Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i8.7317

EFFECTS OF BOBATH APPROACH WITH CORE STABILITY TO IMPROVE BALANCE IN STROKE

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ABSTRACT

Background : A stroke occurs when a blood artery bursts or is disrupted, cutting off the brain's blood supply and resulting in cell death in specific brain regions. It is one of the primary causes of long-term functional impairment, which lowers the quality of life for patients and increases their dependence and social isolation.

Objective : To determine effects Of Bobath Approach with Core Stability to Improve Balance in Stroke.

Methodology: Study design was Randomized Controlled Trial. Sample size was 38 .Simple random sampling technique was utilized . Age 30 – 65 having more than 1 month or less than 6 months onset of stroke were included . Comorbidities like IHD and Rheumatologic disease were excluded.2 group were made. Group A received Bobath approach with core stability training while Group B received Conventional Physical Therapy. Trunk Impairment Scale and Berg Balance Scale were assessment tools .SPSS 25 was used in this study for data analysis.

Results: Revealed post-treatment, Group A mean score increased to 17.000±1.374, whereas Group B's mean score increased to 14.421±2.545. The P value for the post-treatment comparison was 0.001, indicating a statistically significant difference between the groups. For "Standing to Sitting", pre-treatment scores were (P = .589) Post-treatment, showing a significant difference (P = .001) after intervention both group A experimental group an B showed improvement but group A showed more prominent results as compare B to control group .

Conclusion: Study concluded intervention bobath approach with core stability had significant improvement on balance among stroke survivors.

Keywords : Balance, Bobath Approach, Core Stability, Stroke

INTRODUCTION

A stroke is an event in which there is a disruption or rupture of a blood artery blocking off the brain's blood supply and causing cell death in certain brain regions(1). In Western nations stroke is the primary cause of disability among adults.In high-income nations, stroke is the most frequent cause for urgent hospitalization in neurology departments(2). Stroke is one of the main causes of long-term functional impairment which worsens patients' quality of life and increases their reliance and social isolation(3).The number of stroke cases has increased recently and this trend is predicted to continue in the years to come. According to WHO definitions, a stroke is characterized by the rapid onset of localized and global indications associated with compromised brain function that last for more than twenty-four hours as a consequence of cerebral vascular problems. A patient suffering from a stroke usually indicates some of the following five symptoms: sudden weakness or numbness in the face, arms or legs especially in one half of the body sudden confusion most of which is followed by speech problems, sudden problems with vision in one or both eyes, sudden difficulty walking, feeling lightheaded, losing balance and coordination, sudden severe dizziness that doesn't seem to be related to anything. A stroke is a condition affecting the central nervous system (CNS)(4).

Pakistan is one of the top Asian nations with the highest stroke death rates(5). In Pakistan, the estimated yearly incidence of stroke is 250/100,000. About 10.9% of the population had no formal education and the majority (74.66%) came from rural regions. There were 271 instances of stroke found and the frequency was 1.2%. It found that the community had a 4.8% prevalence of stroke with a similar ratio for men and women. Additionally, 30% of all strokes were reported to have happened in people under the age of 45, which suggests that Pakistan has a high rate of young strokes(6). The ensuing neurological impairments have a significant influence on everyday activities, life quality and medical expenses. To develop innovative interventional strategies and suggest suitable therapies for neurological abnormalities and subsequent recovery rehabilitation need a thorough grasp of the underlying processes (7).

One of the most prevalent disabilities experienced by stroke survivors is balance impairment, which increases the risk of falls and reduces mobility. The most prevalent type of impairment is hemiparesis-related decreased mobility. Two primary causes are directly linked to this impairment decrease in central motor control and a quick change in muscle thickness and composition that becomes apparent within a month of the commencement. Reduced balance function is another consequence of all these deficits the patient is unable to keep his center of gravity within his support base, whether or not external forces are at play (8).

The Bobath Concept is a technique that enhances control over postural and selected motions with an emphasis on exercises involving natural movement patterns. Postural muscle tone has a major role in the efficacy and efficiency of the motion generated during motion activities. The patient's posture and balance should improve as a result of completing a Core Stability Exercise utilising the Bobath Concept technique, which is intended to reawaken the postural muscles(9). Bobath is also known as the neuro-developmental approach worldwide. Recently, many in the rehabilitation sector have become interested in this idea, particularly with regard to stroke victims' recuperation(10). The theoretical underpinnings of NDT/Bobath on stroke recovery have been investigated in previous studies, the majority of which were controlled trials.Karl Bobath developed this procedure in 1990, and she described how hemiplegic patients experience motor dysfunctions. Patients who have had a stroke must actively participate in exercises with the support of the therapist(11). Different types of manual handling can be gradually eradicated to assist the patient become more independent in their motor duties. This type of therapy promotes independence and functional control.The NDT/Bobath concept has been recognised as a treatment for stroke patients with movement dysfunctions; nevertheless, in order to explain its widespread use by physiotherapists, further research is needed to determine its effectiveness(12). Therefore, "core stability training" uses targeted pelvic movement and abdominal contractions to activate the deep trunk muscles.In recent years, sports and low back pain rehabilitation have placed a strong emphasis on the idea of "core" and the necessity of retraining "core stability."A number of studies have recently looked into the role that core stability training plays in stroke recovery.Numerous studies have demonstrated the benefits of trunk control and core stability

