DOI: https://doi.org/10.53350/pjmhs211581958

ORIGINAL ARTICLE

Effects of Circuit Training on Vestibular Dysfunctions in Geriatric Population

SADAF WARIS[1], MISBAH WARIS[2], MUHAMMAD MUNEEB[3], MIAN ALI RAZA[4], RABIYA NOOR[5]
[1]*Demonstrator, University of Management and Technology, Sialkot Campus*
[2]*Senior Lecturer, Riphah International University, Lahore*
[3]*Lecturer, University of Management and Technology, Lahore*
[4]*Senior Lecturer, University Institute of Physical Therapy, University of Lahore*
[5]*Assistant Professor, Riphah International University, Lahore*
Correspondence to Dr. Sadaf Waris, Email: dr.sadaf54@gmail.com, Contact No: 0308-8112501, Chungi No.8, street Islamabad near Chowinda Flour Mills

ABSTRACT

Background: Maturing is followed by slow physiological changes in body structures, such as decreases in muscle strength, movement speed, response time, and changes in equilibrium and integumentary systems. Deftness is constantly compromised by maturing procedure.
Aim: To determine effects of circuit training on vestibular dysfunction in geriatric population
Methods: This research included 34 participants with age ranges from 50 to 85. All the participants were divided into two groups. Participants were assessed pre and post treatment by using modified CTSIB, DHI and Fukuda test. Group A received Cawthorne & Cooksey protocol. The standardized protocol consists of 4 steps that include specific exercises carried out during lying, sitting position, position of standing and walking state. These exercises were undertaken during the following 12 weeks until the end of the intervention.
Results: Modified CTSIB pretreatment mean±SD for conventional group was 93.64± 20.709 and post treatment was 80.35± 30.211. On the other hand, pretreatment mean±SD for treatment group was 96.07± 15.349 and post treatment was 79.47± 25.169. Pretreatment P.value for CTSIB is .166 and of post treatment is .466 (P= > .05). DHI pretreatment mean±SD of conventional group was 41.41± 22.25 and post treatment was 20.0± 12.74. Pretreatment mean±SD of treatment group was 38.7± 22.404 and post treatment was 19.8± 16.501.
Conclusion: Conventional treatment and circuit training both are equally effective for the rehabilitation of vestibular dysfunctions. However, according to the P.value (P= <.05) of Fukuda test statistically significant results are seen. That's mean circuit training is effective for treating vestibular problems.
Key words: Geriatric Population, Vestibular dysfunction, Dizziness, Modified CTSIB, DHI

INTRODUCTION

Maturing or aging is described by constant physiological changes in the frameworks of the body, which at a propelled age lead to decreased capacity and increased impotence to infections or aggravations of well-being[1]. Efforts to understand maturing have stressed the need to recognize maturing from sickness as an outcome of this view. In fact, the need to view maturing separately from diseases was a major reason for the Baltimore Longitudinal Study on Aging, the primary large-scale maturing investigation[2]. Constant infections gather with maturing past conceptual models, and together maturing and sicknesses show common associations in causing well-being disintegration, physical and thought capacity, and sudden passage. So it remains completely uncertain whether we can actually distinguish the optional impacts of infection from those of essentially maturing[3]. However, if we take a look in medical course books at disease pathophysiology, apparently a few basic biological procedures are at the center of numerous conditions or ailments. Unexpectedly, illnesses occur in some individuals and not in others, are correlated with specific exogenous danger factors and pathophysiological elements, and the threat to death may not extend. Such characteristics help to prevent diseases[4]. Oxidative pressure, aggravation, deficient fix, and apoptosis are basic highlights of many age-related wellbeing conditions including atherosclerotic cardiovascular illness, kidney infection, dementia, pneumonic disease, osteoporosis, and malignancy. The molecular components for each condition might be tissue and infection explicit; however, they share comparable biologic procedures for the reaction to damage. At the end of the day, the intracellular and transcellular housekeeping components that fail their homeostatic objectives are the equivalent, however their loco regional dissemination is distinctive across diseases maybe due to territorial helplessness (locus minoris resistentiae) because of hereditary foundation or ecological impacts. It is normal that medications focusing on the fundamental system of any of these conditions can widely effects on different sicknesses and general wellbeing status due to some extent to the shared trait of essential biologic procedures. For instance, by focusing on irritation, non-steroidal anti-inflammatory medications have been demonstrated to be useful for joint inflammation torment however have hindering cardiovascular impacts[5]. Restricting the capacity to additionally test them for the counteraction of dementia. Statins were initially used to diminish serum cholesterol, yet ongoing proof proposes that their preventive action might be increasingly identified with their anti-inflammatory properties[6].

