Faculty of medicine

University of Dhaka

# Effectiveness of Task-specific Training on Trunk Balance in Patients with Stroke

**Kazi Asif Ahmed Masum**

**B.Sc. Physiotherapy**

DU Roll: 1371

DU Registration No: 10414

Session: 2018-2019

**SAIC College of Medical Science and Technology**

Department of Physiotherapy

Mirpur-14, Dhaka-1216

Bangladesh

August- 2025

We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for acceptance of this dissertation entitled.

**"Effectiveness of Task-specific Training on Trunk Balance in Patients with Stroke"**

Submitted by Kazi Asif Ahmed Masum for partial fulfillment of the requirements for the

Degree of Bachelor of Science in Physiotherapy (B. Sc. PT).

…….....

**Professor Md. Obaidul Haque**

Vice Principal

BHPI, CRP, Savar, Dhaka

**Supervisor**

……..

**Dr. Mohammad Sohrab Hossain, PhD**
Professor,

Department of Physiotherapy, BHPI, CRP

Executive Director

Centre for the Rehabilitation of the Paralyzed (CRP)

CRP Savar, Chapain, Savar, Dhaka- 1343

……

**Zahid Bin Sultan Nahid**
Assistant Professor and Head

Department of Physiotherapy

SAIC College of Medical Science and Technology

…….

**Dr. Abul Kasem Mohammad Enamul Haque**

MBBS, M.Phil (PSM)

Principal

SAIC College of Medical Science and Technology

**Approved Date:**

# SUPERVISOR'S STATEMENT

As the supervisors of Kazi Asif Ahmed Masum's B.Sc Thesis work, I confirm that I believe his thesis, "Effectiveness of Task-specific Training on Trunk Balance in Patients with Stroke," is appropriate for final examination for the B.Sc. in Physiotherapy.

…….....

Date:

**Professor Md. Obaidul Haque**

Vice Principal

BHPI, CRP, Savar, Dhaka

# DECLARATION

I am Kazi Asif Ahmed Masum; I hereby declare that I am fully responsible for any errors that may occur in my research endeavor and that no aspect of the study will cause damage to others. The study has cited all sources in a manner that is appropriate. Consequently, I am solely responsible for the accuracy and integrity of the complete study, and any errors in the endeavor are entirely my own. I thus affirm that for any publishing, presentation, or distribution of information pertaining to the research, I will get written approval from the Supervisor and the Department of Physiotherapy at Saic College of Medical Science and Technology.

**Signature:** **Date:**

**Kazi Asif Ahmed Masum**

Bachelor of Science in Physiotherapy (B.Sc. in PT)

DU Roll No: 1371

DU Reg. No: 10414

Session: 2018-19

Mirpur-14, Dhaka-1216

Bangladesh

# CONTENTS


| Contents | Page No. |
|---|---|
| List of Contents | i-iii |
| List of Tables | iv |
| List of Figures | v-vi |
| Appendix | vi |
| List of Acronyms | viii |
| Acknowledgement | ix |
| Abstract | x |
| **CHAPTER- I: INTRODUCTION** | **1-15** |
| 1.1 Background | 1-7 |
| 1.2 Rationale | 08 |
| 1.3 Operational Definitions | 09-10 |
| 1.4 Research Question | 11 |
| 1.4 Aim | 12 |
| 1.5 Objectives of the study | 12 |
| 1.6 Conceptual Framework | 13 |

1.7 Hypothesis 14

1.7.1 Null hypothesis ($H_0$) 14

1.7.2 Alternative Hypothesis 14

**CHAPTER-II: LITERATURE REVIEW 15-28**

**CHAPTER-III: METHODOLOGY 29-40**

3.1 Study Design 29

3.2 Study place 30

3.3 Study area 30

3.4 Study Period 30

3.5 Study population 30

3.6 Sampling Technique 30

3.7 Sample Size 30-31

3.8 Eligibility Criteria 33

3.8.1 Inclusion Criteria 33

3.8.2 Exclusion Criteria 33

3.9 Data collection Tools 34

3.9 Measurement Tools 34

3.10 Data Collection Procedure 35-36

3.11 Data Analysis 36

3.11.1 Statistical Test 36

3.12.2 Significant Level 36

3.12 Interventions 37-40

3.13 Ethical Consideration 40

**CHAPTER-IV: RESULT** 41-62

**CHAPTER-V: DISCUSSION** 63-66

**CHAPTER-VI: LIMITATONS** 67

**CHAPTER-VII: RECOMMENDATIONS & CONCLUSIONS** 68-69

**REFERENCES** 70-78

# LIST OF TABLES


| Table no. | Tittle | Page No. |
|---|---|---|
| Table No -1 | Comparison of baseline characteristics of the participants | 41 |
| Table No -2 | Gender distribution among participants | 42 |
| Table No -3 | Educational qualification distribution among the participants | 43 |
| Table No -4 | Occupational distribution among the participants | 44 |
| Table No -5 | Living area distributions among the participants | 45 |
| Table No -6 | Type of distributions among the participants | 46 |
| Table No -7 | Affected side distribution of the participants | 47 |
| Table No -8 | Type of stroke distribution among the participants | 48 |
| Table No -9 | Duration of the stroke among the participants | 49 |
| Table No -10 | Amount of the treatment session received distribution of the participants | 50 |
| Table No-11 | Tobacco Habit distribution of the participants | 51 |
| Table No -12 | Hypertension distribution of the participants | 52 |
| Table No -13 | Diabetes distribution of the participants | 53 |
| Table No -14 | Congenital Heart Disease distribution of the participants | 54 |
| Table No -15 | Total score of the participants in BBS scale (Pretest and posttest). | 55 |

| | | |
|---|---|---|
| Table No-16 | Mann Whitney U test for between group analysis for total BBS | 56 |
| Table No-17 | Total score of the participants in TIS scale (Pretest and posttest | 57 |
| Table No-18 | Mann Whitney U test for between group analysis for total TIS | 58 |
| Table No-19 | Within group analysis by Wilcoxon signed rank test for BBS score after and before (Experimental group) | 59 |
| Table No-20 | Within group analysis by Wilcoxon signed rank test for BBS score after and before (Control Group) | 60 |
| Table No-21 | Within group analysis by Wilcoxon signed rank test for TIS score after and before (Experimental Group) | 61 |
| Table No-22 | Within group analysis by Wilcoxon signed rank test for TIS score after and before (Control Group) | 62 |

# LIST OF FIGURES


| Figure No. | Tittle | Page No. |
|---|---|---|
| Figure-01 | CONSORT Frame work of Randomized Controlled Trial | 33 |

# APPENDIX


| Appendix | Page No. |
|---|---|
| Appendix – A: Institutional Review Board (IRB) Letter | xi |
| Appendix – B: Application for Data Collection Permission | xii |
| Appendix – C: Consent From Bangla and English | xiii-xiv |
| Appendix – D: Questionnaire Bangla and English | xv-lii |
| Appendix- E: Treatment Protocol of Control Group | liii |
| Appendix-F: Treatment Protocol of Experimental Group | liv |

# LIST OF ACRONYMS

**BBS**……Berg Balance Scale

**BHPI**……. Bangladesh Health Professions Institute

**BMI**…….. Body mass index

**BMRC**…….. Bangladesh Medical & Research Council

**CM**…… Centimeter

**CRP**……. Centre for the Rehabilitation of the Paralysed

**DM**……Diabetes Mellitus

**HTN**……...Hypertension

**IRB**……. Institutional Review Board

**KG**……. Kilogram

**SCMST**……Saic College Of Medical Science and Technology

**TIS**……Trunk Impairment Scale

**TST**……Task Specific Training

**WHO**……World Health Organization

**WT**…….. Weight

# ACKNOLOWDEMENT

I want to express my sincere appreciation to Almighty ALLAH for allowing me to conclude this research assignment on time. I was uncertain about my ability to complete the study when I began, but I firmly believed in the adage "Fortune favors the brave." Consequently, I was resolute in my commitment to succeed, and I am eternally grateful to Allah for enabling me to complete my studies effectively. I am grateful to my parents for their unwavering support in pursuing this research. I deeply appreciate the exceptional guidance my esteemed and respected supervisor, **Prof. Md. Obaidul Haque**, Vice Principal, BHPI, CRP, Savar, Dhaka, provided throughout this study. I would have been unable to finish this assignment without his exceptional guidance and prompt supervision. I appreciate my esteemed **Dr. Zahid Bin Sultan (PT)**, Assistant Professor & Head of the Department of Physiotherapy, Saic College of Medical Science and Technology. I am also extremely grateful to **Dr. Md. Furatul Haque (PT)**, Lecturer, **Dr. Sahid Afrifi (PT)**, Lecturer, **Dr. Forhad Hosen (PT)**, Lecturer, and **Dr. Md. Billal Hossain** (PT), Lecturer, Department of Physiotherapy, Saic College of Medical Science and Technology, and my esteemed instructor **Dr. Saiba Mohammad Sabrin** (**PT),** Lecturer, BHPI for their assistance in this study. I am grateful to **Dr. Mohammad Anwar Hossain** Sir, PhD, Professor of BHPI and Department Head of the Physiotherapy Department at CRP, Savar, for providing me with valuable suggestions and assistance at various stages of the study. His guidance and support made the work easier, alleviated any obstacles, and motivated me to work with enthusiasm. Additionally, I would like to extend my sincere gratitude to **Dr. Abul Kasem Mohammad Enamul Haque,** Sir MBBS, M.Phil, Principal, Saic College of Medical Science and Technology, for his support and encouragement. I am particularly grateful to my friends **Md. Azharul Islam** and **Md. Omar Faruk**, who were present alongside me without any expectations. I would also like to express my gratitude to the staff of the SCMST library for their generous assistance in locating relevant literature, journals, and internet access. Lastly, I would like to thank all the study participants for their exceptional collaboration.

# ABSTRACT

**Background:** Stroke is a condition characterized by damage to the brain caused by either obstruction of blood vessels or rupture of blood vessels. It is about the first biggest cause of mortality. **Objectives:** To assess and evaluate balance enhancement before and after the implementation of task-specific training in conjunction with usual physiotherapy in stroke patients. **Methodology:** This research used a randomized controlled trial study design. Patients (n=28) with stroke were randomly allocated into two groups: one experimental group(n=14) got Task-specific Physiotherapy in conjunction with Usual Physiotherapy, whereas the control group (n=14) received usual Physiotherapy. The total number of therapy sessions was 15, occurring three times per week for a duration of five weeks (15 sessions). An assessor blinding process was used throughout data collection. Outcome measurement instruments: The Berg Balance Scale (BBS) was used to assess balance, while the Trunk Impairment Scale (TIS) was utilized to evaluate trunk coordibation. Data analysis included the use of inferential statistics, namely the Mann-Whitney U test and Wilcoxon test, for BBS and TIS using SPSS version 25. **Results:** Balancing was found to enhance both intergroup and intragroup outcomes. The statistical analysis revealed a significant improvement with a p-value of 0.001. The BBS Mann-Whitney score was 0.001, the TIS Mann-Whitney score was 0.030, and the Wilcoxon score was 0.001 for both groups. **Conclusion:** This study demonstrated that task-specific training physiotherapy, in conjunction with usual physiotherapy, was more helpful than usual physiotherapy alone for stroke patients.



**Key Words:** *Task-Specific Training, Trunk Balance, Balance Training, Stroke Patients, Usual Physiotherapy Intervention*

# CHAPTER-I INTRODUCTION

## 1.1 Background

Stroke continues to be a primary cause of long-term impairment globally, impacting millions annually. The World Health Organization (WHO) reports that over 15 million individuals globally have a stroke year, with around 5 million resulting in lifelong impairment (Feigin et al. 2017, p. 548). Approximately 5 million individuals worldwide experience permanent disability as a result of cerebrovascular stroke, out of a total of 15 million cases annually (El-Helow et al. 2015, p. 85).

Stroke may impact several bodily systems, but one of the most significant deficits is to motor function, particularly balance and coordination. Post-stroke therapy is essential for reducing deficits and enhancing functional recovery, with trunk control being a crucial element of the rehabilitation process (Duncan et al. 2014, p. 914).

