

Rheumatic Calisthenics To Improve Functional Status Of Elderly Suffering From Joint Pain

1st Eska Riyanti, S.Kp., M.K.M.
Department of Nursery in Poltekkes Kemenkes Jakarta III
Indonesia
ahmaddazim68@yahoo.co.id

2nd Pudjiati, S.Kp., M.Kes.
Department of Nursery in Poltekkes Kemenkes Jakarta III
Indonesia
ahmaddazim68@yahoo.co.id

Abstract—The disease process of the elderly can threaten the independence and quality of life by burdening the ability to perform personal care and daily activities. Elderly with mild functional decline and impaired activity can improve functional status by reducing joint pain during activity and prevent the joint inflammation process becomes more severe, can be used method of joint body movement that needed. This study was aimed to determine the effect of rheumatic callisthenic on the functional status of elderly with a history of joint pain. This study utilized a pretest-posttest with control group design. The sample involved 40 elderly for each group who were assigned by purposive sampling method. Data analyses used the paired and two sample t test with $\alpha = 0,05$. The result of the study showed there was significant differences in the BADL values of respondents in treatment group before and after doing rheumatic callisthenic ($t(40)=6,904$, $P=0,001$) and in the IADL values as well ($t(40)=4,281$, $P=0,001$). At analysis showed there was differences in the BADL ($F=76,583$, $P=0.001$) and IADL values ($F=19,004$, $P=0,001$) between treatment group and control group. Conclusion: There is positive effect of rheumatic calisthenics on functional status of elderly with joint pain in conducting Activity Daily Living (ADL).

Keyword: Rheumatic Callisthenic, Elderly, Functional Status

1. INTRODUCTION

Life expectancy of a nation is often used as a benchmark for the progress of a nation. UN Population Division, Department of Economic and Social Affairs (1999) stated that the number of population continued to reach 600 *with* million and was projected to be 2 billion by 2050 (Darmojo, 2010). Data from the USA-Bureau of the Census, even Indonesia was expected to experience the largest increase in elderly citizens worldwide, between 1990-2025 which was 414% (Kinsella & Taeuber 1993 in Darmojo 2010). And according to Ambardini (2015), 25% of elderly people living with degenerative disease and life depended on others. And about 99% of them consumed medicines and most spend their lives resting, without doing anything.

Now there are many phenomena on which show that the elderly experience a decline in independence in carrying out their daily activities (Activity of Daily Living / ADL). Many of them still depend on children or other families and become less productive. Although their health is not as bad as expected, 95% of them were still with good ADL, while ADL-

instrumental ranged from 70-80% (Darmojo, 2010). This is because the changes will occur as you get older and the incidence of the disease will increase also as you get older. The ability of one doing an activity cannot be separated from the inadequacy of the nervous and musculoskeletal systems. Among them in the nervous system, the elderly experience decreased coordination and ability to carry out daily activities. The progress of the disease process threatens the independence and quality of life by burdening the ability to carry out personal care and daily activities (Smeltzer & Bare, 2001). Decreased musculoskeletal function includes degeneration, erosion and calcification of cartilage and joint capsules and a decrease in the width of movement with the bones of the body. This process causes a decrease in cellular immune function, so it increases the activity of inflammation around the joints, as a result the elderly experience disruption in activity and are less active in moving (Fatkuriyah, 2010).

The research conducted by Andriyanti (2009) in the Budhi Luhur Kasongan Bantul Unit PSTW Yogyakarta showed that there was a relationship between elderly calisthenics and independence in carrying out basic daily activities. The quality of life of the elderly, especially their functional status, needs to be improved so that the elderly can do ADL independently. Being independent is said to care for themselves or take care of themselves and can carry out activities of daily life (AKS). AKS / ADL could be in the form of eating, drinking, and bathing, walking, sleeping, sitting, defecating, and moving (Susilowati, 2012). And the results of Susilowati's research (2012) was that rheumatic calisthenics or gymnastics can improve the ability to walk the elderly. To maintain and improve the functional status of the elderly, preventive and promoted fitness can be carried out. In the elderly who suffer from pain due to rheumatism, reducing the pain is expected to help the elderly easily to do ADL. In reducing joint pain and preventing rheumatic disease becomes more severe, it can use a method of body movement known as rheumatic exercise. According to Nuhoni (2010), in general rheumatic gymnastic or calisthenics movements were intended to improve muscle ability, function, muscle strength and endurance, aerobic capacity, balance, joint biomechanics and sense of joint position. This exercise concentrates on the movement of the joints while stretching the muscles and strengthening the muscles, because these muscles help the joints support the body (Candra, 2008). By doing rheumatic calisthenics or gymnastic, it is expected that the quality of life of the elderly will increase so that the elderly can do ADL maximally and not be a burden to others.

