The Effect Of Senior Elastic Band Exercise on Increasing Muscle Strength of The Elderly in Sandik Village, Meninting Health Center Working Area, West Lombok District

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Abstract:. Background: Elderly is the final stage of the aging process which experiences a decrease in organ function, one of which is a decrease in physical condition in the form of a decrease in muscle mass which causes a decrease in muscle strength, thus affecting daily activities. So physical exercise is needed, namely *the Senior Elastic Band Exercise* . Research Objective: to determine the effect of *the Senior Elastic Band Exercise* on increasing muscle strength in the elderly. Method: *Pre-experimental research design, one group pretest posttest* . The population is elderly people who experience decreased muscle strength aged 60-69 years in Sandik Village, the working area of the Meninting Health Center, West Lombok District with a population of 804. Samples were taken using purposive sampling of 20. Data collection used the MMT observation sheet and analysis used the Wilcoxon test. Results: Elderly muscle strength before intervention was given: *shoulder* at grade 4 = 100%, *hip* at grade 4 = 60%, and *knee* grade 4 = 55%. Elderly muscle strength after being given intervention : *shoulders* at grade 5 = 65% while hip muscle strength at grade 4 = 50% and knee grade 4 = 65%. The results of the Wilcoxon statistical test showed p-value = 0.000 < α 0.05, which means that H_0 was rejected, which means there is an influence of *the Senior Elastic Band Exercise* on the muscle strength of the elderly. Conclusion: *Senior Elastic Band Exercise* increases muscle strength in elderly people who experience decreased muscle strength. Suggestion: Can be used as an intervention to increase muscle strength in elderly people who experience decreased muscle strength.

Keywords: Senior Elastic Band Exercise, Muscle Strength, Elderly

1. Introduction

Elderly is the final stage of the aging process . After that, the body begins to shrink due to the reduction in cells in the body. As a result, the body will also experience a gradual decline in function, which is what is called the aging process. (Nugroho, W , 2017). The process of growing old is one of the phases in a person's life cycle with the characteristics of a decline in every function of the body's organs, such as emotional, psychological, and most importantly physical condition. (Anuar et al., 2021)

The real decline in function in physical conditions in the elderly is a decrease in muscle mass or atrophy. A decrease in muscle mass causes a decrease in strength which can lead to a decrease in functional ability in the elderly because muscle strength affects almost all daily activities (activities of daily living), which can ultimately cause the elderly to become dependent on other people. (On et al., 2021) .

The development of the elderly population in the world and in Indonesia is interesting to observe, where there tends to be an increase in the number of elderly people from year to year. According to WHO (*World Health Organization*) , the population aged 60 years and over will increase from 1 billion in 2020 to 1.4 billion. By 2050, the world population aged 60 years and over is expected to double to 2.1 billion (WHO, 2022).

Based on data from the Central Statistics Agency, the percentage of the elderly population has reached more than 10 percent. The percentage of elderly people increased by at least 3 percent over a decade, namely 2010-2021, to 10.82 percent (BPS, 2022).

From the results of the 2020 Population Census, when compared with the entire population, the elderly population (60 years and over) in NTB in 2020 was 8.21 percent. According to gender, the number of elderly men is 48.36 percent and 51.64 percent of the number of elderly women is compared to the total population, there are 5.42 percent of the number of elderly aged 60-69 years, 1.39 percent of the number of elderly aged 70-74 years, and 1.39 percent of the number of elderly people over 75 years. Meanwhile, the region with the highest number of elderly people is West Lombok with 54,445 elderly people (BPS NTB, 2020).

Based on data from the Dinas Kesehatan Kabupaten Lombok Barat in 2021, the number of residents aged 60 years and over was 66,130 with the percentage of men being 45% and women being 55%. Where the Meninting Community Health Center occupies the highest position with the number of elderly aged 60 years and over as many as 4,939 (West Lombok Health Districtt, 2021).

Based on this data, it can be seen that the number of elderly people has increased quite drastically. This increase in the number of elderly has an impact on the life expectancy of the elderly which is increasing rapidly. Increasing the life expectancy of the elderly can give rise to various polemic problems, such as social and psychological problems, due to degenerative processes in the elderly. Apart from that, physiological changes in the

musculoskeletal system are also a major problem in the elderly. Real physiological changes in the musculoskeletal system are reduced flexibility and elasticity, decreased range of motion in joints, decreased muscle mass and strength by 1-2% per year after the age of 50 years, which is characterized by decreased contractions resulting in muscle weakness. (Kurniawan et al., 2022) . Decreased muscle strength is caused by many factors. The main causative factor is a decrease in muscle mass which causes elderly people to tend to experience a decrease in muscle strength which causes elderly people to experience functional decline.

