A STUDY TO COMPARE THE EFFECTIVENESS OF STRETCHING EXERCISE VERSUS ECCENTRIC EXERCISE AMONG GERIATRIC POPULATION

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ABSTRACT

In the age of 80 years humans generally loss 30-40% skeletal muscle fibers, The main features associated with ageing skeletal muscles are muscle weakness, decrease flexibility, vulnerability to certain types of injury, and impaired functional restoration which result in the deterioration of physical performance and function. Sarcopenia is defined as the loss of skeletal muscle mass and strength with increased age. Compared with concentric force, eccentric force shows relatively less decline with age (2-48%). In this study was conducted among 20 elderly peoples using convenience sampling method. They divided into two groups and one group will get eccentric exercise and another group get stretching exercise. And data were analyzed using descriptive statistics.

KEYWORDS: Eccentric exercise, stretching exercise, sarcopenia, Lower extremity function, Aging

INTRODUCTION

By the age of 80 years, humans generally loss 30-40% of their skeletal muscle fibers, partially type II fibers. In general muscle mass of 60-70 years olds decrease 70-80% of that younger people (<60 years old)[(1,2)]. The main features associated with ageing skeletal muscles are muscle weakness, decrease flexibility, vulnerability to certain types of injury, and impaired functional restoration which result in the deterioration of physical performance and function[(3)].Lower extremity strength decreases linearly with age in both men and women as shown by numerous cohart studies[(4,5)].Sarcopenia is defined as the loss of skeletal muscle mass and strength with increased age[(6,7)]. In recent studies gait speed, or walking velocity was heighted as a major indicator of mobility decline or sarcopenia in geriatric population[(8,9)].The preservation of eccentric strength in older adults is a well- established phenomenon[(10)]. Compared with concentric force, eccentric force shows relatively less decline with age (2-48%). Thus, preservation of eccentric strength in elders under pins the therapeutic potential of eccentric exercises in this population[(10)]Eccentric muscle contraction involves a lengthening contraction that has greater force than shortening contraction with less energy expended per unit of muscle force. Although the mechanisms remain unclear, an understanding of why older adults show this relative maintenance of eccentric strength could be relevant for practical applications such as training and rehabilitation of elderly people[(10)]. While the systemic reviews have concluded that there is in sufficient evidence to show a beneficial effect of stretching injury risk and movement performance. It is well established that chronic stretching can effectively increase joint range of motion (ROM). The increased joint motion after stretch training has been attributed to mechanical and neural factors as well as tolerance to stretch. Stretching is commonly utilized to stretch the muscle and increase the ROM around the joint and theorized to improve balance performances.

AIM:

To determine to compare the effectiveness of eccentric exercises and the stretching exercise

among the geriatric population.

OBJECTIVE:

To determine effectiveness of eccentric exercise among geriatric population To determine effectiveness of stretching exercise among geriatric population
Compare the effectiveness of the eccentric exercise and stretching exercise among geriatric population

BACKGROUND AND NEED OF THE STUDY:

Older adults are more likely than other age groups to suffer serious injury from a fall and more than 40% of community dwelling adults over 65 years of age fall each year, making falls the leading cause of injury related death[20]. Deficits in muscle power are even more important than muscle strength for safe mobility function through dynamic balance and protective responses[21,22]. Eccentric resistance exercise with its high-force producing potential, at low energetic cost may be ideally suited to address muscle impairment in this older population. The proper duration and frequency are very important when applying stretching techniques Bandy and Irion stated that applying a stretching technique one time for 30 seconds was the most effective duration, because the extensibility was not increased further in application lasting more than 30 seconds[23,24,25]. The purpose of this study is to compare the effectiveness of the eccentric exercise and the stretching exercise among geriatric population.

HYPOTHESIS:

- Alternative hypothesis:

There is a significance difference between the effectiveness of the eccentric exercise and the stretching exercises among geriatric population.

- Null hypothesis:

There is no significant difference between the effectiveness of the eccentric exercise and the stretching exercise of among geriatric population

REVIEW OF LITERATURE:

1. Hoogeboom et al (2020) found that the scores for the dutch version of LEFS showed good internal consistency test- retest reliability as well as construct and discriminant validity.
2. Liangetal (2020) founds that the scores for the modified LEFS reliability and good construct validity in individuals which low back pain.
3. Dr. Bhoomika Gunvantbhai Brahmbhatt et al (2019) concluded that the lower balance and functional scores were related to increase risk of falls and probability of fracture and there was a strong positive relationship between balance and the function status.
4. SAMANTHA L.JOHNSON et al (2018) found that eccentric training was sufficient to yield improve performance on balance and strength.
5. SIEM A DINGEMANTS et al (2018) concluded that high scores were observed for the LESF throughout the whole population, although it did decrease with age. Men had a slightly higher score than women.
6. VERHEY et al (2018) found that the LEFS scores showed good reliability, validity and responsiveness in patients who had lower extremity dysfunction resulting from stroke.

