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Effect of Knee Joint Gymnastics on Decreasing Knee Pain in the Elderly

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Abstract

Elderly had high risk in Osteoarthritis disease. OA disease in elderly mostly undetected, as knee pain emerged in early symptoms did not inflict severe pain. Knee pain treatment divided in two forms, pharmacologic treatment and non-pharmacologic treatment. Non-pharmacology treatment was believed safe for elderly, as Elderly had many health problems and needed to limit drugs consumption. Knee exercise could be alternative for Elderly in treated knee pain and prevented more severe symptoms. This study aimed to identify the effectiveness of knee exercise in reduces knee pain on elderly. This study used quasi experiment method with pre and post-test approach. The sample was recruited from all elderly with knee pain at Kiaracondong district (n=60). The respondent divided into two groups: experimental group and control group. Data were collected using Numeric Rating Scale for measure knee pain before the treatment and after the treatment. Respondent in experimental group received knee exercise for 10 minutes. Respondent in control group received information flyer about knee pain. This study was conducted in 14 days. Data were analyzed using univariate and bivariate method. The result showed that there was significant effect from knee exercise in reduce knee pain (p value 0.000). Knee exercise would increase proteoglycan secretion and conducted to more healthy joints. Furthermore, exercise could increase muscle strength with the result that could support body weight. Knee exercise treatment could be alternative for elderly in avoid more severe knee pain. Knee exercise could be applied everyday as exercise program for elderly.

Keywords: Knee joint gymnastics • Knee joint pain • Elderly

Introduction

Osteoarthritis is the most common type of arthritis found in Indonesia. Its prevalence is quite high, especially in the elderly and is the main cause of disability associated with the disease in elderly individuals (Kenneth, 2005). Based on data from the World Health Organization (WHO) in 2014 the elderly population who experience osteoarthritis disorders in the world is estimated at 25% and in Indonesia it is recorded at 8.1% of the total population. As many as 29% of them was conducted a doctor's examination and the rest or 71% took pain-free medications [1-5].

The prevalence of osteoarthritis reaches 5% by the age of 61 years. Knee osteoarthritis has a fairly high prevalence of 15.5% in men and 12.7% in women. The prevalence of osteoarthritis of the knee in female patients aged 75 years and over can reach 35% of the number of existing cases. The prevalence of osteoarthritis disease increases dramatically among people who have an age of more than 50 years. This is because there are age-related changes in collagen and proteoglycans that decrease tension from joint cartilage and also due to the reduced supply of nutrients for cartilage [6].

In the study of Dr. O'Connor (2007), female sex is a risk factor for osteoarthritis. In the study, the prevalence and incidence of osteoarthritis increased by three times in women when compared to men. Osteoarthritis can affect all joints, but the most frequent prevalence is in the knee joint, which reaches 89.9%.

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The same thing was also found in the research of Zhang Fu-qiang in 2009 in Fuzhou which showed an increase in prevalence higher in women when compared to men, which was 35.87%. The results of the study of Kellgren and Lawrence state that the prevalence of the occurrence of knee OA is 29.8% in men and 40.7% in women. It is known that there are several risk factors that can cause osteoarthritis, including age, gender, occupation, trauma and weight.

There are various treatments for arthritis depending on the degree of severity, ranging from activity modifications, anti-inflammatory drugs, to surgery. Non-surgical treatment can include exercise or knee gymnastics, thigh strengthening and the use of a knee brace or support. According to Dr. Irma Lidia, Jove's team of doctors, exercise can help strengthen the muscles around the sore joints, improve balance, and maintain bone strength so that pain can be reduced and locomotors function increases in arthritis sufferers with mild severity [7]. The American Academy of Orthopaedic Surgeons (AAOS) also advises to lose weight. By exercising, you will certainly maintain weight or even lose weight. Regular exercise to strengthen the leg muscles can help reduce the risk of joint pain [8-10].

The number of arthritis in the Puskesmas Kiara condong Bandung area from January 2020 to September 2020 amounted to 410 people so far received treatment with analgesic drugs and had never been given education with non-pharmaceutics such as knee gymnastics. The treatment of knee pain problems is one of the nurse interventions to overcome client physical problems so that they can improve the quality of service, streamline treatment time and medical expenses [8]. Thus the role of nurses and the cooperation of nurses with other medical personnel are factors that affect the success of client handling.

Gymnastics is a tool to stimulate physical, spiritual and social functional growth and development. Its anatomical-anthropometric structure and physiological functions, its emotional stability and intellectual intelligence as well as its ability to socialize with its environment are noticeably superior especially in the younger generation who actively participate in Sports activities rather than those who do not actively follow them. The author believes that this is also true for the elderly who are active in sports.

