



## Impact of Resistance Exercise On Hand Grip: An Experimental study

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### ABSTRACT

Sarcopenia is a significant medical issue related with aging, characterized as loss of bulk and capacity. It is a condition portrayed by loss of skeletal bulk and quality, with a danger of antagonistic results, for example, handicap, improvement of delicacy, low quality of life and death. Its etiology is still inadequately comprehended. Opposition preparing intercession is sheltered and compelling for checking sarcopenia. Resistance exercise (RE) programs improve muscle anabolism, bulk and muscle quality. The present study aims to assess the impact of resistance exercise on hand grip among the elderly population with sarcopenia. A quasi experimental research design with non-randomized control research design was conducted among 30 elderly population in Arrakonam among which 15 were chosen for the experimental group and 15 were chosen as the control group. A purposive sampling technique was used to select samples. Structured questionnaires were used to collect demographic data and BMI and hand grip was assessed. The resistance exercises were taught to the elderly population and they were asked to perform the exercise every day for one week. After a week, the BMI and hand grip was re-assessed. The studies thus indicates that the experimental group had a reduction in the hand grip and increase in the BMI value after resistance exercise and is also an effective method to prevent further complications that can be caused due to sarcopenia.



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### INTRODUCTION

Old age has been characterized as a sequential age of 65 years of age or more established, while those from 65 through 74 years of age are alluded to as "early older" and those more than 75 old

as late elderly". (Zdzieblik *et al.*, 2015) Common meanings of ageing seldom separate the two cycles. For instance, maturing has been characterized as a 'reformist, summed up disability of capacity bringing about lost versatile reaction to push and in a developing danger old enough related disease'. (Beudart *et al.*, 2017)

The dynamic ageing idea, presently advanced by WHO, empowers the 'cycle of becoming more seasoned without developing old through the upkeep of physical, social, and profound exercises all through a lifetime'. An ordered meaning of old or matured is regularly utilized, however challenged. The WHO utilizes classifications beginning at 65 years old and 80. (Youssef and Shanb, 2016)

Between the years 2000 and 2050, the overall extent of people more than 65 years old is relied upon to dramatically increase from the current 6.9%

to 16.4%. (Iannuzzi-Sucich *et al.*, 2002) The extent of most oldest-old (those aged 80 years and more established) will increase during this period from 1.9 to 4.2%. (Fox *et al.*, 2015) The number of inhabitants in centenarians in 2050 will be multiple times bigger than that in 1998 (2.2 million contrasted with 135 000) with the male-to-female proportion of centenarians tumbling to around 1:4. (Cruz-Jentoft, 2019)

Sarcopenia is perceived as a significant medical issue among older adults. It is a condition portrayed by loss of skeletal bulk and quality, with a danger of antagonistic results, for example, handicap, improvement of delicacy, low quality of life and death. (Maruya *et al.*, 2016) The term sarcopenia was first coined in 1989 by Irwin Rosenberg to depict this age-related reduction of bulk. Albeit essentially an infection of the old, its advancement might be related with conditions, for example, dementia and osteoporosis. (Killingback *et al.*, 2017)

The prevalence of sarcopenia in India found in the current investigation (March 2020) was 14.2% in an old population (<60 years old) and was bound to happen more in ladies when contrasted with men (24.5% versus 3.4%). (Beudart, 2017) The populace based examinations that announced the commonness of sarcopenia in healthy adults aged over 60 utilizing the European Working Group On Sarcopenia In Older People (EWGSOP), The International Working Group On Sarcopenia (IWGS), Asian Working Group For Sarcopenia (AWGS). The predominance is high in non — Asians than Asians. (White *et al.*, 2009)

Resistance training intervention (lifting loads, extending groups or utilizing the people's weight, or exercise executed on obstruction machines) is sheltered and successful for checking sarcopenia. Resistance training intervention (RE) programs improve muscle anabolism, bulk and muscle quality. RE alone improved bulk in 2 of 4 examinations and muscle quality in 3 of 4 investigations contrasted and control exercises (low power home exercise or standard rehabilitation). (de Mello *et al.*, 2019)

As indicated by WangxiaoBao *et al.* (2017) who had directed an investigation to demonstrate that the Exercise as beneficial outcome on improving the muscle mass and muscle strength in more established sarcopenic people. Sarcopenia is an age-related condition that is described by reformist and summed up loss of bulk and capacity. Subsequently the investigation infers that Exercise intercessions as huge improvement in the muscle quality and improvement in the bulk on the sarcopenic older

population. (Bao *et al.*, 2020)

Human muscle quality starts to decrease at 40 years old, with a decrease in the bulk of roughly 5% in every time of life. This decay, which influences essentially the lower appendages, is complemented after age 65 years and arrives at lost up to 40% of the bulk comparative with adulthood. These progressions may influence the person's capacity to react to circumstances wherein it is vital to cover balance on account of a diminished capacity to create quick force in the joints just as eased back effectors reactions, a diminished useful limit, and modified gait. (Rubio *et al.*, 2009)

As per Cruz-Jentoft *et al.* (2014) who led an examination to survey the viability of activity in sarcopenia. Resistance exercise training is given as the mediations. Test chose for the investigation is elderly people (over 60) with sarcopenia. Mediation allowed for a very long time on ordinary timetable. The result are normal exercise is the main technique found to reliably forestall delicacy and improve sarcopenia and actual capacities in more established grown-ups. Actual exercise increment the vigorous limit, muscle quality and perseverance by improving oxygen consuming molding and quality. In more established grown-ups practice and actual action produce atleast similar helpful impacts saw in more younger individuals.

