INTEREST: Jurnal Ilmu Kesehatan
Vol. 12, No. 1, May 2023
https://doi.org/10.37341/interest.v12i1.496

Original Research

No Different Acute Effect Of Passive And Active Stretching On Hamstring Flexibility In Elderly Women

Marti Rustanti[1]*

[1] Department of Physiotherapy, Poltekkes Kemenkes Surakarta, Indonesia

ABSTRACT

Background: *The flexibility of the hamstring muscle contributes significantly to movement and the risk of injury. Decreased hamstring flexibility increases the risk in older women with age. Stretching is the most common form of intervention to overcome this problem, but the most appropriate form of stretching for older women still requires further research.*

Methods: *The study included 2 groups, where Group I received passive stretching treatment on the hamstring muscles while Group II received active stretching treatment on the same muscles. The subjects of this study were elderly women members of the Posyandu Elders from Tohudan Village, Colomadu District, Karanganyar Regency.*

Results: *The results showed that there was a decrease in hamstring flexibility in older women. Passive stretching treatment has an effect on increasing hamstring muscle flexibility (p = 0.00). There was an effect of active stretching on increasing hamstring muscle flexibility (p = 0.03). There was no difference in the effect between passive stretching and active stretching on increasing hamstring muscle flexibility (p = 0.837).*

Conclusion: *Passive stretching treatment has an effect on increasing hamstring muscle flexibility (p = 0.00). There was an effect of active stretching on increasing hamstring muscle flexibility (p = 0.03). There was no difference in the effect between passive stretching and active stretching on increasing hamstring muscle flexibility (p = 0.837). Conclusion: Based on the results of this study, it can be concluded that providing passive stretching and active stretching can both increase hamstring muscle flexibility in older women.*

ARTICLE HISTORY
Received: October 4th, 2022
Accepted: June 21th, 2023

KEYWORDS
active stretching, elderly, hamstring flexibility, passive stretching, women;

CONTACT
Marti Rustanti
✉
rustantiroesyid@gmail.com
Department of Physiotherapy, Poltekkes Kemenkes Surakarta. Jl. Adi Sumarmo, Merten, Tohudan, Kec. Colomadu, Karanganyar Regency, Central Java, Indonesia 57173.

Cite this as: Rustanti, M. (2023). No Different Acute Effect Of Passive And Active Stretching On Hamstring Flexibility In Elderly Women. *Interest : Jurnal Ilmu Kesehatan, 12*(1), 1-6. https://doi.org/10.37341/interest.v12i1.496

INTRODUCTION

In general, older people will experience a decrease in their physical and functional abilities. This decrease in physical and functional abilities will be at risk, with the elderly experiencing limitations in functional activities (Dodok et al., 2022) (Rachmania

and Girianto, 2021). One form of decreased physical capacity in older people is muscle inflexibility or decreased muscle flexibility (Medeiros, de Araújo, & de Araújo, 2013).

Muscles that are less active are at risk for decreased flexibility. Decreased muscle flexibility will lead to limited joint movement, which may limit functional activities. One of the muscles in the body that easily suffers a decrease in flexibility is the hamstring muscle. Reduced flexibility of the hamstring muscles increases the risk of injury when the hip joint is bent and the knee joint is straight (Danielsson et al., 2020).

Additionally, if the hamstring muscles experience a decrease in flexibility, this will result in a change in posture where the pelvis will be lifted backward and the lumbar spine will become hyperlordotic. This change in posture will trigger complaints of lower back pain. Many studies have been done on the decreased flexibility of the hamstring muscles (Suwardianto, 2021). The majority of this study involved young subjects, in particular athletes who experience problems with the shortening of the hamstring muscles (Fauziah et al., 2022). Shortening or decreasing the flexibility of the hamstring muscles in athletes is at high risk of causing muscle injury or interfering with their performance as athletes.

Research on decreased hamstring muscle flexibility in older women is rarely done. Older female subjects are generally past menopause. As a result of menopause, changes have an impact on the musculoskeletal system, which causes a decrease in muscle flexibility (H. Lee et al., 2016). As in previous studies, there are two different forms of observation in this study: the first is to see the effect immediately after the stretching treatment (Nakao, Taniguchi, and Katayose, 2018), and the second is to see the long-term effect of the treatment given (Haab and Wydra, 2017).

In this study, the treatment was in the form of passive and active stretches that were done once with a certain dose to see the short-term effects of stretching. Based on previous research (Nakao et al., 2018), it appears that both active and passive stretching have a positive effect on maintaining and improving hamstring flexibility, therefore, the aim of the study is to compare passive and active stretching on the acute effect of hamstring flexibility in older women.

MATERIALS AND METHOD

This study is a quasi-experimental study with a pre-test and post-test design in two groups (Dahlan, 2014). This study included two groups, where the first group received passive stretching treatment while the second group received active stretching treatment. The subjects of this study were the elderly members of the elderly of Posyandu in Mainland hamlet and Senden hamlet, Tohudan village, Colomadu district, Karanganyar regency. The total number of subjects was 22 people, each group consisted of 11 people. Elderly people from Dusun Darat received passive stretching treatment, while elderly people from Dusun Senden received active stretching treatment.