The preliminary survey conducted on December 20, 2016 on several Posbindu in the work area of Cipayung District Public Health Center obtained data that rheumatic calisthenics actually had never been done in Posbindu. There were only physical health exercises held every once in a week, every Friday at 6:30 with instructors imported from outside. Thus, rheumatic exercise is expected to have a positive effect on the independence of the elderly in the community in carrying out daily activities (ADL).

2. MATERIALS AND METHOD

The type of this research was a quasi-experimental study with the design of non-randomized pretest-posttest control group. The study was conducted on the elderly in Posbindu, Cipayang sub-district. The sample of this study was 80 elderly people who had met the inclusion criteria and then divided into two groups, namely the experimental group which amounted to 40 people and the control group which also amounted to 40 people. The experimental group was the group given rheumatic exercise or calisthenics, while the control group was the group that received physical exercise. This primary data was obtained from respondents using a questionnaire. The instruments used in providing arthritic gymnastics intervention were sound systems, VCD rheumatism gymnastics issued by Pfizer with modifications to the research team to adjust to the health conditions of the elderly, and chairs. Meanwhile, the instrument used to measure the independence of the elderly in conducting ADL was the Barthel Index observation sheet. Data analysis was carried out by univariate and bivariate.

3. RESULTS AND DISCUSSION

Distribution of Respondent Characteristics

Table 1a. Characteristics of respondents based on age and history of joint pain

| Variable | Group | Mean | Median | SD | Min-Max |
|-----------------------|--------------|-------|--------|-------|---------|
| Age | Intervention | 67.82 | 66 | 8.083 | 60 – 85 |
| | Control | 69.45 | 68 | 7.659 | 60 – 85 |
| History of Joint Pain | Intervention | 9.075 | 9 | 2.313 | 6 – 16 |
| | Control | 6.875 | 7 | 4.478 | 0 – 14 |

Tables 1a and 1b show that the characteristics of respondents in the two groups above are the average age of respondents in the intervention group which is around 67.82 years, the youngest age is 60 years and the oldest is 85 years. The average score of joint pain history is 9,075 in the female intervention group, elementary school education, working as a housewife, moslem and marital status as widow/widower

Table 1b. Distribution of Respondent Characteristics Based on gender, education, occupation, religion and marital status

| Variable | Intervention Group | | Control Group | | Total | |
|-----------------|--------------------|------|---------------|------|-------|-------|
| | N | % | N | % | N | % |
| Gender | | | | | | |
| Man | 8 | 20 | 11 | 27.5 | 19 | 23.75 |
| Woman | 32 | 80 | 29 | 72.5 | 61 | 76.25 |
| Education | | | | | | |
| No education | 6 | 15 | 8 | 20 | 14 | 17.5 |
| Elementary Sch | 25 | 62.5 | 16 | 40 | 41 | 51.25 |
| Junior High Sch | 5 | 12.5 | 6 | 15 | 11 | 13.75 |
| Senior High Sch | 4 | 10 | 10 | 25 | 14 | 17.5 |
| Occupation | | | | | | |
| Housewife | 28 | 70 | 24 | 60 | 52 | 65 |
| Retiree | 7 | 17.5 | 12 | 30 | 19 | 23.75 |
| Merchant | 2 | 5 | 3 | 7.5 | 5 | 6.25 |
| Labor | 3 | 7.5 | 1 | 2.5 | 4 | 5 |
| Religion | | | | | | |
| Islam | 39 | 97.5 | 36 | 90 | 75 | 93.75 |
| Protestan | 1 | 2.5 | 4 | 10 | 5 | 6.25 |
| Marital Status | | | | | | |
| Married | 23 | 57.5 | 15 | 37.5 | 38 | 47.5 |
| Widow/widower | 17 | 42.5 | 25 | 62.5 | 42 | 52.5 |

Difference in Level of Knowledge, Score of BADL and IADL (Functional Status) before and after intervention in intervention and control groups.

