Research Article

A Study to Assess the Effectiveness of TAI CHI Ch-Uan Exercises on Balance Control among Older People Living in Selected Old Age Homes in Bangalore, Karnataka

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How to cite this article: Thushara T R. A Study to Assess the Effectiveness of TAI CHI Ch-Uan Exercises on Balance Control among Older People Living in Selected Old Age Homes in Bangalore, Karnataka. International Journal of Contemporary Medicine/Volume 12 No. 1, January-June 2024.

Abstract

Background and Purpose: The treatment of balance disorders lacks a fixed method, with identification and management of external factors being crucial. Many balance disorders benefit from balance training and moderate physical activity. Exercise programs encompass strength training, balance and coordination exercises, dual task training, hydrotherapy, tai chi, and yoga, all proven to enhance balance. Tai Chi Chuan, a martial art, utilizes slow, graceful moves and precise body movements to enhance body awareness and balance, combined with breathing techniques for mind-body harmony and energy flow. Practicing Tai Chi fosters muscle strength, flexibility, aerobic conditioning, and stress reduction, contributing to overall well-being and balance improvement.

Methods: The study was conducted at Omashram Trust, Bangalore, Karnataka. The research design selected for the study was quasi experimental pre-test post-test with experimental and control group. Non probability purposive sampling technique was adopted to select the samples. The data collection tool consisted of part I and part II.

Part I – Dealt with the interview schedule for demographic data which consist of 13 items used to collect the sample characteristics such as age in years, gender, religion, educational status, past occupation, source of income, marital status, diet, on a therapeutic diet, practice of regular exercise, presence of any physical illness, aware of information about Tai Chi Chuan exercise, if yes.

Part II - Berg balance scale was used to assess the balance control in older people.

Results of the Study

Association between the body balance status and demographic variables

a) Experimental Group

The finding of this study in the experimental group showed that there was significant association between the level of balance control and demographic variables such as age and past occupation. Hence the research hypothesis was accepted at 0.05 level of significance and null hypothesis was rejected.

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Submission date: Jul 29, 2023 **Revision date:** Aug 10, 2023 **Published date:**Mach 27 2024

Control Group

The finding of this study in the control group proved that there was significant association between the level of balance control and demographic variables such as age, education and presence of any physical illness. Hence the research hypothesis was accepted at 0.05 level of significance and null hypothesis was rejected.

Discussion: The overall findings of the study clearly showed that effectiveness of tai CHI CH-UAN exercises on balance control among older people living in selected old age homeswas more effective for the Experimental group than the Control group.

Keywords: CHI CH-UAN, Experimental group, Control group, Chi- square, Tai Chi exercises

Introduction

There are various aspects to experience as age increases. Most of it is due to the degenerative changes which may be slowed down. The unpleasant aspects among the experiences are physical, pathological, social and emotional problems. Some of the most common ailments they suffer from are slow reaction time, arthritis, heart ailments, diabetes, dementia, balance disorders and vision problems.[1]

One of the biggest issues that older people face is balance problems. As and when a person gets old, he starts to lose the sense of body balance and feel dizzy or unsteady. Balance disorders are serious as they bring with it a risk of a fall.[2] These kinds of falls when combined with the frail skin and weaker bones due to old age, becomes dangerous and life threatening. Balance related disorders can shorten attention span, disrupt normal sleep patterns and cause excessive fatigue among old people.[3]

There is no fixed method to treat a balance disorder. Identification and treatment of external factors are primary in determining the method of treatment. Many of the other types of balance disorders require balance training. Moderate physical activity will also help in improving balance disorders.[4] Exercise programs like strength training, balance and co-ordination exercises, dual task training, hydrotherapy, allied therapeutics like tai chi exercise and yoga have been found to be used to improve balance.[5]

Tai Chi Chuan is also known as Tai Chi and Taiji. This type of exercise is a martial art which enhances the balance and awareness of the body by the usage of slow and dance like graceful moves with precise body movements.[6] Tai Chi exercises combine these movements with breathing techniques. The flowing movements are designed to focus the body and mind to harmony and to encourage an even flow of energy throughout the body. The practice of tai chi exercises will help in gaining muscle strength, flexibility, balance, aerobic conditioning and also to reduce stress.[7,8]