The study conducted with three exercise interventions focused on hips, knees and body activity performed over 3 months showed the Anterior Knee

Pain Scale was as follows: knee *vs.* control, 0.2 (95% CI, -5.5 to 6.0); hip *vs.* control, 1.0 (95% CI, -4.6 to 6.6); and hip *vs.* knee, 0.8 (95% CI, -4.8 to 6.4). The entire cohort of patients improved for all results at 3 months except for the strength of the knee extension [4].

The results of other studies show very low quality but consistent evidence that exercise therapy can result in clinically important pain reductions and improved functional abilities, as well as improving long-term recovery. There is some evidence of very low quality that hip and knee exercises may be more effective in reducing pain than knee exercises alone [6]. Research by Diah KW, et al. [2] shows that gymnastics for the elderly can reduce complaints of joint pain in the elderly of ward village of Kediri city with a p Value of 0.000.

As said by Diah KW, et al. [2] that elderly gymnastics can have a good influence on the health of the elderly body, namely training the ability of joint muscles so that joint stiffness does not occur, this is also proven by the results of research by Firmansyah D, et al. [3] knee joint movement exercises affect the reduction of knee pain with a p value of 0.000 that knee pain of degrees I and II can be reduced by doing exercise such as doing exercise as ROM (flexion of knee extension) can reduce knee pain because with exercise there will be physiological pressure that will increase the formation of proteoglycans by adult cartilage cells, increase muscle strength so that it can support the load on the joint area, increase the metabolism of synovial joint fluid which will provide nutrients to the surrounding cartilage.

Research on ergonomic gymnastics on reducing pain levels in the elderly occurred a significant decrease in the treatment group in the elderly who had osteoarthritis obtained a p value=0.000 [1]. Preliminary study in September 2020, Reviewed from the recap of reports in the Kiaracondong Puskemas Area of Bandung city including Babakan sari village and Kebon kale village (January–September 2020) had a number of treatment with knee pain of 210 people. The report from the cadres of Babakansari village was 89 people. Given this phenomenon and the importance of reducing pain, it is necessary to study the effect of knee joint gymnastics intervention on reducing pain in the knee in the Kiaracondong health center area of Bandung city.

Methodology

The research method used in this study is the Quasi-Experimental method with pre- and post-test designs with a control group [11]. This study aims to identify the effect of knee gymnastics intervention on reducing knee joint pain in the elderly with Osteoarthritis in Babakansari village in the Kiaracondong health center area, Bandung City. The intervention group/participants in knee gymnastics and the control group in this study were elderly people with knee joint pain.

This research will be carried out in Babakansari Village, Kiaracondong Health Center Area, Bandung [12]. The Kiaracondong Health Center area was chosen as the place where the research was carried out because the area has a large number of elderly people who have knee pain and knee gymnastics has never been applied in the region. This research was conducted in late November to December 2021.

The population in this study was the elderly who experienced knee pain and were recorded suffering from knee pain in Babakansari village in the Kiaracondong Health Center area of Bandung in the period from January 2020 to September 2020. The population that fits the criteria is 66 people based on data on the registration book of the Kiaracondong health center and cadres in Babakansari village. Researchers took a total sampling of the population. However, there were 3 respondents who resigned and 3 respondents who were too elderly to participate in knee gymnastics. Thus, a total of 60 respondents were obtained [13].

The instrument used in this study was a questionnaire with a Numeric Rating Scale (NRS) (score 0-10) with the interview method. Numeric Rating Scale (NRS) is a measuring instrument that describes the degree of knee pain felt by elderly knee pain. The instrument is already in the Indonesian version and has been tested for its suitability of sensitivity and accuracy.

The data collection procedure is as follows:

1. Identify participants who meet the inclusion criteria in both the intervention and control groups.
2. Participants who meet these criteria are given inform consent and asked for consent to become respondents.
3. After obtaining approval from the respondents, knee pain measurements were then carried out in both the intervention group and the control group using NRC (Numeric Rating Scale) for 10 minutes with interview techniques.
4. After identification of knee pain scores of the elderly with knee pain, the intervention group received knee gymnastics interventions of 80 movements, carried out daily for 14 days at their respective homes.
5. In order to maintain the principle of fairness for the sample, there was a control group after the - was not carried out gymnastics intervention but only given a leaflet or information in writing about the pain of his knee, then given time to the control participant to read for 10 minutes and perform Counselling.

