BOBATH TRAINING FOR BAYSIDE STROKE PATIENTS

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ABSTRACT:

Introduction

In India, stroke is projected to rank as the fourth leading cause of disability by the year of 2020. The incidence rate of stroke is about 119-145/100,000 based on the population based studies in 2013. Stroke is defined by the World Health Organizations as a clinical syndrome consisting of rapidly developing signs of focal disturbance of cerebral function lasting more than 24 hours with no apparent cause other than a vascular origin. Stroke rehabilitation begins as soon as diagnosis of stroke is established and life-threatening problems are under control. The intervention may start at the bedside observing the persons ability to hold a sitting position. Priorities during this early period are to prevent recurrent stroke and complications, mobilize the patient as soon as possible, encourage performance of self-care activities, and provide emotional support to family. It is essential for the Occupational Therapy professionals to help the patient restore their basic Activities of Daily Living early, to avoid patient developing psychological fear.

Key words: Stroke, focal disturbance, Bobath, bedside intervention, self care activities, Occupational Therapy professionals

Aim of the study

To identify whether selected Bobath training is suitable to improve trunk balance & correlate selected training influence on ADL for stroke patients at bedside.

Objectives of study

To identify appropriate Bobath training for improving trunk balance.

To correlate relevance between trunk balance (control) and ADL performance for stroke patients.

To identify benefit of Bobath as bay side therapy.

Method of study

Procedure was explained to all patients and consent was obtained before treatment. Treatment was given 4 days a week for 4 weeks and the time duration is 40 minutes for each session. Trunk impairment scale and functional independence measure score was assessed during both pre and post therapy session.

Results

Data analysis show that there is significant effect of bobath training for stroke patients in increasing the trunk control (t=25.026, p=0.000<0.01). There is a direct relationship between trunk (balance) control and ADL performance (r=0.942; p=0.001). The result also shows significant correlation between trunk (balance) control and ADL performance in stroke patients

Conclusion

Intra-group analysis showed that Bobath training for bedside stroke patients is effective in terms of improvement in trunk balance and ADL performance. Hence this study concludes that Bobath training for bedside stroke patients is effective in terms of improvement in trunk balance thereby ADL performance.

Key words: Stroke, Bobath training, Bay side therapy, ADL performance, Trunk balance

Introduction

In human brain complete stoppage of blood flow for longer than 5 min produces irreversible damage, such as Stroke. Prevalence rate of stroke range between 84-262/1,00,000 in rural areas and higher in urban areas, 334-424/1,00,000. Of those people suffering from TIA, up to 30% are at risk of suffering stroke within two years, half of these within the first twelve months (Herman, Layten, van Luijk et al., 2002). The initial shock, trouble in BADL experiences felt by family makes them to feel that loved ones can die (Fisher, 1961; Borden, 1962). Occupational therapist involved in the rehabilitation process can assist in early stages with clear explanations on essential bedside therapies, to restore maximum health of patient.

Trunk control is a crucial component to perform activities of daily living (ADL) and in early stage, after stroke it could predict ADL outcome. Trunk control can be divided into levels of increasing complexity. The first level of trunk control is ability to perform the basic movement components. Trunk exercises performed in the early stage of rehabilitation may improve the functional performance. Trunk control allows the body to remain upright, to adjust to weight shift, to control movements against the constant pull of gravity, and to change body position for balance and function. Research on postural control shows that trunk strength correlates with sitting balance. Loss of trunk strength as occurring in stroke affects functional training.

Retraining strength in the three cardinal planes is a prerequisite for tasks. The initiation patterns result in different spinal patterns, muscular activity, and changes in the distribution of weight[10]. While sitting, the client reaches down or sideways to the floor to pick up an object. As the arm reaches down, the upper body initiates the anterior weight shift. To extend the reach of the arm, the lower body provides stability yet adjusts and adapts.