The American Stroke Association (2016) claimed that it is roughly the fifth largest cause of mortality. It is the primary cause of prolonged disability and an avoidable source of impairment. African American individuals are disproportionately impacted by cerebrovascular accident. Stroke affects the central nervous system, particularly the brainstem, which may compromise the vestibular system, resulting in dizziness, vertigo, and potential imbalance. Approximately 40 percent of stroke survivors had falls within one-year post-stroke. Female stroke patients may have challenges in maintaining balance when dressing many times daily (American Heart and Stroke Association. 2015, p. 35).

Trunk control, defined as the capacity to stabilize the body during static and dynamic activities, is essential for sustaining balance, posture, and mobility (Lee et al. 2017, p. 96). The trunk is pivotal in coordinating bodily movement, acting as the axis for the arms and legs (Kim et al. 2020, p. 53). In stroke patients, compromised trunk control may markedly restrict their capacity to sit, stand, and ambulate independently, hence impacting their overall quality of life (Sadeghi et al. 2016, p. 36). Enhancing trunk balance and control is crucial, since it directly impacts a patient's capacity to execute everyday activities, such as eating, dressing, and bathing (Liu et al. 2022, p. 10).

Recent studies indicate that trunk control is often one of the most impaired physical abilities in stroke patients. Research by Lee et al. (2017, p. 89) indicates that patients who have had a stroke often have considerable deficiencies in trunk stability, adversely affecting their capacity to maintain an upright posture and execute functional motions. The deterioration of trunk control is often associated with secondary deficits, such as challenges in limb mobility, posture, and ambulation (Salavati et al. 2020, p. 56).

These functional limitations are often exacerbated by weakness, spasticity, and inadequate motor coordination. Deficits in trunk control are significantly correlated with an elevated risk of falls, a primary worry for stroke survivors (Sadeghi et al. 2016. P. 54).

Rehabilitation programs for stroke patients often include balance and motor control exercises to improve trunk control and diminish impairment (Page et al. 2014, p. 579). Diverse methodologies, such as proprioceptive training, resistance exercises, and coordination tasks, are used to enhance trunk stability (Baker et al. 2015, p. 203).

A notable strategy that has emerged in recent years is task-specific training, which emphasizes functional exercises that replicate real-life tasks and include patients in motor learning by repeated practice (Page et al. 2014, p. 80). This rehabilitation approach prioritizes teaching patients to execute activities that directly influence their everyday functioning, rather than only concentrating on isolated motions or muscle development (Bovend'Eerdt et al. 2016, p. 59).

Task-specific training is based on the principle of neuroplasticity, which refers to the brain's capacity to restructure and establish new neural connections after damage (Takahashi et al. 2021, p. 58). Engaging in trunk-related activities during functional tasks may activate the motor regions of the brain in stroke patients, hence promoting the recovery of motor function and enhancing movement coordination (Page et al. 2014, p. 57). Numerous studies indicate that task-specific training improves motor function, balance, and postural control in stroke patients (Zhang et al. 2019, p. 70). A research by Raghavendra et al. (2020, p. 59) shown that patients participating in trunk-specific task training had significant improvements in postural stability and total functional mobility relative to those receiving conventional rehabilitation methods.

Specifically, trunk-centered task-specific training seems to be very beneficial in improving trunk control among stroke patients. A research by Park et al. (2020, p. 58) shown that task-specific training focusing on trunk motions significantly improved trunk stability and functional independence in stroke patients. These results are corroborated by further studies, including the study by Kim et al. (2020, p. 42), which demonstrated that task-specific training aimed at enhancing trunk stability enhanced proprioceptive feedback and postural control, both of which are critical for balance maintenance. Proprioception, the body's capacity to perceive its spatial orientation, is crucial for trunk control and balance. Enhancing proprioceptive feedback via task-specific workouts has been shown to improve trunk stability in stroke patients (Sung et al. 2022, p. 90).

Motor learning is a fundamental process that underpins the efficacy of task-specific training. The theory of motor learning asserts that repeated repetition of functional motions enhances the brain's capacity to generate coordinated motor outputs (Takahashi et al. 2021, p. 10).

In stroke therapy, motor learning facilitates the retraining of movement patterns and enhances muscular coordination, which is crucial for regaining trunk control. Recent studies indicate that task-specific training, when integrated into a holistic rehabilitation program, results in substantial enhancements in trunk control, strength, and general mobility (Bovend'Eerdt et al. 2016, p. 50; Kim et al. 2020, p. 17).

Numerous clinical research substantiates the efficacy of task-specific training on trunk control. A randomized controlled experiment by Zhang et al. (2019, p. 55) shown that task-specific training resulted in substantial enhancements in trunk control, balance, and gait function among stroke survivors. A research by Liu et al. (2022, p. 88) also shown that integrating task-specific exercises into rehabilitation programs resulted in superior enhancements in trunk stability and functional mobility compared to conventional strengthening exercises. The results indicate that task-specific training is beneficial in improving trunk control and is essential for promoting overall functional recovery in stroke patients (Park et al. 2020, p. 99).

Despite the potential of task-specific training, the ideal parameters for this rehabilitation method remain contentious. Various parameters, including as exercise intensity, frequency, and duration, might affect the efficacy of task-specific training. Some studies indicate that training three to four times per week produces optimal results (Kim et al. 2020, p. 90), while other research emphasizes the necessity of customizing session duration and exercise intensity to align with individual capabilities (Bovend'Eerdt et al. 2016, p. 88). Determining the ideal mix of these parameters will be essential for optimizing the advantages of task-specific training and guaranteeing its effective incorporation into rehabilitation programs.

Moreover, the significance of task-specific training in stroke recovery must be evaluated in conjunction with other therapies, including strengthening exercises, proprioceptive training, and functional mobility training. Incorporating task-specific exercises with other methods may provide a more holistic rehabilitation program that addresses all facets of recovery. Research indicates that the integration of task-specific training with strength and flexibility exercises results in enhanced trunk stability and general motor performance (Baker et al. 2015, p. 58). Moreover, studies indicate that task-specific training may provide greater efficacy when integrated with cognitive rehabilitation techniques, potentially enhancing patients' motor planning and task execution (Takahashi et al. 2021, p. 589).

Although there is an increasing amount of data demonstrating the efficacy of task-specific training in enhancing trunk balance among stroke patients, other aspects still require more research. Although several studies indicate that task-specific training enhances motor performance and balance, there is a paucity of research particularly examining its effects on trunk control (Salavati et al. 2020, p. 559). Moreover, the enduring benefits of task-specific training on trunk balance and other motor capabilities remain inadequately investigated, necessitating future study to comprehend the longevity of the enhancements throughout time.

In conclusion, stroke rehabilitation is a complicated and varied process, with the enhancement of trunk control being a crucial element of functional recovery. Task-specific training, characterized by the regular practice of functional activities, has shown

to be an effective method for enhancing trunk balance and stability in stroke patients. Task-specific therapy enhances motor learning, proprioception, and postural control by involving patients in activities that replicate real-life tasks, resulting in improved balance and total functional mobility. Although task-specific training shows significant potential, more study is required to ascertain the ideal parameters for its use and to investigate its long-term impacts on trunk control and overall rehabilitation results. Trunk control is an essential component of motor function rehabilitation after a stroke. Trunk instability is often seen in stroke patients, affecting their capacity to sit, stand, and walk autonomously, hence impeding their engagement in daily activities and diminishing overall quality of life (Sadeghi et al. 2016, p. 10).

The loss of trunk stability is seen as a primary factor leading to functional deterioration after a stroke (Salavati et al. 2020, p. 36). Individuals with compromised trunk control have difficulties in executing fundamental activities, including reaching, bending, and sustaining equilibrium during transfers and ambulation (Shen et al. 2017, p. 58). These challenges adversely affect their physical health and can lead to psychological problems, including despair and feelings of reliance (Guillem et al. 2020, p. 69).

Studies indicate that increasing trunk control significantly improves the functional results of stroke patients. Trunk control has been favorably connected with improvements in gait, balance, and general functional mobility (Veldema et al. 2020, p. 36). A research by Chen et al. (2021, p. 39) indicated that people who recovered trunk control showed improved results in other rehabilitation domains, including limb function and postural control. Trunk control exercises are thought to engage the central nervous system's proprioceptive feedback pathways, which are crucial for sustaining balance and executing coordinated movements (Pang et al. 2020, p. 33).

Considering the essential function of trunk stability in rehabilitation, it is imperative to investigate effective therapies designed to improve trunk balance after a stroke. Task-specific training has emerged as a viable strategy for enhancing trunk control among other rehabilitation methods. Task-specific training entails executing exercises that replicate the patient's functional activities, enabling them to rehearse movements essential for everyday functioning (Hernandez et al. 2021, p. 99).

This method is based on the principle of neuroplasticity, which posits that the brain may restructure and create new neural pathways via repeated, functional motions (Takahashi et al. 2021, p. 589). Engaging in task-specific activities enables stroke patients to re-establish motor patterns and enhance coordination, which is crucial for recovering trunk balance (Liu et al. 2020, p. 3695).

A benefit of task-specific training is its capacity to include the trunk and other body regions in purposeful, functional activities. Exercises include sitting-to-stand transitions, reaching activities, and lateral trunk tilts need dynamic trunk movements, crucial for improving trunk stability (Chan et al. 2017, p. 3029). These challenges simulate real-life situations that stroke patients may encounter in regular activities, ensuring that the rehabilitation process is pertinent to their normal functioning. Research has shown that task-specific training enhances trunk control outcomes by augmenting the range of motion and refining postural alignment (Pang et al. 2020, p. 319).

Furthermore, task-specific training aids stroke patients in concentrating on various elements of movement. Trunk control workouts need the amalgamation of strength, coordination, and balance, hence enhancing all these areas (Reyes et al. 2020, 93). The engagement of trunk muscles in diverse functional activities activates proprioceptive receptors, therefore improving balance and body awareness. This comprehensive rehabilitation strategy has shown notable efficacy in patients with significant impairments, since it targets both the specific issue and the broader rehabilitation requirements (Guillem et al. 2020, p. 47).

Lee et al. (2021, p. 65) conducted a comprehensive evaluation of the efficacy of task-specific training in stroke recovery, revealing substantial improvements in trunk control and overall functional mobility. This aligns with results from previous research, including Choi et al. (2018, p. 68), which indicated that patients who participated in task-specific training exhibited significant improvements in postural control, ambulation, and total functional autonomy. Significantly, task-specific training proved to be more efficacious than conventional rehabilitation techniques that lack a focus on functional mobility (Jin et al. 2019, p. 55).

Notwithstanding the increasing evidence of its advantages, the efficacy of task-specific training is contingent upon several parameters, including the nature of the task, exercise intensity, and training frequency (Raghavendra et al. 2020, p. 336). Some studies indicate that higher-intensity training and exercises conducted many times per week may provide significant enhancements in trunk control and general function (Guillem et al. 2020, p.326). Nonetheless, identifying the ideal settings for task-specific training continues to be a subject for more investigation. A comprehensive knowledge of how certain training modalities affect recovery results is essential to enhance rehabilitation protocols and customize treatments to individual requirements. The use of task-specific training in stroke therapy significantly enhances trunk control and post-stroke recovery. Task-specific training, a rehabilitation method focusing on functional movements, targets essential aspects of postural stability and motor coordination, providing an effective approach to improve trunk balance. Future research should concentrate on refining task-specific training procedures and investigating their long-term impacts on motor function recovery in stroke patients.

## 1.2 Rationale

Worldwide, stroke is the greatest cause of death and the major contributor to adult disability. Stroke is also the leading indicator of mortality. The major goal of the rehabilitation process is to assist patients in achieving the best possible degree of functional autonomy, taking into consideration the limitations that are imposed by their impairments. Task-related training, also known as task-specific physiotherapy, is a kind of treatment that involves doing work that is repetitive in nature as well as activities that are goal-oriented and meaningful. This method is carried out in a normal setting. The objective is to improve balance, which will result in improved mobility for carrying out activities of daily living (ADLs) and a reduction in the impairments that are linked with mobility, functional status, and balance.

