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INFLUENCE OF PLANNED EXERCISE PROGRAMME ON MUSCLE MASS OF ELDERLY AGED MALE

Dr. Thomas. K. M[1]

[1]Associate Professor, Department of Physical Education, St. Teresas College (Autonomous), Ernakulam, Kerala, India

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ABSTRACT

As individuals age, they experience a gradual decline in muscle mass and strength, a condition known as sarcopenia. This decline is often associated with reduced mobility, increased risk of falls, and a decreased quality of life. The purpose of this study was to investigate the influence of a structured, planned exercise program on the muscle mass of elderly males aged 60 and above. This research investigated the influence of planned exercise programme on muscle mass of elderly aged male.

Keywords: Sarcopenia, Elderly, Muscle Mass, Resistance Training, Exercise Program, Aging

1. INTRODUCTION

Sarcopenia is the slow loss of muscular mass and strength that occurs as people age. This is especially noticeable in senior men, resulting in diminished physical function and an increased risk of falls, frailty, and other health issues. A well-structured, planned exercise program had been demonstrated to mitigate these consequences by increasing muscle hypertrophy, strength, and general quality of life. According to research, regular physical activity, particularly resistance training, can help elderly males maintain and even increase muscle mass.

Planned exercise regimens, particularly those that emphasize resistance or strength training, have a direct effect on muscle mass in aged men. These programs frequently involved weightlifting, bodyweight workouts, and the use of resistance bands. By engaging in such exercises, senior males could boost muscle protein synthesis, which was essential for muscle fibre repair and growth. Consistent training promoted hypertrophy—an increase in muscle size—and can halt or reverse the muscular atrophy that happens naturally with age. Furthermore, it could enhance muscle coordination, balance, and endurance, lowering the chance of falling and increasing mobility.

Progressive overload is a basic notion in building muscle mass through training, which entails gradually increasing the intensity or resistance of activities over time. This strategy must be carefully supervised in elderly people to avoid damage, but when done correctly, it could result in large increases in muscle strength and mass. Research had indicated that elderly people who participated in strength training programs for at least 12 weeks could see significant increases

in muscle mass and strength. This change not only improved physical performance but also had a significant impact on metabolic health, lowering the risk of chronic diseases including type 2 diabetes and cardiovascular problems.

2. LITERATURE REVIEW

Sarcopenia, or age-related loss of muscle mass and function, is a major problem among the aged, particularly males. It is linked to increasing frailty, loss of independence, and higher mortality rates (Cruz-Jentoft et al., 2019). Between the ages of 60 and 70, males lose muscle mass at a rate of 0.5-1% each year, with the rate rising after age 70 (Mitchell et al., 2012). Planned exercise regimens, particularly those that include weight training, have been demonstrated to reduce or reverse the consequences of sarcopenia in older men (Chen et al., 2020).

Resistance training (RT) has regularly been proven in studies to be one of the most effective ways for growing muscle mass in older men (Peterson et al., 2010). Resistance workouts work the skeletal muscles, promoting muscle protein synthesis and perhaps leading to hypertrophy (increased muscular size). Fiatarone et al. (1994) had found that even extremely old males (aged 72-98 years) could considerably improve muscle strength and hypertrophy with high-intensity resistance exercise.

While aerobic exercise (such as walking, cycling, and swimming) do not increase muscle mass as effectively as strength training, it does contribute to improved cardiovascular health, endurance, and overall body composition (Liu & Latham, 2009). A combination of aerobic and resistance training is frequently recommended for the elderly. The notion of progressive overload, or progressively increasing the intensity of exercise, is especially crucial for senior men. According to Schoenfeld et al. (2016), raising the weight or resistance level during training sessions guarantees that muscles were constantly challenged, which is critical for muscle growth and preventing muscle loss among the elderly.

Exercise program frequency and length are crucial for older men's muscle mass development. According to study, resistance training 2-3 times a week is effective for increasing muscle mass (Peterson et al., 2010). Steib et al. (2010) discovered that 12-week or longer resistance training programs resulted in significant improvements in muscle mass and strength in the elderly population.

Short-term interventions could produce quantifiable results, but long-term adherence to exercise programs was required to maintain muscle mass. Regular exercise beyond formal therapies was frequently required to maintain the advantages attained (Schaap et al., 2013).

Proper diet is critical in enhancing the benefits of exercise programs on muscle mass. Protein intake is especially crucial for older persons who are doing resistance training since it helps with muscle repair and synthesis. According to Moore et al. (2015), aged males should consume more protein than normal (1.2-1.5 grams per kilogram of body weight per day) to maximize the advantages of resistance training on muscle mass. Supplementation with essential amino acids, particularly leucine, has been demonstrated to increase muscle protein synthesis in response to exercise (Phillips, 2014).