7. JOE-YOUNG LIM (2016) concluded that can be performed easily and utilize eccentric strength, which is respectively spared during the aging process to improve both force and velocity in people with age related muscle atropy.
8. RAVISHANKAR REDDY et al, (2016) concluded that 10 weeks of lower extremity stretching exercises are effective in improving single limb stance time and burg balance scale. So lower stretching exercise are effective in improving balance and thereby decreasing falls in elderly.
9. RAJ et al (2012) observed no significant difference between training regimes for most of the maximal strength test.
10. SMEE DJ et al (2012) have shown a strong relationship between falls risk and physical functionality in their study.
11. NEULS PD et al (2011) explained the usefulness of berg balance scale to predict fall in the elderly.
12. MULLER et al (2009) identified significant improvement in isometric leg extension strength and eccentric coordination in the eccentric component of movement (Ecc) group.
13. REEVES et al (2009) found the eccentric torque increased significantly for the eccentric training group, but not for the conventional group, while concentric torque increased.

METHODOLOGY:

STUDY POPULATION: Old age group people or geriatric people. SAMPLE SIZE: 20 samples
SAMPLING METHOD: Random sampling method. STUDY DESIGN: Comparetive study.
STUDY SETTING: Clinical setting. STUDY DURATION: 4 Weeks of study.

INCLUSION CRITERIA

Gender- Both male and female. Age- Above 60 years.
Willing to participate.

Ability to participate in an exercise programme safely. Sarcopenia.

EXCLUSION CRITERIA

THR

TKR.

Trauma.

Rheumatology disorder.

Recent surgery in lower extremity. Cardiac problem.
Cartigosteriods.

Embolism.
OUTCOME MEASURES

- Performance oriented mobility assessment (POMA)
- Lower limb functional scale (LEFS)

PROCEDURE

All the subjects who meet the inclusion criteria where included in the study and informed consent was obtained from the subjects. Demographic variables like Age, sex, height, weight, BMI etc., from documented from all the subjects. Pre test scoring of all the assessment tools were done and documented.

The balance, gait analysis, ADL activities are assed with Lower extremity functional scale (LEFS), Performance oriented mobility assessment (POMA) respectively.

Lower Extremity Functional Scale (LEFS):

Lower extremity functional scale is questionnaire containing 20 questions about a person ability to perform everyday task. The LEFS can be used by clinician as a measure of patient initial function on-going process and outcomes as well as set functional goal.

Scoring instruction:

The columns on the scale are summed to get a total score, the maximum score is 80.

Interpretation of score:

The lower the score, the greater the disability. The minimal detectable change is 9 scale points.

The minimal clinically important difference is 9 scale points. Percentage of maximal function = LEFS score/80*100.

Performance Oriented Mobility Assessment (POMA):

Description:

The Tinetti assessment tool is easily administered tasks-oriented test that measures an older adults gait and balance ability[26].

Equipment need:

Hard armless chair Stop watch
15ft walk way

Completion:

Time- 10-15 minutes

Scoring-

A three point ordinal scale ranging from 0-2, “0” indicates the highest level of impairment and “2” indicates the individual independence

Total balance score = 16 Total gait score = 12 Total test score = 28

Interpretation:

25 - 28 = Low fall risk.

19 – 24 = Medium fall risk.

<19 = High fall risk.

GROUP A:

Group A was treated with Stretching exercises

GROUP B:

Group B was treated with Eccentric exercises.

GROUP A:

STRETCHING EXERCISE:

The treatment included performing hip flexion, hamstring and gastrocnemius stretching exercises[27]. The subjects used their own body weight rather than force of an external weight or an assisting person. Subjects

were instructed to perform 4 sets of stretches, holding each stretch for 30 seconds and alternating the right and left limb (8 stretches in toyal).

GASTRONEMUS STRETCH:

Stand facing a wall from 3 feet away, take one toward the wall with your right foot. Place both palms on the wall bend your right knee.
Lean forward, keeping the left leg straight and the left heel on the floor. Hold 30-60 seconds, repeate 4 times or as instructed.
Switch the legs and repeat.

HAMSTRING STRETCH:

Sit the ground in a butterfuly position.

Extend your right leg with your knee slightly bent. Then bend forward at your waist over your right leg.
You may hold your leg for support but don't force the stretch. Hold for 30 seconds, repeat this stretch for 4 repetation.
Repeat with other leg.

HIF FLEXION STRETCH:

Kneel on your right knee.

Put your left foot on the floor with your left knee at a 90 degree angle. Drive your hip forward, maintaining a straight back ,lean your so forward. Hold the position for 30 seconds, repeat the stretch 4 repetations.
Repeat with other leg.