Based on elderly data from the Meninting Health Center , the number of elderly aged 60-70 years was 2,883, while the number of elderly at high risk was 1615. Based on a preliminary study conducted on March 7 2023, it was found that 23 out of 25 elderly aged 60-69 years experience a decrease in muscle strength. Management or one of the programs that has been implemented in the elderly community in the Meninting Community Health Center working area is the Prolanis program (Chronic Disease Management Program). This program is a program given to the elderly, one of which is through exercise. However, this program has not been able to specifically increase muscle strength capabilities in elderly people. So other programs are needed that can increase the muscle strength of the elderly, especially physical exercise programs.

Lack of physical exercise programs causes elderly people to experience decreased mobility which results in muscle weakness (Pinontoan et al., 2015) . To prevent a decrease in muscle strength in the elderly, there are many types of physical exercise that can be done, one of which is strength *training* . Strength training Progressive ones can increase muscle strength and maintain motor function (Pinontoan et al., 2015) .

One of the strength training exercises What can be done for the elderly is *the senior elastic band exercise* . This type of exercise is a form of loading that can increase muscle strength and activate the sensomotor system through peripheral stimulation, muscle coordination and neuromuscular adaptation. One of the strengthening exercise tools is *an elastic band* .

An elastic band is a simple tool that is used for various kinds of physical exercises where this tool can be stretched. The greater *the band* is stretched, the stronger its resistance to muscle strength. (Wijaya, 2020) . This exercise is easy to do and can be an alternative exercise independently for the elderly at home to increase muscle strength (Kurniawan et al., 2022) . Apart from that, at the Meninting Community Health Center, *the Senior Elastic Band Exercise has never been carried out* to increase the muscle strength of the elderly.

Based on the description above, the author is interested in conducting research on "The Effect of *Senior Elastic Band (SEB) exercise* on increasing muscle strength in the elderly in Sandik Village, Meninting Health Center working area, West Lombok District in 2023."

2. Materials and Methods

Design research Which used in research This is Pre Experimental with One Group Pre-Post test approach. The sample from this research was 20 people. retrieval technique sample Which in use is Purposive Sampling. Instrument Which used For measure tmuscle strength before And after given senior elastic band exercise using MMT sheets .

The first way of working is to measure the muscle strength value of the elderly before being given intervention using the MMT sheet. Then explain benefit from senior elastic band exercise and taught how to do the exercise. this intervention is provided diving 3 times a week for 4 weeks given . After the intervention was given, the elderly's muscle strength was measured again using the MMT sheet.

The data from the research results were analyzed in two ways, namely first, univariate analysis used illustrate every variable Which be measured in form distribution frequency. Second analysis bivariate, using the Wilcoxon test sign Rank Test.

3. Results

To determine the effect of *senior elastic band exercise* on increasing muscle strength in the elderly in Sandik Village, the working area of the Meninting Community Health Center. The following data is presented:

A. Description General Characteristics Respondent

Table 1 . Distribution of Respondent Characteristics Based on Age, Gender, Level Education, Work, And Consume Drug Anti Hypertension On Intervention Group and Control Group in Meninting Community Health Center in 2023

No	Category	Amount	%
1.	**Age**		
	60-69 Years	20	100
	>70 Years	0	0
	Total	**20**	**100**
2.	**Gender**		
	Man	3	15
	Woman	17	85
	Total	**20**	**100**
3.	**Education**		
	basic education	11	55
	No school	9	45
	Total	**20**	**100**
4.	**Work**		
	Work	5	25
	Doesn't work	15	75
	Total	**20**	**100**

Based on table 1 above, it is known that all respondents were in the elderly category with an age range of 60-69 years namely as many as 20 people (100%), while table 2 shows that the majority of respondents are female , namely as many as 17 people (85%) Then table 3 shows that the majority of respondents have primary education, namely as many as 11 people (55%), and in tables 4 7

shows that the majority of respondents do not work, namely 15 people (75%).

B. Description Research Special

1. Muscle Strength Before Being Given *Senior Elastic Band Exercises* in Sandik Village, Meninting Community Health Center working area , West Lombok District can be seen in the following table.