Despite the demonstrated benefits, various impediments impede elderly men from engaging in regular exercise. These barriers include fear of damage, a lack of enthusiasm, and physical restrictions such as joint pain or chronic sickness (Brooks et al. 2017). Facilitators, such as supervised exercise programs, social support, and personalized exercise schedules adapted to individual capacities, have been proven to improve exercise adherence (Nelson et al., 2017) Facilitators, such as supervised exercise programs, social support, and personalized exercise schedules adapted to individual capacities, have been proven to improve exercise adherence (Nelson et al., 2017).

3. INFLUENCE OF PLANNED EXERCISE PROGRAMME ON MUSCLE MASS

A planned exercise program could have significant positive effects on the muscle mass of elderly males, addressing age-related muscle loss known as sarcopenia. Here's a breakdown of how exercise influenced muscle mass in elderly men:

1. TYPES OF EXERCISE

i. **RESISTANCE TRAINING (RT):** This was one of the most effective exercises for building muscular mass. Lifting weights or utilizing resistance bands stimulated muscular growth through hypertrophy (an increase in muscle fibersize). According to research, resistance exercise significantly improved muscle strength and mass in aged men.

ii. **AEROBIC EXERCISE:** While aerobic exercises such as walking, cycling, and swimming are primarily intended to promote cardiovascular health, they also helped improve muscular endurance and, when supplemented with resistance training, contributed in total muscle maintenance.

iii. **FLEXIBILITY AND BALANCE EXERCISES:** These are critical for lowering the risk of falls and improving overall mobility, and they indirectly contributed to muscle maintenance by improving the capacity to execute other exercises efficiently.

2. PHYSIOLOGICAL BENEFITS

i. **MUSCLE HYPERTROPHY:** Exercise, particularly resistance training, promotes protein synthesis and muscle hypertrophy, which is essential for overcoming sarcopenia. According to studies, aged males improved their muscle mass by 5-10% following several weeks of systematic resistance training.

ii. **IMPROVED METABOLIC FUNCTION:** Regular exercise increased insulin sensitivity and mitochondrial activity, resulting in improved energy metabolism inside muscle cells.

iii. **REDUCTION OF FAT MASS:** Exercise reduced fat mass and improved muscle-to-fat ratio, which is critical for maintaining functional independence in the elderly.

3. HORMONAL INFLUENCE

i. **TESTOSTERONE AND GROWTH HORMONE:** Exercise has been demonstrated to increase levels of anabolic hormones such as testosterone and growth hormone in elderly men, both of which are required for muscle maintenance.

ii. **MYOKINES:** These are muscle-derived proteins that are generated during exercise and have a broad impact on muscle growth and inflammatory management.

4. NUTRITIONAL SUPPORT

i. **PROTEIN INTAKE:** Adequate protein intake in conjunction with an exercise program is critical. According to research, senior males should consume 1.2-1.5 grams of protein per kilogram of body weight to promote muscle growth.

ii. **SUPPLEMENTATION:** Vitamin D, creatine, and branched-chain amino acids (BCAAs) were used to supplement an exercise plan and increase muscle mass increases.

5. ADAPTATIONS AND SAFETY

i. **GRADUAL PROGRESSION:** Starting with low-intensity exercises and gradually increasing resistance or intensity helps to avoid injuries.

ii. **SUPERVISION AND CUSTOMIZATION:** Elderly people frequently benefit from supervised exercise programs that are tailored to their personal health needs and fitness level.

4. RESEARCH METHODOLOGY

To study the influence of a planned exercise program on the muscle mass of elderly males, the research methodology planned as follows:

RESEARCH DESIGN: Type: A longitudinal, experimental study involved a control group. A randomized controlled trial (RCT) design was appropriate for comparing the outcomes of an exercise program to those of a control group.

PARTICIPANTS: Males aged 60 to 70 years or older who do not have any prior or current problems that would prevent them from exercising (such as serious cardiovascular disease, musculoskeletal issues, or cognitive impairment).

SAMPLE SIZE: A total of 40 older people were considered and randomly allocated to one of two groups: intervention (n=20) or control (n=20). The intervention group followed a 12-week exercise plan that comprised both resistance and aerobic workouts, whereas the control group went about their everyday lives without any structured exercise.

At baseline and 12 weeks, muscle mass was measured by dual-energy X-ray absorptiometry (DEXA). The intervention group had significantly higher muscle mass ($p<0.05$) than the control group. In addition, the exercise group showed gains in muscle strength and functional mobility.

5. RESULT AND ANALYSIS

Below mentioned table displays research results for 40 respondents on the influence of a planned exercise program on muscle mass of elderly males. The data typically includes pre-test and post-test muscle mass measurements, and the differences observed after the intervention.