The stretching exercises proceeded and were followed by a warm up and cool down period.

The warm up period consists of,

Side stepping to the right and the left 4 times in each direction.

3 sets of walking forward 3 steps, clapping and walking backward 3 steps.

Holding on to a chair for balance, 4 sets of lifting the right knee and then the left knee. The cool down period was consisted of,Taking a deep breath is while bringing both arms over the head and letting the breath out while bringing the arms back down
Shaking out the arms and legs.

Using a chair if needed foe balance, rotating the wrist and ankles alternatively, clock wise and then counter clock wise.
The warm up and cool down periods were identical between all subjects.

GROUP B:

ECCENTRIC EXERCISE:
The eccentric exercise training on both legs 3 days per week eccentric exercise carried out by using a resistance band or theraband.

LEG PRESS:

Participants were positioned supine with the hip and knee flexed to 90*.

The resistance band was wrapped around the heel and the resistance band held by hand[28]. Move their leg up and slowly
Hold the position for 30 seconds and repeat this exercise for 4 repetation

PRONE HAMSTRING CURL:

Participants were positioned prone with the hip and knee flexed to 90* The resistance band is wrapped around the ankle
Move their leg up and slowly

Hold the position for 30 seconds and repeat this exercise for 4 repetation Repeat this exercise for the other leg.

SEAT THERABAND CURL:

Participant were positioned in upright sitting posture

The resistance band is wrapped around ankle cue good sitting posture Pull back the leg and hold the leg for 30 seconds
Repeat this exercise for 4 repetation.

DATA ANALYSIS
LOWER EXTREMITY FUNCTIONAL SCALE:

GROUP A: STRETCHING: P = > 0.0001
t = 10.0888

df = 18

sd = 2.002

GROUP A	PRE	POST
MEAN	44.40	64.60
SD	3.44	5.3

GROUP B: ECCENTRIC: P= > 0.0001
t = 7.4613

df = 18

sd = 2.479

GROUP B	PRE	POST
MEAN	44.40	64.60
SD	3.44	5.3

PERFORMANCE ORIENTED MOBILITY ASSESMENT:

GROUP A: STRETCHING:

P = > 0.0001 t = 7.3943
df = 18

sd = 0.730

GROUP A	PRE	POST
MEAN	16.20	21.60
SD	1.23	1.96

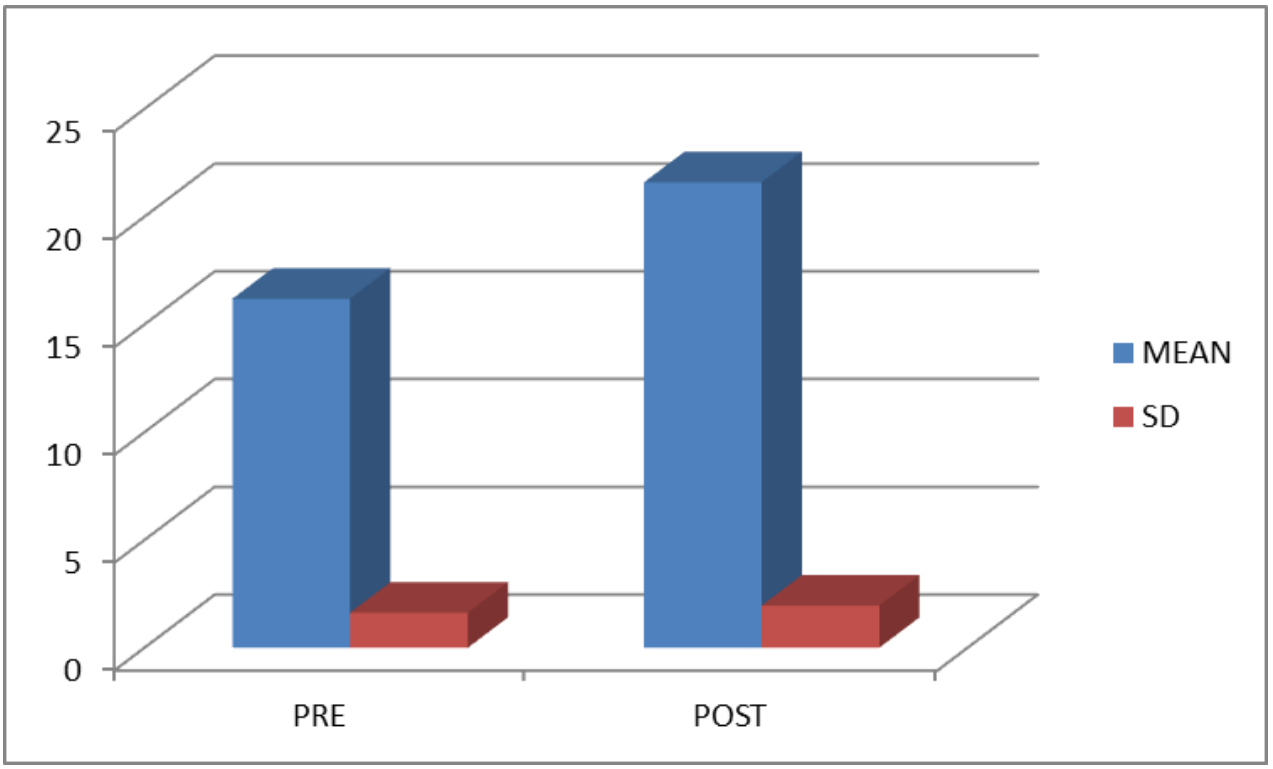
GROUP B: ECCENTRIC:

P = > 0.0001 t = 14.5196
df = 18

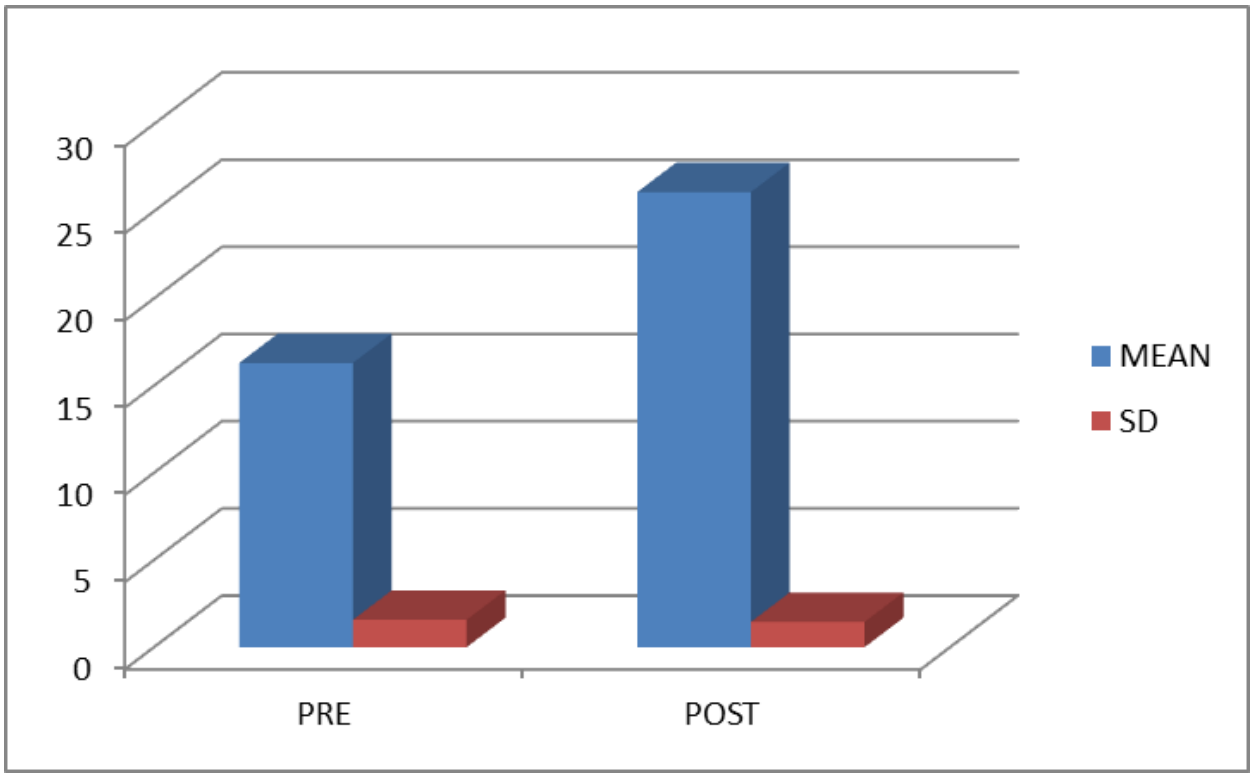
sd = 0.675

GROUP B	PRE	POST
MEAN	16.30	26.10
SD	1.57	1.45