The purpose of the study [1] to assess the grip strengths of the sarcopenic elderly population.[2] to assess the effectiveness of home-based exercise in sarcopenic elderly population. [3] to compare the pre Test and Post-test results of grip strength of sarcopenic elderly population.

## MATERIALS AND METHODS

A quantitative approach with quasi experimental research design with non-randomized control research design was used to conduct the study in Arrakonam. 30 samples out of which 15 were chosen for the experimental and 15 were chosen for the control group the samples were selected by a purposive sampling technique. The criteria for sample selection are Elderly people whose age is 55 and above and who are capable of doing exercises and does not have conditions like Arthritis and the exclusion criteria are elderly population who have restricted movements and conditions like arthritis. Before commencing the data collection, authorized setting permission was obtained from the authorities of the selected area.

The investigator introduced and explained the intention of the investigation to the sample and

obtained the written informed consent. The demographic data was collected using structured questionnaire for the elderly populations and the hand grip and the BMI value was also assessed. The level of hand grip and the BMI value was assessed before performing the resistance exercises amongst the elderly population. Then the resistance exercises were taught and were asked to be performed by the elderly population.

After a week, the level of hand grip and the BMI value was re-assessed among the elderly population. The data were analyzed using descriptive and inferential statistics.

## RESULTS AND DISCUSSION

Among 30 samples the experimental group, most of them 7(46.7%) were aged 60 above, 8(53.3%) were male, 9(60%) were educated, 12(80%) were married, 7(46.7%) were housewife and 10(66.7%) were Hindus. The control group, most of them 8(53.3%) were aged 60 above, 10(66.7%) were female, 8(53.3%) were educated, 12(80%) were married, 10(66.7%) were housewife and 9(60%) were Hindus.

The pretest of experimental group, most of them 11(73.33%) were normal and 4(26.67%) were weak whereas in the post-test, all of them 15(100%) were normal. The Table 1 also portrays that in the control group, most of them 10(66.67%) were weak and 5(33.33%) were normal both in the pretest and post-test.

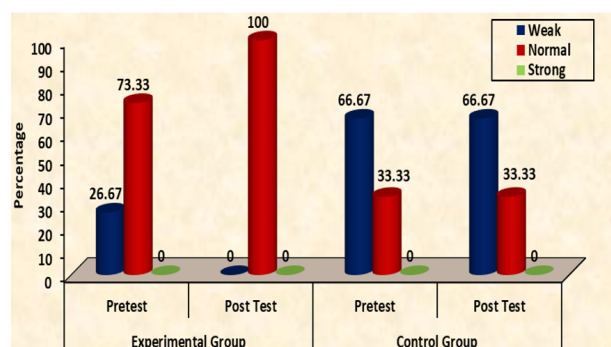
The current examination was upheld by [Iolascon et al. \(2014\)](#) Physical exercise and sarcopenia in older people. 2 preparing programs gave the advantages of improved versatility and equilibrium in old ladies "in danger of sarcopenia"; simultaneous preparing was more successful regarding the practical limit. The investigation thus demonstrated that there is improvement of portability and equilibrium in the older ladies who are high "hazard for sarcopenia."

Another investigation was upheld by [Yeung et al. \(2020\)](#) directed the examination to survey the current information, practice, diagnosis, treatment among the Australian and New Zealand medical care experts. Results acquired by the investigation are all out of 250 experts partook; 84 finished the half year surveys. Previously, legitimately after and at a half year, individually, 14.7%, 93.4% and 59.5% distinguished sarcopenia as an infection; 2.0%, 79.6% and 38.1% effectively addressed the sex explicit shorts for low handgrip quality. Separately, 12.0% and 14.3% reported to make sarcopenia analyze as

a component of their training previously and at a half year. Along these lines the specialists reasoned that knowledge about sarcopenia is restricted among medical care experts who went to an expert advancement occasion. Maintenance of information stays a test to be addressed.

The pretest of experimental group, most of them 11(73.33%) were normal and 4(26.67%) were overweight whereas in the post-test, 12(80%) were normal and 3(20%) were overweight. The control group, most of them 12(80%) were normal and 3(20%) were normal whereas in the post-test, most of them 13(86.67%) were normal and 2(13.33%) were normal.

