



EFFECTIVENESS OF STATIC BALANCE EXERCISE ON FEAR OF FALL AND BALANCE IN ELDERLY – A PILOT QUASI EXPERIMENTAL STUDY.

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ABSTRACT

Introduction: The rapid increase of elderly populations brings greater attention to the loss of independence in individuals 60 years and older. This loss of independence is related to a decrease in functional capacity in completing activities of daily living (ADL) leading to an increased occurrence of falls which is a leading fear of the elderly due to its serious health consequences.

Material and methodology: To determine the effectiveness of static balance exercise on FES-I for fear of fall and Tinetti mobility test (TMT) or performance oriented mobility assessment (POMA) for balance in elderly. The study design was Quasi Experimental Study. The study was conducted in Parul Sevashram Hospital, Vadodara. Twenty elderly peoples working at parul sevashram hospital were included in study. Static balance exercise was given four times a week for six weeks. Fear of falling was assessed with Short Fall Efficacy International (FES – I), Balance was measured with POMA. Paired t-test was used for the analysis of the data.

Results: After six weeks the intervention was given showed significant positive changes in the FES-I (P = 0.003), POMA (P = 0.002). significant improvements were found in Elderly on fear of fall and balance; after intervention.

Conclusion: static balance exercise is feasible and leads to decreased fear of falling, and increase balance in Elderly.

Keywords:

Elderly, Balance, FES-I, POMA

INTRODUCTION

Due to the significant growth of the ageing population, the loss of independence among people aged 60 and up is receiving more attention. This loss of independence is linked to a reduction in functional ability in performing activities of daily living (ADL), which leads to an increase in the occurrence of falls, which is a major concern among the elderly due to the catastrophic health repercussions.^(1,2,9)

Biological ageing is a multifaceted phenomenon that involves significant changes in the activity of cells, tissues, and organs, as well as a decrease in effectiveness due to a variety of physiological processes.^(3,4,5,9) Posture control is altered as these physiological systems age and deteriorate, resulting in gait irregularities and postural

instability.^(6,7,9) When it comes to mortality and morbidity rates, as well as the social and economic implications of falls, postural instability and lack of functional autonomy are public health concerns among the aged.^(8,9)

Many areas of motor control are compromised by ageing in the elderly, resulting in slower and tiny coordinated motions, according to studies. A reduce in the sensitivity of neural receptors, a less in the speed of the brain's central processing systems, cognitive decline, and a decrease in the capacity of power production in motor systems all contribute to a decline in postural stability.^(10,11,12,13)

For autonomous activity, balance control is critical. Muscle deterioration in the elderly, as well as the difficulty they face with daily activities, reflects the progression of ageing. The capacity to maintain balance is hindered. The risk of falling increases as a result of muscle weakness or functional constraints. Because of the fear of falling and losing function, daily activities may be restricted, which may increase the chance of falling. As a result, activities reduced over time, resulting in a decline in senior people's quality of life and mental health. If elderly people follow a regular exercise routine, their gait, balance, and muscle strength will improve, as will their capacity to exercise, resulting in improved functional capacities. As a result, balance training can increase the stability of elderly people and lower their risk of falling.^(14,15,16,17)

There has been little research published on the effectiveness of static balancing training alone in improving stability. Balancing Boards, balance discs, and other balance/stability devices used in many of the research noted above, on the other hand, are designed for a fit population. For the elderly, such balance exercises are prohibitive since they are difficult to execute and even harmful. Even these exercises, depending on the frailty of the senior participants, pose a risk of falling if not supervised. Kita is one of the few balance exercises that has precise guidelines. Static balancing exercises, according to research, may be useful in preventing falls. Regardless, balancing training for the elderly must be done in a safe and regulated atmosphere where the participant feels secure and will not be damaged if they fall.^(18,19) Need of following study is to know the safety and effectiveness of static balance exercise on small population, so that it can be applied on the larger population. Balance decreases with aging. Exercise program has significant effectiveness on improving balance. So, purpose of present study is to know the effectiveness of static balance exercise in preventing falls and balance in elderly.

METHODOLOGY

A. Source of Data: Parul Sevashram Hospital, Vadodara.

B. Method Of Collection of Data:

Study design: Quasi Experimental study.

Sample Size: in this study 20 old individuals were taken.