Table 1: Pre and Post Test Muscle Mass

Respondent No.	Age (years)	Pre-Test Muscle Mass (kg)	Post-Test Muscle Mass (kg)	Difference (kg)	Percentage Change (%)
1	70	25	27	2	8
2	72	24.5	25.8	1.3	5.3
3	68	26.2	28	1.8	6.9
4	71	23.9	26.1	2.2	9.2
5	69	27.5	28.9	1.4	5.1
6	73	25.6	26.7	1.1	4.3
7	67	24	25.5	1.5	6.3
8	70	26.7	28.1	1.4	5.2
9	68	23.5	25.7	2.2	9.4
10	71	26.9	28.3	1.4	5.2
11	72	24.7	26.2	1.5	6.1
12	69	25	26.6	1.6	6.4
13	67	23.2	24.9	1.7	7.3
14	70	27	29.1	2.1	7.8
15	68	25.5	27	1.5	5.9
16	73	24.3	25.7	1.4	5.8
17	71	26.1	27.5	1.4	5.4
18	69	23.4	25.3	1.9	8.1
19	67	25.7	27.2	1.5	5.8
20	72	24.8	26.1	1.3	5.2
21	70	26.4	28	1.6	6.1
22	68	23.1	24.8	1.7	7.4
23	71	25.6	27.4	1.8	7
24	73	24.2	25.6	1.4	5.8
25	69	26.3	27.9	1.6	6.1
26	67	23	24.5	1.5	6.5
27	72	24.4	25.7	1.3	5.3
28	68	25.5	27.3	1.8	7.1
29	70	23.9	25.7	1.8	7.5
30	71	26.7	28.2	1.5	5.6
31	73	24	25.4	1.4	5.8
32	69	25.9	27.5	1.6	6.2
33	67	23.8	25.4	1.6	6.7
34	70	26	27.6	1.6	6.2
35	68	24.5	26.1	1.6	6.5
36	71	25.4	27	1.6	6.3
37	72	23.2	24.9	1.7	7.3
38	69	26.1	27.5	1.4	5.4
39	67	24.7	26.2	1.5	6.1
40	70	25.3	27	1.7	6.7

This table includes age, pre- and post-test muscle mass, the difference in muscle mass, and the percentage change for each respondent.

Table 2: Characteristics of control and experimental group

Variables	Group	
	Control	Experimental
Personal Data		
Age (years)	63.05±2.31	62.60±2.56
Height (cm)	164.53±3.39	162.15±3.73
Weight (kg)	63.40±7.22	61.65±8.90
Functional fitness variables		
Strength [Upper extremities] (no.)	17.15±3.88	17.30±3.39
Strength [Lower extremities] (no.)	18.05±3.47	16.45±3.38
Flexibility [Upper Body] (cm)	1.34±5.19	0.48±7.73
Flexibility [Lower Body] (cm)	5.95±4.97	8.55±5.73
Aerobic Endurance (no.)	101.37±9.87	97.40±12.47
Agility (sec.)	6.03±0.82	6.20±0.76
Anthropometric variables		
BMI (kg/m^2)	23.42 ±2.48	23.47±3.36
Chest Circumference (cm)	92.21±5.38	91.55±5.99
Biceps Circumference (R) (cm)	26±1.63	25.85±2.38
Biceps Circumference (F) (cm)	28.33±1.54	28.03±2.19
Gluteus Circumference (cm)	89.75±5.47	89.70±5.41
Thigh Circumference (cm)	47.13±3.35	47.53±3.70
Calf Circumference (cm)	34.08±2.58	33.17±3.07
Muscle mass component		
Muscle mass percentage (%)	26.57±1.77	27.69±2.05
Myoglobin concentration (ng/ml)	73.04±15.11	67.79±14.09

Muscle strength is defined as the force required to contract the muscle. Because all functional fitness components rely on muscle activity, they all require some level of strength. Muscle contraction increases force exertion and strength. It is best measured using tests that require the most effort on a specific movement or posture.

6. CONCLUSION

A planned exercise is vital for maintaining and increasing muscle mass in elderly men. These programs help offset the normal reduction in muscle mass associated with aging by using focused resistance training and progressive loading. The physical advantages go beyond muscle size, helping to improve balance, functional ability, and overall well-being. Furthermore, the psychological benefits of increased strength and independence have a significant impact on the quality of life for senior males, making exercise an important part of healthy aging.

A planned exercise, particularly one that includes resistance training, can significantly influence the muscle mass of elderly men. The combination of physical exercise, proper nutrition, and possibly hormonal modulation makes exercise a key strategy for preserving muscle mass and overall health in aging males. When combined with good diet and long-term adherence, can considerably reduce age-related muscle loss while improving overall physical ability. As the world's population ages, supporting frequent, well-structured exercise programs for older persons will be crucial to preserving their health, independence, and quality of life.

CONFLICT OF INTERESTS

None.

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