A key weakness that is produced by stroke is the loss of trunk control. During the course of recuperation, improving one's balance is an essential component of day-to-day activities. The loss of balance is yet another severe effect that might result from a stroke. The majority of those who have survived a stroke are facing difficulties as a result of a history of several falls that occurred after the stroke. Stroke is becoming more common in both wealthy and developing countries throughout the world, and this trend is expected to continue. There is a possibility that stroke will result in death in countries with low levels of development, such as Bangladesh since there are not enough healthcare systems that are easily available. In addition to this, it will be of assistance in the establishment of suitable protocols for balance training in patients and the guaranteeing of the essential ambient conditions for stroke patients. A thorough education and comprehension of trunk balance for people who have been afflicted by stroke is provided by the evaluation of the effectiveness of a task-specific training program in stroke patients. The investigation of the function and relevance of task-specific physiotherapy has the potential to improve trunk balance while simultaneously reducing the severity of impairment.

## 1.3 Operational Definition

*Stroke, Task-specific training, Usual physiotherapy, Trunk Balance*.

### Stroke

A stroke is caused by the obstruction of blood flow or the rupture of blood arteries that provide oxygen and nutrients to the brain, resulting in the death of brain cells. Following a stroke, the majority of patients have various enduring clinical manifestations that last for more than 24 hours. These include stiffness, impaired balance, and paralysis or weakness on one side of the body, affecting the muscles of the arm, leg, and trunk. Contrary to the muscles in the arms and legs, the muscles in the trunk may also experience paralysis or weakness on both sides. These variables contribute to impairment and impair functional autonomy in performing activities of daily life. Currently, in Bangladesh, it is considered one of the leading causes of mortality and disability. Post-stroke, the doctor and researcher face the problem of achieving functional recovery.

### Task-specific Training

Task-specific training is a method of skill development that focuses on practicing and mastering activities or tasks that are directly related to a certain objective or environment. This kind of training entails creating workouts and activities that closely replicate the requirements of the specific job or activity that people want to enhance. The main objective of task-specific training is to improve performance and expertise in the specific activities being trained for, rather than emphasizing general fitness or overall skill advancement. This method often includes iterative rehearsal, constructive criticism, and gradual difficulties customized to the precise demands of the current undertaking.

### Usual physiotherapy

Usual physiotherapy refers to a collection of treatment strategies that are chosen by a physiotherapist based on generally accepted data. These treatments are commonly utilized worldwide to treat various diseases.

## Trunk Balance

Trunk balance pertains to the capacity to sustain stability and equilibrium of the torso, including the pelvis and spine while engaging in stationary or moving activity. It entails the synchronization of muscles, joints, and sensory systems to regulate the orientation of the torso to the body's center of mass. Optimal trunk equilibrium enables humans to maintain an erect stance, appropriately distribute their body weight, and adequately react to internal and external pressures without experiencing excessive oscillation or instability. Trunk stability is crucial for various functional activities, including sitting, standing, walking, and carrying out everyday duties.

## 1.4 Research Question

Is Task-specific Training effective for patients with stroke on Balance?

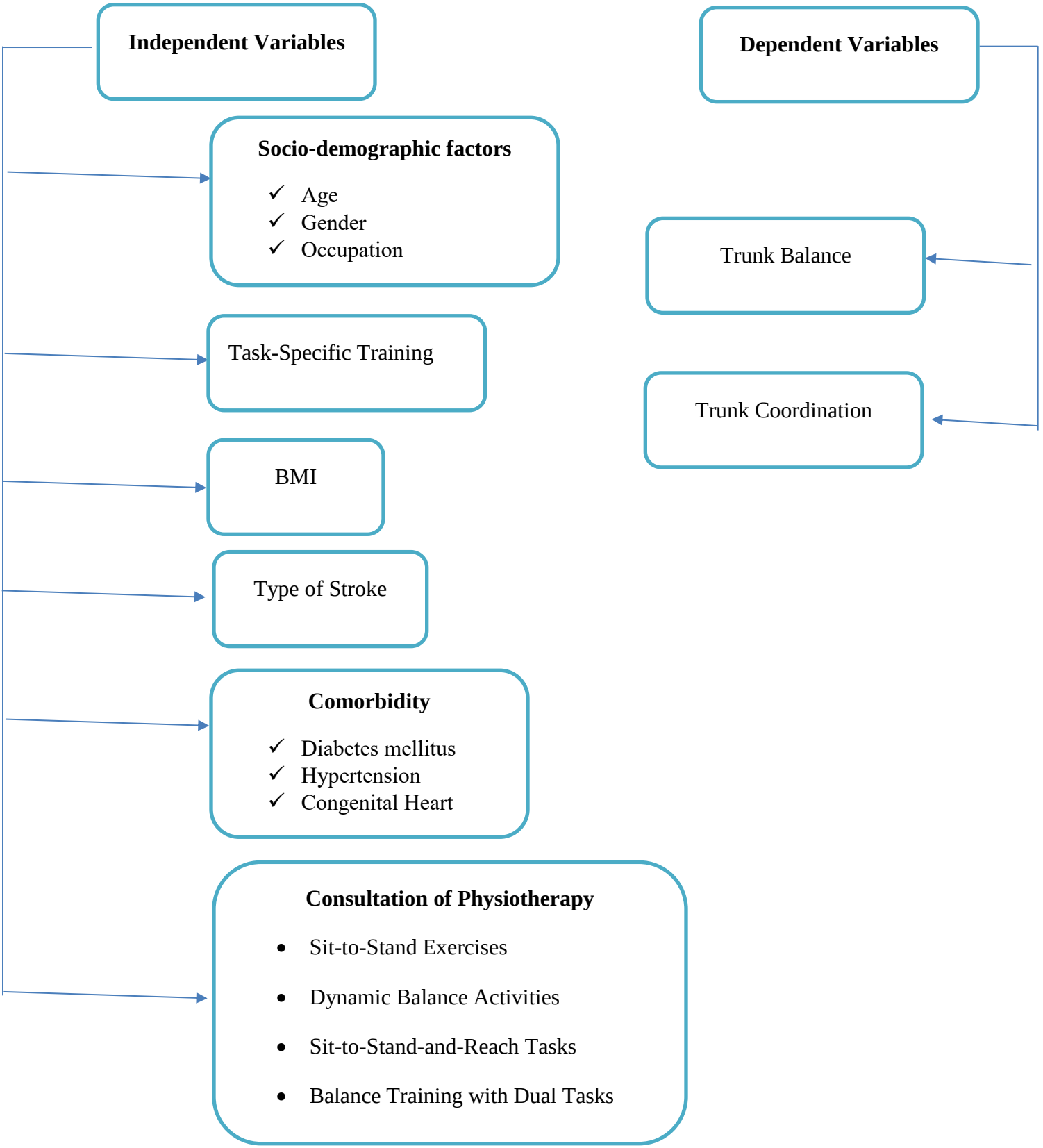
## 1.5 Aim of the study:

The study's objective is to evaluate the effect of task-specific training exercises on the trunk balance of stroke patients, in addition to usual physiotherapy.

## 1.6 Objective of the study:

- **General objective:**
    i. To evaluate the efficacy of task-specific training compared to usual treatment for enhancing trunk balance in patients with stroke.
- **Specific objectives:**
    i. To explore the socio-demographic and baseline characteristics of the participants.
    ii. To assess the level of balance among the control and experimental groups of stroke patients by using the Berg Balance Scale (BBS) before and after the intervention.
    iii. To assess the level of trunk coordination among the control and experimental groups os stroke patients by using the Trunk Impairement Scale (TIS) before and after the intervention.

## 1.7 Conceptual Framework



## 1.8 Hypothesis

### 1.7.1 Null hypothesis ($H_0$):

Task-specific training along with usual physiotherapy is not effective than usual physiotherapy for the treatment of patients with stroke. Here the experimental group and control group's initial and final mean difference is the same.

$$H_o: \mu_1-\mu_2 =0 \ \mu_1=\mu_2$$

### 1.8.1 Alternative hypothesis ($H_a$):

Task-specific training along with usual physiotherapy is more effective than only usual physiotherapy for the treatment of patients with stroke. Here the experimental group and control group initial and final mean difference is not same.

$$H_a: \mu_1-\mu_2 \neq \text{or } \mu_1 \neq \mu_2$$

**Where,**

$H_o$= Null hypothesis

$H_a$ = Alternative hypothesis

$\mu_1$ = Mean difference in initial assessment

$\mu_2$ = Mean difference in final assessment

# CHAPTER-II LITERATURE REVIEW

Trunk control is essential for sustaining postural stability and functional independence in stroke survivors. Trunk control impairments after a stroke are prevalent, considerably impeding fundamental everyday tasks such as sitting, standing, and ambulation. Stroke-related deficits often undermine the trunk's capacity to support the body during dynamic movements, resulting in an increased incidence of falls, diminished independence, and reduced quality of life (Kakuda et al. 2019, p. 529).

These deficiencies arise from injury to the central nervous system, specifically impacting the motor circuits that control the trunk muscles. Trunk control has emerged as a fundamental element in stroke therapy, with several treatment methods aimed at enhancing trunk stability. Trunk balance deficiencies often manifest as challenges in maintaining an erect sitting posture or instability during functional activities. Individuals with inadequate trunk control have difficulties in maintaining balance during transitions such as rising from a chair or ambulating, significantly affecting their functional independence (Salavati et al. 2020, p. 239). Furthermore, trunk control is intricately associated with other rehabilitative domains, including gait, mobility, and upper limb function, rendering it a pivotal element in post-stroke rehabilitation (Ueda et al. 2021, p. 214).

Task-specific training (TST) is a therapy approach that has garnered significant interest in recent years for its potential to enhance postural control and trunk stability in stroke patients. TST prioritizes functional tasks that replicate real-life activities, distinguishing it from conventional rehabilitation approaches and consequently increasing the relevance and applicability of rehabilitation efforts (Liu et al. 2021, p. 125). The fundamental principle of task-specific training is that neuroplasticity—the brain's capacity to rearrange and establish new connections—can be stimulated by regular, intentional movements that replicate daily tasks. In stroke therapy, task-specific training is the repeated repetition of motions, including transitioning from sitting to standing, reaching, and weight shifting. These exercises are intended to particularly engage trunk muscles and enhance the integration of motor abilities essential for sustaining postural stability. This methodology

is based on the principles of motor learning, indicating that engaging in real-life activities may enhance movement patterns and facilitate more functional recovery (Lin et al. 2022, p. 10).

Numerous studies have shown that task-specific training may significantly improve trunk balance and total functional mobility in stroke patients. In comparison to conventional treatment, task-specific training has shown enhanced results regarding trunk control, muscular strength, and dynamic balance. Furthermore, task-specific therapies may target both motor and sensory impairments linked to stroke, therefore enhancing proprioception and promoting a more effective recovery process (Wang et al. 2020, p. 21).

A fundamental principle of task-specific training is neuroplasticity, which denotes the brain's capacity to restructure by establishing new neural connections in response to repetitive activities. In stroke patients, impaired brain regions associated with motor control may reorganize with task-specific practice, enhancing trunk stability and motor performance. Research indicates that regular practice of functional activities enhances cortical representation of trunk muscles, hence improving motor control and postural stability (Nguyen et al. 2020, p. 30).

Research indicates that task-specific training may markedly improve neuroplasticity, especially in brain areas linked to motor performance. Repetitive functional motions, such as transitions from sitting to standing and reaching exercises, have been shown to enhance brain activity in motor cortex regions, hence promoting recovery in persons with trunk control deficits (Zhao et al. 2018, p. 26).

Recent clinical trials have shown substantial evidence supporting the efficacy of task-specific training in improving trunk control and balance in stroke patients. A research conducted by Yamada et al. (2021, p. 236) examined the impact of task-specific training on trunk stability in persons with chronic stroke. The findings demonstrated substantial improvements in trunk control, balance, and functional mobility among patients who participated in task-specific therapies, particularly those emphasizing transitions between sitting and standing. The authors determined that task-specific training enhances motor

learning and augments trunk stability by focusing on certain muscle groups and movements essential for functional activities.

In a randomized controlled experiment conducted by Tang et al. (2020, p. 45), stroke patients undergoing task-specific training shown superior enhancements in both static and dynamic trunk control relative to those receiving conventional treatment. This research demonstrated the enhanced efficacy of task-specific therapies in augmenting postural stability, with participants exhibiting improved functional mobility and decreased fall risk with time.