In a study the slow motion and meditative exercises of Tai Chi were found to reduce the risk of falling among older people by 47.5 percent. In a 4-week Tai Chi exercise schedule, the positive results were in two areas. First it improved balance and strength. Second after the study ended, they continued to do Tai Chi exercises for 6 months which maintained these improvements. Other studies have shown that Tai Chi exercises also improve cardiovascular endurance, breathing efficiency and muscle flexibility.[9,10]

The need for improving the health of older population in general has to start immediately by bringing about balance control, coordination of activities and improving confidence in order to improve the quality of life of older adults. One step towards this direction is introducing preventive healthcare techniques such as enduring exercises like Tai Chi being imbibed into the routine of the elderly.[11]

As Tai Chi is a non-invasive, slow moving, easy to follow exercise by the elderly people in their daily life, these exercises will help them lead a quality life and enjoy the senescence contently and peacefully.[12] The vast experience of the researcher in elderly care and close observations of their problems along with the study of related literature motivated the researcher in the use of Tai Chi exercise for the elderly in improving balance control, enhancing their quality of life and also to help them gain confidence and in moving independently without risk of falls.[13]

OBJECTIVES OF THE STUDY

- Assess the balance control in older people in experimental and control groups.
- Evaluate the effectiveness of tai chi ch-uan exercises on balance control in experimental group.
- Compare the effectiveness of Tai chi ch-uan exercises among experimental and control group.
- Find out the association between the pre-test levels of balance control with selected demographic variables.

Methodology

Inclusion criteria:

Older adults who

1. have an age above 60 years and have average or good balance control.
2. are available during the period of data collection.
3. can follow English and Kannada language.

Exclusion Criteria:

Older adults who are

1. critically ill.
2. not willing to participate in this study.
3. having psychological disorders.
4. practicing body balance exercises.

After the thorough review of literature related to the topic, an interview schedule was developed. The study tool consisted of two parts: -

Part I – Dealt with the interview schedule for demographic data which consist of 13 items used to collect the sample characteristics such as age in years, gender, religion, educational status, past occupation, source of income, marital status, diet, on a therapeutic diet, practice of regular exercise, presence of any physical illness, aware of information about Tai Chi Chuan exercise, if yes.

Part II - Berg balance scale was used to assist the balance control in older people.

SCORING KEY

Maximum score: 56

Minimum score: 0

Table No. 1

	Total Score:	**Remarks**
Scoring	Good balance control	41 to 56
	Average balance control	21 to 40
	Poor balance control	0 to 20

TESTING OF THE RESEARCH INSTRUMENT

A. Preparation of the first draft of the research tool

According to the study the research tool was prepared. The research tool consisted of interview schedule for collecting socio demographic data and Berg Balance Scale to measure the balance control. The scoring of the Berg Balance Scale was ranging between 0-56.

B. Content Validity of the Research Tool

To ensure content validity, the tool along with objectives, operational definitions and intervention protocol, criteria checklist is given to 10 experts. Out of them 8 were in nursing field, 1 is physician, 1 statistician. The expertwas requested to judge the item for relevance, clarity, appropriateness of the title and content area, the modification was done in tool based on expert'sopinion and suggestions and in consultation with guide.13 items are prepared for socio demographic variables by all the experts. Content validity of the structured interview schedule was 98.4. Content validity of the Berg Balance Scale was 100

C. Language Validation

The tool was translated into Kannada without changing the meaning and the same was validated by a Kannada language expert. The re-translation to English was carried out and there was no correction.

D. Reliability of the tool

Reliability of an instrument is the degree of consistency with which it measures the attribute it is supposed to be measuring. Berg balance scale is a standardized scale. The reliability of the berg balance scale is 0.98.

DEVELOPMENT OF INTERVENTION PROTOCOL

Intervention protocol is defined as an influencing force or act that occurs in order to modify a given state of affairs. It has also been defined as any

measurement used to increase wellness or well-being of an individual.

A. Selection of the intervention Protocol:

The intervention protocol was developed keeping in mind the general objective, related review of literature and suggestions.

B. Development of criteria rating scale:

A criterion rating scale was prepared as a step towards the development of protocol after review of literature and consulting with the subject expert. The areas included in the criteria rating scale were as follows:

- Objectives of the intervention
- Selection of the content
- Organization of the steps in protocol
- Language
- Practicability and feasibility

Criteria rating scale included items like Appropriate, Need Modification and Inappropriate and experts were also asked to give their remarks.

C. Description of intervention protocol

The interventions protocol was titled Tai Chi Chuan exercise. It included the following aspects.