Table 2. Analysis of Knowledge Level, BADL Value and IADL score (Functional Status) of respondents before and after inter-group intervention

| Variable | Group | Mean | SD | 95% CI | T | P value |
|-----------------|--------------|--------|-------|-----------------|--------|--------------|
| Knowledge Level | Intervention | | | | | |
| | Before | 5.325 | 4.084 | 14.535 – 11.564 | 17.764 | 0.001 |
| | After | 18.375 | 1.408 | | | |
| | Difference | 1.305 | | | | |
| | Control | | | | | |
| | Before | 4.80 | 2.997 | 0.419 – 0.019 | 1.842 | 0.073 |
| After | 5.00 | 2.882 | | | | |
| Difference | 0.20 | | | | | |
| BADL value | Intervention | | | | | |
| | Before | 10.78 | 1.050 | 1.422 – 0.777 | 6.904 | 0.001 |
| | After | 11.87 | 0.515 | | | |
| | Difference | 1.10 | | | | |
| | Control | | | | | |
| | Before | 10.50 | 1.086 | 0.221 – 0.021 | 1.669 | 0.103 |
| After | 10.60 | 1.007 | | | | |
| Difference | 0.10 | | | | | |
| IADL value | Intervention | | | | | |
| | Before | 3.55 | 0.959 | 0.993 – 0.356 | 4.281 | 0.001 |
| | After | 4.225 | 0.576 | | | |
| | Difference | 0.675 | | | | |
| | Control | | | | | |
| | Before | 3.45 | 0.932 | 0.304 – 0.004 | 1.964 | 0.057 |
| After | 3.60 | 1.032 | | | | |
| Difference | 0.15 | | | | | |

Table 2 shows that there were significant differences in knowledge about rheumatic gymnastics in the intervention group before and after the intervention (p value = 0,001), with the difference in the mean score of 1305. However, in the control group, there were no significant differences in the respondents' knowledge about rheumatic exercise or calisthenics (p value = 0.073). The analysis also shows that there were significant differences in the respondents' BADL values on the functional status of the elderly in the intervention group before and after the intervention (p value = 0.001) with the difference in the average attitude score of 1.10. Whereas in the control group there were no significant differences in BADL values (p = 0.103). The difference (p value = 0.001), whereas in the control group there were no significant differences in the value of IADL (p value = 0.057). Differences in Knowledge Level, BADL and IADL scores (functional status) of respondents after inter-group intervention

Table 3. Analysis of Knowledge Level, BADL and IADL values After intervention between groups

| Variable | Group | Mean | SD | 95% CI | F | P value |
|-----------------|--------------|-------|------|-------------|-------|--------------|
| Knowledge Level | Intervention | 13.05 | 4.64 | 14.35–11.34 | 29.53 | 0.001 |
| | Control | 0.20 | 0.68 | | | |
| BADL value | Intervention | 1.10 | 1.00 | 1.34 – 0.65 | 76.58 | 0.001 |
| | Control | 0.10 | 0.37 | | | |
| IADL value | Intervention | 0.67 | 0.99 | 0.87 – 0.17 | 19.0 | 0.001 |
| | Control | 0.15 | 0.48 | | | |