training for sitting, standing, balance, mobility, and neuromuscular integration, all of which have a favourable impact on day-to-day activities.Rehabilitative regimens are therefore now focusing on core stability through the strengthening of the lumbar, pelvic, and abdominal muscles.Neuroplasticity and learning in stroke patients can be influenced by several circumstances(13).

METHODS

Study design was Randomized Controlled Trial. Data gathered from Pakistan Institute of Neuro Sciences (PINS), Lahore's rehabilitation center and home sessions in various Lahore neighborhoods. A sample size of 38 was calculated through epitool software by using Confidence Interval (CI=95%), Anticipated population proportion (p=0.60), and Absolute precision (d=0.08).Simple random sampling technique was utilized .Duration of Study was 6 months after the approval of synopsis Feb 2024 to 10 July 2024.Age 30 – 65 both Genders having more than 1 month or less than 6 months since onset of stroke and GCS score 11 to 15 were included .GCS less than 10,Any Pathological fracture, Diagnosed Orthostatic hypotension and Comorbidities like IHD and Rheumatologic disease were excluded. Ethical consideration was followed throughout study. Consent was get from patients . Both groups were pass through rehabilitative exercise program. Group A (Experimental group); received Bobath approach with core stability training while Group B (Control group) received Conventional Physical Therapy for 40 min 5 days a week up to 8 weeks (14) .Trunk Impairment Scale and Berg Balance Scale were assessment tools .SPSS 25 was used in this study for data analysis.

RESULTS

Table 4.1 :Frequency Distribution of Demographics

		Treatment Group				Total	
		Group A		Group B			
		N	%	N	%	N	%
Gender	Male	12	63.2%	11	57.9%	23	60.5%
	Female	7	36.8%	8	42.1%	15	39.5%
Duration of stroke	1-3 Months	13	68.4%	11	57.9%	24	63.2%
	4-6 Months	6	31.6%	8	42.1%	14	36.8%
Paralysis side	Right side	12	63.2%	13	68.4%	25	65.8%
	Left side	7	36.8%	6	31.6%	13	34.2%
Total		19	100.0%	19	100.0%	38	100.0%

Table demonstrated the Demographics of study population

Figure 4.1:Age histogram

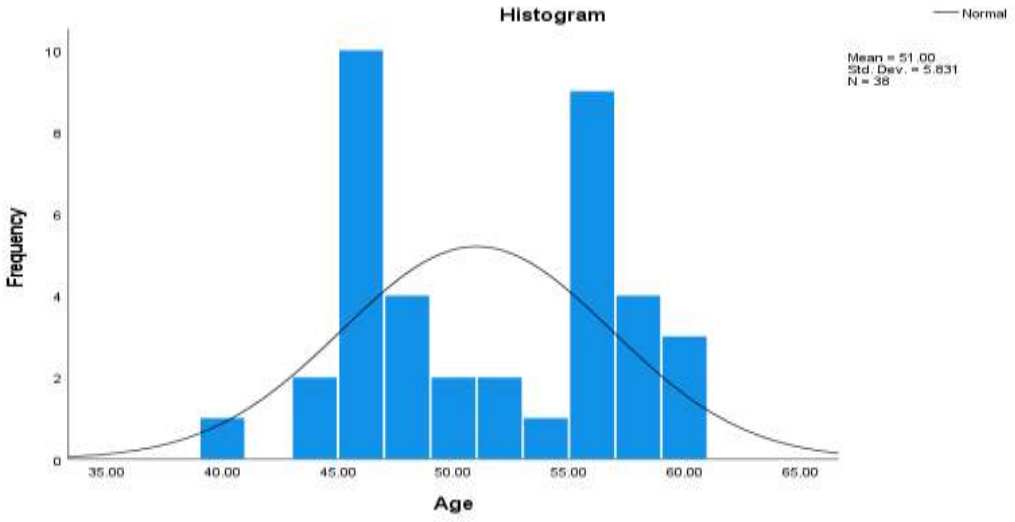

Table 4.2: Between group Comparison of Berg Balance Scale using Independent Sample t test

