



International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

JAMSCR |Volume 10 | Issue 1 | Jan- Mar – 2022
www.ijamscr.com

ISSN:2347-6567

Research article

Medical research

Effect of functional task exercises on gait parameters in elderly individuals of Maharashtra: A randomized control trial

Akanksha N. Padte¹, Dr. Nilesh Andhare*², Dr. Shilpa Khatri³

^{1,3}College of Physiotherapy, Tilak Maharashtra Vidyapeeth, Pune, Maharashtra, India

²Indutai Tilak College of Physiotherapy, Tilak Maharashtra Vidyapeeth, Pune, Maharashtra, India.

Corresponding Author: nileshandhare88@gmail.com

ABSTRACT

Background

Elderly individuals are the individuals that are 65 years of age and above. Normal aging process causes changes in the neuromuscular system of an individual which causes restriction in walking capabilities. Walking is a basic function required in daily living. Walking speed determines individuals' stability to avoid falls, which reduces further problems and the patient's quality of life.

Aim

To study the effects of functional task exercises on gait parameters in elderly individuals of Maharashtra.

Methods

Among 79 individuals, 30 elderly were randomly allocated in two groups (15 individuals each) as per their inclusion and exclusion criteria. Gait parameters like dynamic stability, gait speed, cadence and affective level were assessed before and after training. Functional task exercises were based on state-of-the-art knowledge about human movement sciences. These specific exercises were inculcated to experimental group participants in three different phases with hydration interval in-between for 4 weeks while control group participants continued with conventional exercise program. Post training data were collected and statistically analysed.

Results

Dynamic gait index findings of experimental group compared to control group with mean (21.33±1.490) and (21.4±1.650) respectively before intervention and (22.4±1.2) and (21.933±1.481) respectively after intervention. Modified gait efficacy questionnaire of experimental group compared to control group with mean (56.66±15.776) and (50±10) respectively before intervention and (70.66±12.364) and (54.66±13.597) respectively after intervention. Cadence of experimental group compared to control group with mean (83.86±9.527) and (85.06±12.374) respectively before intervention and (91.46±8.523) and (89.46±11.598) respectively after intervention. Gait speed of experimental group compared to control group with mean (0.86±0.144) and (0.88±0.146) respectively before intervention and (1.086±0.154) and (0.98±0.145) respectively after intervention.

Conclusion

The study concludes that functional task exercise program significantly improved gait in elderly than conventional exercises.

Keywords: Elderly, gait speed, functional task exercises.

INTRODUCTION

Elderly individuals are the people who are 65 years of age and above. ⁽¹⁾ Elderly population has been represented as the fastest growing segment of world population in the 20th century. It is seen that as individuals age there is definite reduction in musculoskeletal, cardiovascular, neuropsychiatry and immune system. ⁽²⁾ Changes in neuromuscular system of a human being causes restriction in his walking capabilities because of normal aging process. Hence it is important to study the changes in gait speed of elderly ⁽³⁾Gait related changes are most commonly seen in elderly these are generally associated with decrease in muscle strength, muscle fibres and aerobic capacity. ⁽⁴⁾ All these factors together affect gait in elderly and eventually affect the patient's quality of life. When the individual walks slower the chances to fall increases which can further cause problems and affect the patient's quality of life and reduce the individual's confidence in walking. Decline in walking speed will result in reduced motivation and pre dispose to inactivity which will lead to undesirable consequences. ⁽⁵⁾