Group I consists of the elderly people of Dusun Daratan, while Group II consists of the elderly people of Dusun Senden. Before and after treatment, each group was measured. This study compares the results of the initial flexibility measurement and the results of the final flexibility measurement after treatment in the form of stretching. Measurement of hamstring muscle flexibility using a 90/90 hamstring flexibility test.

Measurements were taken with the subject lying supine with the hip joint and knees bent 90 degrees, and then the subject was asked to straighten the knee as much as possible. When the knee joint is in a 90° flexion position and then moves in a straight line or extends, the range of motion of the joint is measured using a goniometer (J. H.

Lee, Jang, Kim, Rhim, & Kim, 2021). The passive stretching treatment was performed by a physiotherapist who stretches and maintains it for 30 seconds, repeated three times, while the active stretching treatment was performed independently by the subject, who stretches their hamstring in a long sitting position.

In this position, the subject also held for 30 seconds and repeated the methods three times. This study has been approved by the ethical committee of the Health Polytechnic of Surakarta (No. LB.02.02/1.1/6324/2022).

RESULTS

From the descriptive data presented below, the following results are obtained.

Table 1. Descriptive analysis of research subjects

Var	Group I	Group II
Age		
Maximum	64	84
Minimum	60	60
Mean	62.09	67.36
Standart Dev	1.446	8.968
Body Mass Index		
Maximum	24.1	25.8
Minimum	20.9	20.7
Mean	22.53	22.3
Standart Dev	1.175	1.739

Table 2. The results of the difference test analysis

Var	Test	p value
Pre test and Post test Group I	Paired t test	0.000
Pre test and Post test Group II	Paired t test	0.003
Post test Group I dan Post test Group II	Independent t test	0.837

From the results of the analysis, passive stretching was found to have an effect on increasing the flexibility of the hamstring muscles, which was indicated by a p-value of 0.000, while Active stretching had an effect on increasing hamstring muscle flexibility, which was indicated by a p-value of 0.003. The two stretching methods showed no difference in the effect of increasing hamstring muscle flexibility, as shown by a p-value of 0.837.

DISCUSSION

Based on the data analysis performed, it was proven that, in older women, there was a decrease in the flexibility of the hamstring muscles, which was shown from the results of the initial measurements using a goniometer in all subjects. The average results were 165^0 in group I and 163.54^0 in group II, which showed a decrease from the normal value, which should have been 180^0. This is consistent with the opinion (Medeiros et al., 2013), which states that the more muscle flexibility decreases, the more joint mobility is also an increasingly important limit.

Passive stretching treatment can increase the flexibility of the hamstring muscles, as indicated by an increase in the range of motion of the knee joint measured by a goniometer. The increase in hamstring muscle flexibility after passive stretching

treatment was 5.18^0. The results of this study are in agreement with research conducted (Alshammari, Alzoghbieh, Abu Kabar, and Hawamdeh, 2019), where passive stretching for 30 seconds repeated three times can significantly increase the flexibility of the hamstring muscles.

Passive stretching for a period of time can increase the flexibility of the hamstring muscle by stretching the muscle fibers and tendons of the hamstring muscle to increase the flexibility of the muscle (Takeuchi & Nakamura, 2020). The results of this study are also similar to the results of the research conducted (Gunn et al., 2019), which compared passive stretching with passive stretching plus soft tissue mobilization and PNF, where passive stretching was shown to increase the flexibility of the hamstring muscles. The active stretching treatment in this study also showed an increase in hamstring muscle flexibility based on the statistical analysis performed. Active stretches lasting 30 seconds repeated three times have been shown to increase hamstring muscle flexibility in older women.

The result of increased hamstring muscle flexibility in this subject was 6.09^0. The results of this study were consistent with previous studies (Alshammari et al., 2019), where the increase in flexibility as measured by the amplitude measurement of the movement of the knee joint increased by 9.30^0. The increase in hamstring muscle flexibility in the study was not as significant as in the previous study, given that the subjects in this study were elderly, whereas, in the previous studies, the subjects were younger. The results of this study are also consistent with research findings (Nakao et al., 2018), which showed that either active or passive stretching of the hamstring muscles can increase muscle flexibility.

Passive and active stretching treatments of the hamstring muscles are also good for increasing muscle flexibility. The results of this study indicate that stretching has an effect on increasing muscle flexibility, both passively and actively. There is no data showing that passive stretching is better than active stretching.

These results are identical to those of studies J. H. Lee et al., (2021) and Decoster, Scanlon, Horn, & Cleland, (2004) which proved that the stretching method with passive knee extension and active knee extension can increase flexibility of the hamstring muscles. The results of this study are consistent with the research (Nishikawa et al., 2015) showing that both passive and active stretching can increase hamstring muscle flexibility. In Nishikawa's study, passive stretching was better than active stretching in the younger group of research subjects.