In the intervention group, knee joint gymnastics interventions were carried out by involving cadres and students. The steps are carried out as follows:

Step one: Environmental preparation and respondents who will take part in knee gymnastics, a pain scale measurement is taken before being given knee gymnastics

Step two: carry out a knee joint gymnastics intervention with duration of 10 minutes, consisting of a 2-minute warm-up, a 10-minute core movement with 80x movements, and a 3-minute cooling.

Step three: evaluate the knee joint gymnastics intervention that has been carried out for 14 days in the form of a post-test or re-measurement of the degree of pain using a questionnaire.

This study analyzed the data using univariate and bivariate methods. The analysis of univariate data in this study aimed to describe the variable ability to overcome knee pain before and after intervention in the control and treatment group [14]. A bivariate analysis was performed to test the difference in the mean (mean) of variables in the ability to overcome knee pain before and after the administration of interventions in the control and treatment groups [15].

Results

The average value, standard deviation, and minimum-maximum value of knee pain before and after the knee joint gymnastics intervention in the treatment group and control group in the elderly in the work area of the Kiara Condong Health Center in Bandung city can be seen in Table 1.

Based on Table 1 above, it can be seen that the average value of knee pain in the control group was 1.23. Wilcoxon test results show a p value of 0.241 (>0.05)

Based on Table 2, it can be seen that there was a decrease in the average knee pain with a decrease in score of 28.57 after knee joint gymnastics interventions Furthermore, Wilcoxon test results showed that knee joint gymnastics had an effect on reducing knee pain in the elderly with a p value of 0.00 (<0.05).

The difference in the average value of knee pain in the control and intervention group at the Kiaracondong Health Center, Bandung City, is as follows.

In Table 3, it can be seen that there is an average difference of 23.86. After the Man Whitney Test, a P Value of 0.000 <0.05 was obtained, meaning that knee joint gymnastics in the intervention group had a significant effect on reducing knee pain in the elderly compared to the control group. The results showed that before and after the knee joint gymnastics intervention there was a decrease in the average value of 28.57 in the treatment group and a decrease

Table 1. The average value of knee pain in the elderly before and after in the control group in the working area of the Puskesmas kiara leaning Bandung City (n=30).

Variables	Intervention	Mean	SD	At a minimum	P *value*
Knee pain	Before	2.6	770	52.00-149.00	0.000
(Kel Control)	After	1,37	490	74-119	

Table 2. The average value of knee pain in the elderly before and After Intervention in the intervention group in the Kiaracondong Health Center Working Area, Bandung City (n=30).

Variables	Intervention	Mean	SD	At a minimum	P *value*
Knee pain (Kel Treatment)	Before	112,37	7,559	42-120	0.00
	After	83,80	15,365	42-111	

Table 3. Differences in the average lutrut pain in the elderly between the Control group and the intervention group in the Kiaracondong Health Center Work area, Bandung City (n=30).

Group	Mean	SD	P *value*
Control	42.43	9,312	0.000
Treatment	18.57	7,559	

of 1.23 in the control group. After the Wilcoxon test, a p-value of 0.000 <0.005 was obtained in the treatment group and 0.241> 0.05 in the control group. The results of this study illustrate that knee joint gymnastics is effective in lowering knee pain. Furthermore, after the Man Whitney test to see the difference in influence between the control and intervention groups, there was an average difference of 23.86 with a p value of 0.00 <0.05 meaning that Gymnastics is effective in reducing knee pain. This is in line with the research of Diah KW, et al [2] that gymnastics for the elderly can reduce complaints of joint pain in the elderly in the village of The Ward of Kediri City with a p value of 0.000. As Diah KW, et al. [2] said that elderly gymnastics can have a good influence on the health of the elderly body, training the ability of joint muscles so that joint stiffness does not occur.

Discussion

The results of research by Firmansyah D, et al. [3] that knee joint movement exercises have an effect on reducing knee pain with a p value of 0.000 that knee pain of degrees I and II can be reduced by doing exercise such as ROM (knee extension flexion) can reduce knee pain because with exercise there will be pressure physiologically which will increase the formation of proteoglycan by adult cartilage cells, increases muscle strength so that it can support the load on the joint area, increasing the metabolism of synovial joint fluid which will provide nutrients to the surrounding cartilage. This is also proven by the results of research by Sutinah (2019) that there is an influence of ergonomic gymnastics on the elderly who experience osteoarthritis with a p value of 0.000.