They are not able to walk the way they used is the most common complaint the elderly has regarding their gait. How they miss their normal walking speed, how it used to be time efficient now because of their slower walking speed there is always some short of delay and also fear that they may fall. A decrease at a rate of 12% to 16% per decade is seen in habitual gait speed and for fast gait speed it decreases about 20% per decade. A decrease by 9% to 11% is reported in habitual gait speed and decrease in 8% to 18% is reported in fast gait speed by Oberg et al and Bohannon between the fourth and eighth decades. Habitual gait speed is the comfortable walking speed (e.g., self-selected speed, preferred speed, normal pace). The general speed used by individuals to walk in any normal circumstances. Fast gait speed where subjects are asked to walk at as fast as possible (i.e., at maximal gait speed).⁽⁶⁾When gait speed slows below 1.0 to 1.2 m/s, elderly individuals have reported to have more difficulty crossing the street safely before the traffic light changes. This is rather very risky considering the chances of accident are rather very high, as the traffic light changes the cars start moving in speed. All these changes are associated due to their aging. ⁽⁷⁾For the reduction or prevention of functional decline with aging it is important to do some regular physical activity. In consideration of other exercise program for older

people, FTE is based on knowledge about human movement sciences and action theory. It is seen in previous research conducted for older women has shown that, by comparison with the usual care, i.e. strength exercise, FTE is more effective in improving functional performance, and that FTE is the first exercise programme with sustainable effects. ⁽⁸⁾Older individual's physical capacity is enhanced by FTE and also because it fits in with daily routines. ⁽⁹⁾

MATERIALS AND METHODS

Ethical clearance was taken from institutional ethical committee of Tilak Maharashtra Vidyapeeth, Department of Physiotherapy. 30 elderly were included in the study who belonged to the age group above 65 years, both male and female were included and the ones who were willing to participate. The individuals excluded were those who were bed ridden, those who had undergone any recent surgeries, individuals with neurological problems, and individuals with assistive devices. The modified gait efficacy questionnaire was used to evaluate older adult's perception of their level of confidence in walking during challenging circumstances. This questionnaire was given to the participants and any query regarding understanding the questions were cleared at the same time. Data were collected and statistical analysis was done.

Dynamic Gait Index was used to evaluate balance. There are 8 items that contain walking task by changing walking speeds, adding head turning, turning and stopping, walking over and around obstacles, and ascending / descending stairs. Scoring focuses on changes in balance or changes in gait patterns during the various walking tasks. Time required is 15 minutes Gait speed was measured twice during a 4-meter walk test at baseline and follow-up visits. Subjects will start the walk from a standing position at the beginning of the 4- meter path and will be instructed to walk at their usual speed. The faster of the two speeds were selected and were assumed to better represent their usual speed after becoming accustomed to the experimental setting. Cadence is number of steps taken per unit time it was measured as number of steps per minute. Cadence of about 110 steps per minute can be considered normal in male and 116 steps per minute is considered typical in female.

Sampling was done in 2 groups that is Group A, Group B by random allocation using envelope

method, after meeting the inclusion and exclusion criteria. Group A were given functional task exercises along with reactive balance control exercises. Group B were given reactive balance control exercises.

STATISTICS

A total of 30 elderly were included in which 80% were female which is more in number than 20% male. Dynamic gait index findings which are significantly improved in experimental group as compared to control group with mean (21.33±1.490) and (21.4±1.650) respectively before intervention as well as (22.4±1.2) and (21.933±1.481) respectively after intervention. Modified gait efficacy questionnaire findings which is significantly improved in experimental group as compared to

