ROM). Researchers made observations on complaints of pain levels experienced by the elderly who became research respondents (control and treatment groups). The frequency of joint motion physical exercise (ROM) is 3 times a week and is carried out together and the movements will be guided by the researcher. The joint motion physical exercise (ROM) program begins with a warm-up (5 min). Joint movements from the upper extremities to the lower extremities each movement 5–10 repetitions slowly plus 2–4 repetitions approaching 15–20 repetitions for 20–30 min. To determine the level of joint pain using a numerical pain scale of 0–10.

2.2 Data Analysis

The statistical test in the treatment group used the paired sample T-Test, the control group used the Wilcoxon signed rank test and for the comparison test, the Mann Whitney test was used.

3 Results

The subjects of this study were the group of elderly women aged 60–74 years and found 52 people. Subjects were divided into the control group which obtained 26 people and the treatment group 26 people. Most of the respondents in both the treatment group and the control group were aged 60–65 years, by 80.8% in the treatment group and 88.5% in the control group. Elderly aged 66–70 years in the treatment group 19.2% and 11.5% in the control group. Characteristics of respondents according to their last education. Most were university graduates in the treatment group and the control group. As many as 46.2% of college graduates, 19.2% of high school graduates, and 15.4% of junior high and elementary school graduates while those who were not were 3.8% in the control group. Meanwhile, the treatment group consisted of 30.8% college graduates, 26.9% high school and junior high school graduates, 11.5% elementary school graduates, and 3.8% not different. Characteristics according to respondents are occupations in the treatment group as much as 73.1% private, 23.1% teachers, and 3.8% retirees. Meanwhile, the private control group and retirees have the same number, namely 46.2%, and those who work as teachers are 7.7%.

Figure 1 shows the characteristics of respondents based on their dietary history. The diet history of the respondents in the treatment group and the control group had the same number, namely those who did not diet 69.2%, while those who did diet offal and melinjo chips were 30.8%.

The results of the Mann Whitney test showed that there was a significant difference between the control and treatment groups ($p = 0.001$) (Table 1). This means that physical exercise of joint motion (ROM) can reduce joint pain in the elderly.

The results of the Paired t-test statistical test showed a decrease in pain intensity before and before performing joint physical exercise (ROM) in the statistically significant

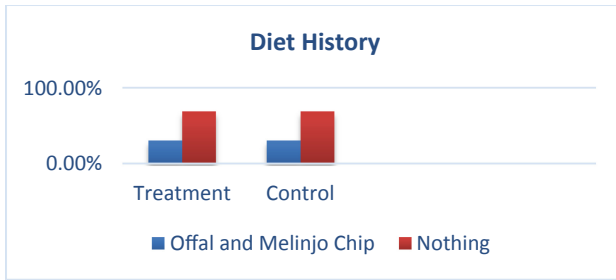


Fig. 1. Distribution of Respondents’ characteristics according to dietary history

Table 1. Joint pain intensity after ROM

Groups	n	Mean joint pain score	p
Control	26	37.58	0.001
Treatment	26	15.42	

group ($p = 0.001$). While the level of pain in the control group did not change significantly ($p = 0.265$).

The results of the Paired t-test analysis showed that there was a statistically significant increase in the area of joint flexion and hyperextension of the hip ($p = 0.001$), flexion ($p = 0.002$), joint abduction (0.011), and adduction (0.008) before and after ROM exercises in the treatment group. This states that there is an effect of passive Range of Motion exercise on the hip joint range of motion in the elderly.

4 Discussion

All subjects of this study were menopausal women. Menopausal women almost no estrogen hormone secreted by the ovaries. This lack of estrogen can lead to osteoclasts in bone, reduced bone matrix, and reduced bone calcium and phosphate deposits. Some women, this effect is so great, that it causes joints, bone loss which can strengthen bones and can cause bone fractures [11–14].

Joint pain can also be affected by advancing age [15, 16]. Like the respondents in this study, the elderly aged 60–74 years. In the treatment group, there were 80.8% elderly aged 60–65 years while 19.2% were between 66–74 years old. The elderly tend to be more often affected by joint pain because there has been a decrease in the function of members and organs of the body. This condition is exacerbated by poor movement and poor diet. As in the results of this study, there were many respondents who did not do sports, which was around 30.8% did not do sports and 46.2% only did sports walking. While the rest do other sports such as cycling or gymnastics.

Another factor that can affect the level of joint pain is the unhealthy consumption pattern of the elderly, such as liking food, especially animal fat. Based on the results of the study, it was obtained data that most of the respondents in the treatment group

experienced moderate pain, consumed offal, nuts and *melinjo*. This is in accordance with the theory that foods containing animal fats in the body turn into eicosanoids, in limited quantities. This substance is needed by the body, but if the levels of eicosanoids exceed normal limits it can cause joint disease [17, 18].

Offal, nuts and *melinjo* are foodstuffs that contain high levels of purines. Uric acid is a normal product resulting from the breakdown of protein into purines (the basic ingredient of uric acid), gout in the joints can cause arthritis and cause pain [19–21].

The results of this study indicate that the level of pain in the control group before and after daily activities without doing physical exercise (ROM) did not change significantly. While in the treatment group there was a significant difference between the control and treatment groups, with physical exercise of joint motion (ROM) can reduce joint pain in the elderly. The decrease in joint pain complaints from moderate pain to mild or no pain in respondents can be influenced by various factors, including the quality and quantity of each respondent when doing physical joint motion exercises (ROM).

ROM exercises are exercises that move the joints as optimally and as widely as possible according to a person's ability that does not cause pain in the joints that are moved. Any movement in the joints will cause an increase in blood flow into the joint capsule. When moved, the cartilage surfaces between the two bones rub against each other. Cartilage contains a lot of proteoglycans attached to hydrophilic hyaluronic acid, so that cartilage contains a lot of water as much as 70–75%. The presence of pressure on the cartilage will force the release of air from the cartilage matrix into the synovial fluid. When the pressure stops, the air that comes out into the synovial fluid will be pulled back by bringing nutrients from the synovial fluid. Decreased ROM caused by inactivity and to maintain normal. Joints and muscles must be moved maximally and carried out regularly. Static stretching exercises in adulthood can also increase joint flexibility [22–24].

Range of motion (ROM) exercises can be done to maintain or improve the level of perfection of the ability to move joints normally and completely. The exchange of fluid in the diarthrosis depends on it by transudation from the blood capillaries into the joint cavity and on its exit, by trans synovial movement of fluid and macromolecules into the lymph capillaries, assisted by the transient increase in pressure resulting from intermittent flexion of the joint. Pressure on the joints that occurs due to movement which further triggers synovial fluid out. It also contains hyaluronate and a glycoprotein, lubricin, both of which are molecules with lubricating properties [25, 26]. One of this study's weaknesses is the confounding variables that cannot be controlled in this study. This will affect the data obtained.

5 Conclusion

There was a decrease in joint pain in the elderly after ROM physical exercise. Elderly who do not do physical exercise ROM of joint motion tend not to experience a decrease in joint pain or a slight decrease. ROM joint motion exercises can reduce joint pain in the elderly.

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