- Title
- Background
- Aim
- Objectives
- Steps of intervention
- Efficacy assessment
- Safety assessment

PILOT STUDY

Pilot study was conducted from 16.02.16 to 23.02.16 in Omashram Trust, J P Nagar, Bangalore, with 10 samples. The samples were selected through non probabilistic purposive sampling technique. The tool was administered to 10 samples those with similar characteristics of the main study sample. Data was collected and analysed by using descriptive and inferential statistics. A structured interview schedule was used to collect the demographic data and Berg Balance Scale was used to measure the balance control. For collecting the demographic data, the time taken was 10 minutes and for measurement of balance control for each patient time taken was 10-20 minutes.

Pre-assessment of balance control was done one day before starting Tai Chi Chuan exercise for the subjects by using Berg Balance Scale. After pretest subjects were made to do Tai Chi Chuan exercise every day for a period of two weeks. After Tai Chi Chuan exercise schedule, post assessment of balance control was done by Berg Balance Scale.

A. Results of the Pilot Study

After comparing the pre and post test score of subject, the results showed that the obtained't' test value was greater than the table value (3.5 > 2.78). Hence Tai Chi Chuan exercises were found to be effective in improving balance control among older people. Association of pre-interventional balance control and demographic variables like age in years, gender, religion, educational status, past occupation, source of income, marital status, diet, on a therapeutic diet, practice of regular exercise, presence of any physical illness, aware of information about Tai Chi Chuan exercise, if yes were computed by Chi-square. There was a significant association between pre interventional balance control and selected demographic variables, so the research hypothesis was accepted.

Results

SECTION – I

This section deals with body balance status among experimental and control group.

- Findings related to pre-test assessment of balancecontrol among experimental and control group
- Findings related to post-test assessment of balance control among experimental and control group

Findings related to pretest assessment of level of balance control among experimental and control group(N=60)

Table No. 2

Pre-Test levels Of Balance Control	Experimental group					Control group				
	n = 30					n = 30				
	Frequency	Score Of Balance	Mean	Mean%	SD	Frequency	Score Of Balance	Mean	Mean%	SD
Average balance	30	896	29.8	53.21%	3.51	30	938	31.2	55.71%	2.96

The above table represented pre-test assessment of balance control among experimental and control group. In experimental group 30 subjects had average balance control with the mean of 53.21%.**In control group 30 subjects had average balance control with the mean of 55.71%.**

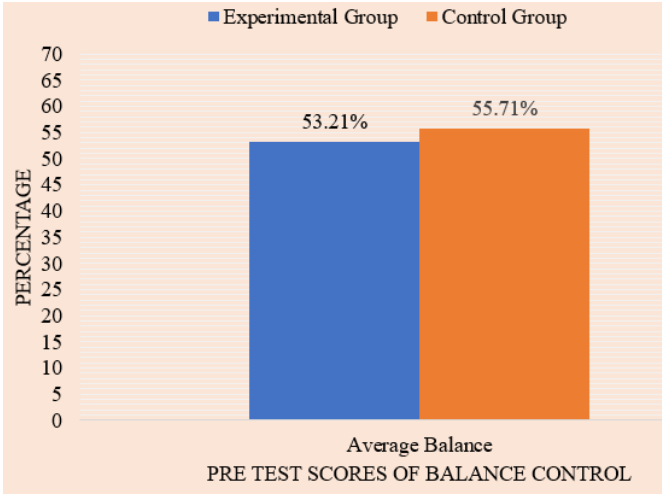

Fig 1: Distribution of the pre-test scores of balance control among older people

Findings related to posttest assessment of level of balance control among experimental and control group (N=60)

Table No. 3

Pre-Test levels Of Balance Control	Experimental group					Control group				
	n = 30					n = 30				
	Frequency	Score Of Balance	Mean	Mean%	SD	Frequency	Score Of Balance	Mean	Mean%	SD
Average balance	21	782	37.2	46.7%	2.24	30	964	32.1	57.32%	4.23
Good Balance	9	383	42.5	53.3%	1.34	-	-	-	-	-

The above table represented post-test assessment of level of balance control among experimental and control group. In experimental group, the majority of the subjects (21) had average balance control with the mean of 37.2, 9 of the subjects had good balance control with the mean of 42.5. **In control group, without intervention the subjects (30) had average balance control with the mean of 32.1.**