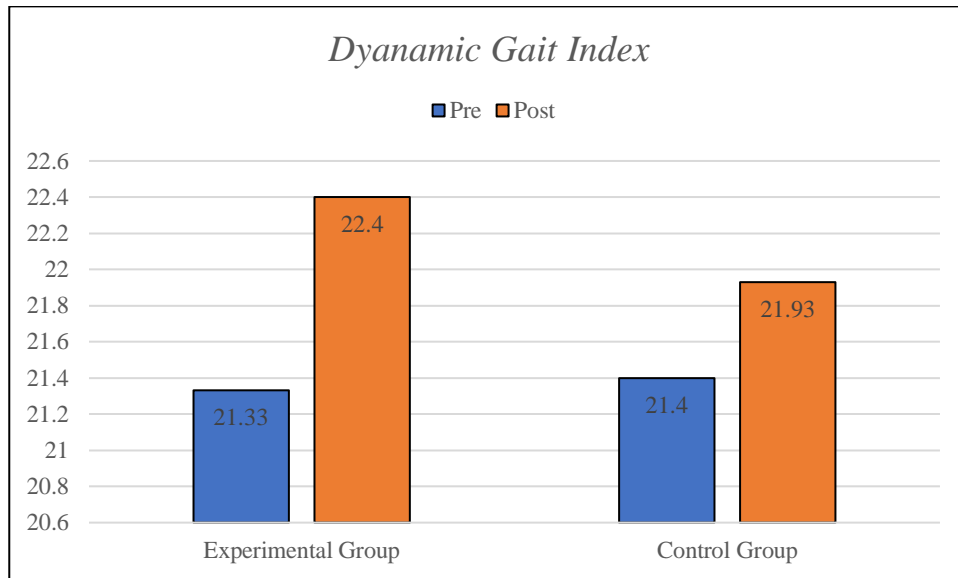
control group with mean (56.66±15.776) and (50±10) respectively before intervention as well as (70.66±12.364) and (54.66±13.597) respectively after intervention.

Cadence findings which is significantly improved in experimental group as compared to control group with mean (83.86±9.527) and (85.06±12.374) respectively before intervention as well as (91.46±8.523) and (89.46±11.598) respectively after intervention. Gait speed findings which is significantly improved in experimental group as compared to control group with mean (0.86±0.144) and (0.88±0.146) respectively before intervention as well as (1.086±0.154) and (0.98±0.145) respectively after intervention.

RESULT

Table & Graph 1: Distribution of subjects according to Dynamic gait index

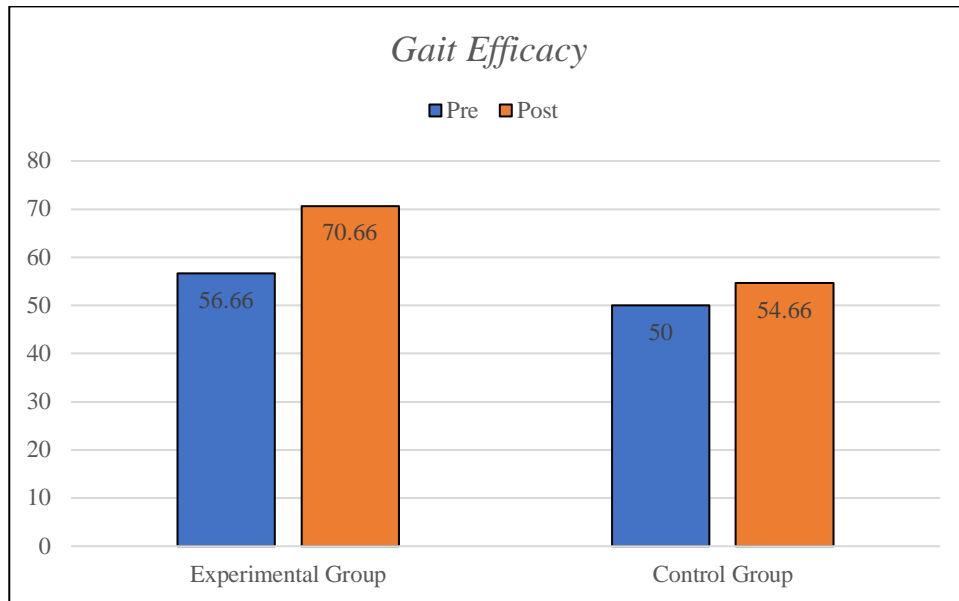
Dynamic gait index	Experimental group	Control group
Pre intervention	21.33±1.49	21.4±1.65
Post intervention	22.4±1.2	21.93±1.48
p-value	<0.0007	<0.0061