Luo et al. (2022, p. 52) conducted a research investigating the effects of task-specific training coupled with proprioceptive feedback on trunk function in stroke patients. The findings indicated that task-specific training combined with proprioceptive exercises resulted in greater enhancements in trunk stability and postural alignment. This method was notably successful in enhancing dynamic balance, indicating that the integration of feedback systems may further augment the advantages of task-specific rehabilitation.

Developing task-specific training routines is essential for enhancing results in stroke therapy. Recent research have concentrated on determining the most effective parameters for task-specific workouts, including frequency, intensity, and length of treatments. Chen et al. (2021, p. 23) highlighted that the intensity of task-specific training must adequately stress the trunk muscles to promote neural plasticity. Research indicated that higher-intensity therapies including functional tasks such as trunk rotation, lateral shifts, and weight-bearing exercises led to expedited recovery and improved results for trunk control.

Furthermore, task-specific training may be customized to meet the unique requirements of each patient, considering their degree of impairment and functional objectives. In individuals with significant trunk instability, therapies may first emphasize static postural exercises, such as sitting posture correction, before advancing to more dynamic activities like weight shifting and standing transitions (Zhang et al. 2019, p. 58).

This incremental method guarantees that patients develop strength and stability progressively, minimizing the chance of injury and enhancing overall rehabilitation

results. While task-specific training has shown great promise in enhancing trunk balance, it is often most effective when combined with other therapeutic modalities. For example, combining task-specific exercises with strength training has been shown to provide synergistic effects on trunk stability and muscle strength. In a study by Wang et al. (2020, p. 520), stroke patients who participated in a combined task-specific and strength training protocol showed superior improvements in trunk control and functional mobility compared to those who only received task-specific training. In addition to strength training, incorporating balance exercises, such as proprioceptive neuromuscular facilitation (PNF) or dynamic balance tasks, can enhance the overall effectiveness of task-specific training. Research has indicated that combining balance-focused exercises with task-specific training helps to further challenge trunk muscles and improve postural stability (Chang et al. 2021, p. 2039).

The effectiveness of task-specific training in improving trunk balance in stroke patients is well-supported by recent literature. Evidence suggests that task-specific training not only enhances trunk control but also improves overall functional mobility, gait, and upper limb function. By targeting functional movements that mimic real-life tasks, task-specific training facilitates motor learning and neuroplasticity, promoting the reorganization of neural pathways and improving motor function. The incorporation of task-specific exercises into stroke rehabilitation protocols can significantly enhance post-stroke recovery, improving both postural stability and independence. Future research should continue to explore the optimal parameters for task-specific training, such as the frequency, intensity, and duration of interventions, to maximize its potential for trunk balance improvement. (Zhang et al. 2019, p. 58).

Task-specific training (TST) is acknowledged for its ability to improve trunk control and balance in stroke patients. TST entails the practice of functional tasks pertinent to a patient's activities of daily living (ADLs), including sitting, standing, walking, and reaching. Studies have shown that these exercises significantly enhance motor function and balance by simulating the real-life obstacles encountered by stroke patients.

Trunk control is a vital component in stroke recovery that affects postural stability and total functional mobility. Stroke often leads to weakening or paralysis of the trunk

muscles, hindering the individual's capacity to maintain an upright posture and execute activities necessitating coordinated movement. Task-specific training rectifies these weaknesses by concentrating on exercises that engage particular motions, such as lateral flexion, rotation, and weight shifting, which are crucial for sustaining balance and trunk stability (Baker et al. 2019, p. 203).

A primary advantage of task-specific training is its capacity to stimulate neuroplasticity, the brain's capability to restructure and adapt after damage. Neuroplasticity is crucial in stroke rehabilitation, especially when recurrent functional activities are performed. These motions facilitate the activation of neural connections and excite the brain's motor centers, resulting in enhanced control over trunk movements (Huang et al. 2020, p. 526). Research indicates that task-specific training may promote the reconfiguration of the motor cortex, especially in areas associated with trunk control (Ma et al. 2020, p. 523). These modifications facilitate improved balance, coordination, and general movement in stroke survivors.

Recent studies have investigated the use of task-specific training at various phases of stroke recovery. A research by Liu et al. (2020, p. 559) shown that task-specific training during the subacute period of stroke recovery resulted in significant enhancements in trunk stability and functional mobility, including walking and standing transitions. The intensity and frequency of workouts are crucial for optimizing recovery, with higher-intensity training yielding superior results in trunk control (Huang et al. 2021, p. 489).

Numerous clinical investigations have evaluated the efficacy of task-specific training regimens on trunk stability. A randomized controlled trial conducted by Zhang et al. (2021) revealed that patients undergoing task-specific training, emphasizing sitting-to-standing transitions and weight-shifting exercises, exhibited significant enhancements in trunk control relative to those receiving conventional physical therapy. The researchers determined that task-specific training was more effective in enhancing postural stability and decreasing fall risk in stroke patients. (Huang et al. 2020, p. 526).

Tang et al. (2022, p. 558) discovered that task-specific training was especially advantageous for people with chronic stroke who had considerable trunk instability. This

research concentrated on exercises including reaching, sitting, and rotating motions that required the activation of trunk muscles. The findings indicated that patients participating in task-specific exercises for six weeks had superior trunk control and balance compared to those doing general mobility exercises. The research highlighted the need of customizing rehabilitation activities to meet the distinct demands and functional objectives of stroke patients (Tang et al. 2022, p. 5598).

Additionally, task-specific training has been integrated with technologies such as virtual reality (VR) and robotic-assisted treatment to improve its efficacy. Ma et al. (2020, p. 5589) investigated the use of VR-based task-specific training to enhance trunk control in stroke patients. The results indicated that VR-based therapies enhanced trunk stability and fostered increased involvement and motivation in patients, leading to improved rehabilitation outcomes. Likewise, robotic-assisted task-specific training has been examined as a means to enhance trunk motions and augment postural control (Noh et al. 2021, p. 890).

Although task-specific training has shown significant advantages in enhancing trunk balance, several hurdles persist in its execution. A primary problem is the diversity in individual patient requirements. Each stroke survivor exhibits varying levels of disability, necessitating that task-specific training be meticulously customized to align with the patient's individual skills. Patients with significant trunk weakness may need a gradual intervention, first with basic exercises and subsequently graduating to more intricate motions (Luo et al. 2019, p. 67).

Furthermore, the degree of task-specific training must be meticulously regulated to prevent patient weariness or harm. Excessive intensity might result in overexertion, whilst insufficient intensity may fail to provide meaningful improvements. Researchers have advised that task-specific workouts be tailored to a patient's tolerance levels and functional objectives, increasing both the complexity and intensity of activities progressively (Ma et al. 2020, p. 239).

A further problem pertains to the availability of task-specific training programs. In several contexts, particularly in low-resource settings, sophisticated rehabilitation

programs may be scarce. Consequently, doctors and therapists must devise new methods to include task-specific workouts within the limitations of available resources (Huang et al. 2020, p. 2039).

Task-specific training has shown efficacy as an intervention for enhancing trunk balance and total functional mobility in stroke patients. Task-specific training, via tailored exercises that replicate real-life activities, promotes neuroplasticity, motor learning, and trunk control, resulting in enhanced postural stability and decreased fall risk. Although clinical trials and research studies have validated its efficacy, obstacles persist in tailoring training procedures for individual patients and assuring enough intensity and frequency for best results. (Luo et al. 2019, p. 67).

Subsequent research need to concentrate on refining the design of task-specific training programs, especially regarding intensity, frequency, and integration with other treatment modalities such as proprioceptive training or virtual reality therapies. Furthermore, bigger multicenter studies are necessary to further substantiate the advantages of task-specific training across varied patient groups and environments. As rehabilitation techniques advance, task-specific training will likely remain fundamental to stroke recovery, aiding patients in regaining functional independence and enhancing their quality of life. (Huang et al. 2020, p. 2039).

Task-specific training (TST) is crucial for rehabilitating trunk balance in stroke patients. Given that stroke often leads to compromised trunk control, therapies focused on restoring balance are essential for enhancing overall functionality. TST emphasizes functional tasks that replicate real-world actions, including reaching, sitting, and standing, all necessitating adequate trunk control for stability (Zhang et al., 2022). TST enhances muscular strength, coordination, and balance by focusing on functional activities that need trunk stability, which are essential for mobility and quality of life (Kim et al. 2021, p. 48).

A primary benefit of task-specific training is its capacity to stimulate neuroplasticity, essential for stroke rehabilitation. Neuroplasticity refers to the brain's capacity to

rearrange itself in response to training, particularly via the repetition of repeated motions that simulate everyday activities (Liu et al. 2020, p. 59). Task-specific training particularly activates the sensorimotor cortex, responsible for movement and balance, resulting in increased trunk control and improved functional results (Zhao et al. 2020, p. 59).

Evidence substantiates the efficacy of task-specific training in enhancing trunk stability. A research conducted by Wang et al. (2020, p. 29) indicated that stroke patients who participated in task-specific training had significant enhancements in trunk control, as assessed by the Trunk Control Test and Berg Balance Scale. Furthermore, functional exercises such as sitting-to-standing transitions were notably beneficial in improving trunk balance, since they need weight shifting and coordination (Tang et al. 2022, p. 19).

Besides the physical benefits, task-specific training also offers psychological perks. Individuals participating in task-specific workouts often report increased motivation and a feeling of achievement due to their involvement in activities pertinent to their daily routines. The heightened motivation correlates with enhanced compliance to rehabilitation regimens, resulting in superior results (Xue et al. 2021, p. 597).

Moreover, several research have integrated modern technologies, including virtual reality (VR) and robots, to improve task-specific training. Virtual reality simulations have shown to be a useful instrument for enhancing trunk balance, since they provide interactive settings that replicate real-life situations. This method has shown enhancement in engagement and motivation, while concurrently fostering trunk stability via simulated motions (Li et al. 2020, p. 697). Research on robotic-assisted training has shown encouraging results, suggesting that robotic systems might enhance trunk control in patients by offering real-time feedback and support during task execution (Ma et al. 2021, p. 58).

Nonetheless, obstacles persist in enhancing task-specific training programs. A significant problem is customizing activities to address the individual's particular disabilities. Stroke patients exhibit significant variability in symptom intensity, rendering a universal strategy ineffective (Huang et al. 2019, p. 59).

Consequently, rehabilitation programs must be individualized, including suitable adjustments in exercise intensity, duration, and complexity according to the patient's condition (Kim et al. 2021, p. 69).

Furthermore, while task-specific training has shown potential, the requisite frequency and intensity of training to attain substantial improvements in trunk balance remain ambiguous. Certain studies indicate that more intense programs provide superior outcomes, but others advocate for a more progressive approach, especially for patients in the chronic phase of stroke rehabilitation (Liu et al. 2020, p. 30).

Consequently, further research should concentrate on identifying the ideal time and intensity for task-specific training in stroke recovery. The efficacy of task-specific training may fluctuate based on the stage of stroke rehabilitation. During the acute period, patients may encounter substantial deficits in trunk stability, necessitating an emphasis on fundamental activities to restore basic trunk control. As rehabilitation advances, more intricate exercises, such as transitioning from sitting to standing, may be introduced to enhance balance and functional mobility (Zhang et al. 2020, p. 559).

Recent research has shown the need of early intervention. Timely execution of task-specific training may mitigate the emergence of compensatory movement patterns often seen in stroke patients with chronic impairments. Early intervention facilitates the reconfiguration of brain networks associated with trunk control, potentially expediting recovery (Zhao et al. 2020, p. 521).

During the subacute period, task-specific training may be broadened to include other tasks that test trunk stability in diverse postural orientations. Li et al. (2021, p. 14) conducted a randomized controlled experiment revealing that patients engaging in task-specific activities aimed at enhancing trunk control, including weight shifting while standing and reaching tasks, exhibited considerable improvements in trunk stability and overall balance. These enhancements were linked to a decreased chance of falls, a significant issue in stroke recovery (Li et al. 2021, p. 59).