Aging is followed by gradual physiological changes in body structures, such as decreases in muscle strength, movement speed, response time and changes in

Received on 23-02-2021
Accepted on 03-07-2021

equilibrium and integumentary systems. Deftness is constantly compromised by maturing procedure. To some extent, this is expected to cause degeneration and dynamic loss of nerve cells in the peripheral and central vestibular frame, leading to instability and vertigo[7,8]. Although the dysfunction may be caused by various factors, almost one percent of these cases are caused by vestibular problems[4,9,10]. Vestibular problems occur in 18.5% of adults aged 40 to 49, in 49.4% of older adults aged 60 to 69 and up to 84.8 percent of older adults aged 80 and over[11]. In addition to being slightly more severe at an advanced age, impairment in older people may be considered increasingly dangerous[12], at a time when impedances can occur in other body balance control frameworks. Inconsistency involves specific expert consideration among the different outcomes of maturing, since it is associated with a few etiological components[13]. This symptom is also highly prevalent in older age[14].

Unsteadiness in the drug is one of the most checked signs. It's difficult to characterize, difficult to gage, a diagnostic challenge and difficult to treat. The word dizziness is used to describe different sensations of body movement and location that are difficult for patients to portray as often as possible[15,16]. Dizziness may be due to a wide range of mild and extreme conditions, of which no significant number is known for sure. For most cases, the manifestation instantly settles, yet a significant minority of patients experience chronic, disabled, disabled side effects and a few have a dangerous condition[16,17,18]. "Dizziness" refers to specific anomalous symptoms that correlate with the body's perception of the connection to space[19]. In a great paper, Drachman and Hart identified four subtypes: vertigo, pre-syncopal lightheadedness, disequilibrium and complex dizziness. This typology remains the basis for defining and classifying dizziness almost 30 years after the fact, since it has long since replaced the narrow definition ("vertigo") used in previous studies[14,20].

Vestibular dysfunction is generally characterized by vertigo (a sensation of spinning movement) or body discomfort (look and aggravation of postural stability)[11,21]. During exercises that include head changes, movements, and ambulation, these side effects are usually triggered. Vestibular problems are therefore answered a lot of the time to prompt noteworthy inconvenience, to diminish independence day by day exercises and to upset the body's balance[11,22]. Vestibular dysfunction visibly weakens the confidence in equilibrium capacity, which leads to increased danger[23].

The objective of the study was to determine effects of circuit training on vestibular dysfunction in geriatric population

MATERIAL AND METHODS

This study was a Quasi Experimental. The study was conducted in the Riphah Rehabilitation Centre and Social Welfare society in Township Lahore after permission from Ethical Committee. This research included 34 participants with age ranges from 50 to 85. All the participants were divided into two groups. Participants were assessed pre and post treatment by using modified CTSIB, DHI and Fukuda test. Group A received Cawthorne&Cooksey protocol. The standardized protocol consists of 4 steps that include specific exercises carried out during lying, sitting position, position of standing and walking state. These exercises were undertaken during the following 12 weeks (1hour session twice a week) until the end of the intervention. Group B: received circuit training using Berg Balance Scale (BBS) for 12 weeks (1-hour session, twice a week). Training stations were made according to the berg balance scale components. Study was completed in 6 months after the approval of synopsis. Old population with age 50-85, both male and female with balance, sensory balance, vestibular problems and with fukuda test positive were included in this study. Old population with cognitive deficits, joint replacement, cervical vertigo, stroke, and neurological diseases was excluded. SPSS was used for statistical analysis. Frequency charts and percentages were used to present qualitative characteristics. All quantitative variables were provided as mean standard deviation. A paired t-test was used for before and after comparisons, and an independent t-test was used for a between group comparison. P-values less than 0.05 were considered significant.