Table 2. Distribution Of Respondents Based On Muscle Strength Test Scores For The Elderly Before Being Given Senior Elastic Band Exercises In Sandik Village, Meninting Community Health Center Working Area, West Lombok District, 2023 (N=20)

	Muscle Strength	**Amount**	**%**
shoulders	Grade 4	20	100
	Total	20	100
Hip	Grade 3	8	40
	Grade 4	12	60
	Total	20	100
Knees	Grade 3	9	45
	Grade 4	11	55
	Total	20	100

Based on table 8, the frequency and percentage of the data can show that of the 20 respondents before being given the *senior elastic band exercise intervention* , all 20 respondents had *shoulder muscle strength* at grade 4 (100%). Then *mostly* for hip muscle strength in grade 4 there were 12 people (60%), *knees* in grade 4 were 11 people (55%)

2. Muscle Strength After Being Given *the Senior Elastic Band Exercise* The muscle strength of respondents after being given the senior elastic band exercise in Sandik Village, the working area of the Meninting Community Health Center, West Lombok District, can be seen in the following table.

Table 3. Distribution of Respondents Based on Muscle Strength Test Scores for the Elderly Before Being Given Senior Elastic Band Exercises in Sandik Village, Meninting Health Center Working Area, West Lombok District, 2023 (N=20)

	Muscle Strength	**Amount**	**%**
shoulders	Grade 4	7	35
	Grade 5	13	65
	Total	20	100
Hip	Grade 3	4	20
	Grade 4	10	50
	Grade 5	6	30
	Total	20	100
Knees	Grade 3	5	25
	Grade 4	13	65
	Grade 5	2	10
	Total	20	100

Based on table 9, the frequencies and percentages of the data can show that of the 20 respondents after being given the *Senior Elastic Band Exercise intervention* , there was a majority of *shoulder muscle strength* in grade 5, 13 people (65%), Hip in grade 4, 10 people (50%).), and *knee* in grade 4 as many as 13 people (65%).

3. The Effect of *Senior Elastic Band Exercise* on the Muscle Strength of the Elderly in Sandik Village, Meninting Community Health Center Working Area, West Lombok District

Before the statistical test was carried out, a normality test was carried out using Shapiro-Wilk with the result $p < \alpha = 0.05$, which means the data was not normally distributed so a non-parametric statistical test was carried out using the Wilcoxon sign rank test.

Table 4. The Effect of Senior Elastic Band Exercise on Increasing Muscle Strength in the Elderly in Sandik Village, Meninting Community Health Center Working Area, West Lombok District in 2023 (N=20)

		N	Mean Rank	Sum of Ranks
Post Test *Shoulder* - Pre Test *Shoulder*	Negative Ranks	0 [a]	.00	.00
	Positive Ranks	12 [b]	6.50	78.00
	Ties	8 [c]		
	Total	20		
Post Test *Hip* - Pre Test *Hip*	Negative Ranks	0 [d]	.00	.00
	Positive Ranks	10 [e]	5.50	55.00
	Ties	10 [f]		
	Total	20		
Post test *Knee* - Pre Test *Knee*	Negative Ranks	0 [g]	.00	.00
	Positive Ranks	5 [h]	3.00	15.00
	Ties	15 [i]		
	Total	20		
Wilcoxon signed rank p value = 0.000 ($p < \alpha$ 0.05)				

Based on table 10 , it shows that the muscle strength of the respondents has increased, namely *shoulder* with an increase in mean rank = 6.50 and sum of rank = 78.00, then for Hip, namely mean rank = 5.50 and sum rank = 55.00, and for *knee* , namely mean rank = 3.00 and sum rank = 15.00 with the results of the Wilcoxon sign rank test statistical test obtained the result *p* value = 0.000 ($p < \alpha$ 0.05) so Ho is rejected, which means there is an influence of *the Senior Elastic Band Exercise* on increasing muscle strength in the elderly.

4. Discussion and Conclusion

A. Muscle Strength Before Senior elastic band exercise

Based on table 7 of the data obtained , it shows that of the 20 respondents before being given the *Senior Elastic Band Exercise intervention* , the majority of muscle strength in the upper extremities was at grade 4 (*shoulder* = 100%) and likewise for the lower extremities, namely at grade 4 (*Hip* = 60%, and *Knee* = 55%). The average shoulder muscle strength in the elderly before *senior elastic band exercises* is 4.00. The average value for the hip is 3.60 with a minimum value of 3.00 and a maximum value of 4.00, and for the knee it has an average value of 3.55 with a minimum value of 3 and a maximum value of 4 .