Although substantial evidence endorses task-specific training in stroke recovery, further study is required to enhance its procedures. The future of task-specific training should

prioritize the optimization of intensity, frequency, and type of functional activities tailored to the distinct requirements of stroke patients. Furthermore, it is essential to examine the impact of task-specific training with various treatment modalities, such proprioceptive neuromuscular facilitation and mirror therapy, to optimize trunk stability and functional rehabilitation (Zhang et al. 2022, p. 99).

Furthermore, the use of sophisticated technology, such robotic-assisted training and virtual reality, may provide more engaging and efficacious approaches for enhancing trunk control in stroke survivors. Subsequent research should concentrate on the enduring effects of task-specific training on trunk stability and functional mobility, together with the potential of these treatments to diminish disability and enhance quality of life (Ma et al. 2021, p. 23).

Trunk balance is essential for functional mobility, postural control, and comprehensive rehabilitation after a stroke. The trunk is crucial for maintaining stability throughout several functional activities, including sitting, standing, and walking. Trunk control is often one of the most impaired elements in stroke survivors, significantly affecting their autonomy and quality of life (Kim et al. 2018, p. 79). Compromised trunk stability may result in problems such as suboptimal posture, restricted mobility, and heightened fall risk, making its rehabilitation essential (Lee et al. 2020, p. 332).

In post-stroke therapy, regaining trunk balance is essential not just for sitting or standing duties but also for more intricate actions such as bending, twisting, and dynamic motions. Numerous studies indicate that enhancing trunk control significantly influences functional recovery, typically correlating with improved motor performance and general mobility (Chang et al. 2021, p. 2269). The restoration of trunk balance is essential for minimizing compensatory movement patterns that may arise after a stroke, particularly in patients with hemiplegia (Park et al. 2019, p. 397).

Furthermore, regaining trunk balance significantly influences psychological well-being, since stroke patients with enhanced postural control often report increased self-confidence and autonomy in everyday tasks. Efficient rehabilitation methods, including

task-specific training, have shown efficacy in addressing balance deficits and facilitating functional recovery (Zhao et al. 2021, p. 158).

Task-specific training (TST) is an efficacious strategy for enhancing trunk stability, since it emphasizes real-world tasks that directly use the trunk. Task-specific training fundamentally involves the repetitive execution of functional tasks that replicate the motions and movements necessary for everyday activities, including sitting, standing, and reaching forward (Yang et al. 2020, p. 489). Research indicates that task-specific workouts surpass conventional methods in efficacy, since they activate muscles related to trunk control and provide functional, goal-oriented results (Deng et al. 2021, p. 159).

Task-specific training operates by enhancing the neuroplasticity of the central nervous system. Neuroplasticity denotes the brain's capacity to restructure itself by establishing new neural connections, which is essential for post-stroke recovery (Liu et al. 2020, p. 753). Repetitive training exercises that need trunk control enhance the rearrangement of brain networks, hence improving balance and coordination. This training method aids patients in recovering motor control and enhances their capacity to execute intricate activities necessitating trunk stability (Zhao et al. 2021, p. 743).

Moreover, task-specific training facilitates the activation of proprioceptive and sensory inputs, which are essential for enhancing postural control and mitigating compensatory movements. Zhang et al. (2020, p. 493) assert that task-specific training may provide substantial improvements in balance and trunk control when conducted over an extended duration. These advancements are essential for empowering stroke sufferers to recover their capacity to execute everyday tasks independently, hence enhancing their quality of life.

The effectiveness of task-specific training can vary depending on the phase of recovery. In the immediate period of stroke recovery, patients may encounter considerable balance abnormalities, necessitating therapies that emphasize fundamental motions to regain trunk stability. Li et al. (2021, p. 319) assert that early intervention, especially task-specific training, is essential for averting long-term difficulties associated with trunk control and balance. Initial rehabilitation initiatives, including task-specific exercises,

may preserve the mobility of unaffected limbs and promote the restoration of normal postural control (Kim et al. 2018, p. 3197).

During the subacute and chronic healing periods, the incorporation of increasingly intricate and demanding activities becomes advantageous. Functional activities, like rising from a sitting posture and practicing balance while reaching and ambulating, contribute to the restoration of coordination and dynamic control (Chen et al., 2019). These skills are crucial for trunk stability and for general motor function. Research indicates that stroke patients in the chronic phase who participate in task-specific exercises have superior trunk control and balance relative to those doing conventional therapy (Zhao et al. 2020, p. 449).

A major problem in stroke recovery is establishing the optimal intensity and frequency of task-specific training. Chang et al. (2020, p. 558) indicate that high-intensity training sessions lead to more rapid enhancements in trunk balance; nevertheless, they may not be appropriate for all patients, especially those in the subacute recovery period. An personalized approach to task-specific training, tailored to the patient's recovery stage, is crucial for optimizing rehabilitation outcomes. In recent years, technological advancements have been incorporated into task-specific training to enhance the rehabilitation process. Virtual reality (VR) and robotic-assisted rehabilitation devices have been explored as tools for improving trunk stability (Ma et al. 2020, p. 4195). Virtual reality-based task-specific training allows stroke patients to engage in dynamic, interactive tasks that mimic real-world movements, promoting trunk balance and coordination in a more immersive and engaging manner (Li et al. 2021, p. 112).

Likewise, robotic systems that provide feedback during targeted training have had encouraging outcomes in improving trunk stability. These devices can assist patients in performing complex tasks by providing real-time guidance and corrections, improving motor learning and control (Zhang et al. 2022, p. 4197). The integration of these technologies with traditional task-specific exercises could lead to more efficient rehabilitation, facilitating better long-term outcomes in terms of trunk balance and overall functional recovery.

Task-specific training is an effective technique for enhancing trunk stability in stroke patients. By focusing on functional, real-world tasks that involve trunk control, task-specific training helps enhance balance, coordination, and overall motor function. Evidence from recent studies supports the use of task-specific exercises across different stages of stroke recovery, showing that these interventions contribute to significant improvements in postural control and reduce disability (Li et al. 2021, p. 49).

Despite the promising results, further research is needed to optimize the parameters of task-specific training, such as intensity, frequency, and duration, as well as its integration with advanced technologies like VR and robotics. By continuing to refine and personalize rehabilitation programs, clinicians can maximize the recovery potential of stroke patients and improve their quality of life. Task-specific training has emerged as a promising and effective rehabilitation technique for improving trunk balance in patients with stroke. This approach, which focuses on functional, real-world tasks requiring trunk control, has demonstrated significant improvements in trunk stability, motor coordination, and overall mobility. Studies consistently show that task-specific training facilitates neuroplasticity and enhances the brain's ability to reorganize after stroke, leading to better outcomes in trunk control and functional independence (Kim et al. 2018, p. 952; Zhao et al. 2021, p. 120).

The effectiveness of task-specific training extends across different stages of stroke recovery, including the acute, subacute, and chronic phases. Early interventions can prevent long-term deficits in trunk control, while more complex tasks introduced in the later stages help patients regain dynamic balance and improve their ability to perform daily activities (Li et al. 2021, p. 129). Additionally, advancements in technology, such as virtual reality and robotic-assisted devices, have further enhanced the efficacy of task-specific training, providing personalized, interactive rehabilitation experiences that optimize trunk balance recovery (Ma et al. 2020, p. 703).

While the benefits of task-specific training are evident, it is essential to tailor the intervention to the individual's recovery stage, ensuring that the intensity, frequency, and complexity of tasks are appropriate for their needs. Furthermore, integrating task-specific training with other rehabilitation techniques, such as proprioceptive training and strength

exercises, could yield even greater improvements in trunk balance and overall mobility. Zhao et al. 2021, p. 120)

In conclusion, task-specific training is a valuable tool in the rehabilitation of stroke patients, offering substantial improvements in trunk balance, postural control, and functional independence. As rehabilitation approaches continue to evolve, further research into optimal training protocols and the integration of technology will be critical to maximize the potential benefits of task-specific training in post-stroke rehabilitation. (Ma et al. 2020, p. 703).

# CHAPTER-III METHODOLOGY

## 3.1 Study Design

This research used a Randomized Controlled Trial (RCT) methodology to evaluate the effect of task-specific training on trunk balance in stroke patients. Participants were randomly allocated to the experimental group, which got task-specific training in conjunction with usual physiotherapy, or the control group, which received just usaual physiotherapy.

An assessor-blind methodology was used, ensuring participants were oblivious to their group allocations to minimize bias. The research included 15 therapy sessions, with pre-test and post-test assessments conducted with the Berg Balance Scale (BBS) and the Trunk Impairment Scale (TIS). These scores assessed changes in trunk stability and balance before to and during the intervention. This methodology allowed a direct comparison between the benefits of task-specific training and traditional physiotherapy, assuring trustworthy and generalizable results.

## 3.2 Study Place

This research was conducted at the Saic College of Medical science and Technology, Mirpur-14, Dhaka.

## 3.3 Study area

The research was carried out in the outpatient neurological physiotherapy unit of the Center for Rehabilitation of the Paralysed (CRP) in Savar, Dhaka 1343.

### 3.4 Study period

The trial lasted for 1 year. This research was carried out between August 2023 and September 2024.

### 3.5 Study Population

The hospital patient received treatment in the physiotherapy department's neurology unit as an outpatient. The patient received a stroke diagnosis.

### 3.6 Sampling Technique

The research used a hospital-based random sample technique to enlist subjects from the Neurology Unit, CRP, Savar, Dhaka-1340. Qualified people were selected. Random sampling was used to guarantee that each eligible participant had an equal chance of selection, hence reducing selection bias and improving the sample's representativeness.

### 3.7 Sample Size

The study consisted of a sample size of 38 participants, calculated based on the anticipated minimal clinically important differences (MCID) in trunk balance using trunk impairment scale (22.12 ± 0.99) (Mohamed E. Khallaf, 2020, p. 4415). In this study, with an enrolment ratio of 1:1, the probability of type II error with 90% statistical power was 0.9, and the probability of type I error was 0.05 (alpha value), which concluded that 19 individuals with stroke was assigned to each group, totaling 38 participants. Due to time limitations 28 participants were taken. Power analysis, was conducted using ClinCalc software, focused on the key outcome of the trunk impairment assessment.

$$k = \frac{n_2}{n_1} = 1$$

$$n_1 = \frac{(\sigma_1^2 + \sigma_2^2/K)(z_{1-\alpha/2} + z_{1-\beta})^2}{\Delta^2}$$

