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Impact of Mild Level Exercise Program on Incidence of Falls, Gait and Balance Among Elderly People at Selected Rural Areas of Belagavi District.

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Abstract:

Context: Exercises that are low-intensity can aid with balance and gait. Regular low-intensity exercise is a beneficial substitute for treating balance and gait issues brought on by ageing. **Objective:** To assess incidence of falls, gait and balance of elderly people before and after low intensity exercise program and to assess effectiveness of low intensity exercise program on incidence of falls, gait and balance of elderly people.
Setting and design: The study was conducted in selected rural areas of Belgaum district and pre experimental one group pretest post test study design was used.
Materials and Methods: Population was comprised of elderly people aged 60 years and above. The sample size was 30 and non probability purposive sampling technique was used to select the samples. Berg balance scale and Performance oriented mobility assessment scale for gait was used to assess gait and balance..
Statistical Analysis used: Descriptiveand inferential statistics were used with the helpof SPSSversion 20. **Results:** In pretest12 (40%) of elders had incidence of fall during the one month prior to pre test and is reduced in post test as 7(23.3%) were had incidence of fall after one month to interventional program. The obtained value of ‘ t’ (29) = 6.97 for gait and ‘ t’ (29) = 2.65 for balance are found significant at 0.05 level of significance, indicating that the low intensity exercise program has helped elderly to improve their gait and balance.
Conclusions: Low intensity exercise program helped elderly people to improve their gait and balance. So, such programs need to be implemented in community area to prevent incidence of fall and improve gait and balance among the elderly population.

Key-words: Incidence of fall, gait, balance, elderly people, low intensity exercise

Introduction: People above the age of 60 are becoming more prevalent very quickly, particularly in India. With 76.6 million citizens aged 60 or over, India ranks second in the globe, making up 7.7% of the total population. Due to the social and cultural changes occurring throughout Indian society, this community is dealing with a number of issues.

Falls are one of the main issues that older people face and are a substantial threat to their health and well-being. There is little research on ageing in India, despite the fact that the factors of health have been extensively studied in Western nations.

Gait, balance, and functional status changes are all correlated with ageing. Analysing these motor processes may help to spot circumstances when falling might be a possibility. Due to their prevalence and potential for negative physical, psychological, and social effects, such occurrences pose a severe threat to public health.

A major health concern for the senior population is falling. Half of the community's residents over 65 years old who fall each year—between 20 and 30 percent of them—do so more than once.

Injuries from falls happen frequently in India. Even though there are numerous old age facilities to effectively care for these older individuals, the prevalence of falls is still high. There aren't many studies on it that were conducted in India. Additionally, some study findings indicated that exercising either increased the risk of falling or had no effect on the frequency of falls. The researcher concluded that it is important to investigate the impact of low-intensity exercise programs on gait, balance, and the frequency of falls in the elderly and to design suitable interventional health treatments that can be advised to the elderly.

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Objectives of the study:

1. To assess incidence of falls, gait and balance of elderly people before and after low intensity exercise program
2. To assess effectiveness of low intensity exercise program on incidence of falls, gait and balance of elderly people

Subjects and Methods:

Research Approach and design: The quantitative post test only control group research design was used to assess the impact of mild level exercise program on incidence of falls, gait and balance among elderly people.

Research Setting: The study was conducted in selected rural areas of Belagavi district.

Population: Population was comprised of elderly people of age 60 years and above.

Sampling Technique: Non probability purposive sampling technique was used to recruit the 30 samples.

Sampling Criteria

a) Inclusion criteria:

1. Above 60 years willing to participate in the exercise program

b) Exclusion criteria:

1. Elderly people who have chronic cardiac or pulmonary disease, terminal illness, severe joint pain, dementia, progressive neurological disorder.

Development and evaluation of tool and low intensity exercise program : The following Tools were developed to generate necessary data

Performa for selected personal variables

- This consists of Age, gender, work, illness, number of meals taken per day, incidence of falls during last one month, and frequency of falls.

2**. Berg balance scale**

- The Berg balance scale is a standardized scale, developed for assessing the Balance. It consists of 14 items, each item having the score from 0 - 4 and the score ranges from 0-56.

3. **Performance oriented mobility assessment scale for gait**

The Performance oriented mobility assessment scale developed by Tinetti, Williams and Mayewski in 1986 for gait is a standardized scale. It consists of 8 items and the score range is 0-12.

LOW INTENSITY EXERCISE PROGRAMME

The low intensity exercise program was developed by the researcher through the review of research and non researched literature. First draft of Low intensity Exercise program was prepared and given for validity to experts and after that the program was finalized as follows.