Muscle strength can be influenced by several factors such as muscle cross-section, strength and stiffness of connective tissue, speed of contraction,

length of muscle when contracting, type of muscle contraction, age and physical fitness, hormones, gender, and psychological factors (Ohsawa et al, 2017) . In this study, researchers found several factors that cause a decrease in muscle strength, such as age , gender, education and occupation.

The first factor is age . In this study, it was found that some of the respondents were elderly with an age range of 60-69 years. An elderly person will experience changes in the body/physical, psychological/intellectual, social and spiritual/religious. This is in accordance with the theory of ADI et al (20121) which states that muscle weakness affects people of all ages and addition increases every 10 years from age 55 years and above. This is supported by the results of research conducted by ADI et al (2017) with the title description of muscle strength in the elderly at Ryuku medicals Okinawa Japan which states that the increase in muscle weakness along with increasing age is related to the aging process, where all body organs experience a decline in function including muscle weakness. and joints become paralyzed.

Gender is also a cause of decreased muscle strength in the elderly. From the results of this research, it can be seen that the largest number of respondents were female respondents, namely 17 people with a percentage of 85%. This is because men's muscle strength is generally greater than that of women. This is caused by differences in muscle mass. This increase in strength is related to muscle growth after puberty, because after period Puberty period muscle man more big compared to women. This is in line with research conducted by Chen that muscle strength in women is lower than muscle strength in men. Women have muscle strength 37-68% of men's muscle strength.

In terms of education, it can be seen that the largest number of respondents based on education level were respondents with basic education, namely 11 people (55%). The results of this research are in line with (Rasdianah, 2016) showing that the level of muscle strength is influenced by predisposing factors, one of which is education.

A factor that is no less important is in terms of employment, where it can be seen that the largest number of respondents based on employment are unemployed, namely 15 people (75%). This is caused by the inability of the elderly to carry out other activities due to functional decline.

B. Muscle Strength After *Senior Elastic Band Exercise*

Based on table 8 , the data obtained shows that of the 20 respondents after being given the *Senior Elastic Band Exercise intervention* , there was an increase in muscle strength in the upper extremities, most of which increased from grade 4 to grade 5 (*shoulder* = 65%) with an average value of 4.60 and a minimum value of 4. and the maximum value is 5 , while lower extremity muscle strength mostly increases from grade 3 to grade 4 (*hip* = 50% and *knee* = 65%) . The average value for the hip is 4.10 with a minimum value of 3.00 and a maximum value of 4.00. Meanwhile, the average value for the knee is 3.55 with a minimum value of 3 and a maximum value of 5, which means there is an increase in the muscle strength of the elderly after being given *the Senior Elastic Band Exercise* for both the upper and lower extremities. This is in accordance with the opinion of (MD Abdullah et al. al., 2019) which says that an elastic band training program for older adults (elderly) can increase muscle strength.

The results of the research above are in accordance with the theory (MM Abdullah & Nur'amalia, 2022) that the benefits provided by strengthening exercises using *elastic bands* are that they have an effect on increasing the function of 47external variables thereby increasing strength and ability with a positive effect on muscle strength and the ability to carry out activities. daily functional. In general, *elastic band strengthening exercise* improves balance, walking ability, flexibility, muscle strength, mobility, and reduces joint pain .

Based on the results of research conducted by (Hasan, 2019) on 25 elderly people who experienced muscle weakness in the upper and lower extremities, intervention was carried out using *elastic bands.* The results showed that there was an increase in muscle mass which had a direct effect on muscle strength and physical performance in the elderly compared to those who did not. do *senior elastic band exercises* because not doing movement causes less movement and results in a decrease in strength in the elderly's muscles .

Doing *senior elastic band exercises* can increase muscle activation and build muscle hypertrophy in adults who have low activity (MD Abdullah et al., 2019) . Because Senior Elastic Band Exercise is a category of strength training which will activate motor control and produce muscle contractions. Furthermore, muscle contractions will stimulate contractile tissue and produce tension in the muscles to produce strength (Wahyuni & Zakaria, 2021) .