Sampling method: selective sampling method

Intervention Duration: 4days/ week for 6 weeks

C. Inclusion criteria:

1. Age group between 60-70 years.
2. No use of walking aids.
3. Participants of both male and female was included.
4. The ability to live independently: FIM Scale.
5. Ability to follow simple commands.

D. Exclusion criteria:

1. Any neurological disorders such as cerebral disorders, stroke, Parkinson etc.
2. Vertigo
3. Any severe cardiovascular disorders.
4. Fractures of lower limb last 6 months.

E. Materials used in study:

1. Pen
2. pencil
3. paper
4. Chair
5. Figure of eight walk
6. stepping stool

F. Outcome measures:

1. FES-I(Short FES-I)
2. POMA or TINETTI mobility test

G. Ethical Clearance:

The Parul University Institutional Ethics Committee for Human Research granted ethical approval because the study involves human beings (PU- IECHR). The participants in the study were also asked to sign a formal consent form.

H. PROCEDURE:

Elderly peoples was taken from parul sevashram hospital

Assessed for eligibility =
35

Did not meet inclusion criteria (n=15)

Excluded

reason for exclusion

- * use of walking aids
 - * Age of above 70
 - * Do not live independently
- Exclusion criteria
- 1.) fractures of lower limb
 - 2.) vertigo
 - 3.) cardiorespiratory problems

Sample size (N) =20

Pre test assessment

1. Fall efficacy scale (FES-I)
2. Tinetti mobility test (POMA)

Exercise for 6 weeks (24 sessions)

1. Warmup =5 min
 2. Exercise protocol =30 min
 3. Cool down =5 min
- 40 min , 4 days/week for 6 weeks

Post test assessment

1. Fall efficacy scale (FES-I)
2. Tinetti mobility test (POMA)

Out come data(N) =20

Statistical methods to used and data analysis: using t test

Exercise Protocol:

Before starting treatment program there was given a specific warm up (5 minutes) for subjects, after warm up the treatment training for 30 minutes, and end of training there was given a cool down for 5 minutes.

Exercise	Week-1	Week-2	Week-3	Week-4	Week-5	Week-6
Heel raise, toe raise	3 reps	3 reps	5 reps	5 reps	8 reps	8 reps
Sit down and get up from chair	5 reps	5 reps	8 reps	8 reps	10 reps	10 reps
Normal walking in a straight line	A 5-m normal walk	A 5-m normal walk	An 8-m normal walk	An 8-m normal walk	A 10-m normal walk	A 10-m normal walk
Standing on one leg (alternating legs)	3 reps	3 reps	5 reps	5 reps	8 reps	8 reps

Exercise	Week-1	Week-2	Week-3	Week-4	Week-5	Week-6
Tandem stand	5 reps	5 reps	10 reps	10 reps	15 reps	15 reps
Step up and down	5 reps	5 reps	8 reps	8 reps	10 reps	10 reps
Standing unsupported with feet together	3 reps	3 reps	5 reps	5 reps	8 reps	8 reps
Side way walking	3-m for 3 reps	3-m for 5 reps	5-m for 3 reps	5-m for 5 reps	8-m for 3 reps	8-m for 5 reps
Standing with feet together with eyes closed	3 reps	3 reps	5 reps	5 reps	5 reps	8 reps
Figure of 8 walking	3 reps	3 reps	5 reps	5 reps	10 reps	10 reps