Sitting In Chair

Set I

- Extend up then and back down
- Raise up and down on toes then heels
- Bring leg out to side then back towards middle
- Bring leg towards chair then forward again

Set II

- Bend arms up towards shoulders then back down again
- Push arms out away from chest then back again
- Push arms up from shoulders then back down again
- Raise shoulders up towards ears then back down again
- Roll shoulders forward then backward
- Raise arm to shoulder levels and extend forearm towards ceiling then back down
- Bring elbows in then back put from chest

Standing Balance Exercises

- Bring leg in towards middle then back out again
- Rise up on heels and toes
- March in place
- Bend up towards buttocks then back down
- Squat down and keep back straight bend at the knees only
- Kick leg straight back behind the body and don't bend knee
- Kick leg in front of body and don't bend knee
- Lunge out to side than back towards middle again
- Lunge leg in back of body then back towards front again
- Practice standing on one leg then the other, without holding on to counter.

Data collection Technique:Data collection was done after obtaining ethical clearance from institutional ethical committee. Permission for conducting research in the selected villages was obtained from Chairman Gram Panchayat. On day one pre test was conducted to assess Gait, Balance, and incidence of fall among elders. Personal variables were collected using an interview technique. Low intensity exercise program was conducted from second day to fifteenth day and post tests was conducted on twenty second day

Statistical Analysis used: The data analysis was planned by using descriptive and inferential statistics with the help of SPSS version 20.The plan for data analysis is as follows:

1. Descriptive statistics: Frequency and percentage distribution was used to analyze baseline characteristics of participants.

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2. Inferential Statistics: Paired‘t test’ computed for determining the significance of difference between pre test to post test mean gait and balance scores.
Chi-square test will be used to find out the association between gait, balance and selected socio demographic variables.

Results:

Section 1: Description of socio demographic variables of the study

The study sample composed of 30 elders. The selected personal variables are presented in Table 1.

TABLE 1

Frequency and percentage distribution of elders according to their age, Gender, work, presence of any morbidity and numbers of meals taken per day

n= 30

Socio demographic variables		F	%
Age (Years)	a. 60-70	09	30.00
	b. 71-80	16	53.30
	c. 81-90	05	16.70
Gender	a. Male	11	36.70
	b. Female	19	63.30
Work	a. Not engaged in any work	14	46.70
	b. Engaged in work	16	53.30
Kind of work	a. Kitchen work	08	50.00
	b. Office work	00	00.00
	c. Agricultural work	07	43.75
	d. Any other	01	06.25
Presence of morbidity	a. Yes	19	63.30
	b. No	11	36.70
Meals taken per day	1. One time	01	03.30
	2. Two times	17	56.70
	3. Three times	12	40.00

The data presented in the table 1 indicates that, majority 16 (53.30%) of the sample were between the age of 71-90 years, majority 19(63.30%) of samples were females, majority 16(53.30%) were engaged in work, majority 7(43.75%) were engaged in agricultural related work, majority 19(63.30%) were had associated morbidity and 17(56.70%) were taking meals two times per day.

Section 2: Information related to incidence of falls during one moth prior to pretest.

TABLE 2

Frequency and percentage distribution of elder’s according to their incidence of falls during one month prior to pretest.

N:30

Incidence of fall	Yes	12	40%
	No	18	60%
Frequency of fall	1. Onetime	9	75%
	2. Two times	2	16.7%

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	3. Three times	1	8.33%
	4. More than three times	0	0

Incidence of falls:
Data presented in table 2 reveals that, 12 (40%) of elders had incidence of fall during the one month prior to pre test.

Frequency of falls:
Overall, majority 9 (75%) of the elders had fallen once during the one month prior to pre test, 2(16.7%) had a fall twice and 1 (4%) had a history of fall 3 times in previous one month.

SECTION 3: EFFECTIVENESS OF LOW INTENSITY EXERCISES

a) Description of elder's gait and balance

The pretest and post tests Gait and balance scores obtained by the subjects were tabulated to a master data sheet and the total scores obtained by each elder in the pretest and posttests were tabulated. Mean, standard deviation, median and range of pretest and post test were computed. The findings were presented in the Table 3.

Variable	PRE TEST				POST TEST			
	Mean	SD	Median	Range	Mean	SD	Median	Range
Gait	6.17	2.69	5	2-12	8	2.32	6	3-12
Balance	32.3	11.6	37	1-49	39.57	9.92	41	21-54

Data presented in table 3 reveals the pretest and post test gait and balance scores of elderly people. It shows that,

With respect to gait, in pretest mean gait score was 6.17 with standard deviation 2.69, median value was 5 and scores ranged between 2-12. In post test mean gait score was 8 with standard deviation 2.32, median value was 6 and scores ranged between 3-12.