RESULTS

Total 34 participants who fulfill the inclusion criteria were included in this study with the age range from 50 to 85. Table 2 shows, there were 17 participants in each group. In conventional group minimum age was 52 and maximum age was 85. On the other hand, in treatment group minimum age was 55 and maximum age was 72.

Table 3 shows that DHI pretreatment mean±SD for conventional group is 41.41± 22.25 and post treatment is 20.0± 12.74. On the other hand, pretreatment mean±SD for treatment group is 38.7± 22.404 and post treatment is 19.8± 16.501. Pretreatment P. value for DHI is .823 and of post treatment is .916.

Table 4 shows that Modified CTSIB pretreatment mean±SD for conventional group is 93.64± 20.709 and post treatment is 80.35± 30.211. On the other hand, pretreatment mean±SD for treatment group is 96.07± 15.349 and post treatment is 79.47± 25.169. Pretreatment P.value for Modified CTSIB is .166 and of post treatment is .466.

Table 5 shows that Fukuda Test pretreatment mean±SD for conventional group is 1.5± .51887 and post treatment is 1.23±.43724. On the other hand, pretreatment mean±SD for treatment group is 1.42± .513 and post treatment is 1.0±.00000. Pretreatment P.value for Fukuda test is .607 and of post treatment is .000 (P=<.05).

Table 1: Age of all participants

	N	Min.	Max.	Mean	Std. Deviation
Age of participants	34	52.00	85.00	65.3235	7.17623
Valid N	34				

Table 2: Age of participants according to groups

Group		N	Minimum	Maximum	Mean	Std. Deviation
Conventional	Age of participant	17	52.00	85.00	66.0588	8.62750
	Valid N	17				
Treatment	age of participant	17	55.00	72.00	64.5882	5.53465
	Valid N	17				

Table 3: Dizziness Handicap Inventory

Groups	DHI	Mean± standard deviation
Conventional Group	Pre	41.41± 22.25
	Post	20.0± 12.74
Treatment Group	Pre	38.7± 22.404
	Post	19.8± 16.501

DHI

P. Value Pre. Treatment: .823

P. Value Post. Treatment: .916

Table 4: Modified clinical test of Sensory integration and Balance

Groups	CTSIB	Mean ± standard deviation
Conventional Group	Pre	93.64± 20.709
	Post	80.35± 30.211
Treatment Group	Pre	96.07± 15.349
	Post	79.47± 25.169

Modified CTSIB

P. Value Pre. Treatment: .166

P. Value Post. Treatment: .466

Table 5: Fukuda Test

Groups	Fukuda Test	Mean± standard deviation
Conventional Group	Pre	1.5± .51887
	Post	1.23±.43724
Treatment Group	Pre	1.42± .513
	Post	1.0±.00000

Fukuda Test

P. Value Pre. Treatment: .607

P. Value Post. Treatment: .000

DISCUSSION

Wrisley et al. conducted research in 2004 to see how foot position affected the Modified clinical test of sensory integration and balance. Thirty patients with vestibular dysfunction (mean age, 58±17y) who have had vestibular treatment. The modified CTSIB was finished by subjects with their feet together and feet separated towards the end of a vestibular treatment session. Subjects also completed the SOT at around the same time. As indicated by their examination, Scores performed with the feet together on the altered CTSIB did not vary from scores performed with the feet separated on the modified CTSIB. The CTSIB finished with the feet together in people with vestibular problem associated the more closely with the SOT (sensory organization Test)[24].