Table 3. shows that there were differences in knowledge, BADL values and IADL values of respondents between the intervention group and the control group after intervention (p value = 0,001). Elderly who were selected as research respondents were elderly who were in the category of Partly Compensatory System and Supportive Educative System. They were not in total dependence and could still walk even though with the tools or needed health education in the form of active rheumatic exercise because respondents had never received rheumatic calisthenics (Resoprodjo, 2010). In 2015, there were 100 productive residents had to support 9 elderly people aged 65 years and over. Elderly dependence is caused by the condition of elderly people experiencing a decline in physical and psychological health, meaning that they experience development in the form of changes that lead to negative changes (Darmojo, 2010). This can be seen from several changes: (1) changes in appearance on the face, hands and skin, (2) changes in physiological abilities in the inside of the body such as the nervous system: brain, stomach contents: spleen,

liver, (3) changes in five senses: vision, hearing, smell, taste, and (4) motoric changes include reduced strength, speed and learning new skills. These changes generally lead to physical deterioration which will ultimately affect their economic and social activities. Therefore, in general it will affect the activities of daily life such as independence in the fulfillment of ADL.

Elderly people who have entered the age of 70 years, are high-risk elderly. Usually it will hinder the decline in various things including the level of independence (Maryam, 2008). Most of the elderly who were respondents were the elderly with more than 70 years of age, who had experienced a setback in the independence of ADL. The ability of daily activities in the elderly is affected by the elderly themselves. The older the greater the dependence. A person's age shows a sign of willingness and ability, or how a person reacts to the inability to carry out daily activities (Potter, 2008). The results of the analysis showed that the average age of the elderly in the intervention group was around 67.82 years, the youngest age was 60 years and the oldest was 85 years. Whereas in the control group the average age of the elderly in the control group which is around 69.45 years is not much different from the intervention group. In line with the results of Andriyani's research (2010) on the relationship of characteristics with functional status of elderly who concluded that age was associated with a decrease in the ability of the elderly in carrying out their daily activities where the elderly in the elderly group had a higher degree of dependence than the pre-elderly group. Based on research conducted, it shows that respondents who are mostly female are 76.25% compared to respondents who are male. This is comparable to the results of research conducted by Rinajuminta (2011), where the number of female respondents was 56% more than male respondents. To respondents who are male. This is comparable to the results of research conducted by Rinajuminta (2011), where the number of female respondents was 56% more than male respondents. The results of this study are also comparable to the 2009 National Socio-Economic Survey results, according to gender. People or 8.96 percent of the entire female population. The number of elderly women is more than that of men, which is only 8.88 million people or 7.76 percent of the total male population, this is caused by women's life expectancy which higher than male elderly.

The results of the study showed that in general, respondents with low education in elementary schools were 51, 25. The results of this study are consistent with research conducted by Kurniawan (2009) where the number of respondents with low education level below junior high is higher than respondents with junior high school education and above. This study is also comparable to the results of the 2009 National Socio-Economic Survey, where the education of the elderly population is still relatively low, there are still many elderly people who have not / have never attended school and did not complete elementary

school. Elderly people with lower secondary education were 90.66 percent and older people who had a senior high school education or above were only 9.34 percent. These results are reinforced by research conducted by Rinajuminta (2010) in Payakumbuh that the elderly generally have a low education.

Decrease in the strength of the muscles in the lower limbs can be seen in parents while doing the activity of climbing stairs (difficulty in doing so), stiffness of the legs while running. Bone loses density and becomes more brittle. The waist, knees and fingers of the wrist are limited and the joints enlarge and become stiff (Brunner & Sudarth, 2010). Muscle fibers shrink so that a person moves into slow cramping muscles and becomes tremor. One of the elderly diseases that interfere with the musculoskeletal system is joint pain. The results showed that there were differences in the history of joint pain between the intervention group and the control group. Where in the elderly group the intervention had an average pain history score of 9,075 while in the elderly group that became the control had an average score of 6,875. The results of this study are reinforced by the results of researches on elderly disease profiles in 2009 in 4 cities, Padang, Bandung, Denpasar and Makassar, which found that many health problems experienced by the elderly were bone disease and joint pain 69.39 percent, memory decreased 30.08 percent, nausea or stomach ache 26.66 percent, sleeplessness 24.88 percent and shortness of breath 21.28 percent.