figure no.1 side walking



figure no. 2 standing on one leg

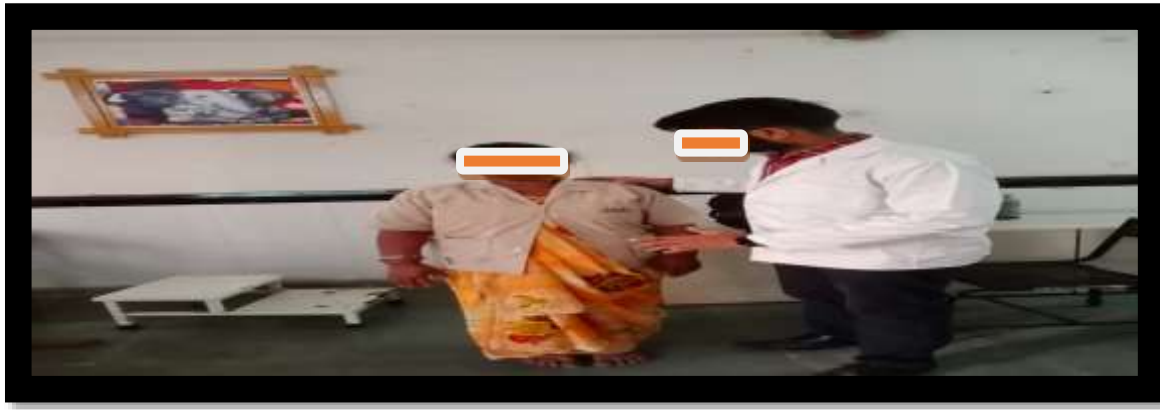


figure no. 3 : standing with feet together with eyes closed



figure no.4 toe raise



figure no.5 heel raise

DATA ANALYSIS:

In this study, twenty persons, both male and female, between the ages of 60 and 70, were recruited. All of the study participants attended the therapy sessions and were evaluated on outcome measures before and after the intervention.

STATISTICAL ANALYSIS:

Descriptive statistical analysis was accomplished in the present study. Outcome measurement was measured using Short FES-I and POMA Scale. Significance was assessed at 5% level of significance $p < 0.05$ (2-tailed hypothesis test considered).

Statistical test:

1. The normality test was used to determine if the data obtained followed a normal distribution or not.
2. Demographic data was analysed using descriptive statistics.
3. The significance of parameters before and after the test was determined using the Paired t- test.

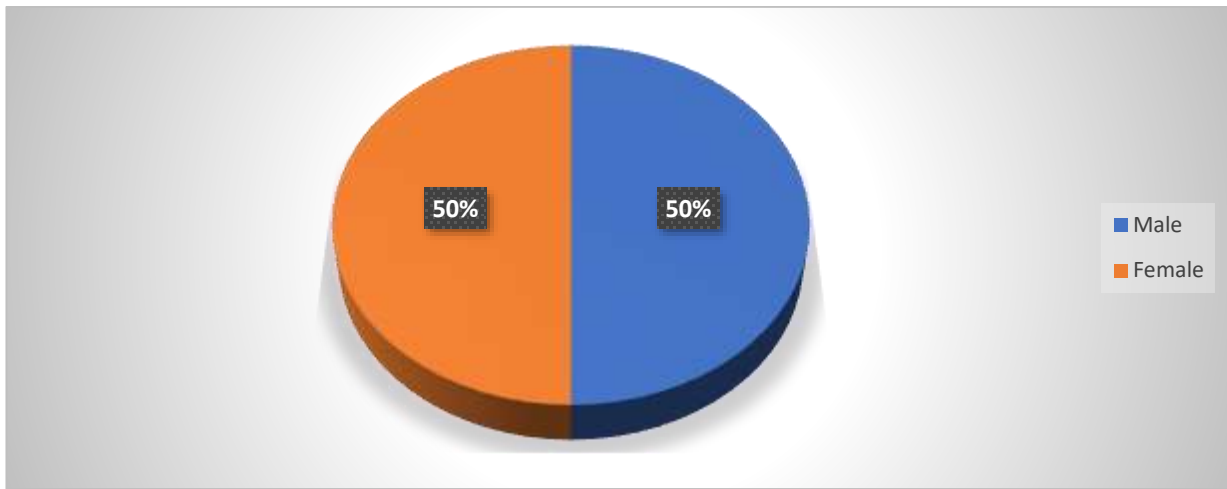
Statistical software:

The statistical software namely SPSS 2.1.0.1 was used for the analysis of data, Microsoft Word and Excel were used to generate graphs, tables.

RESULT:

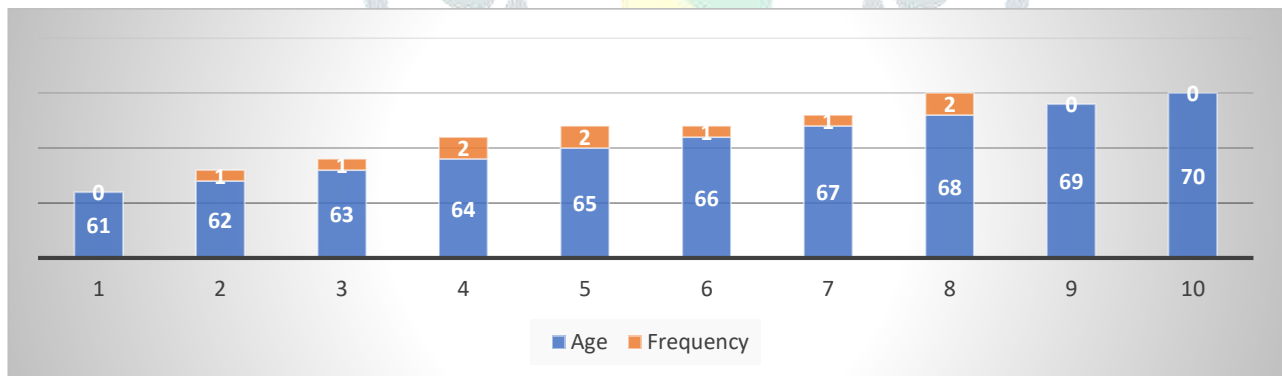
table: 1 gender distribution

TABLE NO. 1 : GENDER DISTRIBUTION OF SUBJECTS			
Characteristic		Experimental Group	Total
Gender	Male	10	10 (50%)
	Female	10	10 (50%)
	Total	20	20 (100%)