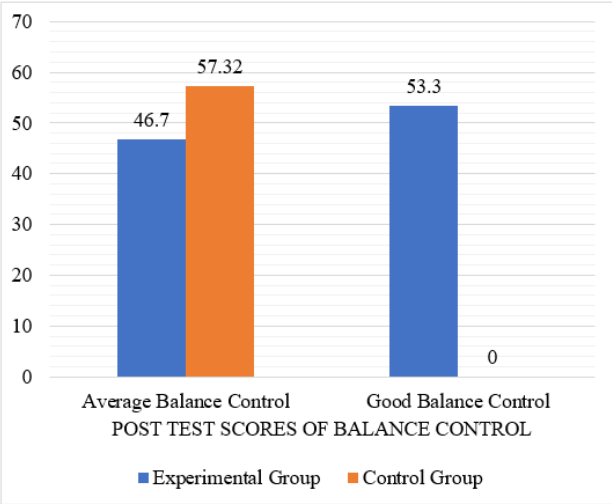

Fig 2: Distribution of the post test scores of balance control among older people

SECTION II

This section deals with the effectiveness of Tai Chi Chuan exercises among experimental group and control group

- Findings related to comparison of pre-test and post test scores of levelsof balance control among experimental group by paired 't' test
- Findings related to comparison of pre-test and post test scores of levelsof balance control among control group by paired 't' test
- Findings related to comparison of post test scores of levels of balance control among experimental group and control group by student 't' test

Comparison of the pre-test and post-test scores of level of balance control among experimental group by paired't' test(N=30)

Table No. 4

Level of Balance Control Among Experimental Group	Mean	SD	t-Test Value	df	Table Value	Significance
Pre – test	29.8	3.51	47.61	29	2.76	Significant
Post – test	38.8	3.16				

$t_{(29, 0.01)} = 2.76$

The above table revealed that the post-test mean level is higher than the pre-test mean level of balance control (38.8 > 29.8). The data further depicts that the obtained't' test value is 47.61 which is greater than the table value $t_{(29,0.01)} = 2.76$ at 0.01 level of significance. This shows that there was effectiveness in Tai Chi Chuan exercise.

H_1: There is a significant improvement in balance control after Tai Chi Chuan exercises.

Hypothesis was tested at 0.01 level of significance. The 't' test value of mean difference between pre-test and post-test score was 47.61 which was greater than the table value. Hence the research hypothesis was accepted.

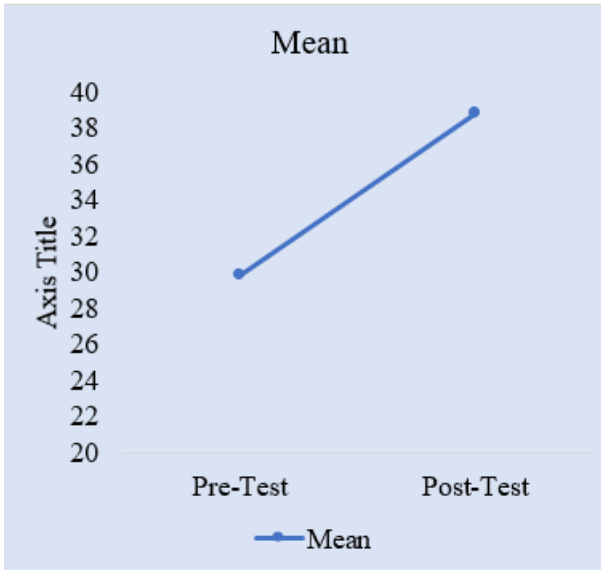

Fig 3: Comparison of mean of the pre-test and post-test scores of balance control

Comparison of the pre-test and post-test scores of level of balance control among control group by paired't' test (N=30)

Table No. 5

Level Of Balance Control Among Control Group	Mean	SD	t-Test Value	Df	Table Value	Significance
Pre – test	31.2	2.96	1.53	29	2.76	Significant
Post – test	32.1	4.23				

$t_{(29, 0.01)} = 2.76$

The above table revealed that the post-test mean level is higher than the pre-test mean level of balance control (32.1 > 31.2). The data further depicts that the obtained't' test value is 1.53 which is lesser than the table value $t_{(29,0.01)} = 2.76$ at 0.01 level of significance. This shows that there was no effectiveness in Tai Chi Chuan exercise in control group.

H_1: There is a significant improvement in balance control after Tai Chi Chuan exercises.