The phenomenon in the elderly community is the reluctance in doing elderly exercises or calisthenics. If the elderly are reluctant to take part in such activities, it will actually cause stiffness of bones and joints which is the cause of joint pain in the elderly. Besides the reluctance of the elderly to do gymnastics, it's also happening due to their low knowledge of the importance and benefits of exercise for the health of the elderly.

The analysis showed that there were significant differences in the respondents' BADL value on the functional status of the elderly in the intervention group before and after the intervention (p value = 0.000) with the difference in the average attitude score of 1.10. The same thing with the results of the analysis of IADL values in the intervention group before and after the intervention showed a significant difference (p value = 0.000.). This showed that there was an intervention effect of rheumatic exercises or calisthenics on the functional al status of the elderly in the control group.

The results of this study are in line with research conducted by Fatkuriyah (2010), showing that rheumatic exercise or calisthenics can reduce joint pain after being given for 5 weeks. Increased elderly independence that occurs can be caused by joint pain that is felt to be reduced so that the elderly are better able to do ADL independently. Researchers provide rheumatic calisthenics for 5 weeks. The time that researchers used was in accordance with research that had been done by previous researchers, so that rheumatic exercise

given could really give effect to the elderly, namely a decrease in joint pain. Differences in Knowledge Levels, BADL and IADL scores (functional status) of respondents after inter-group intervention in this study showed that there were differences in knowledge, BADL values and IADL scores of respondents against smoking between the intervention group and the control group after intervention ($p = 0,000$). Rheumatic exercises have resistance training. Elderly people who take rheumatic gymnastics will perform movements that include joint velocity, wide range of joint motion, and strength resulting from muscle elongation and shortening that can increase motion ability, function, strength and endurance, aerobic capacity, balance, joint biomechanics and sense of joint position so that it will increase the ability to move in the elderly (Nuhoni, 2010). These activities have a positive influence on the elderly in the extremity area so that the elderly are able to use extremities that experience quality improvement in carrying out and meeting the needs of daily activities such as walking, moving, mobilizing and bathing. Maryam (2008), suggested that physical exercise would be beneficial to improve physical fitness in the elderly if carried out in a training zone for at least 15 minutes. The right frequency of exercise to improve and maintain physical fitness is done at least three days or as much as 5 days in a week. Rheumatic exercise or calisthenics given by researchers has a minimum duration of 30 minutes and is given 2 times a week. a week that is Tuesday and Friday. This has a significant effect on elderly fitness so that the elderly will become more active which will automatically increase the independence of the elderly in ADL fulfillment. Susilowati's (2012) research said that rheumatic calisthenics can improve the ability to walk in the elderly. Rheumatic exercise or calisthenics that has been given has been able to increase the independence of the elderly, one of which is transferring or moving places. Increased ability to walk in the elderly can increase the independence of the elderly in moving or mobilizing.

Research conducted by Hasibuan (2010) shows the results of giving active exercise will improve joint stability and strength of the knee muscles because this exercise is useful for reducing irritation, maintaining and enhancing active stability in the knee joint can also nourish the synovial nutrition for the better. Rheumatic exercise or calisthenics is an active exercise that gives the effect of increasing joint stability and strength of the knee muscles. With repeated movements in rheumatic gymnastics there will be an increase in the work of muscles around the joints which will accelerate blood flow and cause metabolism to increase. This will support the elderly more easily in doing ADL. This is supported by research conducted by Protas and Tissier (2010) which explains that it can increase muscle strength, ability to walk and functional abilities of the elderly.

4. CONCLUSION

Functional status of the elderly with joint pain in carrying out Activity Daily Living (ADL) after doing rheumatic calisthenics in the independent category. There is an influence of rheumatic exercises or calisthenics on the independence of the elderly with joint pain in conducting Activity Daily Living (ADL) in the Cipayung District. Rheumatic calisthenics activities should be carried out regularly in the right time and for a longer period of time which is at least 3 times in a week and a maximum of 5 times in a week. In addition, rheumatism gymnastics can be used as an alternative to replace existing exercises with the right intensity.

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