The pretest mean score of grip strength in the experimental group was  $26.19 \pm 1.65$  and the post-test mean score was  $29.66 \pm 1.20$ . The calculated paired 't' test value of  $t = 8.507$  was statistically significant at  $p < 0.001$  level. This indicates significant improvement in the level of grip strength in the post-test among the elderly with Sarcopenia in the experimental group which clearly infers that home-based exercise administered to the elderly with Sarcopenia in the experimental group had improved the post-test level of grip strength considerably. (Table 2)



**Figure 1: Percentage distribution of pretest and post-test level grip strength among elderly in the experimental and control group**

The pretest mean score of grip strength in the control group was  $23.69 \pm 3.04$  and the post-test mean score was  $23.71 \pm 3.07$ . The calculated paired 't' test value of  $t = 1.000$  was not found to be statistically significant. (Table 3 & Figure 1)

The calculated student independent 't' test value of  $t = 6.989$  was found to be statistically significant at  $p < 0.001$  level. This indicates that there was significant improvement in the level of grip strength in the post-test among the elderly with Sarcopenia in the experimental group than the control group which clearly infers that home based exercise administered to the elderly with Sarcopenia in the experimental group had improved the post-test level of grip strength considerably. (Table 4)

**Table 1: Frequency and percentage distribution of pretest and post-test level grip strength among elderly in the experimental and control group N=30(15+15)**

Group	Grip Strength	Weak		Normal		Strong	
		No	%	No	%	No	%
Experimental Group	Pretest	4	26.67	11	73.33	0	0
	Post Test	0	0	15	100.0	0	0
Control Group	Pretest	10	66.67	5	33.33	0	0
	Post Test	10	66.67	5	33.33	0	0

**Table 2: Frequency and percentage distribution of pretest and post-test level BMI among elderly in the experimental and control group N = 30(15+15)**

Group	BMI	Underweight	Normal	Over Weight	Obese
		%	%	%	%
Experimental Group	Pretest	0	73.33	26.67	0
	Post Test	0	80.0	20.0	0
Control Group	Pretest	0	80.0	20.0	0
	Post Test	0	86.67	13.33	0

**Table 3: Comparison of pretest and post-test level of grip strength among elderly with Sarcopenia in the experimental and control group N= 30(15+15)**

Group	Test	Mean	S.D	Paired 't' test Value
Experimental Group	Pretest	26.19	1.65	t = 8.507 p = 0.0001 S***
	Post Test	29.66	1.20	
Control Group	Pretest	23.69	3.04	t = 1.000 p = 0.334 N.S
	Post Test	23.71	3.07	

**Table 4: Comparison of post-test level of grip strength among elderly with Sarcopenia between the experimental and control group N = 30(15+15)**

Group	Mean	S.D	Student Independent 't' test value
Experimental Group	29.66	1.20	t = 6.989 p = 0.0001 S***
Control Group	23.71	3.07	

\*\*\*p<0.001, S -Significant

The present is upheld by [Wei et al. \(2016\)](#) directed the examination on Whole-Body Vibration Training Improves Muscle and Physical Performance in Community Dwelling with Sarcopenia. The WBV bunch demonstrated critical inside gathering enhancements in isometric and isokinetic knee augmentation, TUG, 5 STS and 10 MWT (p<0.05), however not in CSA of VM. The WBV bunch had altogether preferable execution over the benchmark group in isokinetic knee augmentation at 180°/s, TUG, 5 STS at both mid-and post-mediation (p<0.05).

Another investigation is additionally upheld by [Tsekoura et al. \(2018\)](#) Effects of Group and Home-Based Exercise Programs in Elderly with Sarcopenia. Results were evaluated at the pattern,

promptly post-mediation (week 12), and 3 months post-intercession (week 24). Huge gathering x time connections (p < 0.001) were observed grasp and knee muscle quality. Gathering based contrasted with locally established exercise yielded huge upgrades (p < 0.05) in bulk record, muscle quality at 12 weeks. Most enhancements at 24 weeks were accounted for with gathered exercise. No progressions were found over the benchmark group. Outcome propose bunch based exercise was more successful than locally situated for increasing the practical ability. The demographical factors had indicated measurably huge significant with the post-test level of hold quality among older with Sarcopenia in the exploratory gathering. Support in a mediation ought to do the resitense exercise to

forestall huge decreases in lower extremity muscle mass, quality and versatility, even in the long haul and may be helpful in stifling in any case huge increases in fall rates.

## CONCLUSIONS

Resistance training intervention is sheltered and successful for checking sarcopenia. Resistance training intervention (RE) programs improve muscle anabolism, bulk and muscle quality. This indicates the home based resistance exercises is significant in improving the muscle mass and muscle strength among the sarcopenic elderly population. Exercise promotes both the physical and mental health of the elderly population.

## Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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