

Role of Bobath and Task Specific Approach to Improve Upper Limb Activity of Daily Living among the Individual with Chronic Stroke - A Review Study

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Abstract: ***Aim:** To investigate the evidence on effect of Bobath and Task specific approach to improve upper limb activity of daily living among the individual with chronic stroke. **Methods:** A comprehensive search on PUB med, Google scholar, Cochrane library, CINHAL, using keywords Bobath, Task specific training, Motor relearning, post stroke, upper limb rehabilitation by using AND, OR. Randomized controlled trials, systematic review and meta - analysis published since 2012 are reviewed. **Results:** 36 studies identified through database searching. 13 were selected according inclusion criteria. The result of this review provides evidence that Bobath and Task specific training both are effective form of rehabilitation to improve balance, gait and functional activity among the individual with stroke and give better result than conventional therapy. **Conclusion:** The result of this review provide evidence that both Bobath and task specific training has significant positive effect on stroke rehabilitation, helps to regain mobility, motor control, balance, gait and functional activity of daily living.*

Keywords: Stroke, Bobath, task - oriented approach, Activity of daily living.

1. Introduction

Stroke is one of the major cause of disability worldwide [22]. The world health organization (WHO) defined stroke as rapidly developing clinical signs of focal (or global) disturbance of cerebral function lasting more than 24 hours or leading to death, with no apparent cause then of vascular origin [22] half of the patients after stroke are left with disability. The estimated adjusted prevalence rate of stroke range 84 - 262/1000000 in rural and 334 - 424/1000000 in urban areas. The incidence rate is 119 - 145/1000000 based on the recent population based studies [15]. There are two types of stroke, Ischemic and haemorrhagic. In ischemic stroke clot block the blood flow of brain and preventing brain tissue from getting essential oxygen and nutrients, this is the commonest type of stroke, effects 80% of individual with stroke. Haemorrhagic stroke occurs when sudden rupture of blood vessel causes bleeding inside brain [16]. The morbidity rate is higher in low and middle income countries.

A variety of deficit may occur after stroke like changes in the level of consciousness, sensory, motor, perceptual and functional impairment. According to world health organization in most of the cases patient regain lower limb function but only less than 50% will recover arm function. The lower limb recovery process is often faster than upper limb [7]. Among physical function, gait is mostly affected by stroke, walking speed and duration go shorter, affecting activities of daily living (ADL), leaving stroke patients unable to perform simultaneous tasks. Physical therapy treatment helps in improving function [14]. Problems with upper limb functions are very common after a stroke. These impairments commonly include difficulty moving and co-ordinating the arms, hands and fingers, often resulting in

difficulty carrying out daily activities such as eating, dressing and washing. More than half of people with upper limb impairment after stroke will still have problems many months to years after their stroke [19].

Brunnstrom Stages of Arm Recovery [21]

Stage 1: limb will be in flaccid state, no movements can be initiated.

Stage 2: The basic limb synergies components may appear as associated reactions, minimal voluntary movement responses may be present.

Stage 3: Patient gains control over the movement synergies, although the full range of all synergy components does not develop. Spasticity has developed further and can become severe [21].

Stage 4: Spasticity begins to decline.

- Raising arm forward to horizontal position.
- Arm to rear of the body.
- Pronation - supination of forearm, elbow flexed.

Stage 5: Components to be present are:

- Arm rising to side horizontal position.
- Overhead arm rising.
- Moving the palm up and down, elbows extended.

Stage 6: Synergy and spasticity disappear. Stage 5 Movement combinations, are under control. Patient can move the individual joint in a well manner near to normal [21]

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Stage 7: Normal motor function is restored.

Improving upper limb functions is a core element of stroke rehabilitation needed to maximise patient outcomes and reduce disability. Many interventions have been developed; which include different exercises or training methods, equipment or techniques, or they could take the form of a drug (pill or injection) given to help arm movement [19].