2. When the client lifts up a leg to tie a shoe, the lower body initiates a posterior weight shift. The upper body adjusts to the weight shift and to the demands of the arm and hand as they tie the shoe. 3. In standing, upper-trunk movements occur as postural adjustments as the legs initiate both the stance phase (forward weight shift) and swing phase (stepping) of walking. The third level of trunk control allows strength and stability for power production from the arm or leg. The movement and control of the trunk are used to support power

production in the extremities for propulsive activities such as stair climbing, jumping, running, throwing, hitting, and rowing.[10]

Trunk function plays a key role in performing activities of daily living (ADL) including locomotion and sitting. Sitting and ADL should be performed as early as possible especially during the acute phase of stroke rehabilitation. In the stroke rehabilitation process, the trunk function is an important predictor of the functional outcome Therefore, the trunk function plays a key role in basic activities, such as sitting, transferring from the supine to the sitting position, and also rolling

As a result of stroke, people can become disabled and lose the ability to live independently. Paralysis, common after a stroke, can significantly impact ADL (Activity Daily Living)[8]. The Bobath concept describes trunk as the heart of the treatment program for such paralysis or hemiplegia . **Postural alignment** and stability are facilitated while excessive tone and abnormal movements are inhibited. The trunk is considered as the central key point to allow the body adjust weight shifts during static and dynamic postural alignment [8] Trunk control is necessary to free the limbs for function. **Trunk facilitation** was given with slight downward compression in upper and mid thoracic area and lumbar region to increase trunk extension until therapist hand could be withdrawn and patient could stabilize independently. Do pelvic bridging to achieve stability at the pelvis, to improve control in forward translation of the knee with activation of proximal hamstrings, gluteal muscles and abdominal muscles. Sensory stimulation used as facilitation and inhibition via proprioceptive and tactile inputs is needed during a treatment **Functional reach out** was done with clasping the hand in front of him, and elbow extended. In **forward reaching** the therapist should stand at hemiplegic side of the patient. Right and left reach out of therapist in front of the patient stabilizes the patient legs to prevent compensatory movement. Reach out should be done at the shoulder level.

Trunk control is the ability of the trunk muscles to allow the body to remain upright, adjust weight shift and perform selective movements of the trunk so as to maintain the center of mass with in the base of support. Alteration of trunk position sense & weakness of trunk muscles has a significant influence on balance difficulty. Increased risk of falls due to poor balancing also leads to poor functional performance. Postural alignment and stability are facilitated while excessive tone and abnormal movements are inhibited. Sensory stimulation is used as both facilitation and inhibition technique via proprioceptive and tactile inputs during treatment. The following methods are employed in training.

- ❖ Position of the patient in sitting
  Positioning the patient with adequate postural support to align stability of the trunk and limbs is the initial treatment. This is done using towel fold under the affected side pelvis, thigh and upper limb. Such a method can fix and improve the trunk activity. It also provide proprioceptive and sensory input to facilitate the exploration of postural movement control & alignment and interaction of base of support.
- ❖ Strengthening of abdominal muscles
  This exercise is to be performed in crook lying position and the therapist sits in front of the patient. Therapist hand stabilizes patient hands and the patient tries lifting the head and upper thorax. For ten counts atleast it is repeated and then patient relaxes.

- ❖ Facilitate trunk extension
  Therapist trains trunk extension by giving slight downward compression in upper
  and mid thoracic area and lumbar region. Therapist hand could be withdrawn when patient learns the movement to stabilize independently.

❖ Training of lumbar spine stabilizers

  pelvic bridging exercise helps patient to achieve increased stability at the pelvis which improves control in forward translation of the knee. Activation of proximal hamstrings, gluteal muscles and abdominal muscles is also done by this exercise.

❖ Functional reach out

  In the right, left and anterior directions, this exercise is given. Functional reach out was done with clasping the hand in front, and elbow extended. In forward reaching the therapist is available at affected side of the patient. Stabilizing the patient legs to prevent compensatory movement is much essential.

❖ Rotation and counter-rotation

  In crook lying, therapist supports the patient leg and helps for rotation of the foot. Patient is asked to move the legs right and left. Patient can clasp both hands together and rotate their upper trunk by moving arms to the side.

Trunk impairment scale (TIS)

TIS was developed by Verheyden and Fujiwara 2004, to evaluate the trunk in patients who suffered a stroke.Though so many assessment tools are available to assess the trunk performance and balance, trunk impairment scale is one of the valid tool. The scale consists of three subscales related to static sitting balance, dynamic sitting balance and co-ordination.

The **static subscale** assess: (1) the ability of the subject to maintain a sitting position with feet supported; (2) the ability to maintain a sitting position while the legs are passively crossed, and (3) the ability to maintain a sitting position when the subject crosses the legs actively.