	Treatment Group	N	Mean	Std. Deviation	P value
Sitting to standing Pre treatment	Group A	19	1.789	.976	.235
	Group B	19	1.421	.901	
Sitting to standing Post Treatment	Group A	19	3.736	.452	.001
	Group B	19	2.736	.561	
Standing unsupported Pre Treatment	Group A	19	1.473	1.123	.735
	Group B	19	1.368	.895	
Standing unsupported Post Treatment	Group A	19	3.210	.787	.029
	Group B	19	2.736	.452	
Sitting with back unsupported Pre Treatment	Group A	19	2.263	1.147	.760
	Group B	19	2.368	.955	
Sitting with back unsupported Post Treatment	Group A	19	3.947	.229	.038
	Group B	19	3.631	.597	
Standing to sitting Pre treatment	Group A	19	1.421	1.346	.589
	Group B	19	1.631	1.011	
Standing to sitting Post Treatment	Group A	19	3.315	.820	.001
	Group B	19	2.578	.606	
Transfer Pre treatment	Group A	19	1.736	.991	1.00
	Group B	19	1.736	.561	
Transfer post treatment	Group A	19	3.526	.512	.001
	Group B	19	2.736	.561	
Standing with eyes closed Pre treatment	Group A	19	1.473	1.389	.536
	Group B	19	1.684	.477	
Standing with eyes closed post treatment	Group A	19	3.526	.512	.001
	Group B	19	3.000	.333	
Standing with feet together Pre treatment	Group A	19	1.105	.809	.401
	Group B	19	1.578	2.292	
Standing with feet together post treatment	Group A	19	3.684	.477	.001
	Group B	19	2.105	.458	
Reaching forward with outstretched arm Pre treatment	Group A	19	.736	.653	.001
	Group B	19	1.631	.495	
Reaching forward with outstretched arm post treatment	Group A	19	3.421	.507	.005
	Group B	19	3.000	.333	
Retrieving object from floor Pre treatment	Group A	19	1.473	1.123	.118
	Group B	19	1.052	.229	
Retrieving object from floor post treatment	Group A	19	3.210	.787	.001
	Group B	19	2.368	.597	
Turning to look behind Pre treatment	Group A	19	1.315	1.293	.337
	Group B	19	1.631	.495	
Turning to look behind Post treatment	Group A	19	3.526	.512	.001
	Group B	19	2.789	.535	
Turning 360 degrees Pre treatment	Group A	19	1.526	1.172	.721
	Group B	19	1.631	.495	
Turning 360 degrees Post treatment	Group A	19	3.157	.764	.028
	Group B	19	2.684	.477	
Placing alternate foot on stool Pre treatment	Group A	19	1.000	.881	1.00
	Group B	19	1.000	.000	
	Group A	19	3.157	.764	.016

Placing alternate foot on stool Post treatment	Group B	19	2.631	.495	
Standing with one foot in front Pre treatment	Group A	19	1.000	.881	.255
	Group B	19	.736	.452	
Standing with one foot in front Post treatment	Group A	19	3.157	.764	.001
	Group B	19	2.052	.229	
Standing on one foot Pre treatment	Group A	19	1.052	.848	.181
	Group B	19	.736	.452	
Standing on one foot Post treatment	Group A	19	3.210	.713	.001
	Group B	19	2.052	.229	

For the "Sitting to Standing" task, pre-treatment scores P = .235. Post-treatment, scores (P = .001).Standing Unsupported pre-treatment scores were P = .735. Post-treatment, scores were (P = .029).For "Sitting with Back Unsupported", pre-treatment scores were (P = .760). Post-treatment, scores showing a significant difference (P = .038).For "Standing to Sitting", pre-treatment scores were (P = .589). Post-treatment, showing a significant difference (P = .001).For "Transfer", pre-treatment (P = 1.00). Post-treatment, significant difference (P = .001).For "Standing with Eyes Closed", pre-treatment scores were (P = .536). Post-treatment, scores were a significant difference (P = .001).For "Standing with Feet Together", pre-treatment scores were (P = .401). Post-treatment, scores showing a significant difference (P = .001).For "Reaching Forward with Outstretched Arm", pre-treatment scores were (P = .001). Post-treatment, scores showing a significant difference (P = .005).For "Retrieving Object from Floor", pre-treatment scores were (P = .118). Post-treatment, scores significant difference (P = .001).For "Turning to Look Behind", pre-treatment scores were (P = .337). Post-treatment, scores were showing a significant difference (P = .001).For "Turning 360 Degrees", pre-treatment scores were (P = .721). Post-treatment, scores were showing a significant difference (P = .028).For "Placing Alternate Foot on Stool", pre-treatment scores were (P = 1.00). Post-treatment, scores were showing a significant difference (P = .016).For "Standing with One Foot in Front", pre-treatment scores were (P = .255). Post-treatment, scores were showing a significant difference (P = .001).For "Standing on One Foot", pre-treatment scores were (P = .181). Post-treatment, scores were showing a significant difference (P = .001).