Bobath concept is one of the popular neurophysiological Approach in the field of neuro rehabilitation, based on neuro developmental treatment the aim of this concept is to optimize the person’s functional capacity after stroke by improving the postural control with the help of facilitating selective movements [5]. This approach believed that patient must be active while therapist assist the patient to move using key point of control and reflex inhibition. This concept includes disability analysis and assessment of functional deficit and their cause [13].

Task specific training is developed by Carr and Shepherd in 1987, it is a treatment approach of neurological rehabilitation based on motor re learning. It believed that rehabilitation should start soon after injury and focus on functional task rather than the normal exercise, where patient practice context specific motor task and receive some form of feedback, it involves functional task of everyday’s life. There is a growing evidence on effectiveness of task specific training in rehabilitation and neural plastic changes following stroke [7].

2. Methodology

Source:

Relevant studies from 2012 to 2022 were obtained from the following database google scholar, PUB med, CINAHL, Cochrane library using key words such as stroke, Bobath approach, task specific training, motor relearning and activity of daily living.

Study selection:

Randomized control trial, systematic review and meta - analysis, on effect of Bobath, task - oriented training, motor relearning on stroke rehabilitation and which were studied on human population, published in English are included in this study.

Data extraction:

The data which was collected were tabulated based on the sample size, Objective, outcome measure used, level of evidence.

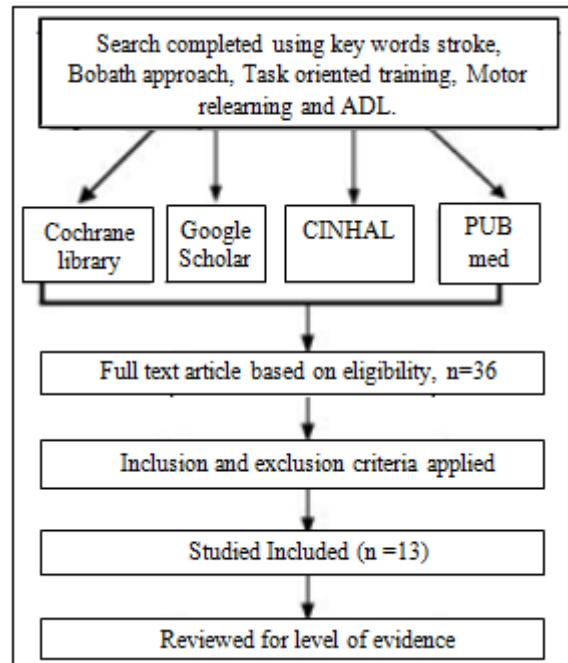


Figure 1: Flow chart of methodology

Serial no.	Author’s name	Objective	Sample size	Outcome measure	Result	Level of evidence
1.	Kamal Narayana Arya et al., [1]	To evaluate the effectiveness of meaningful task - specific training on upper limb motor recovery on subacute stroke	103	Fugl - Meyer assessment Action Research Arm Test.	After 4 weeks of treatment according to the outcome measures task specific training group showed significant improvement than conventional physiotherapy group of patients	Level I
2.	Huseyin Sinoglu et al., [8]	To compare the effect of Bobath and CIMT on arm functional recovery among the individual with stroke	24	Wolf motor function test Motor activity log - 28 Motor evaluation scale for arm in stroke.	According to the score of outcome measures CIMT seems to be more efficient than Bobath in improving the amount and quality of effected arm use.	Level I
3.	Emilia Mikolajewska [13]	To evaluate the effect of Bobath on ADL of stoke patient.	60	Barthel index	Patients showed improvement in 3 components, wheelchair to bed transfer, walking on level surface, stair climbing (up and down)	Level I
4.	Timmermans et al., [23]	To evaluate the effectiveness of a task - oriented mental practice approach as an addition to regular armhand therapy in patients with subacute stroke	42	Fugl - Mayer test Barthel index, Frenchay activities index, Wolf motor function test, Accel - erometry (ACC).	After 6 weeks of treatment patients showed significant improvement of ADL.	Level I
5.	Gajanan V bhalerao et al., [3]	Compare the effect of motor relearning and Bobath on ADL of acute stroke patient	32	Barthel index, Functional independence measure, Dynamic gait index, Functional ambulation category.	Both groups showed significant improvement in first 6 weeks of training. In comparison between two groups MRP group showed significant differences in the improvement compared to Bobath	Level I