Above graph represents, dynamic gait index findings which showed significant improvement in experimental group (p<0.0007) as compared to control group (p<0.0061)

Table & Graph 2: Distribution of subjects according to modified gait efficacy questionnaire

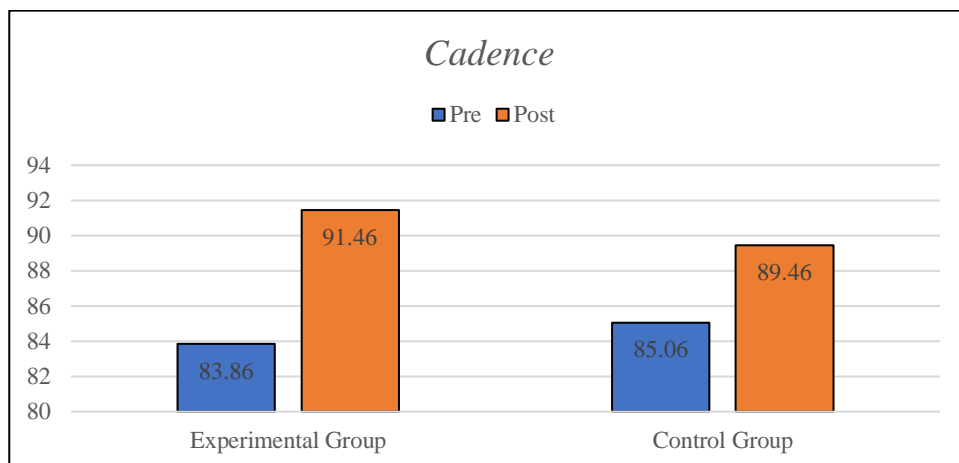
Modified gait efficacy questionnaire	Experimental group	Control group
Pre intervention	56.66±15.776	50±10
Post intervention	70.66±12.364	54.66±13.597
p-value	<0.0001	<0.0135



Above graph represents, gait efficacy findings which showed significant improvement in experimental group ($p < 0.0001$) as compared to control group ($p < 0.0135$)

Table & Graph 3: Distribution of samples according to cadence

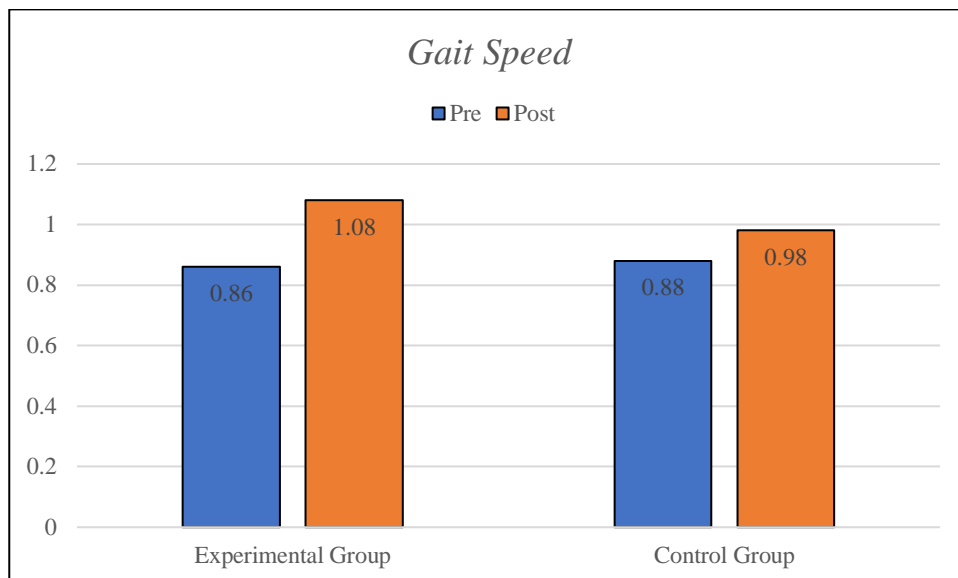
Cadence	Experimental group	Control group
Pre intervention	83.86±9.527	85.06±12.374
Post intervention	91.46±8.523	89.46±11.598
p-value	<0.0001	<0.0001