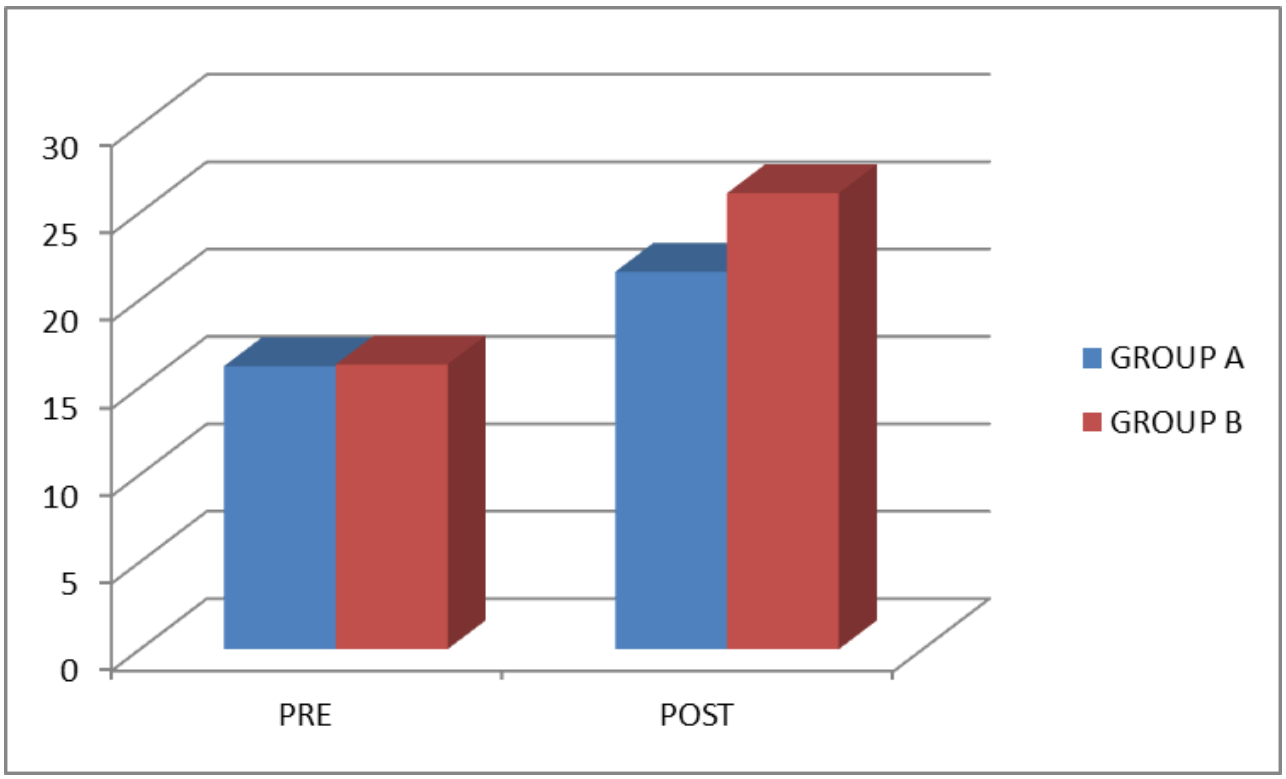
PERFORMANCE ORIENTED MOBILITY ASSESSMENT



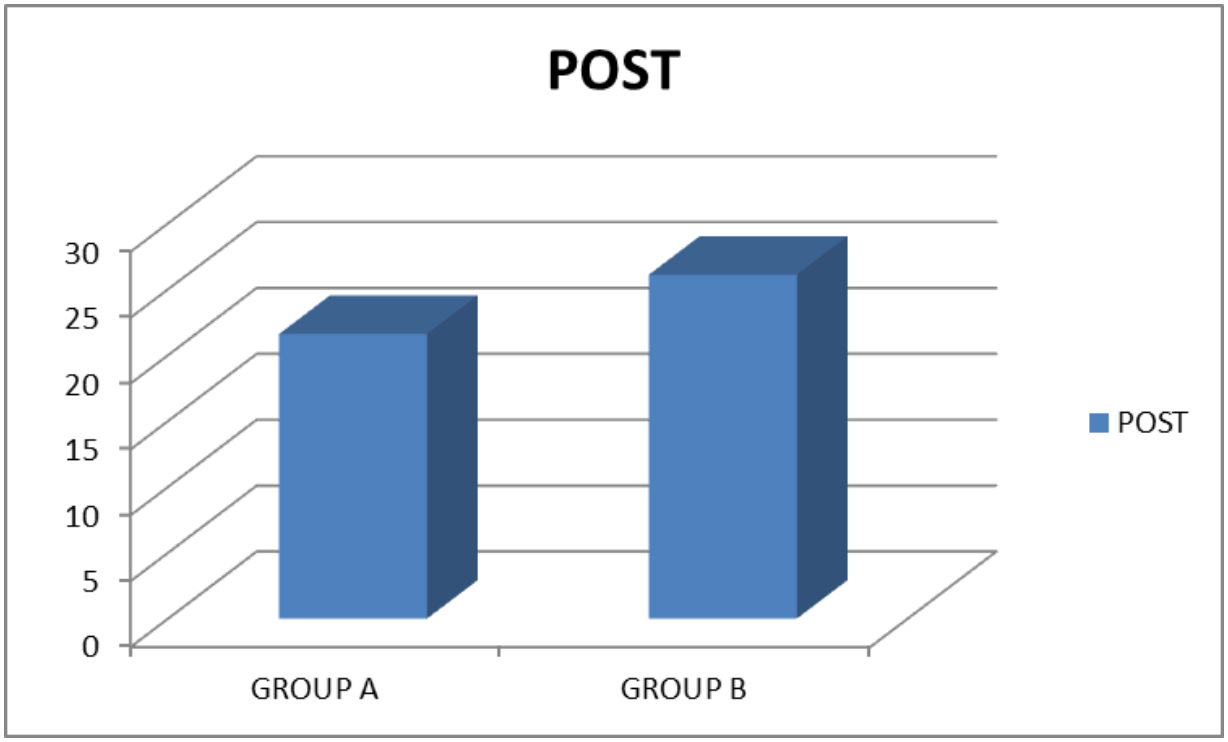
GROUP A	PRE	POST
MEAN	16.20	21.60
SD	1.63	1.96