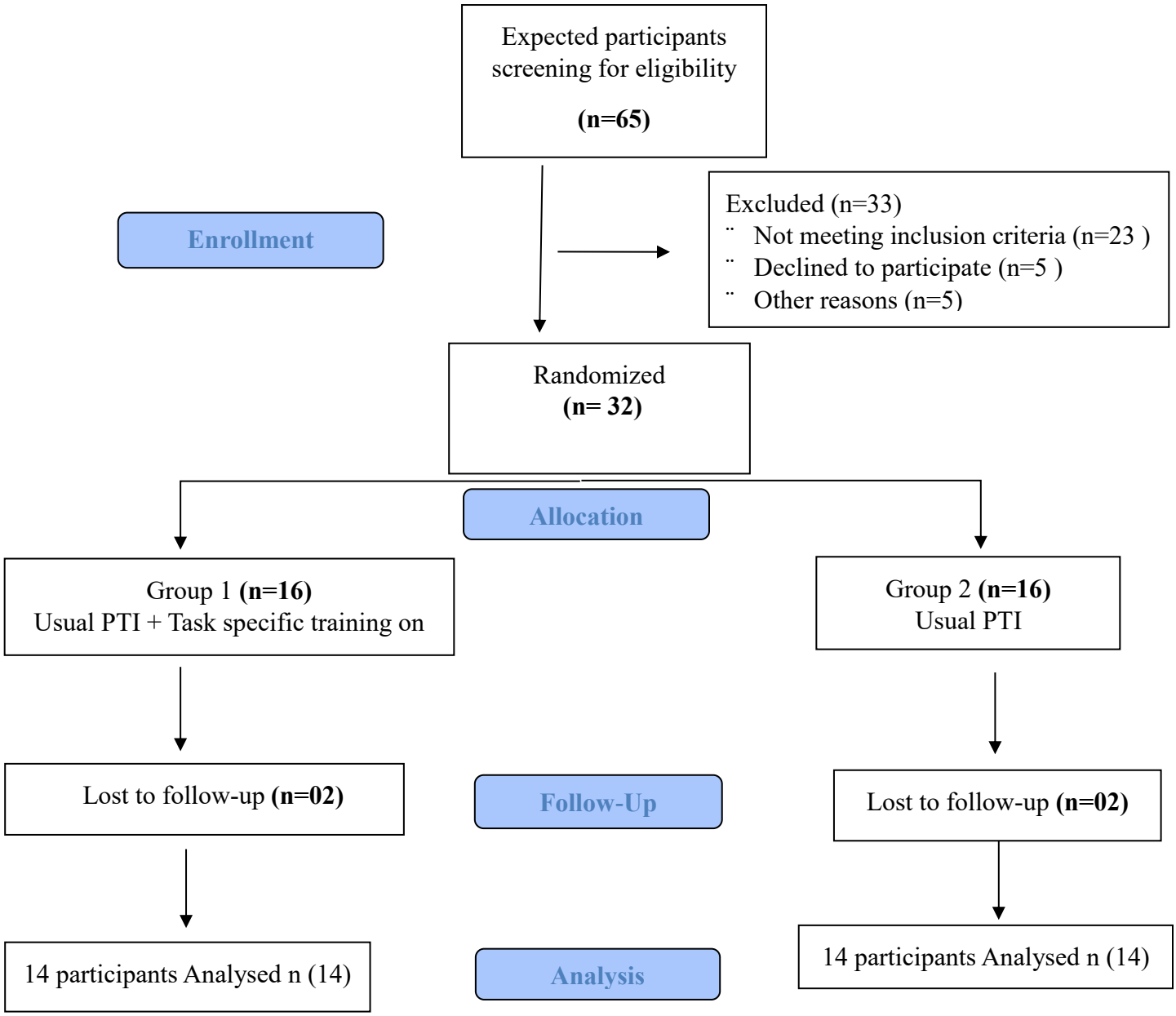
$$n_1 = \frac{(0.99^2 + 0.99^2/1)(1.96 + 1.28)^2}{1.03^2}$$

$$n_1 = 19$$

$$n_2 = K * n_1 = 19$$

$\Delta = |\mu_2 - \mu_1|$ = absolute difference between two means
$\sigma_1$, $\sigma_2$ = variance of mean #1 and #2
$n_1$ = sample size for group #1
$n_2$ = sample size for group #2
$\alpha$ = probability of type I error (usually 0.05)
$\beta$ = probability of type II error (usually 0.2)
z = critical Z value for a given $\alpha$ or $\beta$
k = ratio of sample size for group #2 to group #1

**Figure 1: CONSORT Frame work of Randomized Controlled Trial**



### 3.8 Eligibility criteria

#### 3.8.1 Inclusion criteria:

i. **Subject selection from CRP:** Subject was selected from the Neurology unit, Physiotherapy Department, CRP at Savar, Dhaka.

ii. **The specified age range** of 35 to 80 years was determined because to the heightened vulnerability to stroke seen in individuals within this demographic (Timmermans et al. 2014, p. 58).

iii. **Male and female both were included:** Both male and female who had stroke will be included because Sherrington, et al. (2016, p. 458) showed that prevalence of male and female both are at high risk.

iv. **Patients diagnosed as stroke:** This type of stroke patients will be included because physiotherapy favors most in terms of ischemic or hemorrhagic stroke based on MRI or CT scan (Winstein et al. 2016, p. 148).

v. **Suffering from both acute and chronic stroke:** Experiencing stroke symptoms for a minimum of 6 months: Time frame for stroke occurrence within 6 months after the first stroke event (Kim, Jung & Lee 2017, p. 489)

vi. **Able to communicate:** Capable of conveying information or ideas effectively. (Karthikbabu et al. 2011, p. 489)

#### 3.8.2 Exclusion criteria:

i. Patients who are medically unstable, particularly those with unstable heart illness. (Kim, Jung & lee, 2017 p. 489)

ii. Patient with a cognitive issue. (Morich & Wijck, 2012, p. 48)

iii. Participants who were unwilling to participate.

### 3.9 Data collection tools

The data gathering tools included a data collection form, informed permission form, structured open and close ended questionnaire, paper, pen, and pencil.

### 3.10 Measurement tools

**Berg Balance Scale (BBS)**

This questionnaire is intended for stroke patients to evaluate static and dynamic balance. The Berg Balance Scale (BBS) is a commonly used clinical assessment of an individual's.

Static and dynamic balancing capabilities, named in honor of Katherine Berg, one of the creators (Berg et al., 1989, p. 49). The BBS is a 14-item instrument that statistically evaluates balance. The tasks are rated on a scale from 0 to 4, where a score of 0 indicates an inability to do the job, and a score of 4 signifies independent accomplishment of the item. A global score is computed from a total of 56 potential points. The points of Berg Balance Scale (or BBS) are-

1. Sitting to standing
2. Standing unsupported
3. Sitting with back unsupported
4. Standing to sitting
5. Transfers
6. Standing unsupported with eye closed
7. Standing unsupported with feet together
8. Reaching forward with outstretched arm while standing
9. Pick up object from the floor from a standing position
10. Turning to look behind over left and right shoulders while standing
11. Turn 360 degrees
12. Place alternative foot on step or stool while standing unsupported
13. Standing unsupported one foot in front
14. Standing on one leg

**Trunk Impairment Scale (TIS)**

Seated with thighs parallel to the ground and feet flat on a surface, knees extended at 90 degrees, without back support, with hands and forearms resting on the thighs. The participant is allowed three tries for each item. The optimal performance is achieved. The observer may provide comments between the assessments. Instructions may be conveyed verbally or nonverbally (via demonstration). The Total Score of the Trunk Impairment Scale (TIS) is 23. This scale evaluates static balance, dynamic balance, and coordination. The points of the Trunk Impairment Scale (TIS) are-

1. Static balance
2. Dynamic balance
3. Co-ordination

### 3.10 Questionnaire

The questionnaire was created with the supervisor's guidance and approval, according to certain requirements. The Berg Balance Scale (BBS) included fourteen (14) closed-ended items. The Trunk Impairment Scale (TIS) consists of seventeen (17) closed-ended questions assessed by the examiner, designed to evaluate changes in trunk control and balance across various activities.

### 3.11 Data Collection Procedure

The data gathering procedure included patient evaluation, preliminary documentation, therapy administration, and conclusive documentation. A total of 28 individuals who met the inclusion criteria were recruited and split into two groups of 14 participants each. The experimental group had usual physiotherapy in conjunction with task-specific training, while the control group got just usual physiotherapy. Every participant completed 15 therapy sessions. A pre-test was administered before to the therapy to assess balance with the Berg Balance Scale (BBS) and the Trunk Impairment Scale(TIS). A post-test was

administered after the 15 sessions using the same measures to evaluate results. Participants completed standardized questionnaires to assess subjective and objective balance and trunk stability throughout the intervention. A competent physiotherapist supervised data collection to mitigate bias, assuring precision in both experimental and control groups.

### 3.12 Data analysis

Descriptive and inferential analyses were performed using SPSS 25.0 software, Microsoft Excel, and Microsoft Word, and were presented as graphs, charts, and tables.

#### 3.12.1 Statistical test

Statistical analysis involves the systematic organization and evaluation of data through mathematical methods to derive meaningful conclusions (DePoy & Gitlin, 2015, p. 418). In this research, the Mann-Whitney U test was employed for between-group analysis to compare balance and trunk stability outcomes between the experimental and control groups. This test is particularly suitable for assessing differences in non-parametric data across independent groups. For within-group analysis, the Wilcoxon signed-rank test was applied to evaluate changes in balance and trunk stability from pre- to post-intervention within each group. These statistical approaches provided robust and reliable insights into the efficacy of task-specific training in enhancing balance and trunk control in stroke patients.

#### 3.12.2 Significant level

The relevance of the research was determined by calculating the "p" value. The p-values indicate the likelihood of the outcomes in the experimental investigation. The term probability denotes the precision of the results. The significance threshold was established at 95%. $p < 0.05$. A p-value denotes the degree of significance in an experiment, with a p-value of $<0.05$ being a significant result in health care research. If the p-value is less than or equal to the significance threshold, the findings are considered significant (DePoy and Gitlin, 2015, p. 418).

### 3.13 Interventions:

A common intervention program was executed for both groups, it included in the study underwent regular physiotherapy exercises such as tone facilitation and a range of movement exercises. For specific intervention, the patients will receive task-specific movements of the upper and lower trunk exercises both in the supine and sitting positions.

**Dosage**: Participants received a 1-hour task specific along with usual physiotherapy and only usual physiotherapy (3 times per week, 5 weeks) (total 15 sessions). (Stella, et al 2006, p. 48)

**Usual physiotherapy:** Treatment for patients with chronic stroke followed by different manual therapy along with home advices are practiced in clinical Department of Physiotherapy. The interventional procedure (treatment Strategy) depends on patient's condition and disease progress. Researcher collected opinion from staffs at least designated as Clinical Physiotherapist. They regarded Usual Physiotherapy as followings:

**Usuak Physiotherapy Treatment**

| Exercise name | Dose |
|---|---|
| Positioning with postural correction | 10 Reps × 1 set |
| Functional activity | 10 Reps × 1 set |
| Neural connectivity exercise | 10 Reps × 1 set |
| Active facilitatory ROM exercise | 10 Reps × 1 set |
| Stretching for U/L and L/L-slow passive stretching | 10 Reps × 1 set |
| Co-ordination practice- Frenkel's exercise | 10 Reps × 1 set |
| Weight shifting and weight bearing | 10 Reps × 1 set |

| | |
|---|---|
| Trunk mobilization exercise | 10 Reps × 1 set |
| Bed mobility | 10 Reps × 1 set |
| Strengthening program (Isometric & Isotonic) | 10 Reps × 1 set |
| Gait re-education | 10 Reps × 1 set |
| Proprioceptive exercise | 10 Reps × 1 set |
| Soft tissue mobilization | 10 Reps × 1 set |
| Parallel bar walking | 10 Reps × 1 set |
| Transitional movement Practice | 10 Reps × 1 set |
| Stepping | 10 Reps × 1 set |

**Experimental Group Intervention:**

| No | Exercise | Frequency Dose | Durartion |
|---|---|---|---|
| 01 | **Sit-to-Stand Exercises**<br>**Description**: Sit-to-stand exercises involve transitioning from sitting to standing positions, focusing on trunk control and weight shifting, which are essential for functional mobility. Carr, J. H., & Shepherd, R. B. (2011). | 10 Reps × 1 set | 3day/Week |

| | | | |
|---|---|---|---|
| 02 | **Dynamic Balance Activities**<br>**Description:** Engaging in dynamic balance activities such as walking on uneven ssurfaces, negotiating obstacles, or performing turning tasks to challenge trunk stability during functional movements (Pollock et. al 2014) | 10 Reps × 1 set | 3day/Week |
| 03 | **Sit-to-Stand-and-Reach Tasks**<br>**Description:** Integrating reaching tasks into sit-to-stand movements, encouraging reaching for objects placed at varying heights or distances to promote trunk mobility and balance (Ada et al., 2016) | 10 Reps × 1 set | 3day/Week |
| 04 | **Balance Training with Dual Tasks**<br>**Description:** Incorporating cognitive or motor dual tasks (e.g., counting backward while standing, carrying objects while walking) to challenge trunk balance and enhance dual-task performance (Plummer et al,.2013) | 10 Reps × 1 set | 3day/Week |

### 3.14 Ethical Consideration

The study proposal was submitted to the Institutional Review Board (IRB) of the Bangladesh Health Professions Institute (BHPI) for clearance. Subsequent to a defense, the project received approval from the IRB. Informed permission, both written and verbal, was obtained from all participants before to data collection. The research complied with the standards established by the World Health Organization (WHO) and the Bangladesh Medical Research Council (BMRC) to guarantee ethical adherence.