Above graph represents, cadence findings which showed significant improvement in both experimental group ($p < 0.0001$) as well as in control group ($p < 0.0001$)

Table & Graph 4: Distribution of subjects according to gait speed

Gait speed	Experimental group	Control group
Pre intervention	0.86±0.14	0.88±0.14
Post intervention	1.08±0.15	0.98±0.14
p-value	<0.0001	<0.0001



Above graph represents, gait speed findings which showed significant improvement in both experimental group ($p < 0.0001$) as well as in control group ($p < 0.0001$)

DISCUSSION

The aim of the research was to study the effect of functional task exercises on gait speed in elderly. Gait is an essential component of one's life and also the speed of our walking also plays an important role. In geriatric population to improve social, psychological, intellectual and cognitive performance, facilitation of nervous system plays an important role. ⁽¹⁰⁾ In consideration of other exercise program for elderly, FTE is based on knowledge about human movement sciences and action theory. It is seen in previous research conducted for older women it has shown that, by comparison with the usual care, i.e. strength exercise, FTE is more effective in improving functional performance, and that FTE is the first exercise programme with sustainable effects. ⁽⁸⁾ Older individual's physical capacity is enhanced by FTE and also because it fits in with daily routines. ⁽⁹⁾ This clearly differentiates FTE from other programmes in regular use. Total population in the research was 30 in which both females and males participated. Out of which 6 individuals were male and 24 individuals were female that makes about 80% of the population was female and 20% population was male. The study was conducted in the duration of 6 months their demographic details were collected like age, gender, height, weight, BMI. The target population of the study was the elderly's that is the individuals with age above 65 years. These 30 individuals were further divided in two groups of 15 individuals each Group A (experimental group) and Group B (control group). Group A consist of functional task exercises and

conventional exercises and Group B consist of only conventional exercises. These exercises were given for about 6 weeks and were given for 3 sessions per week. First a pilot study was conducted and errors were resolved with the approval of the guide. Over here the Functional task exercises program is divided in 3 phases with the duration of two weeks for one phase. Before the start of FTE first there is a warm up consisting of (10 minutes), which includes walking with moving arms and legs and dynamic stretching. Then the individuals can start performing FTE which includes two circuits and in between these two circuits there is about 5 minutes of hydration break. The circuit 1 consist of locomotor activities like zig zag walking, picking up clothes from the ground, dialling on the phone while walking and etc. circuit 2 consist of other ADLs like squatting, with towel imitate the movement of drying ones back and etc. With a repetition of 5 times each. Then finally comes the cooling off (10 minutes) static stretching in lying down. Then comes group B which consist of conventional exercises that are the Reactive balance control exercises which include ankle strategy- one leg stance with the trunk erect, hip strategy- draw lines on floor perform tandem stance and single leg stance with trunk bending and steeping strategy- practice steeping on a stool. These were also done for 3 times per week for the duration of 6 weeks and were repeated for 5 times. Dynamic gait index findings which is significantly improved in experimental group as compared to control group with mean (21.33 ± 1.490) and (21.4 ± 1.650) respectively before intervention and (22.4 ± 1.2) and (21.933 ± 1.481) respectively after

intervention. Modified gait efficacy questionnaire findings which are significantly improved in experimental group as compared to control group with mean (56.66±15.776) and (50±10) respectively before intervention and (70.66±12.364) and (54.66±13.597) respectively after intervention. Cadence findings which is significantly improved in experimental group as compared to control group with mean (83.86±9.527) and (85.06±12.374) respectively before intervention and (91.46±8.523) and (89.46±11.598) respectively after intervention. Gait speed findings which is significantly improved in experimental group as

compared to control group with mean (0.86±0.144) and (0.88±0.146) respectively before intervention and (1.086±0.154) and (0.98±0.145) respectively after intervention.