Range of Motion exercises can be performed to maintain or improve the level of perfection, the ability to move the joints normally and completely [9]. The presence of movement in the joints will cause an increase in blood flow into the joint capsule. When the joint is moved, the surface of the cartilage between the two bones will rub against each other. Cartilage contains a lot of proteoglycans attached to hyaluronic acid which is hydrophilic, so cartilage contains a lot of water as much as 70-75%. The emphasis on cartilage will urge water out of the cartilage matrix to the synovial fluid that will lubricate the joint area. Based on the results of research and research theories, researchers concluded that when the elderly perform movements Knee joint movements gradually, it will have an impact on reducing joint pain due to the production of synovial fluid that can be used to lubricate the joint area and the production of synovial fluid will cause a decrease in the pain felt in osteoarthritis sufferers and will cause a sense of comfort As a result of skeletal muscle activities that are carried out regularly and measurably, it has a direct or indirect influence on the functioning of other body organs. With gymnastics exercises, at least 10 minutes every day makes the mentality healthier, clear mind, less stress and triggers the onset of feelings of happiness make blood circulation smooth Buy (2014).

Conclusion

Gymnastics is an aerobic exercise that is easy and cheap to do. Knee gymnastics is a series of body movements centered on training the muscles of the lower extremities so as to increase leg strength. Knee gymnastics is done together; this can be a fun activity for the elderly and can have a good impact on the psychological. Osteoarthritis of the knee I and II degrees can be reduced by doing exercises such as ROM (knee extension flexion), strengthening exercise and aerobics. Exercise can reduce the pain of knee OA patients because with exercise there will be physiological pressure that will increase the formation of proteoglycans by adult cartilage cells, increase muscle strength so that it is able to support the load on the joint area, increase synovial joint fluid metabolism which will provide nutrients to the surrounding cartilage. Quadriceps strengthening exercise in knee OA patients is one of the recommended non-pharmacological therapies.

References

1. Surya, Andi, Erna, and Rahmawati. "The effect of ergonomic gymnastics on the pain level of osteoarthritis sufferers in the elderly in child care homes and the elderly." 3 (2018): 1-143.
2. Kristiana Dewi, Diah, and Dian Prawesti. "Decrease in joint pain complaints in the elderly through elderly gymnastics." 6 (2013).
3. Firmansyah, Dedi and Edy Suprayitno. "Effect of knee joint motion exercises on pain in the elderly who experience osteoarthritis." (2018).
4. Hott, Alexandra, Jens Ivar Brox, Are Hugo Pripp and Niels Gunnar Juel, et al. "Effectiveness of isolated hip exercise, knee exercise, or free physical activity for patellofemoral pain: A randomized controlled trial." *Am J Sports Med* 47 (2019): 1312-1322.
5. Ministry of Health of the Republic of Indonesia. "Dismissing osteoarthritis attacks." (2016).
6. Lozada. "Effect of holding relaxes technique on changes in pain levels in patients with osteoarthritis of the knee joint at the R. Herifa Clinic." *J Physiother* 1 (2013): 55-57.
7. Lukman and Ningsih. "Nursing care in clients with system disorders musculoskeletal." Jakarta: Salemba Medika Notoatmodjo, *Health Res Methodol*. 2912. Jakarta: EGC." (2011).
8. Richmond, J., D. Hunter, J. Irrgang, and M. H. Jones, et al. "American Academy of Orthopaedic Surgeons clinical practice guideline on the treatment of osteoarthritis (OA) of the knee." *JBJS* 92 (2010): 990-993.

9. Potter, Patricia A., Perry Anne Griffin, Hall Amy and Stockert Patricia A. "Fundamentals of nursing." Basic Health Outcomes (2010).

10. Sumual, A.S. "The effect of weight on friction style and the onset of osteoarthritis in people over 45 years old at RSUP Prof. Dr. R. D. Kandou Manado." Thesis. Manado: Physics Section of the Faculty of Medicine, Sam Ratulangi University Manado." (2012).

11. Sastro, S. and S. Ishmael. "Basics of clinical research methodology." Jakarta: Sagung Seto (2011).

12. Sugiyono. "Qualitative quantitative research methodology." (2012).

13. Sturdee, D.W., and N. Panay. "Recommendations for the management of postmenopausal vaginal atrophy." *Climacteric* 13 (2010): 509-522.

14. WHO. "Chronic rheumatic conditions." (2021).

15. Wittenauer, Rachel, Lily Smith and Kamal M. Aden. "Background paper 6.12 osteoarthritis." World Health Organisation (2013).

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