Hypothesis was tested at 0.01 level of significance. The 't' test value of mean difference between pre-test and post-test score was 1.53 which was lesser than the table value. Hence the research hypothesis was rejected.

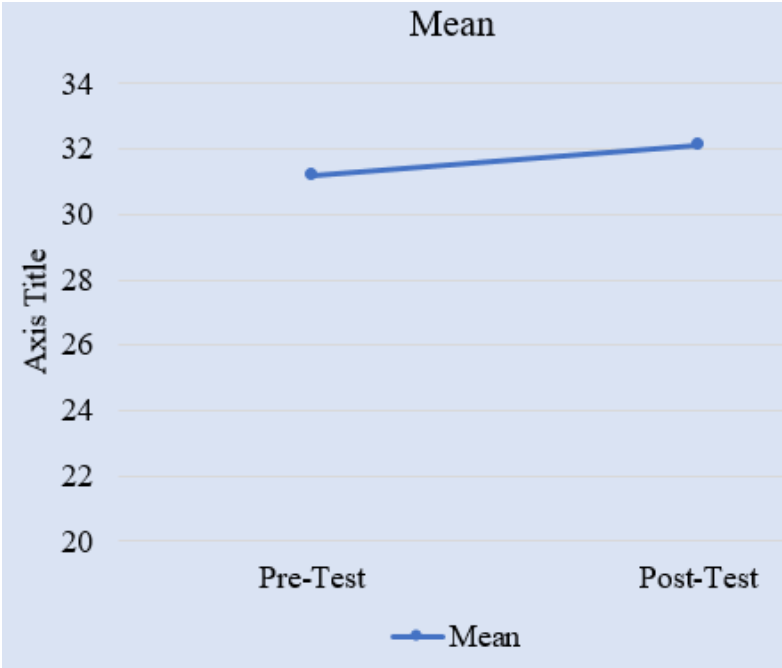

Fig 4: Comparison of mean of the pre-test and post-test scores of balance control

Comparison of post-test scores of level of balance control among experimental and control group by student't' test (N=60)

Table No. 6

Post Test Level of Balance Control	MEAN	SD	t-Test Value	Df	Table Value	Significance
Experimental Group	38.8	3.16	7.28	58	3.55	Significant
Control Group	32.1	4.23				

$t_{(58, 0.01)} = 3.55$

The above table depicted that mean of the post-test level of balance control among experimental group (38.8) was greater than the mean of the post-test level of body balance status among control group (32.1). The data showed that the obtained 'T' test value 7.28 at df 58 at 0.01 level of significance was greater than table value. This data supported the effectiveness of Tai Chi Chuan exercise in increasing balance control among subjects in experimental group comparing to control group. So the research hypothesis was accepted and null hypothesis was rejected.

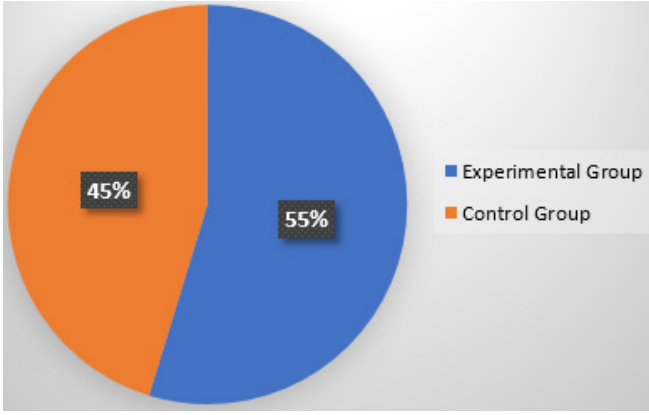

Fig 5: Comparison of mean of the post-test scores of balance control among experimental and control group

Conclusion

The focus of this study was to assess the effectiveness tai CHI CH-UAN exercises on balance control among older people living in selected old age homes. The collected data was subjected to analysis using descriptive statistics such as frequency, mean and mean percentage, median and standard deviation. Inferential statistical methods like paired' test, correlation coefficient and Chi- square ($\chi 2$) were used for analysis. The overall results of the study sound good comparatively to the Experimental group than Control group.

List of Abbreviation

SD-Standard Deviation

Ethical Clearance

Ethical clearance has been obtained from the concerned authority and participants.

Source of Funding: This is a self-funded study.

Conflict of Interest: Have no conflict of interest relevant to this research study.

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