Table 4.3: Between groups Comparison of Trunk Impairment scale using Independent Sample t test

	Treatment Group	N	Mean	Std. Deviation	P value
Trunk Impairment Scale Pre Treatment	Group A	19	11.947	2.570	.908
	Group B	19	11.842	2.967	
Trunk Impairment Scale Post Treatment	Group A	19	17.000	1.374	.001
	Group B	19	14.421	2.545	

Post-treatment, Group A's mean score increased to 17.000±1.374, whereas Group B's mean score increased to 14.421±2.545. The P value for the post-treatment comparison was 0.001, indicating a statistically significant difference between the groups.

Table 4.4: Within group comparison of BBS in Group A using Paired Sample T test

Treatment Group			Mean	Std. Deviation	P value
Group A	Pair 1	Sitting to standing Pre treatment	1.789	.976	.001
		Sitting to standing Post treatment	3.736	.452	
	Pair 2	Standing unsupported Pre treatment	1.473	1.123	.001
		Standing unsupported Post treatment	3.210	.787	
	Pair 3	Sitting with back unsupported Pre treatment	2.263	1.147	.001

		Sitting with back unsupported Post treatment	3.947	.229	
	Pair 4	Standing to sitting Pre treatment	1.421	1.346	.001
		Standing to sitting Post Treatment	3.315	.820	
	Pair 5	Transfer Pre treatment	1.736	.991	.001
		Transfer post treatment	3.526	.512	
	Pair 6	Standing with eyes closed Pre treatment	1.473	1.389	.001
		Standing with eyes closed post treatment	3.526	.512	
	Pair 7	Standing with feet together Pre treatment	1.105	.809	.001
		Standing with feet together post treatment	3.684	.477	
	Pair 8	Reaching forward with outstretched arm Pre treatment	.736	.653	.001
		Reaching forward with outstretched arm post treatment	3.421	.507	
	Pair 9	Retrieving object from floor Pre treatment	1.473	1.123	.001
		Retrieving object from floor post treatment	3.210	.787	
	Pair 10	Turning to look behind Pre treatment	1.315	1.293	.001
		Turning to look behind Post treatment	3.526	.512	
	Pair 11	Turning 360 degrees Pre treatment	1.526	1.172	.001
		Turning 360 degrees Post treatment	3.157	.764	
	Pair 12	Placing alternate foot on stool Pre treatment	1.000	.881	.001
		Placing alternate foot on stool Post treatment	3.157	.764	
	Pair 13	Standing with one foot in front Pre treatment	1.000	.881	.001
		Standing with one foot in front Post treatment	3.157	.764	
	Pair 14	Standing on one foot Pre treatment	1.052	.848	.001
		Standing on one foot Post treatment	3.210	.713	

These results indicate significant improvements in all measured tasks of the Berg Balance Scale for Group A after treatment.

Table 4.5: Within group comparison of BBS in Group B using Paired Sample T test

Treatment Group			Mean	Std. Deviation	P value
Group B	Pair 1	Sitting to standing Pre treatment	1.421	.901	.001
		Sitting to standing Post treatment	2.736	.561	
	Pair 2	Standing unsupported Pre treatment	1.368	.895	.001
		Standing unsupported Post treatment	2.736	.452	
	Pair 3	Sitting with back unsupported Pre treatment	2.368	.955	.001
		Sitting with back unsupported Post treatment	3.631	.597	
	Pair 4	Standing to sitting Pre treatment	1.631	1.011	.001
		Standing to sitting Post Treatment	2.578	.606	
	Pair 5	Transfer Pre treatment	1.736	.561	.001
		Transfer post treatment	2.736	.561	
	Pair 6	Standing with eyes closed Pre treatment	1.684	.477	.001
		Standing with eyes closed post treatment	3.000	.333	
	Pair 7	Standing with feet together Pre treatment	1.578	2.292	.335
		Standing with feet together post treatment	2.105	.458	
	Pair 8	Reaching forward with outstretched arm Pre treatment	1.631	.495	.001
		Reaching forward with outstretched arm post treatment	3.000	.333	
	Pair 9	Retrieving object from floor Pre treatment	1.052	.229	.001
		Retrieving object from floor post treatment	2.368	.597	