					group.	
6.	M. J Diaz - Arribas et al., [5]	To evaluate the effectiveness of Bobath in sensory - motor rehabilitation after stroke.	15 RCT	PEDro scale	The Bobath is not more effective than other approaches, there is superiority of other therapeutic approaches like CIMT.	Level I
7.	Fahimeh Firoozeh et al., [7]	To investigate the effect of task - oriented training and Bobath on upper limb function after stroke.	16	Fugl Meyer Assessment, Wolf Motor Function Test, Barthel Index, Grip Strength Test.	The result showed that that the group received task - oriented training combined with Bobath showed better improvement than only task - oriented training group.	Level I
8.	T Pumprasart et al., [20]	To evaluate the effect of Bobath therapy on upper extremity function in individual with chronic stroke.	26	Wolf Motor Function Test. Fugl - Meyer assessment for upper extremity Modified Ashworth Scale Nottingham Sensory Assessment.	After comparing pre and post data there was significant improvement in upper limb muscle tone and stereognosis.	Level I
9.	Anandan et al., [15]	to identify the effect of task specific training and PNF on various functions in stroke survivors.	50	Modified Ashworth scale Action Reach Arm Test Berg Balance Scale Dynamic gait index	After ten weeks of treatment comparing pre and post data both groups showed significant difference in comparison between PNF and task specific group, the task specific training produce slightly higher improvement than PNF group.	Level I
10.	M Iqbal et al., [14]	To compare the effect of dual task specific training and conventional physical therapy on ambulation of chronic stroke patient.	64	10 Meter walk test (10MWT) Time up and Go test (TUG)	Post treatment score revealed significant improvement in variables of gait.	Level I
11.	Selin ozen et al., [18]	to identify the effect of task specific training and PNF on various functions in stroke survivors. To identify the effect of computer game assisted task specific exercise in stroke rehabilitation	30	Fugl - Mayer upper extremity scale, BSSR for hemiplegic upper extremity, Montreal cognitive assessment test, Stroke specific quality of life	High difference in the score of outcome measures indicate patients were improved with the treatment.	Level I
12.	Yazici et al., [26]	To investigate the effect of Bobath approach in stroke rehabilitation	39	Stroke rehabilitation assessment of movement scale Trunk Impairment Scale Berg Balance Scale Barthel Index	NDT helped to improve mobility skill and Balance, Early improvement is seen in Bobath group.	Level I
13.	K - H Kim et al., [9]	To examine the effectiveness of task - specific training combined with cognitive sensorimotor exercise to improve proprioception, spasticity and gait speed in stroke patients.	37	Composite spasticity score Myoton pro 10 Meter Walk Test	After 8 weeks of training, the task specific combined with sensory motor exercise group showed significant improvement in proprioception compared to the only task specific training and control group (p < 0.05). In CSS, gastrocnemius muscle tone (GMT) and gait speed among three groups, the combined group differed significantly compared to the control group (p < 0.05).	Level I

Level I (systematic reviews, met - analysis, RCTs)

Level II (nonrandomized controlled trials, Case - control trials)

Level III (pre - test - post - test designs, cross - sectional design)

Level IV (single subject design, case series)

Level V (case reports, narrative literature reviews).