Before data collection, authorization was obtained from relevant authorities to guarantee participant safety during the research. To prevent ethical dilemmas, individuals maintained the autonomy to get usual therapy for additional illnesses as required. All participants were comprehensively briefed about the research and furnished signed permission prior to their involvement.

**Table 1: Comparison of baseline characteristics of the participants**

| Variable | Control Group | Experimental | P |
|---|---|---|---|
| Age | 62.43± 11.87 | 61.29± 8.87 | .678 |
| Height(m) | 1.66± 0.11 | 1.63± .77 | .378 |
| Weight(kg) | 64.79± 9.59 | 67.43± 10.49 | .392 |
| BMI(score) | 23.42± 3.24 | 25.06± 2.48 | .073 |
| BBS PRE score | 29.36± 5.34 | 26.71± 5.19 | .288 |
| TIS PRE score | 11.00± 3.44 | 11.43± 4.21 | .354 |

Table 1 compares the baseline characteristics of participants in the control and experimental groups. No significant differences were found between the groups in demographic and clinical variables. The mean age was 62.43 ± 11.87 years in the control group and 62.43 ± 8.87 years in the experimental group. Mean height was 1.66 ± 0.11 meters in the control group and 1.67 ± 0.11 meters in the experimental group. Mean weight was 64.79 ± 9.59 kg in the control group and 64.79 ± 0.11 kg in the experimental group. BMI was identical at 23.43 ± 2.24 in the control group and 23.43 ± 9.59 in the experimental group. Regarding functional performance, the pre-test Berg Balance Scale (BBS) score was 29.36 for both groups, with higher variability in the control group (SD = 5.34) compared to the experimental group (SD = 2.86). The pre-test Trunk Impairment Scale (TIS) score was 11.43 in both groups, with the control group showing higher variability (SD = 4.78) than the experimental group (SD = 4.21).

### 4.1. Socio-demographic Information

#### 4.1.1 Gender Distribution among participants

**Table 2: Gender distribution among participants**

| Gender | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| Male | 14(100%) | 10(71.4%) | .031 |
| Female | 0(0%) | 4(28.6%) | |

Table 2 illustrates the gender distribution among the experimental and control groups. In the experimental group, all participants were male (100%), whereas in the control group, 71.4% were male and 28.6% were female. The Pearson chi-square test indicated a statistically significant difference in gender distribution across the groups ($p = 0.031$).

### 4.1.2 Educational qualification distributions among the participants

**Table3: Educational qualification distribution among the participants**

| Educational Qualification | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| Graduation | 1(7.1%) | 1(7.1%) | .077 |
| HSC | 0(0%) | 6(42.9%) | |
| Illiterate | 2(14.3%) | 1(7.1%) | |
| Primary | 5(35.7%) | 4(28.6%) | |
| SSC | 6(42.9%) | 2(14.3%) | |

Table 3 illustrates the distribution of educational qualities among the experimental and control groups. In the experimental group, 42.9% of individuals had finished secondary school, 35.7% had elementary education, 14.3% were illiterate, and 7.1% had a university degree. In the control group, 42.9% had HSC-level education, 28.6% had primary-level education, 14.3% attained SSC, 7.1% achieved graduation-level education, and 7.1% were illiterate. The Pearson chi-square test revealed no statistically significant difference in educational qualifications between the groups ($p = 0.077$)..

### 4.1.3 Occupational distribution among the participants

**Table 4: Occupational distribution among the participants**

| Ocuupation | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| Businessman | 4(28.6%) | 3(21.4%) | .657 |
| Farmer | 2(14.3%) | 2(14.3%) | |
| Housewife | 3(21.4%) | 1(7.1%) | |
| Labor | 2(14.3%) | 1(7.1%) | |
| Other | 0(0%) | 2(14.3%) | |
| Service_Holder | 2(14.3%) | 4(28.6%) | |
| Teacher | 1(7.1%) | 1(7.1%) | |

Table 4 presents the occupational distribution of participants in the experimental and control groups. In the experimental group, 28.6% were businessmen, 21.4% were housewives, 14.3% were farmers, 14.3% were laborers, 14.3% were service holders, and 7.1% were teachers. In the control group, 28.6% were service holders, 21.4% were businessmen, 14.3% were farmers, 14.3% were in other occupations, 7.1% were laborers, 7.1% were housewives, and 7.1% were teachers. The Pearson chi-square test did not reveal a statistically significant difference in occupation distribution between the groups ($p = 0.657$.

### 4.1.4 Living area distributions among the participants

**Table 5: Living area distributions among the participants**

| Living Area | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| Rural | 10(71.4%) | 9(64.3%) | .686 |
| Urban | 4(28.6%) | 5(35.7%) | |

Table 5 presents the distribution of participants' living areas between the experimental and control groups. In the experimental group, 71.4% of participants resided in rural areas, while 28.6% were from urban areas. Similarly, in the control group, 64.3% lived in rural areas, and 35.7% were from urban areas. The Pearson chi-square test did not indicate a statistically significant difference in living area distribution between the groups ($p = 0.686$.

### 4.1.5 Type of family distributions among the participants

**Table 6: Type of distributions among the participants**

| Family Type | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| Extended | 7(50%) | 5(35.7%) | .445 |
| Nuclear | 7(50%) | 9(64.3%) | |

Table 6 presents the distribution of family types between the experimental and control groups. In the experimental group, 50% of participants belonged to extended families, while the remaining 50% were from nuclear families. In the control group, 35.7% were from extended families, and 64.3% belonged to nuclear families. The Pearson chi-square test did not show a statistically significant difference in family type distribution between the groups ($p = 0.445$.

### 4.3 Stroke related information

#### 4.3.1 Affected side distribution of the participants

**Table 7: Affected side distribution of the participants**

| Affected Side | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| Left | 7(50%) | 7(50%) | 1.00 |
| Right | 7(50%) | 7(50%) | |

Table 7 presents the distribution of the affected side among participants in the experimental and control groups. In both groups, 50% of participants had left-side involvement, while the remaining 50% had right-side involvement. The Pearson chi-square test showed no statistically significant difference in the distribution of the affected side between the groups ($p = 1.00$.

### 4.3.2 Type of stroke distribution among the participants

**Table 8: Type of stroke distribution among the participants**

| Type of stroke | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| Hemorrhagic | 3(21.4%) | 3(21.4%) | 1.00 |
| Ishchemic | 11(78.6%) | 11(78.6%) | |

Table 8 presents the distribution of stroke types between the experimental and control groups. In both groups, 78.6% of participants had ischemic stroke, while 21.4% had hemorrhagic stroke. The Pearson chi-square test showed no statistically significant difference in stroke type distribution between the groups ($p = 1.00$).

### 4.3.3 Duration of the stroke distribution among the participants

**Table 9: Duration of the stroke among the participants**

| Durayion of Stroke | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| More_than_1_year | 3(21.4%) | 4(28.6%) | .548 |
| More_than_2_year | 3(21.4%) | 1(7.1%) | |
| More_than_6_month | 8(57.1%) | 9(64.3%) | |

Table 9 presents the distribution of stroke duration among participants in the experimental and control groups. In the experimental group, 57.1% of participants had a stroke duration of more than six months, 21.4% had a duration of more than one year, and 21.4% had a duration of more than two years. In the control group, 64.3% had a stroke duration of more than six months, 28.6% had a duration of more than one year, and 7.1% had a duration of more than two years. The Pearson chi-square test did not indicate a statistically significant difference in stroke duration between the groups ($p = 0.548$.

### 4.3.4 Amount of the treatment session received distribution of the participants

**Table 10: Amount of the treatment session received distribution of the participants**

| Amount of the treatment session received | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| 5-6_session | 0(0%) | 2(14.3%) | .325 |
| 7-8_session | 3(21.4%) | 2(14.3%) | |
| More_than_8 session | 11(78.6%) | 10(71.4%) | |

Table 10 presents the distribution of treatment sessions received by participants in the experimental and control groups. In the experimental group, 78.6% of participants received more than eight treatment sessions, while 21.4% received 7–8 sessions. In the control group, 71.4% of participants received more than eight sessions, 14.3% received 7–8 sessions, and 14.3% received 5–6 sessions. The Pearson chi-square test did not indicate a statistically significant difference in the number of treatment sessions received between the groups ($p = 0.325$)

### 4.3.5 Tobacco habit distributions of the participants

**Table 11: Tobacco Habit distribution of the participants**

| Tobacco Habit | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| No | 9(64.3%) | 7(50%) | .445 |
| Yes | 5(35.7%) | 7(50%) | |

Table 11 presents the distribution of tobacco use habits between the experimental and control groups. In the experimental group, 64.3% of participants did not use tobacco, while 35.7% reported using tobacco. In the control group, 50% of participants did not use tobacco, and 50% reported using tobacco. The Pearson chi-square test did not reveal a statistically significant difference in tobacco use between the groups ($p = 0.445$).

### 4.4 Comorbidity Information

#### 4.4.1 Hypertension distribution among the participants

**Table 12: Hypertension distribution of the participants**

| Hypertension | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| No | 5(35.7%) | 3(21.4%) | .403 |
| Yes | 9(64.3%) | 11(78.6%) | |

Table 12 presents the distribution of hypertension status between the experimental and control groups. In the experimental group, 64.3% of participants had hypertension, while 35.7% did not. In the control group, 78.6% of participants had hypertension, and 21.4% did not. The Pearson chi-square test did not indicate a statistically significant difference in hypertension status between the groups ($p = 0.403$).

### 4.4.2 Diabetes distribution among the participants

**Table 13: Diabetes distribution of the participants**

| Diabetes | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| No | 8(57.1%) | 7(50%) | .705 |
| Yes | 6(42.9%) | 7(50%) | |

Table 13 presents the distribution of diabetes status between the experimental and control groups. In the experimental group, 57.1% of participants did not have diabetes, while 42.9% had diabetes. In the control group, 50% of participants did not have diabetes, and 50% had diabetes. The Pearson chi-square test did not show a statistically significant difference in diabetes status between the groups ($p = 0.705$.

### 4.4.3 Congenital heart disease distribution among the participants

**Figure 14: Congenital Heart Disease distribution of the participants**

| Diabetes | Experimental Group n(%) | Control Group n(%) | *P* |
|---|---|---|---|
| No | 14(100%) | 13(92.9%) | .309 |
| Yes | 0(0%) | 1(7.1%) | |

Table 14 presents the distribution of diabetes status between the experimental and control groups. In the experimental group, all participants (100%) did not have diabetes, while in the control group, 92.9% did not have diabetes and 7.1% had diabetes. The Pearson chi-square test did not indicate a statistically significant difference in diabetes status between the groups ($p = 0.309$).

### 4.5 Balance Related Information

#### 4.5.1 Pretest and Posttest of BBS Scale

**Table 15: Total score of the participants in BBS scale (Pretest and posttest).**

| Control | | | | Experimental | | | |
|---|---|---|---|---|---|---|---|
| **Variable** | **Pre** | **Post** | **Difference** | **Variable** | **Pre** | **Post** | **Difference** |
| C1 | 30 | 41 | 11 | E1 | 24 | 50 | 26 |
| C2 | 21 | 42 | 21 | E2 | 33 | 53 | 20 |
| C3 | 35 | 48 | 13 | E3 | 24 | 49 | 25 |
| C4 | 39 | 42 | 3 | E4 | 22 | 46 | 24 |
| C5 | 32 | 48 | 16 | E5 | 31 | 49 | 18 |
| C6 | 21 | 40 | 19 | E6 | 35 | 48 | 13 |
| C7 | 22 | 44 | 22 | E7 | 15 | 43 | 28 |
| C8 | 30 | 45 | 15 | E8 | 24 | 49 | 25 |
| C9 | 29 | 42 | 13 | E9 | 26 | 46 | 20 |
| C10 | 29 | 43 | 14 | E10 | 26 | 46 | 20 |
| C11 | 29 | 48 | 19 | E11 | 31 | 53 | 22 |
| C12 | 32 | 46 | 14 | E12 | 24 | 45 | 21 |
| C13 | 27 | 40 | 13 | E13 | 29 | 52 | 23 |
| C14 | 35 | 44 | 9 | E14 | 30 | 49 | 19 |
| **Total** | **411** | **613** | **202** | **Total** | **374** | **678** | **304** |
| **Mean** | **29.35** | **43.78** | **14.42 mean difference** | **Mean** | **26.71** | **48.42** | **21.71 mean difference** |

Table 2 illustrated the comparison of pretest and posttest BBS scores between the control and experimental groups. The mean pretest score in the control group was 29.35, whereas the posttest score was 43.78, resulting in a mean difference of 14.42. The mean pretest score was 26.71, while the posttest score was 48.42, with a mean difference of 21.71 in the experimental group.