The dynamic subscale contains items on lateral flexion of the trunk and unilateral lifting of the hip. To assess the coordination of the trunk, the subject is asked to rotate the upper or lower part of trunk 6 times, initiating the movements either from the shoulder girdle or from the pelvic girdle, respectively. For each item, a 2-, 3- or 4-point ordinal scale is used. On the static and dynamic sitting balance and coordination subscales the maximal scores that can be attained are 7, 10 and 6 points. Total score ranges from a minimum of 0 to a maximum of 23.

FIM scale is used by healthcare practitioners to assess and grade the functional status of a person based on the level of assistance they require. It is comprised of 18 items, grouped into 2 subscales with motor and cognition components. Each item is scored on a 7 point ordinal scale. The higher the score, the more independent the patient is in performing the task associated with that item. This study is an attempt to train patients with Bobath approach, at bedside, to regain trunk balance early, thereby an independence in ADL earlier.

REVIEW OF LITERATURE

1) **Shiksha Verma et al., (2023)** conducted a study to identify the effectiveness of bobath approach along with core stability training in stroke patients. 15 subjects with stroke are selected to perform bobath approach. The outcome measures are TIS and berg balance scale. This study concluded bobath

approach along with core stability training shows more improvement in trunk function and sitting balance after 4 week therapy.

2) **Suharto et al., (2021)** conducted a study to identify the effectiveness of bobath exercise on the ability to walk and leg spasticity of stroke patients in 12 post stroke hemiparesis patients selected to perform bobath exercise. The outcome measures are timed up and go test scale and asworth scale were use this study concluded that bobath exercise can improve walking ability and reduce spasticity of stroke patients, so treatment of stroke patients should use this method.

3) **Abhishek Pathak et al., (2021)** conducted a study to identify the bobath concept (NDT) as rehabilitation in stroke patients, they found 425 articles with bobath as an intervention along with another control group. After a detailed review,19 articles were selected according to eligibility criteria this study is in conclusive in determining the effectiveness of bobath approach for the movement rehabilitation of stroke patients. These results are similar to the result of previous reviews done on the same topic.

4) **Masahiro Ishimatari et al., (2021)** conducted a study to identify the trunk impairment as a predictor of activities of daily living in acute stroke in 67 patients with acute stroke were included. They are assessed by TIS and trunk control test, the outcome measures are SIAS-M score and FIM – M score. This study concluded that TIS is a reliable method for evaluating trunk control function and is an early predictor of ADL among patients with acute stroke.

5) **Michal Kuciel et al., (2021)** conducted a study to identify the effect of PNF and NDT bobath concept in improving trunk motor control in ischemic stroke patients. Thirty patients upto 3 months after ischemic stroke were randomly assigned to two study groups. 15 patients to participate PNF and bobath training, the outcome measures are TIS. This study concluded both PNF and bobath concept a proven to be effective and treatment of posture control and significant improvement has been noted in patients from both group.

6) **Thomas Besios et al., (2019)** conducted a study to identify the effect of the neuro developmental treatment (NDT – bobath) in the mobility of adults with neurological disorders. 20 patients with neurological disorder selected to perform bobath method, the outcome measures are TUG, BBS, TMT and MAS tests were used, this study concluded that bobath – **NDT method improves both mobility and functionality** of patient with neurological disorders. More researches will have to be done in the future.

7) **Charles I Kechuwku Ezema et al., (2018)** conducted a study to identify the bobath vs proprioceptive neuromuscular facilitation in retaining of balance and functional independence in activities of daily living. 50stroke survivors were selected to perform bobath and PNF exercises, the outcome measures are barthel index and berg balance scale. This study concluded **bobath appears superior to PNF** in the retraining of balance and functional independence in ADL.

8) **Gokhan Yazici et al., (2018)** conducted a study to identify effect of neurodevelopmental therapy – **bobath approach in the early term of stroke;** safe and effective. 39 patients were selected to participate bobath approach, the outcome measures are the stroke rehabilitation assessment of movement scale**, TIS**. This study concluded that **bobath treatment can improve trunk control of stroke**.