CONCLUSION

Based on the results of the discussion above, the following conclusions can be drawn, there is a decrease in hamstring muscle flexibility in older women, passive stretching has an effect on increasing hamstring muscle flexibility in older women, active stretching also has an effect on increasing hamstring muscle flexibility and there is no difference in the effect of passive stretching and active stretching on increasing hamstring muscle flexibility in older women.

ACKNOWLEDGEMENT

We would like to thank all subjects for their valuable contributions, and further thanks also go to the students of the physiotherapy department at the Health Polytechnic of Surakarta for their contribution to the data collection.

REFERENCES

Alshammari, F., Alzoghbieh, E., Abu Kabar, M., & Hawamdeh, M. (2019). A novel approach to improve hamstring flexibility: A single-blinded randomised clinical trial. *S Afr J Physiother, 75*(1), 465. doi:10.4102/sajp.v75i1.465

Dahlan, S. (2014). *Statistik untuk Kedokteran dan Kesehatan* (6 ed.). Jakarta: Epidemiologi Indonesia.

Danielsson, A., Horvath, A., Senorski, C., Alentorn-Geli, E., Garrett, W. E., Cugat, R., Hamrin Senorski, E. (2020). The mechanism of hamstring injuries - a systematic review. *BMC Musculoskelet Disord, 21*(1), 641. doi:10.1186/s12891-020-03658-8

Decoster, L. C., Scanlon, R. L., Horn, K. D., & Cleland, J. (2004). Standing and Supine Hamstring Stretching Are Equally Effective. *J Athl Train, 39*(4), 330-334.

Gunn, L. J., Stewart, J. C., Morgan, B., Metts, S. T., Magnuson, J. M., Iglowski, N. J., .Arnot, C. (2019). Instrument-assisted soft tissue mobilization and proprioceptive neuromuscular facilitation techniques improve hamstring flexibility better than static stretching alone: a randomized clinical trial. *J Man Manip Ther, 27*(1), 15-23. doi:10.1080/10669817.2018.1475693

Haab, T., & Wydra, G. (2017). The effect of age on hamstring passive properties after a 10-week stretch training. *J Phys Ther Sci, 29*(6), 1048-1053. doi:10.1589/jpts.29.1048

Lee, H., Caguicla, J. M., Park, S., Kwak, D. J., Won, D. Y., Park, Y., Kim, M. (2016). Effects of 8-week Pilates exercise program on menopausal symptoms and lumbar strength and flexibility in postmenopausal women. *J Exerc Rehabil, 12*(3), 247-251. doi:10.12965/jer.1632630.315

Lee, J. H., Jang, K. M., Kim, E., Rhim, H. C., & Kim, H. D. (2021). Effects of Static and Dynamic Stretching With Strengthening Exercises in Patients With Patellofemoral Pain Who Have Inflexible Hamstrings: A Randomized Controlled Trial. *Sports Health, 13*(1), 49-56. doi:10.1177/1941738120932911

Medeiros, H. B., de Araújo, D. S., & de Araújo, C. G. (2013). Age-related mobility loss is joint-specific: an analysis from 6,000 Flexitest results. *Age (Dordr), 35*(6), 2399-2407. doi:10.1007/s11357-013-9525-z

Nakao, G., Taniguchi, K., & Katayose, M. (2018). Acute Effect of Active and Passive Static Stretching on Elastic Modulus of the Hamstrings. *Sports Med Int Open, 2*(6), E163-e170. doi:10.1055/a-0733-6957

Nishikawa, Y., Aizawa, J., Kanemura, N., Takahashi, T., Hosomi, N., Maruyama, H., Takayanagi, K. (2015). Immediate effect of passive and active stretching on hamstrings flexibility: a single-blinded randomized control trial. *J Phys Ther Sci, 27*(10), 3167-3170. doi:10.1589/jpts.27.3167

Takeuchi, K., & Nakamura, M. (2020). The optimal duration of high-intensity static stretching in hamstrings. *PLoS One*, *15*(10), e0240181. doi:10.1371/journal.pone.0240181

Dodok, Y., Guntur, A., Indriyawati, & Wicaksono, K. E. (2022). Behavioral Differences In Seeking Help For Mental Health Among Generation Z From The Kodi People Group And The Madurese Ethnic Group. *Journal of Applied Nursing and Health*, *4*(1 SE-Articles), 78–85. https://doi.org/10.55018/janh.v4i1.57

Fauziah, E., Hartati, S., & Kamesyworo. (2022). The Effectiveness Of Elderly Exercise In Decreasing The Level Of Insomnia. *Journal of Applied Nursing and Health*, *4*(1 SE-Articles), 71–77. https://doi.org/10.55018/janh.v4i1.55

Rachmania, D., & Girianto, P. W. R. (2021). The Relationship of Physical Activity with Relapse of Gastritis in Gastritis Patient. *Journal of Applied Nursing and Health*, *3*(2), 119–125. https://doi.org/10.55018/janh.v3i2.15

Suwardianto, H. (2021). Physical and Cognitive Therapy (PCT) in Critically Ill Patient. *Connectivity and Functional Specialization in the Brain*, 47.