



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 4.295

(Volume 4, Issue 6)

Available online at: www.ijariit.com

Occupational therapy intervention for balance activity and its correlation with functional level of all neurological condition in Anand, Gujarat

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ABSTRACT

Occupational therapy is a client-centred health profession concerned with promoting health and well-being through occupation. The primary goal of occupational therapy is to enable people to participate in the activities of everyday life. The purpose of the study was to find out the Occupational Therapy intervention for balance activity and its correlation with the functional level of all neurological conditions. A total of 20 subjects (13 males, 7 female) were included for balance training. Subjects were of age ranging from 31 to 85 years (Mean = 57.81, SD= 14.78). Fall Efficacy Scale - International (FES-I) questionnaire was used to assesses fear of falling (FOF). The FIM scale was used to measure the patient's progress and assess rehabilitation outcomes. This study found that Improvement in balance and due to decreasing risk of falling in patients they were very satisfied and they became more social inside and outside the home and they were actively performed their ADLs.

Keywords— Occupational therapy intervention, Balance activity, Functional level, Neurological condition

1. INTRODUCTION

Occupational therapy is a client-centred health profession concerned with promoting health and well-being through occupation. The primary goal of occupational therapy is to enable people to participate in the activities of everyday life. Occupational therapists achieve this outcome by working with people and communities to enhance their ability to engage in the occupations they want to, need to, or are expected to do, or by modifying the occupation or the environment to better support their occupational engagement. (WFOT 2012)¹.

A balance disorder is a disturbance that causes an individual to feel unsteady, for example when standing or walking. It may be accompanied by feelings of giddiness, or wooziness, or having a sensation of movement, spinning, or floating. Balance is the result of several body systems working together: the visual system (eyes), the Vestibular system (ears) and proprioception (the body's sense of where it is in space). Degeneration or loss of function in any of these systems can lead to balance deficits². Experts believe that more than four out of 10 Americans, sometime in their lives, will experience an episode of dizziness significant enough to send them to a doctor. Balance disorders can be caused by certain health conditions, medications, or a problem in the inner ear or the brain. A balance disorder can profoundly impact daily activities and cause psychological and emotional hardship³.

Problems with balance can occur when there is a disruption in any of the vestibular, visual, or proprioceptive systems. Abnormalities in balance function may indicate a wide range of pathologies from causes like inner ear disorders, low blood pressure, brain tumours, and brain injury including stroke. Many different terms are often used for dizziness, including lightheaded, floating, woozy, giddy, confused, helpless, or fuzzy. Vertigo, Disequilibrium and pre-syncope are the terms in use by most physicians and have more precise definitions. A sense of balance comes from many different systems working together to create stability of body and vision. Good balance depends on: 1. Correct sensory information from your eyes (visual system), muscles, tendons, and joints (proprioceptive input), and the balance organs in the inner ear (vestibular system). 2. The brain stem making sense of all this sensory information

in combination with other parts of the brain. 3. Movement of your eyes to keep objects in your vision stable and keep your balance (motor output).

Falls can lead to “fear of falling” with increasing levels of immobility and dependency with a deteriorating quality of life⁴. Balance is an operational construct most frequently referring to the ability of a person not to fall⁵. In the standing posture, the balancing ability of an individual is a function of the maximal isometric force of contraction generated by antigravity muscles⁶. Patients who have suffered a stroke present with abnormal and delayed postural responses in the extremity muscles during standing displacements and deformed proprioception. They also demonstrate postural control problems such as loss of anticipatory activation during voluntary movements, increased sway during quiet standing especially more on the affected side, and decreased area of stability during weight shifting while standing. All these could result in clinical presentations such as loss of static and dynamic stability which often result in falls and reduced functional abilities.

Balance confidence, which is based on Bandura’s⁷ theory of self-efficacy, is defined as the belief that the individual has the capability to perform an activity or action. Measures of balance confidence were developed to provide a sensitive measure of fear of falling. Earlier approaches simply consisted of asking whether someone was afraid of falling⁷. Other neurological conditions have been identified as the most prevalent diagnosis among adults who fall. Relating fear of falling to balance performance and functional position would provide a strong rationale for evaluating and targeting independence in daily activities⁸. Therefore, the purpose of this study is to guess the level of self-efficacy in persons with other neurological disorders and the strength of relations between balance confidence and balance.

2. MATERIALS AND METHODS

It is a Quantitative experimental study. Subjects were taken from Smt. Kamlaben P. Patel Institute of Physiotherapy and Occupational Therapy College at Anand, Community-dwelling neurological disorders patients. (In and around Anand), Nirant Vividh Seva Trust (Datt Physiotherapy Sevadharm) at Nadiad.