9) **Yasemin Parlak demir et al., (2018)** conducted a study to identify the assessment of trunk control in patients with neuromuscular disease; validity and reliability of the trunk impairment scale 66 patients with NMD were selected, outcome measures are Trunk Impairment Scale (TIS), Manual muscle test, motor function measurement (MFM), FIM, Rivermead mobility index (RMI), this study concluded **TIS is an easy, intra-rater reliable and a valid instrument for the measurement for the trunk performance** in ambulatory patients with MND. TIS is as measure that can be completed easily and in a short time in rehabilitation clinics.

10) **Matra Sideway, et al (2017)** found that Trunk Impairment scale is best tool to examine a patient with hemiparesis taking into account qualitative and quantitative assessment of the trunk deficit. The scale

supports clinical reasoning in terms of structure and function, body disorders and activity limitation of patients with stroke hemiplegia may not only affect the expansion of detailed documentation of motor deficits, but to support planning and carrying out appropriate physiotherapy strategies.

11) **Emilia Mikalajewska (2015) et al.,** conducted that bobath concept for young adults considered an effective form of post rehabilitation in young adults. This study conclude trunk training exercise performed with either stable or unstable surface, could be a good rehabilitation strategy and might help improving trunk performance and dynamic sitting balance after stroke.

12) **B. Gialormella et al., (2013)** conducted a study to investigate the predicting outcome of the stroke; the role of basic activities of daily living 260 consecutive patients with primary diagnosis of stroke were enrolled and 241 patients were used in the final analysis. The outcome measures are cumulative illness rating scale, national institute of health stroke scale (NIHSS); Fugl-Meyer scale, trunk control test, FIM were used. This study indicates that **performance of basic ADLs** are important as stroke outcome predictors and among which social interaction, grooming, upper body dressing, and bowel control are the most important.

METHODOLOGY

INTRODUCTION

In stroke, loss of equilibrium is the common problem on the affected side causing inability to maintain postural alignment. This poor trunk control result in poor sitting, standing balance and loss of ability to perform functional activities. The trunk function plays a key role in performing activities of daily living (ADL) including locomotion, sitting, standing and ADL. Stroke rehabilitation should commence as early as possible for optimal recovery to be achieved. Exactly how early rehabilitation should start is controversial. Early mobilization (getting out of bed within 24 hours of stroke onset) is a well-established feature of acute stroke. Bobath approach aims to regain motor control and function after stroke without promoting compensation.

AIM OF THE STUDY

To identify whether selected Bobath training is suitable to improve trunk balance & correlate selected training influence on ADL for stroke patients at bedside.

OBJECTIVES OF STUDY

➢ To identify appropriate Bobath training for improving trunk balance.
➢ To correlate relevance between trunk balance (control) and ADL performance for stroke patients.
➢ To identify benefits of such training as bay side therapy.

METHOD OF STUDY

Procedure was explained to all patients and consent was obtained before treatment. Treatment was given 4 days a week for 4 weeks and the time duration is 40 minutes for each session. Trunk impairment scale and functional independence measure score was assessed during both pre and post therapy session.

STUDY DESIGN

Single group experimental study.

STUDY SETTING:

General medicine ward, GMC&H, Cuddalore

Guru medical centre, Chidambaram.

STUDY PARTICIPANTS

15 Stroke patients

Inclusion criteria

Patients in the acute and subacute stroke hemiparesis stroke (onset<6 months)

Patients as indicated by trunk impairment scale (TIS)

Both gender patients, age between 25 to 60 years old

Exclusion criteria

Patients with other orthopedic or neurological disorders, communication problems

Psychiatric patients

Those suffering from cardio pulmonary disease

OUTCOME MEASURES:

Trunk impairment scale (TIS)

Functional Independence measure (FIM)

RESULTS

The evidence is sufficient to show that there is significant effect of bobath training for stroke patients in increasing the trunk control (t=25.026, p=0.000<0.01). There is a direct relationship between trunk (balance) control and ADL performance (r=0.942; p=0.001). The result also shows significant correlation between trunk (balance) control and ADL performance in stroke patients

CONCLUSION

Intra-group analysis showed that Bobath training for bedside stroke patients is effective in terms of improvement in trunk balance and ADL performance. Hence this study concludes that Bobath training for bedside stroke patients is effective in terms of improvement in trunk balance thereby ADL performance.