Based on the results of this study, researchers are of the opinion that senior elastic band exercise can increase average muscle strength by one level from the previous grade if done regularly 3 times a week for 3 weeks with a duration of 30-45 minutes which will have a good influence on increasing muscle strength. both in the upper and lower extremities. Researchers also believe that increasing muscle strength in the elderly depends on several aspects such as age, gender, and accuracy in carrying out movements during exercise. Apart from that, increasing muscle strength also affects how much strength the elderly have when using elastic bands. This is in line with research (Wahyuni & Zakaria, 2021) which states that the greater the elastic band is stretched, the stronger its resistance to muscle strength. The greater the resistance to the muscle, the greater the muscle contraction produced and the higher the value of muscle strength produced.

The results of this research are in line with the results of research (Kesoema & Novriansyah, 2020) , in their research showing that *elastic bands* as an exercise for the elderly can increase the strength of the quadriceps femoris muscles in the elderly. This research is also in line with research (Anuar et al., 2021) that resistance exercise (resistance) physical activity has a positive effect, namely it can improve the physical fitness and functional maintenance of the elderly. Resistance training induces muscle strength or hypertrophy. In addition, osteoatrial and muscular changes such as changes in balance caused by time must be considered

when selecting the training environment and type of exercise. Regular exercise can improve physical fitness, upper limb strength, lower limb strength.

C. Effects of *Senior Elastic Band Exercise* Towards Increasing Muscle Strength in the Elderly

Based on the results of statistical tests using the Wilcoxon sign rank test, the results obtained were ($p < \alpha$ 0.05) so that Ho was rejected, which means that there was an influence of *Senior Elastic Band Exercise* on the test of increasing muscle strength in the elderly . This research was carried out 3x/week for 3 weeks with a duration of 30 minutes so that regular exercise like this will affect the movement of the hands and feet which will experience a decrease in strength. In the research, there is video media that can make it easier for respondents to do *the Senior Elastic Band Exercise* .

Senior Elastic Band Exercise is a simple exercise given to the elderly using an *elastic band* which consists of 3 movement components during exercise. This exercise can increase muscle strength in the upper extremities and most importantly the lower extremities because the blood flow that carries nutrients to the lower parts of the body is smooth after carrying out the exercise. During this condition, the elderly's ability to stand on one leg is very possible. When muscle mass increases, the elderly's ability to mobilize increases and causes the care burden incurred to be reduced (Santoso & Kristianto, 2019) .

The results of the research above are also in accordance with theory (Beijersbergen et al., 2019) . noted that training with *elastic bands can improve muscle strength, joint* stability , and balance skills in the elderly population. This exercise involves movements that engage the core and extremity muscles, which are important for maintaining postural stability and preventing falls. The results of this research show that *elastic band* training can be used as an effective method to increase muscle strength. Additionally, research by Torres-Costoso et al. (2020) found that *Elastic band* training has a positive influence on p quality life in adults with osteoarthritis . This study shows that *elastic band* training can improve functional abilities and quality of life in adults and the elderly .

Researchers are of the opinion that this senior elastic band exercise is suitable to be given to the elderly because the elastic band adapts to the strength of each individual and does not worry that the elderly experience overload. This is supported by theory from research results (Kurniawati, 2018) *Senior Elastic Band Exercise* meets 4 criteria for exercise for the elderly, namely: 1) Simplicity, namely movements that do not make it difficult for the elderly; 2) Safety, namely movement that is safe and does not endanger the elderly; 3) Suitability, namely the movement is possible for the elderly; 4) Helping, namely movement can help the elderly to maintain and improve their health.

CONCLUSION

1. Elderly muscle strength before being given the *Senior Elastic Band Exercise intervention* The data obtained is that most of the muscle strength in the upper extremities is at grade 4 (*shoulder* = 100%) and likewise for the lower extremities, namely at grade 4 (*hip* = 60%, and *knee* = 55%).
2. Elderly muscle strength after being given the *Senior Elastic Band Exercise intervention* The data obtained is that muscle strength in the upper extremities mostly increased to grade 5 (*shoulder* = 65%) while muscle strength in the lower extremities mostly increased to grade 4 (*hip* = 50% and *knee* = 65%).
3. *Wilcoxon* test results obtained a value of p=0.000 or p<0.05 , which means that Ho is rejected and it can be concluded that *the Senior Elastic Band Exercise intervention* has an effect on increasing muscle strength in elderly people who experience decreased muscle strength .

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