2.1 Procedure

The procedure of this study was explained informed consent to the subjects. Demographic data which includes name, age, sex, address, contact number, diagnosis, date of birth, duration of illness, date of assessment, date of results, dominant of hand along with the side of weakness and medical history were collected. A study protocol of all data essentials was collected during one visit and re-assessment was taken after four weeks of the treatment programme.

2.2 Instrumentation

2.2.1 Falls Efficacy Scale– International: Fall Efficacy Scale - International (FES-I) is a questionnaire that assesses fear of falling (FOF). Fear of falling has been defined as an ongoing concern about falling, which ultimately limits the performance of activities of daily living. The 16-item FES-I was developed by the Prevention of Falls Network Europe group (ProFaNE) to augment content covered by the original 10-item Fall Efficacy Scale (FES); the social dimension of FOF was added. In order to minimize the assessment burden and increase the acceptability, a 7-item version of FES-I (short FES-I) has also been developed, validated and recommended for the community-dwelling older population. Individuals are instructed to rate each activity regardless of whether they actually perform it. The scores are added up to calculate a total score that ranges from 16 to 64 for the FES-I and 8 to 28 for the short FES-I⁹. A higher score indicates a greater FOF. The FES-I and short FES-I exhibit excellent internal consistency (Cronbach's alpha = 0.96 and 0.92) and test-retest reliability (ICC = 0.96 and 0.83) in a community-dwelling population¹⁰. The 16 items of FES-I demonstrate mean inter-item correlations of 0.55 (range 0.29 to 0.79).

2.2.2 Functional Independence Measurement: The Functional Independence Measure (FIM) scale assesses physical and cognitive disability. This scale focuses on the burden of care – that is, the level of disability indicating the burden of caring for them. Items are scored on the level of assistance required for an individual to perform activities of daily living. The scale includes 18 items, of which 13 items are physical domains based on the Barthel Index and 5 items are cognition items. Each item is scored from 1 to 7 based on the level of independence, where 1 represents total dependence and 7 indicates complete independence. The scale can be administered by a physician, nurse, therapist or layperson. Possible scores range from 18 to 126, with higher scores indicating more independence. Alternatively, 13 physical items could be stored separately from 5 cognitive items.

2.3 Clinical Application

After completing the evaluation procedure, Balance training was provided on Thera-Band Stability Trainers and Thera-Band Stability Disc. We used one green oval shaped colour-coded, one blue oval shaped colour-coded stability trainers and one silver round shaped colour-coded Stability Disc. Stability trainers are oval shaped colour-coded cell foam pads with anti-slip-ridged surface and stability disc also has an anti-slip ridged surface. It’s available in 2 densities, GREEN with smaller surface area and firm density, BLUE with larger surface area and soft density¹¹.

Stability Trainer: The stability trainer exercises can be progressed in 3 levels of challenge_ (1) Firm surface [No stability trainer], (2) Green stability trainer for beginner challenge level and (3) Blue stability trainer for intermediate challenge level. Stability Disc: - The stability disc was used for advance challenge level on sitting and standing balance. The stability disc is also used for core postural muscles development and it is also used for active sitting. Progression should be based on the individual’s ability to perform movements safely, correctly with proper postural stability and co-ordination¹².



Fig. 1: Stability disc

Stability Trainer exercises:

- Bilateral balance
- Bilateral calf raises
- Unilateral balance
- Unilateral balance with ball kicks forward, backward, sideways
- Bilateral mini-squat
- Bilateral balance with reach out activity in a different direction
- Ankle range of motion exercises with the sitting position
- Sit to stand and reverse
- Step up exercises

Stability Disc exercises:

- Two leg balance
- One leg balance
- Ankle range of motion exercises
- Stepping
- Sitting pelvic tilt
- Core muscles strengthening exercises

Other balance exercises:

- Stretching
- L/E strengthening exercises
- Toes raise exercises
- Standing with feet together, semi-tandem and tandem stance with an eye open and close.
- Stepping forward, backward and sideways
- Walking on a straight line/ sideways.
- Step up and chair sit up
- One leg stance
- Deep breathing exercises

Note: Stability trainer, disc and other balance exercises were given to the experimental group in this study and only other balance exercises were given to control group of my study. It was a one-month protocol, 5 days/week for each challenge level. The patient can proceed on to next challenge level in <5 days if good performance is seen in terms of attaining and maintaining specific position¹³. All exercises were performed 2 times each and patients were allowed to take support whenever required. The training session lasted for about an average of 45 minutes daily for each session.