DATA ANALYSIS AND RESULTS

GRAPH 1

Showing the scores PLOT of Trunk Impairment scale for individual patients (pre and post interventions)
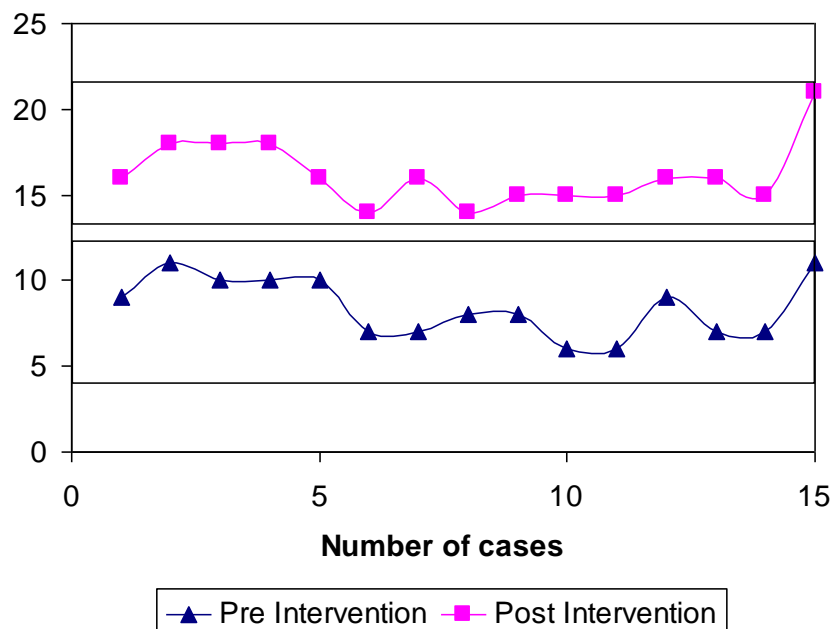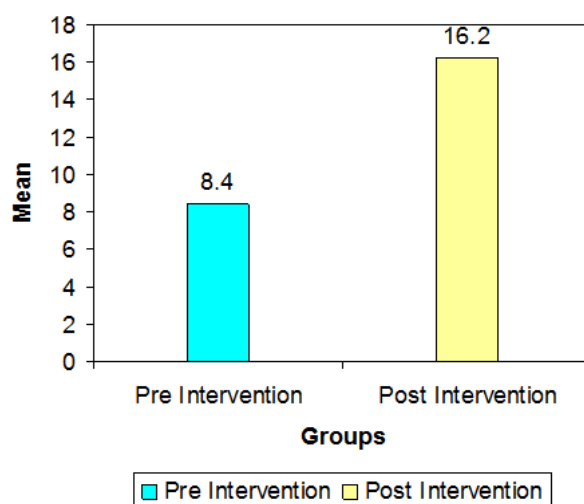

TABLE- 1

Paired sample't' test table showing the mean compared scores of Trunk Impairment (balance) control among stroke patients at bedside (pre and post intervention)

Groups	N	Mean	SD	t-value	P Value
Pre Intervention	15	8.40	1.73	25.026	0.000 (P<0.01)
Post Intervention	15	16.20	1.86		

(Pre and post intervention scores)

Pre intervention mean score (8.40) is less than post intervention mean (higher) score (16.20) The calculated 't' value (25.026) which is greater than the table 't' value, there is a significance difference exists between the pre and post intervention score groups. So, Post intervention means scores have level trunk (balance) control than pre intervention score among stroke patients at bedside. Hence Bobath training is effective.

BAR DIAGRAM showing MEAN score for PRE &POST INTERVENTION

GRAPH -2

Showing the compared scores of ADL performance among stroke patients at bedside (pre and post intervention) Using PLOT procedure, for individual patients
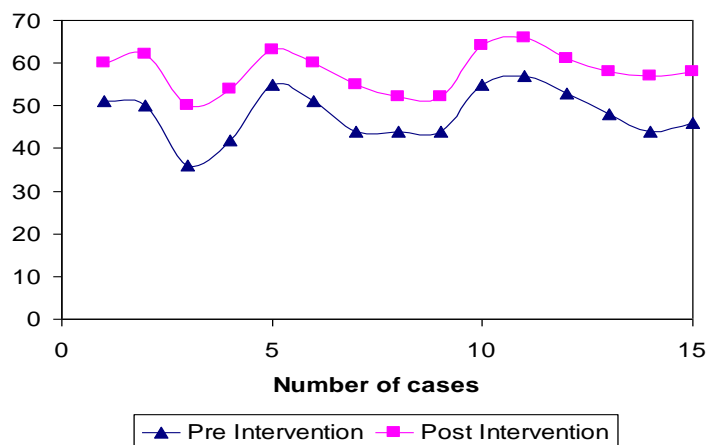