GROUP B	PRE	POST
MEAN	16.30	26.10
SD	1.57	1.45

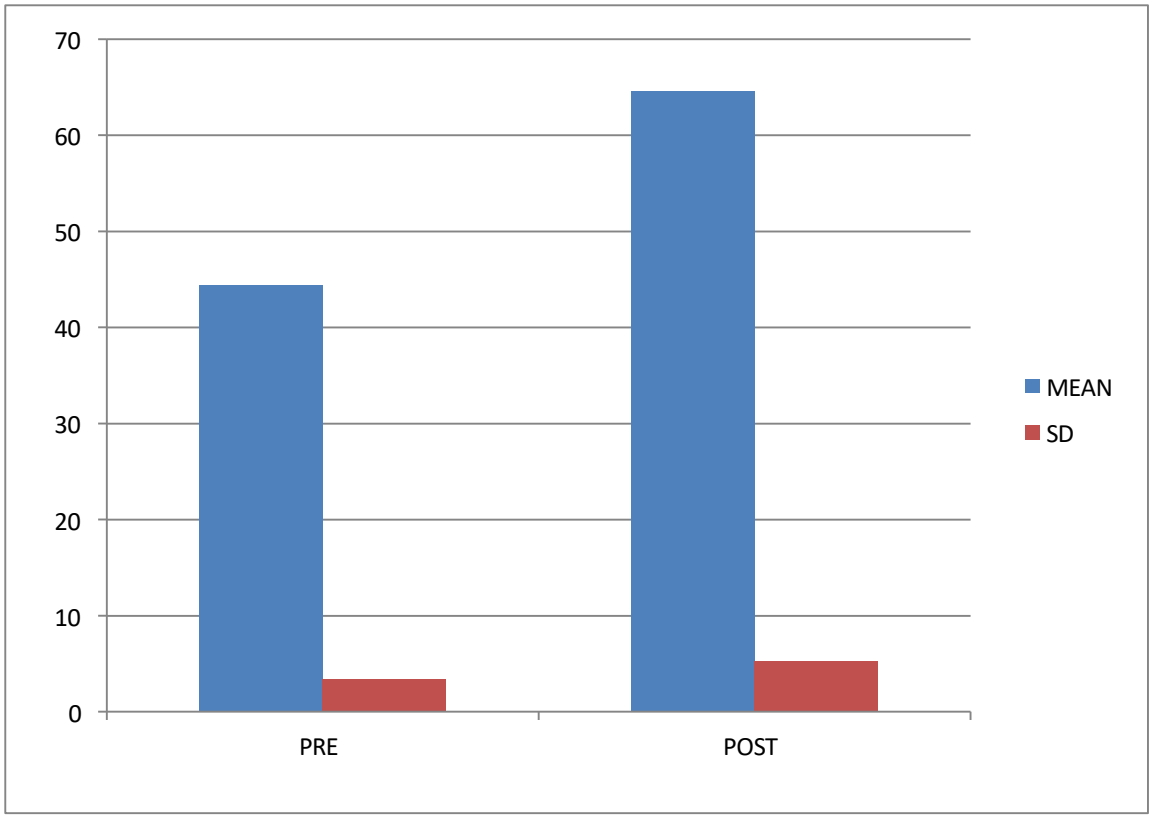


MEAN	PRE	POST
GROUP A	16.2	21.6
GROUP B	16.3	26.1

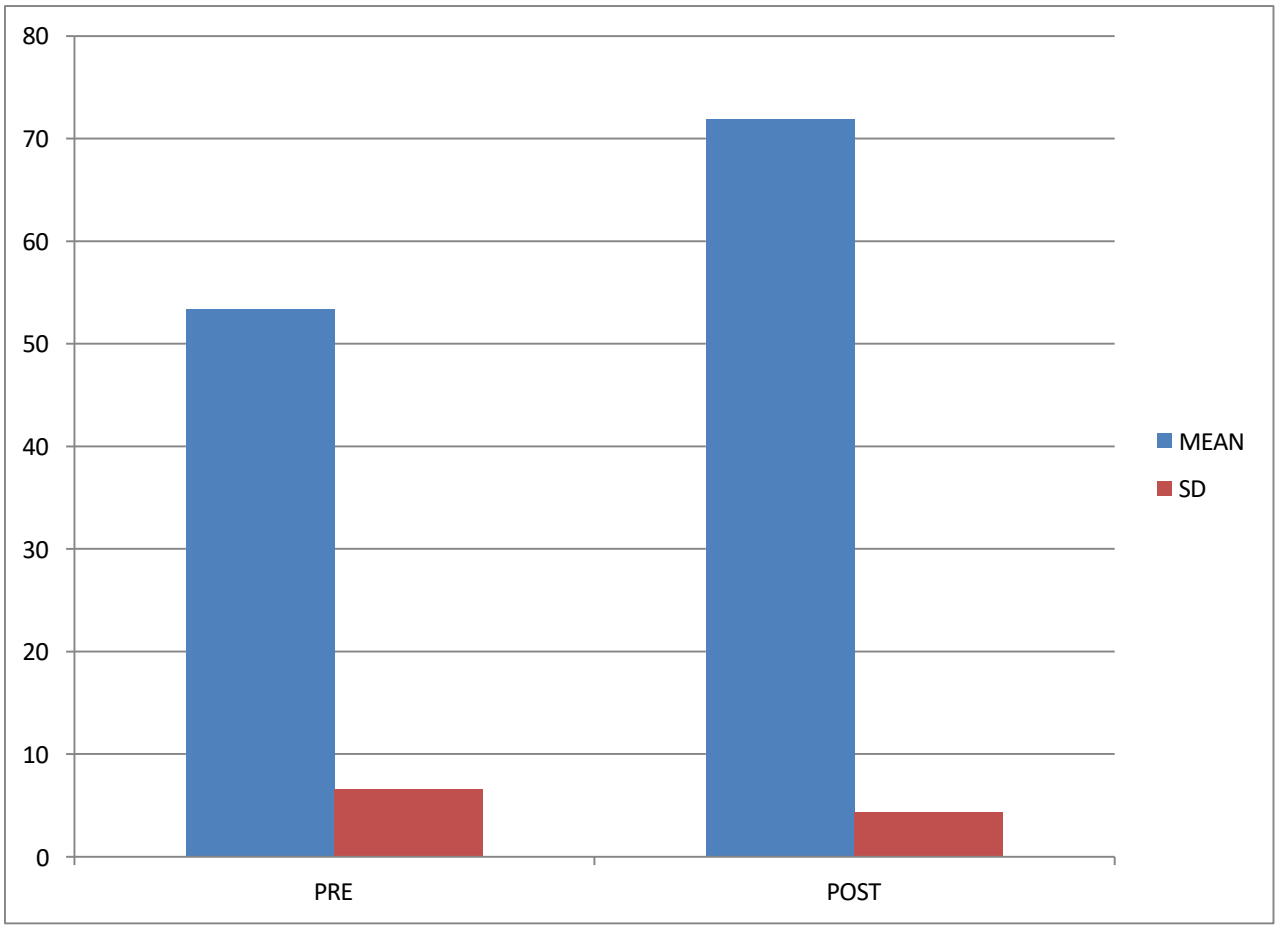


MEAN	POST
GROUP A	21.6
GROUP B	26.1

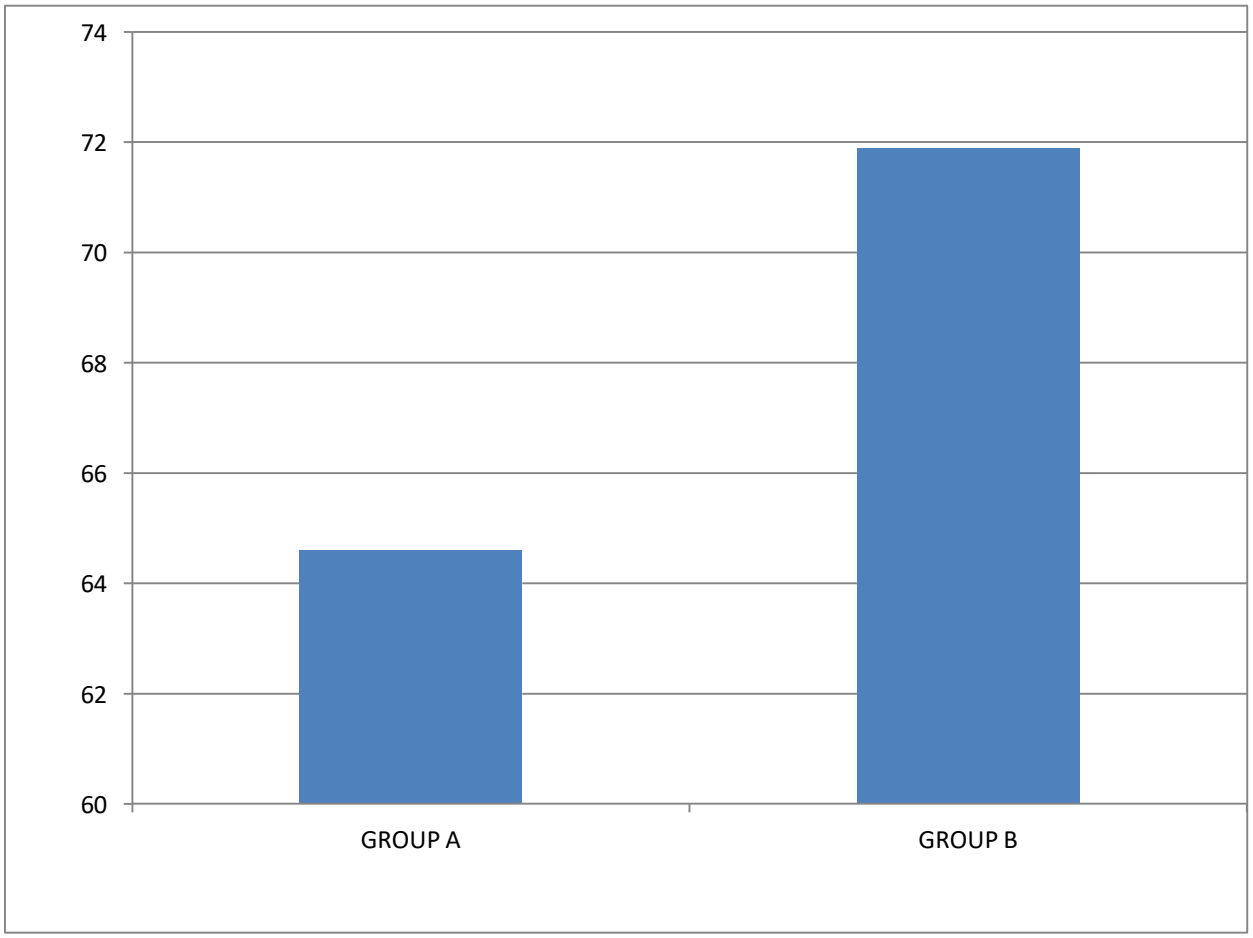
LOWER EXTERIMITY FUNCTIONAL SCALE



GROUP A	PRE	POST
MEAN	44.4	64.4
SD	3.44	5.3



GROUP B	PRE	POST
MEAN	53..4	71.9
SD	6.57	4.28



MEAN	POST
GROUP A	64.6
GROUP B	71.9

RESULT
Inference:

GROUP A (LEFS):

Pre test and post test mean values are significantly different. Hence there is a significant improvement in lower extremity functional scale values in post test value compared to pre test value.

GROUP A (POMA):

Pre test and post test mean values are significantly different. Hence there is significant improvement in performance oriented mobility assessment scale values in post test value compared to pre test value.

GROUP B (POMA):

Pre test and post test mean values are significantly different. Hence there is significant improvement in performance oriented mobility assessment scale values in post test value compared to pre test value.

GROUP B (LEFS):