	Pair 10	Turning to look behind Pre treatment	1.631	.495	.001
		Turning to look behind Post treatment	2.789	.535	
	Pair 11	Turning 360 degrees Pre treatment	1.631	.495	.001
		Turning 360 degrees Post treatment	2.684	.477	
	Pair 12	Placing alternate foot on stool Pre treatment	1.000	.000	.001
		Placing alternate foot on stool Post treatment	2.631	.495	
	Pair 13	Standing with one foot in front Pre treatment	.736	.452	.001
		Standing with one foot in front Post treatment	2.052	.229	
	Pair 14	Standing on one foot Pre treatment	.736	.452	.001
		Standing on one foot Post treatment	2.052	.229	

These results indicate significant improvements in nearly all measured tasks of the Berg Balance Scale for Group B after treatment, except for "Standing with Feet Together

Table 4.6: Within group comparison of Trunk Impairment Scale using Paired Sample T test

Treatment Group			Mean	Std. Deviation	P value
Group A	Pair 1	Trunk Impairment Scale Pre Treatment	11.947	2.570	.001
		Trunk Impairment Scale Post Treatment	17.000	1.374	
Group B	Pair 1	Trunk Impairment Scale Pre Treatment	11.842	2.967	.001
		Trunk Impairment Scale Post Treatment	14.421	2.545	

These results indicate significant improvements in the Trunk Impairment Scale for both Group A and Group B after treatment.

DISCUSSION

Current randomized control trial conducted on 38 stroke survivors 19 were in experimental (bobath and core stability exercise) and 19 were in control group (conventional physical therapy). 15 were female and 23 were male participants undergone 8 week treatment session.

Berg balance and trunk impairment scale were used as assessment tool. Group A experimental group showed significant improvement after 8 week intervention on balance berg scale showed setting to standing mean score 1.789± 9.76 to 3.73±.452 with significant p value 0.001 these results were accordance to Verma et al. study concluded core stability comibing with boabth approach improve balance among stroke survivors with significant p <0.05(15).

Present study revealed 39.5% were female subjects and 60.5% were male participant having stroke these population was accordance to Chen X et al. study had 30% female and 70% were male underwent a core stability exercises to improve balance results demonstrated subjects underwent core stability training showed improve balance with significant p value < 0.05 these results were accordance to present study showed improvement core stability training with P < .005(16).

Karthikbaba et al. Study revealed that core stability exercise improve balance and mobility among stroke survivor after 6 week treatment showed significant improvement on trunk impairment scale with p <. 05 these results were accordance to current study showed p value 0.001 after 8 week core stability and bobath approach on stroke survivor. Current study worked on 2 intervention but previous study just focued on core stability training (17).

Van Criekinge et al. Study demonstrated core stability exercise showed significant improvement on sitting and standing balance among stroke survivors showed significant p value <0.05 these results were accordance to present study showed For "Standing to Sitting", pre-treatment scores were 1.421±1.346 for Group A and 1.631±1.011 for Group B (P = .589). Post-treatment, scores increased

to 3.315±.820 for Group A and 2.578±.606 for Group B, showing a significant difference (P = .001). For "Standing Unsupported", pre-treatment scores were 1.473±1.123 for Group A and 1.368±.895 for Group B (P = .735). Post-treatment, scores were 3.210±.787 for Group A and 2.736±.452 for Group B, also showing a significant difference (P = .029)(18).Present study revealed post treatment For "Standing with Feet Together", pre-treatment scores were 1.105±.809 for Group A and 1.578±2.292 for Group B (P = .401). Post-treatment, scores were 3.684±.477 for Group A and 2.105±.458 for Group B, showing a significant difference (P = .001) these results were accordance to previous study (19).Preset study demonstrated Standing with One Foot in Front, pre-treatment scores were 1.000±.881 for Group A and .736±.452 for Group B (P = .255). Post-treatment, scores were 3.157±.764 for Group A and 2.052±.229 for Group B, showing a significant difference (P = .001) these results were accordance to previous study by Verheyden G et al. (20).

CONCLUSION

Study concluded intervention bobath approach with core stability had significant improvement on balance among stroke survivors

Funding : No source of funding's

Acknowledgement: .We want to really thank my supervisor for his insightful advice and upbeat attitude regarding this study. We owe him a great deal for making our study session much easier by making sure that the right conditions and atmosphere were provided. Without his assistance and knowledgeable direction, this endeavor would not have been feasible.

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