TABLE - 2

Paired sample 't' test table showing the mean compared scores of ADL performance by (FIM score) among stroke patients at bedside (pre and post intervention)

Groups	N	Mean	SD	t-value	P Value
Pre Intervention	15	48.00	5.82	19.326	0.000 (P<0.01)
Post Intervention	15	58.13	4.78		

Table 2 shows Pre intervention mean score (48.00) is less than post intervention mean (higher) score (58.13). Thereby, we can understand, **ADL dependence** existed for patients before BOBATH training at bedside. The calculated 't' value (19.326) which is greater & has significant difference between the pre and post intervention score groups, proves ADL performance is improved.

GRAPH - 3

Showing the mean compared scores of ADL performance (FIM score) among stroke patients at bedside (pre and post intervention)
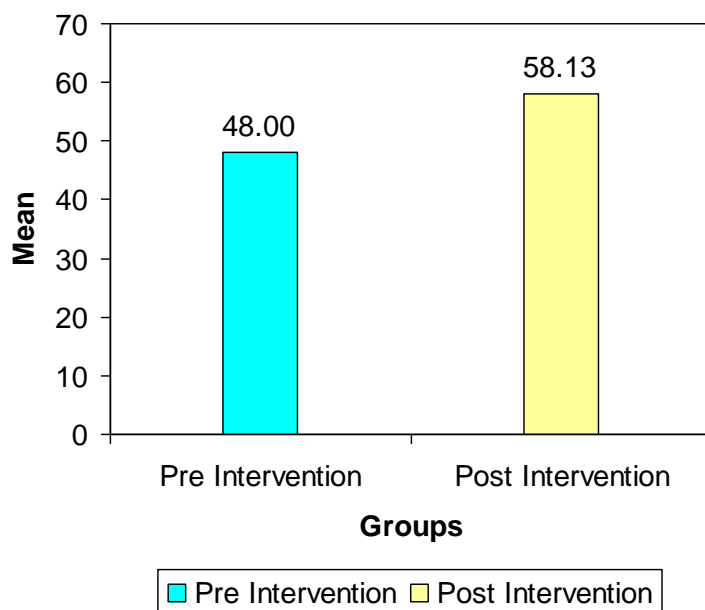

TABLE - 3

Showing correlation between trunk (balance) control and ADL performance of stroke patients

	ADL (FIM score) Performance
Trunk (balance) control	0.942**

** Significant at the 0.01 level

Result

Pre intervention mean score (8.40) is less than post intervention mean (higher) score (16.20) The calculated 't' value (25.026) is greater & there is a significant difference between the pre and post intervention score groups. All these can infer Bobath training is effective**.**

DISCUSSION

The aim of the current study is to identify whether selected procedures (Bobath training) is suitable to improve trunk (balance) control for patients at bedside, Which indirectly improves ADL. The current study involves 15 stroke patients with age 25-55. Bobath training was given 4 days for 4 weeks for 40 minutes duration, trunk impairment scale and functional independence measure score were assessed pre and post intervention. Evidence by statistical analysis shows, Bobath exercise improves trunk control, dynamic sitting balance, standing balance, gait and activities of daily living in patients after subacute stroke.

In the current study patients with poor alignment is improved by a position of the patient and facilitation with key points of control in sitting, trunk balance is improved by a lumbar stabilization of the trunk, coordination movements of the trunk are rotation in both sides abdominal muscles are improved by abdominal strengthening exercise. This exercise was given 4 days for 4 weeks and the time duration 40 minutes for each session.

Conclusion

Trunk control is necessary inorder to change the body position against gravity and to shift the weight to free the upper extremity for hand function. Bobath training is a proved concept which helps to increase trunk balance. With good trunk balance, patients can perform ADL activities independently. By giving Bobath training to improve trunk balance, we can decrease the prolonged bed stay, thereby FACILITATING INDEPENDENCE in ADL.

LIMITATIONS

1) Study is limited to patients of Cuddalore district (In & around chidambaram).

RECOMMENDATIONS

1) This study can be carried out for other neurological conditions who are confined to bedside.

Reference

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