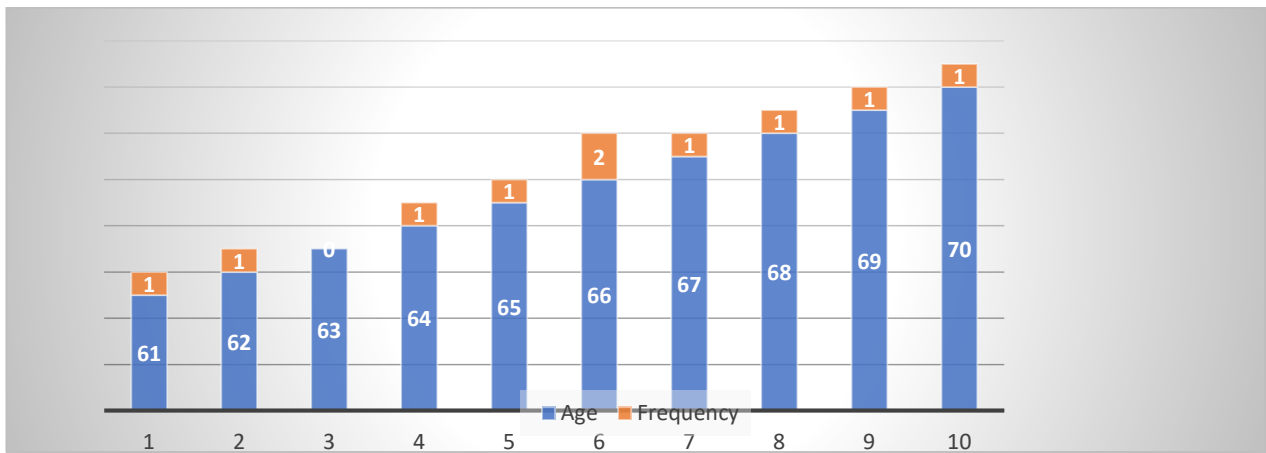


Pie chart showing Gender distribution in the study

graph: 1 gender distribution of male and female in the study



graph: 2 age frequency distribution of female in the study



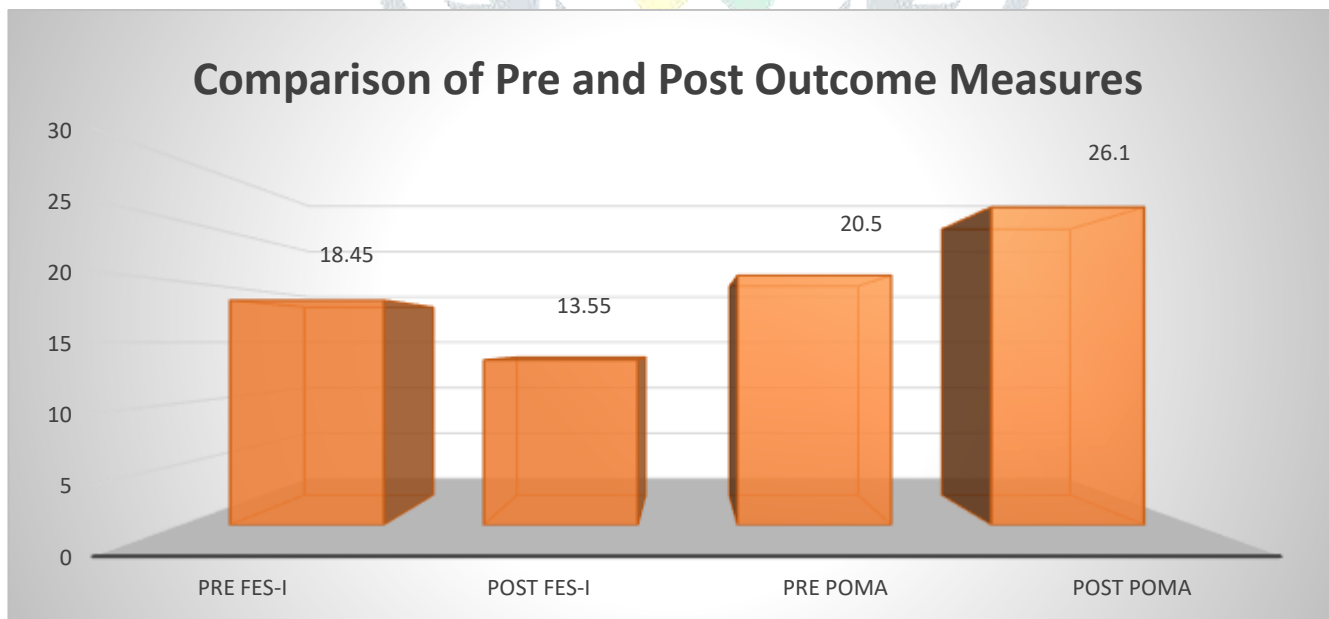
graph: 3 age frequency distribution of male in the study

table: 2 descriptive analyses

Outcome measures	N	Mean	SD
Pre FES-I	20	18.45	2.25
Post FES-I	20	13.55	2.18
Pre POMA	20	20.50	2.16
Post POMA	20	26.10	1.41

table: 3 comparisons of pre and post outcome measures

Outcome Measures	Experimental Group				t-value	p-value
	Pre test		Post test			
	Mean	SD	Mean	SD		
Short FES-I	18.45	2.25	13.55	2.18	16.14	0.0031
POMA or TINETTI	20.50	2.16	26.10	1.41	-14.52	0.002



graph: 4 comparisons of pre and post outcome measures

DISCUSSION:

The result of the present study showed that there was positive effect of static balance exercise on fear fall, balance in elderly working peoples of Parul Sevashram Hospital.

In this study total 20 subjects were taken between 60 to 70 years of age including both male and female.

The result of present study showed that there was improvement in FES- I scale and POMA scale.

Table 1, Graph 1, 2 and 3 describes about the gender and age distribution of experimental group consisting of 10 people's males, 10 people's females of which age ranged between 60-70 years.

Short FES-I of experimental group is described in table 2,3 and Graph 4. In experimental group the mean value of post intervention decreased to 13.55 from 18.45.

POMA Scale of experimental group is described in table 2,3 and Graph 4. In experimental group the mean value of post intervention increased to 26.10 from 20.5.

Therefore, after reviewing the tables and graphs for each objective whether it may be fear of fall and balance comparison of experimental group post intervention results revealed that there is both objective is significant, but balance is highly significant compare to the fear of fall.

The reduced fear of fall and increased balance in elderly can be considered because of physiological effect of static balance exercise which help in decreased fear of fall and enhanced balance by activating proprioception and stability.

The Multi-system physical Exercise (MPE), which included proprioceptive, reaction time, balance training exercises, and muscle strengthening was found to improve fall risk, muscle strength, proprioception, postural sway, reaction time, and health-related quality of life in 72 prefrail adults (sixty-five years and older) with mild to moderate fall risk in a randomized control trial.⁽²⁰⁾

So, when static balance exercise was given to the peoples with fear of fall and balance problem in elderly showed better improvement in reduced fear of fall and increased balance.

CONCLUSION:

The results of this study showed that static balance exercises were successful in reducing fear of falling, increasing balance. But balance improved much more than fear of fall.

LIMITATIONS OF THE STUDY:

1. The study's subjects were drawn from a single geographic location.
2. The study's sample size was small.

FURTHER RECOMMENDATIONS OF THE STUDY:

1. A large sample size could be used in a similar study.
2. By including one control group, the study can be made more interesting.

FUNDING:

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