3. Discussion

Following stroke both Bobath and Task oriented training are beneficial to improve activity of daily living but the improvement differ with the degree of severity taken into consideration. There is no article which clearly says about which technique is more effective on stroke populations. In the study by kamal Narayana arya et al, found that Meaningful task specific training more beneficial in improving the UE recovery of the subacute stroke patient in comparison to the conventional rehabilitation program. It helps in motor recovery commenced post treatment and

continued during the 8 - week follow - up evaluation. There was an improvement in the sensor motor recovery and functional use of the affected upper limb as well. MTST provided optimal motor learning and greater participant independence [1]. The RCT by Huseylinsinoglu et al revealed that the Bobath Concept and constraint - induced movement therapy approaches resulted in similar degrees of functional ability, performance time, quality of movement and level of independence in ADL in stroke patients with a high level of function in the affected arm [8]. In the RCT by Emilia Mikolajewska, The NDT - Bobath method showed significant changes in the health status of patients in the few items of the Barthel Index. These changes in three areas of

ADL (Transfer from wheelchair to bed and back), walking on level surface, climbing up and down stair) were favourable. In the short period of time the results were considering very good [13]. In the study by Timmermans et al found that addition of Mental practice (MP) with the conventional therapy improve arm and hand function and facilitate the functional activity of upper limb as compared with additional NDT in subacute stroke patients, In MP and conventional combined group showed significant improvement in FAT and after 12 months of treatment that was maintained [23]. In the RCT by Gajanan V bhalerao et al found that Motor relearning and Bobath approach both helped to improve specific components of ADL, In Comparison at intervals of 2 weeks showed that there was significant difference in two groups. MRP showed better improvement than Bobath approach on Barthel Index, Functional Independence Measure and Function ambulation category. Therefore concluded that MRP is more effective in early enhancement of activities of daily living and ambulation. Task specific training of MRP in initial phase of rehab helped in learning of the motor control and pattern of movement for specific activity [3]. In the study by M. J Diaz - Arribas et al 15 RCT were assessed here using physiotherapy evidence database showed that Bobath is effective to improve motor control among the stroke survivor [5].

Fahimeh Firoozeh et al found combination of task - oriented training and Bobath showed comparable improvement in upper limb function, the time and quality of movement, grip strength and the ADL significantly improved in effected limb. Several studies have reported that repetitive TOT plays an important role in inducing and maintaining brain changes for the overall limb performance [7]. T Pumprasart et al The 6 - week Bobath therapy programme was effective in improving upper limb functions in individuals with moderate to severe motor deficits after stroke, it also helps to improve muscle tone and cortical sensation [20]. In the study by Anandan et al 50 MCA stroke patient randomly divided into two groups. TST group and PNF group. This study is assessed by Modified Ashworth scale, Action reach arm scale, Berg balance scale, and Dynamic gait index. After treatment they concluded that task specific training group shows better improvement than the PNF group in chronic stroke [15].

M Iqbal et al 64 patients, there were divided into two groups that both had male and female. Post - treatments scores revealed significant improvement is seen in dual task group than conventional physiotherapy [14]. Selin ozen et al the study aimed to determine the effectiveness of computer game related task specific exercise to improve motor, cognitive function and quality of life. In this 38 stroke patients were randomized into two groups, task specific exercise group and control group. All patients were assessed by, Fugl Meyer Upper Extremity (FMUE) scale, BSSR for hemiplegic upper extremity, MOCA, SS - QOL and concluded that task specific training (computer assisted) is effective to improve cognitive function and quality of life [18]. Yazici et al, 39 patients with acute ischemic stroke were randomly assigned into two groups. The patients were evaluated with Stroke Rehabilitation Assessment of Movement Scale, Trunk Impairment Scale, Berg Balance

Scale and Barthel Index. After completion of the treatment protocol is found that NDT - B reduced hospitalization period improved mobility and balance than other group [26]. K - H Kim et al 37 subjects included in this study, divided into 3 groups. one group receive task specific training combined with cognitive sensory motor exercise, task specific training group and control group, found that the combination of task specific training and CSE helps to improve proprioception, spasticity and gait speed in stroke patients [9].

4. Conclusion

The result of this review provide evidence that task specific training and Bobath both are effective form of rehabilitation and help in neural plastic changes following stroke. Both approaches help to improve upper limb motor function, Cognitive function as well as balance and gait, It also concluded that task specific training combined with Bobath gives better result than either of the intervention alone.

Limitation:

Reduced sample size. Use of Non standardized outcome measure in few studies.

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