Pre test and post test mean values are significantly different. Hence there is significant improvement in lower limb function scale value in post test compared to pre test value

FINAL RESULT:

The above pre test and post test mean value tables shows that the both the groups were effective in improving the flexibility and ADL activities. But the GROUP B eccentric exercises shows the better or slightly higher improvement in ADL activities, functional abilities and flexibility in older age people than GROUP A with stretching exercise.

DISCUSSION

Thus the present study was intended to investigate the effectiveness of stretching exercises versus eccentric exercises among the geriatric population.Eccentric exercise has several important therapeutic advantages aging population including low metabolic cost and minimal cardio respiratory burden.Another reason for the usefulness of the eccentric exercises is the less delayed onset of the muscle soreness in older population.The potential advantages of eccentric resistance training might be particularly important during the initial stage of resistance training interventions for elder adults with poor muscle strength.Previously study states that resistance exercises results in negatively, eccentrically induced work were applied to older cancer surviours using a specially designed motor driven ergonometer.To date consistent with evidence presented above, a number of students reported advantages of eccentric exercises versus concentric resistance training.However the other studies have reported little or no additional benefits of eccentric resistance training over conventional training.Wolf et al, Harcla et al and Shwnwaycook et al. All there studies used individualized exercise programme in order to improve functional balance performance.All the results of the aforementioned and this study show that deterioxtion of balance function can be reserved with training

CONCLUSION:

Both the eccentric exercise and stretching exercise will show the improvement in ADL and flexibility for older aged people. The eccentric exercise will show more significant improvement than the stretching exercise in older aged people.

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