CONCLUSION

The present study concluded that, functional task exercise program showed significant improvement on gait and their parameters in elderly than conventional exercises.

REFERENCES

1. Landefeld CS, Palmer RM, Johnson MA, Johnson CB, Lyons LW. Current geriatric diagnosis and treatment. international ed. McGraw-Hill; 2004.
2. Arif M, Ohtaki Y, Nagatomi R, Inooka H. Estimation of the effect of cadence on gait stability in young and elderly people using approximate entropy technique. *Meas Sci Rev*. 2004;4(2):29-40.
3. Prince F, Corriveau H, Hébert R, Winter DA. Gait in the elderly. *Gait Posture*. 1997;5(2):128-35. doi: [10.1016/S0966-6362\(97\)01118-1](https://doi.org/10.1016/S0966-6362(97)01118-1).
4. Elble RJ, Thomas SS, Higgins C, Colliver J. Stride-dependent changes in gait of older people. *J Neurol*. 1991;238(1):1-5. doi: [10.1007/BF00319700](https://doi.org/10.1007/BF00319700), PMID [2030366](https://pubmed.ncbi.nlm.nih.gov/2030366/).
5. Oberg T, Karsznia A, Oberg K. Basic gait parameters: reference data for normal subjects, 10-79 years of age. *J Rehabil Res Dev*. 1993;30(2):210-23. PMID [8035350](https://pubmed.ncbi.nlm.nih.gov/8035350/).
6. Shimada H, Kim H, Yoshida H, Suzukawa M, Makizako H, Yoshida Y, Saito K, Suzuki T. Relationship between Age-Associated Changes of Gait and fall and Life-Space in Elderly People. *J Phys Ther Sci*. 2010;22(4):419-24. doi: [10.1589/jpts.22.419](https://doi.org/10.1589/jpts.22.419).
7. Abellan van Kan G, Rolland Y, Andrieu S, Bauer J, Beauchet O, Bonnefoy M, Cesari M, Donini LM, Gillette Guyonnet S, Inzitari M, Nourhashemi F, Onder G, Ritz P, Salva A, Visser M, Vellas B. Gait speed at usual pace as a predictor of adverse outcomes in community-dwelling older people an International Academy on Nutrition and Aging (IANA) Task Force. *J Nutr Health Aging*. 2009;13(10):881-9. doi: [10.1007/s12603-009-0246-z](https://doi.org/10.1007/s12603-009-0246-z), PMID [19924348](https://pubmed.ncbi.nlm.nih.gov/19924348/).
8. De Vreede PL, Samson MM, van Meeteren NL, Duursma SA, Verhaar HJ. Functional-task exercise versus resistance strength exercise to improve daily function in older women: a randomized, controlled trial. *J Am Geriatr Soc*. 2005;53(1):2-10. doi: [10.1111/j.1532-5415.2005.53003.x](https://doi.org/10.1111/j.1532-5415.2005.53003.x), PMID [15667369](https://pubmed.ncbi.nlm.nih.gov/15667369/).
9. Fleuren MA, Vrijkotte S, Jans MP, Pin R, van Hespren A, van Meeteren NL, Siemonsma PC. The implementation of the functional task exercise programme for elderly people living at home. *BMC Musculoskelet Disord*. 2012;13:128. doi: [10.1186/1471-2474-13-128](https://doi.org/10.1186/1471-2474-13-128), PMID [22824202](https://pubmed.ncbi.nlm.nih.gov/22824202/).
10. Dr. Dhawale T, Dr. NehaBhosale, Dr. NileshAndhare, VishakhaPatil relationship between trunk mobility and balance in Parkinson's disease Turkish. *J Physiother Rehabil*;32 (3):6638-42.