In current study, 34 patients who met with the inclusion criteria with the age range from 50 to 85 (mean age 65±7.17y) were classified into two subgroups, conventional group (A) and treatment group (B) respectively. There were 17 participants in each group. In conventional group minimum age was 52 and maximum age was 85. On the other hand, in treatment group minimum age was 55 and maximum age was 72. All participants were assessed using modified CTSIB, DHI and Fukuda Test before and after the treatment. Almost all participants were able to complete the modified CTSIB for 10secs without a break. Modified CTSIB pretreatment mean±SD for conventional group was 93.64±20.709 and post treatment was 80.35±30.211. On the other hand, pretreatment mean±SD for treatment group was 96.07±15.349 and post treatment was 79.47± 25.169. Pretreatment P.value for CTSIB is .166 and of post treatment is .466 (P= > .05).

Badke et al completed a study in 2005. The aims of this investigation were to assess vestibular compensation in vestibular problem patients during an exercise-based program and to determine the perception of dizziness disorder of patients during their release from treatment. To sum up, the findings of this study suggest that both peripheral and main or mixed vestibular dysfunction patients showed substantial increases in vestibular and composite SOT scores as well as useful post-VBRT DHI scores. Likewise, during the follow-up examination, patients with central or mixed vestibular issue showed substantial improvement in visual SOT[25].

In current study, 34 old participants are included by dividing into to subgroup, conventional and treatment group respectively. Old participant with both central and peripheral or mixed were included. A circuit training program using components of Berg balance scale and some balance exercises was developed for the treatment group to rehabilitate vestibular dysfunction. Purpose of this study was to determine whether the conventional or circuit training is effective for the rehabilitation of vestibular problems.

In 2006, Brown et al. conducted a retrospective case-by-case study to see if vestibular physical therapy (PT) helped people with central dysfunction improve their functional outcomes. They took 48 participants with central vestibular dysfunction who had already met the criteria for inclusion in the survey. 48 patients were classified into different subgroups including central vestibulo-pathy, cerebellar dysfunction, stroke, central and peripheral mixed vestibulo-pathy and chronic posttraumatic disorder. Patients received a personalized physical therapy program, which was scheduled by hand for an average of 5 visits for a median duration of five months. Important variations were observed between the start of the assessment and the receiving the complete treatment in respect of each performance requirement for the entire community. Post-hoc studies that were performed to determine, by inference, whether there was a significant difference between any of the measures of assessment. Patients who were suffering from vestibular dysfunctions central part progressed in both subjective and objective balance tests following PT interventions. Individuals who suffered from cerebellar impairment have minimally changed[26].

In current study, 34 old participants divided into two subgroups, Conventional and treatment group. Both conventional and treatment group were asked to complete an exercise-based program, using Cawthorne Cooksey Exercises for conventional group and Circuit Training for treatment group. Participant were assessed pre and post

treatment using modified CTSIB, DHI, and Fukuda Test. Modified CTSIB pretreatment mean±SD for conventional group was 93.64± 20.709 and post treatment was 80.35± 30.211. On the other hand, pretreatment mean±SD for treatment group was 96.07± 15.349 and post treatment was 79.47± 25.169. Pretreatment P.value for modified CTSIB is .166 and of post treatment was .466 (P= >.05). Fukuda Test pretreatment mean±SD for conventional group was 1.5± .51887 and post treatment was 1.23±.43724. Pretreatment mean±SD of treatment group was 1.42±.513 and post treatment was 1.0±.00000. Pretreatment P.value of Fukuda test was .607 and of post treatment was .000 (P= <.05).

CONCLUSION

Statistically significant differences were not found between effectiveness of conventional treatment and circuit training. Both are equally effective for the rehabilitation of vestibular dysfunctions. However, according to the P.value of fukuda test statistically significant results are seen. That's mean circuit training is effective for treating vestibular problems.

Conflict of interest: Nil

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