With respect to balance, in pretest mean balance score was 32.3 with standard deviation 11.6, median value was 37 and scores ranged between 1-49. In post test mean balance score was 39.57 with standard deviation 9.92, median value was 41 and scores ranged between 21-54.

b) Comparing pretest and posttest scores

Significance of difference between mean pretest and posttest Gait and balance scores.

In order to find out the significance of difference between means of pretest and posttest Gait and balance scores, paired't' value was computed. The data are presented in Table 4. To test statistical significance following null hypothesis was stated:

Ho_1: There will be no significant difference between the mean pre-test and post test Gait scores of elders who have received low intensity exercise.

Ho_2: There will be no significant difference between the mean pre-test and post test balance scores of elders who have received low intensity exercise.

TABLE 4

Mean, mean difference, SD difference, S_{MD}, and paired' test of pretest and posttest gait and balance scores of elders who have received low intensity exercises

n= 30

Variables	Test	Mean	Mean difference	SD_{MD}	SEMD	Paired 't' test	Level of significance
Gait	Pretest Post test	6.17 8	1.83	1.44	0.26	6.97	S
Balance	Pretest Post test	32.3 39.57	7.27	13.98	2.55	2.65	S

t' (29) = 2.04 $p<0.05$ S=Significant NS=Not significant

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The data presented in Table 4 shows that with respect to gait, the mean difference between the pretest and posttest mean gait score is 1.83. This indicates a slight increase in gait scores after undergoing low intensity exercise program. To find significance of the difference in gait score paired't' test value was computed and the obtained value of' t' (29) = 6.97 is found significant at 0.05 level of significance, indicating that the low intensity exercise program has helped elderly to improve their gait. Hence H_{o1}a is not supported and research hypothesis is supported indicating that the improvement in gait is not by chance and elderly people who have undergone low intensity exercise program have improved in their gait.

With respect to balance, the mean difference between the pretest and posttest mean balance score is 7.27. This indicates a slight increase in balance scores after undergoing low intensity exercise program. To find significance of the difference in balance score paired't' test value was computed and the obtained value of't' (29) = 2.65 is found significant at 0.05 level of significance, indicating that the low intensity exercise program has helped elderly to improve their balance. Hence H_{o2}a is not supported and research hypothesis is supported indicating that the improvement in gait is not by chance and elderly people who have undergone low intensity exercise program have improved in their balance.

c) Information related to incidence of falls during one month after to interventional program.

TABLE 5
Frequency and percentage distribution of elder's according to their incidence of falls during one month after to intervention program
N:30

Incidence of fall	Yes	7	23.3%
	No	23	76.6%
Frequency of fall	1. Onetime	6	20%
	2. Two times	1	3.33%
	3. Three times	0	0
	4. More than three times	0	0

Incidence of falls:
Data presented in table 5 reveals that reduction of incidence and frequency of falls among elderly after one month of interventional program, it shows that ,majority 23(76.6%) of elders were not had incidence of fall during the one month after to interventional program and 7(23.3%) were had incidence of fall after one month to interventional program.

Frequency of falls:
Overall, majority 6 (20%) of the elders had fallen once, 2(16.7%) had a fall twice and 1 (4%) had a history of fall two times during one month after to interventional program.

Discussion: Maximum number elders belong to the age group of 71-90 years. While considering the presence of morbidity 19(63.30%) of the elders were having the morbidity. A study was conducted previously where they compared the presence of morbidity in elderly men and women, which revealed that 50.6% of women were suffering from Hypertension and 35.8 % of them suffering from Diabetes Mellitus, and in men it is 43% and 23.9% respectively .It was found that, 25(41.67%) of the elders had a history of fall. These findings are consistent with other studies [1, 4]where the incidence of falls were 51.5% and 38% respectively. The present study revealed that 12(4.%) of the elders had fallen once, Similar findings were observed in one study [2,5]where 57% of the samples had a history of fall at least once, 31% had two falls and 19% had 3 falls. Study findings revealed that there is significant gain in Gait, Balance and significant reduction in incidence of falls. These findings were consistent with the findings of other studies which showed significant gain in the gait,[3] balance[5,6,7,8] and a significant reduction in the incidence of fall[8,9]. In contrary there are studies which revealed that exercise program had no effect in reducing fall and in spite it will increase the incidence of falls[10, 11, 12]

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