3. RESULT AND DATA ANALYSIS

The data were fed into the computer in Microsoft Excel for statistical analysis software used. The descriptive statistics were calculated to get first look for data then we used paired t-Test to compare mean values of a variable between pre and post data FES-I, pre and post data FIM. Correlation data analysis (Pearson’s correlation value) was written for pre and post data FES-I, pre and post data FIM and post and post data of FES-I and FIM.

Table 1: Correlation of pre and post data

S. no.	Pre data FES-I	Post data FES-I	Pre data FIM	Post data FIM
1	64	61	66	83
2	37	27	116	121
3	46	36	111	117
4	46	37	104	108
5	22	16	115	125
6	35	25	120	125
7	33	31	114	116
8	38	31	108	116
9	28	22	114	123
10	62	46	69	90

11	29	18	117	124
12	24	16	115	126
13	27	16	117	126
14	25	19	117	123
15	35	29	105	115
16	22	16	88	105
17	43	37	90	96
18	49	30	103	116
19	35	25	117	123
20	49	41	91	98

Table 2: Statistical analysis paired sample statistic (N=20, df=19)

Scale	Mean	Standard Deviation	Significance 2-tailed	t-Test 5% LOS	Pearson correlation
Pre data FIM	104.85	15.99	1.01819E-07	2.09	0.96
Post data FIM	113.8	12.93			
Pre data FES-I	37.45	12.29	1.09821E-08	2.09	0.94
Post data FES-I	28.95	11.75			

Table 3: Pearson’s correlation study (N=20)

Scale	Pearson’s correlation
Post data FES-I	-0.84
Post data FIM	

4. DISCUSSION

The presented results show that a balance rehabilitation programme with a focus on enhancing self-efficacy and supported release involved positive effects for the participants’ activity of daily living in the early phase after neurological postural and gait problems. Balance, Postural control and functional mobility are the key focus areas for therapeutic intervention after balance issues of patients. Balance behaviour is complex and is influenced by multiple factors. The primary goal of this study was to see the effects of balance training on falls efficacy level and its correlate with functional independence level of client¹⁴.

According to table no.1 its show that correlation of pre and post data of FES-I, comparatively post data FES-I scores decreased in line than pre-data FES-I scores. According to the paired sample statistics table no. 02, Falls Efficacy Scale- International (FES-I) was used to assess the patient’s fear of falling and there was a significant difference between pre and post data on statistical analysis. Mean score for pre and post data of FES-I has changed from 37.45 to 28.95. According to statistical analysis, the value of significance 2-tailed was 1.09821E-08, t-test 5% LOS value was 2.09 and Pearson’s correlation analysis value was 0.94. Functional Independence Measure (FIM) scale was used to assess the patient’s independence level in various areas and there was a considerable difference between pre and post on statistical data compilation. Mean score for pre and post data of FIM has changed from 104.85 to 113.8 and my statistical descriptive data shows that significance 2-tailed value was 1.01819E-07, t-Test 5% LOS value was 2.09 and Pearson’s correlation analysis value was 0.96.

According to Table no-3. Related with this study for post data FES-I and post data FIM, Falls Efficacy Scale– International a higher score indicates a greater fear of falling and lower score indicates a decrease fear of falling so lower score gave positive results in my sample study and in FIM scale higher score indicating more independence and lower score indicates a more dependency level. According to my correlation study of post data FES-I and post data FIM scale were concluded that positive correlation has between falls efficacy and functional independence levels of clients. It is indicated that this correlation study has a positive correlation between FES-I and FIM. Hence it’s concluded that post data FES-I and post data FIM Pearson’s Correlation value comes [-0.84]. This value is indicating positive results of my study population According to study, few participants in my study reported being afraid of falling due to low balance, muscles spasticity and some clients have L/E weakness and few thought they were likely to be injured if they did fall and while my patients were got balance exercises with the used of stability trainer and stability disc for one month protocol of his/her treatment so finally they were reported that fear of falling was reduced.

After balance protocol, patients were more confident about their upright postures and its control, so became more social outside and inside the home, they were happy with their balance improvement and 3 patients were discontinued use of stick and caregivers support. This is based on overview, which occurs when the person is able to apply the newly learned strategy to a new task in new surroundings¹⁵.

5. CONCLUSION

This study concluded that use of stability trainer and stability disc can be helpful/ beneficial for who have had balance and postural control problem in various neurological conditions. Improvement in balance and due to decreasing risk of falling in patients they were very satisfied and they became more social inside and outside the home and they were actively performed their ADLs. In conclusion, this study showed that the Hindi version of the Falls Efficacy Scale– International can help address communication in between therapist and patients or/and caregivers for who don’t know the English language.

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