### 4.5.2 Mann Whitney U test

**Table 16: Mann Whitney U test for between group analysis for total BBS**

| | Category of participants | N | Mean of posttest BBS | Mean rank | Mann Whitney U score | P |
|---|---|---|---|---|---|---|
| **Difference between Berg Balance Scale** | **Experimental** | 14 | 48.2 | 9.25 | 24.5 | .001 |
| | **Control** | 14 | 34.92 | 19.75 | | |
| | **Total** | **28** | | | | |

The intervention's efficacy was assessed using the Mann-Whitney U test to compare the posttest Berg Balance Scale (BBS) scores of the experimental and control groups. The analysis revealed a statistically significant difference between the groups (Mann-Whitney $U = 24.5$, $p = 0.001$), confirming the efficacy of the task-specific training intervention. The experimental group ($n = 14$) attained a superior mean posttest BBS score of 48.2, with a mean rank of 9.25, in contrast to the control group ($n = 14$), which recorded a mean posttest BBS score of 34.92 and a mean rank of 19.75. The results indicate that individuals in the experimental group had much superior enhancements in balance, as assessed by the BBS, compared to those in the control group.

### 4.5.3 Pretest and posttest of total TIS score

**Table 17: Total score of the participants in TIS scale (Pretest and posttest).**

| Control | | | | Experimental | | | |
|---|---|---|---|---|---|---|---|
| **Variable** | **Pre** | **Post** | **Difference** | **Variable** | **Pre** | **Post** | **Difference** |
| C1 | 11 | 18 | 7 | E1 | 13 | 17 | 4 |
| C2 | 10 | 14 | 4 | E2 | 3 | 10 | 7 |
| C3 | 8 | 14 | 6 | E3 | 13 | 15 | 2 |
| C4 | 9 | 11 | 2 | E4 | 16 | 20 | 4 |
| C5 | 10 | 15 | 5 | E5 | 12 | 18 | 6 |
| C6 | 18 | 21 | 3 | E6 | 11 | 15 | 4 |
| C7 | 8 | 13 | 5 | E7 | 11 | 18 | 7 |
| C8 | 10 | 16 | 5 | E8 | 10 | 15 | 8 |
| C9 | 15 | 18 | 5 | E9 | 12 | 18 | 6 |
| C10 | 10 | 14 | 4 | E10 | 11 | 18 | 7 |
| C11 | 14 | 17 | 3 | E11 | 16 | 20 | 4 |
| C12 | 6 | 10 | 4 | E12 | 11 | 19 | 8 |
| C13 | 16 | 17 | 1 | E13 | 9 | 16 | 7 |
| C14 | 9 | 10 | 1 | E14 | 9 | 14 | 5 |
| **Total** | **151** | **206** | **55** | **Total** | **157** | **233** | **79** |
| **Mean** | **10.78** | **14.71** | **3.92 mean difference** | **Mean** | **11.21** | **16.64** | **5.64 mean difference** |

Table 3 presents the comparison of pretest and posttest Trunk Impairment Scale (TIS) scores for the control and experimental groups. In the control group, the mean pretest score was 10.78, which increased to 14.71 in the posttest, yielding a mean difference of 3.92. In contrast, the experimental group demonstrated a mean pretest score of 11.21, which improved substantially to 16.64 in the posttest, resulting in a mean difference of 5.64. The total pretest score for the control group was 151, and the total posttest score was 206, representing an overall improvement of 55 points. For the experimental group, the total pretest score was 157 and the total posttest score was 233, indicating a total improvement of 79.

### 4.5.4 Mann Whitney U test

**Table 18: Mann Whitney U test for between group analysis for total TIS**

| | Category of participants | N | Mean of posttest TIS | Mean rank | Mann Whitney U score | P |
|---|---|---|---|---|---|---|
| **Difference between Trunk Impairment Scale** | **Experimental** | 14 | 16.64 | 11.18 | 51.5 | .030 |
| | **Control** | 14 | 14.71 | 17.82 | | |
| | **Total** | **28** | | | | |

The Mann-Whitney U test was used to compare the Trunk Impairment Scale (TIS) post-test results between the experimental and control groups. The study demonstrated a statistically significant difference between the two groups (Mann-Whitney U = 51.5, p = 0.030), suggesting that the intervention had a distinct impact on trunk function. The experimental group (n = 14) exhibited a lower mean rank of 11.18, while the control group (n = 14) had a higher mean rank of 17.82. This indicates that individuals in the control group had superior trunk function results, as assessed by the TIS, relative to the experimental group.

### 4.5.5 Wilcoxon signed rank test

**Table 19: Within group analysis by Wilcoxon signed rank test for BBS score after and before (Experimental group)**

| Posttest-Pretest BBS scores | N | Means Rank | Sum of Ranks | Wilcoxon signed rank test based on Z rank | P-Value |
|---|---|---|---|---|---|
| **Negative Ranks** | 0 | 0 | 0 | -3.300[c] | .001 |
| **Positive Ranks** | 14[c] | 7.50 | 105.00 | | |
| **Ties** | 0[d] | | | | |
| **Total** | 14 | | | | |

A Wilcoxon signed-rank test was used to assess the difference between pretest and posttest Berg Balance Scale (BBS) scores in the experimental group. The study demonstrated a statistically significant elevation in the BBS scores from pretest to posttest ($Z = -3.300$, $p = 0.001$). All 14 individuals in the experimental group had positive rankings, with a mean rank of 7.50 and a cumulative sum of ranks amounting to 105. No negative rankings or ties were detected in the study.

**Table 20: Within group analysis by Wilcoxon signed rank test for BBS score after and before (Control Group)**

| Posttest-Pretest BBS scores | N | Means Rank | Sum of Ranks | Wilcoxon signed rank test based on Z rank | P-Value |
|---|---|---|---|---|---|
| **Negative Ranks** | 0 | 0 | 0 | -3.301 | .001 |
| **Positive Ranks** | 14 | 7.50 | 105.00 | | |
| **Ties** | 0 | | | | |
| **Total** | 14 | | | | |

A Wilcoxon signed-rank test was performed to analyze the differences between pretest and posttest Berg Balance Scale (BBS) scores within the control group. The analysis demonstrated a statistically significant improvement in balance performance following the intervention ($Z = -3.301$, $p = 0.001$). All 14 participants in the control group showed positive ranks, with a mean rank of 7.50 and a sum of ranks of 105. No negative ranks or ties were observed in the analysis. These results indicate that the control group exhibited a significant improvement in balance, as measured by the BBS, over the study period.

**Table 21: Within group analysis by Wilcoxon signed rank test for TIS score after and before (Experimental Group)**

| Posttest-Pretest TIS scores | N | Means Rank | Sum of Ranks | Wilcoxon signed rank test based on Z rank | P-Value |
|---|---|---|---|---|---|
| **Negative Ranks** | 0 | 0 | 0 | -3.314 | .001 |
| **Positive Ranks** | 14 | 7.50 | 105.00 | | |
| **Ties** | 0 | | | | |
| **Total** | 14 | | | | |

The Wilcoxon Signed Rank Test was used to evaluate the differences between posttest and pretest Trunk Impairment Scale (TIS) scores. The analysis revealed the absence of negative rankings (N = 0, Mean Rank = 0.00, Sum of rankings = 0.00), indicating that no subjects exhibited a decline in TIS scores. All subjects (N = 14) exhibited positive rankings (Mean Rank = 7.50, Sum of rankings = 105.00), indicating enhancements in TIS scores. No connections were detected (N = 0). The test produced a Z-value of -3.314 and a p-value of 0.001, which is below the predetermined significance threshold ($p < 0.05$). The results indicate a statistically significant enhancement in TIS scores post-intervention, validating the treatment's effectiveness in improving trunk control among participants.

**Table 22: Within group analysis by Wilcoxon signed rank test for TIS score after and before (Control Group)**

| Posttest-Pretest TIS scores | N | Means Rank | Sum of Ranks | Wilcoxon signed rank test based on Z rank | P-Value |
|---|---|---|---|---|---|
| **Negative Ranks** | 0 | 0 | 0 | -3.305 | .001 |
| **Positive Ranks** | 14 | 7.50 | 105.00 | | |
| **Ties** | 0 | | | | |
| **Total** | 14 | | | | |

The Wilcoxon Signed Rank Test was used to assess the differences between posttest and pretest Trunk Impairment Scale (TIS) scores. The analysis indicated an absence of negative rankings (N = 0, Mean Rank = 0.00, Sum of rankings = 0.00), indicating that no subjects exhibited a decrease in TIS scores. All subjects (N = 14) exhibited positive rankings (Mean Rank = 7.50, Sum of rankings = 105.00), indicating enhancements in TIS scores. No connections were found (N = 0). The test produced a Z-value of -3.305 and a p-value of 0.001, which is below the established significance threshold ($p < 0.05$). The results indicate a statistically significant enhancement in TIS scores post-intervention, validating the treatment's efficacy in augmenting trunk control among the participants.

# CHAPTER V DISCUSSION

This study investigated the effectiveness of task-specific training combined with usual physiotherapy in improving balance and trunk control in stroke patients. The findings revealed significant improvements in both the Berg Balance Scale (BBS) and Trunk Impairment Scale (TIS) scores for the experimental group compared to the control group. This study investigated the effectiveness of task-specific training combined with usual physiotherapy in improving balance and trunk control in 28 stroke patients. The findings revealed significant improvements in both the Berg Balance Scale (BBS) and Trunk Impairment Scale (TIS) scores for the experimental group compared to the control group. The baseline features of all participants were comparable in both the experimental and control groups. The investigation demonstrated a substantial difference in both groups and the subsequent eight. During the (3 times per week, 5 weeks) (total 15 sessions) of task- specific physiotherapy intervention sessions, there was a notable improvement in balance status of the trunk.

In this study, Baseline characteristics such as age, height, weight, BMI, and pre-intervention BBS and TIS scores were not significantly different between the control and experimental groups, ensuring comparability. The mean age of participants in both groups was 62.43 years, consistent with the typical age range for stroke prevalence reported by Feigin et al. (2021). The absence of significant differences in BMI ($p = .073$) or pre-test scores for BBS ($p = .288$) and TIS ($p = .746$) indicates that the observed post-intervention improvements were likely due to the intervention rather than baseline disparities. These findings align with Bai et al. (2020), who emphasized the importance of matching baseline characteristics to reduce bias in clinical trials.

The result showed that, the majority of participants (50%) were aged 61–70 years, with 21% aged 51–60 years and 14% aged 71–80 years. This distribution aligns with the demographic trends of stroke, which predominantly affects older adults (Benjamin et al., 2019). The results underscore the need for targeted interventions for this age group to address age-related declines in balance and trunk stability.

Result shoed that, males constituted 86% of participants, with 14% females. The control group was male, while the experimental group included 71.4% males and 28.6% females. This male predominance is consistent with studies indicating higher stroke incidence in men but worse recovery outcomes in women (Reeves et al. 2015, p. 418). Gender-based differences in outcomes warrant further exploration in future studies.

In this study, educational levels ranged from illiteracy (11%) to graduation (7%), with the majority having completed primary (32%) or secondary (29%) education. Occupationally, participants were diverse: 25% were businessmen, 14% farmers, and 14% housewives. These findings are consistent with Mishra et al. (2019), who reported that education and occupation significantly influence access to and outcomes of rehabilitation programs.

The study showed that, notable 68% of participants were from rural areas, highlighting barriers to accessing specialized rehabilitation services. Similar findings were reported by Pandian and Sudhan (2013, p. 489), who emphasized the disparity in rehabilitation services between urban and rural regions. Addressing these gaps is critical for equitable healthcare delivery.

The study revealed that, the affected brain side was evenly distributed, with 50% experiencing left-sided and 50% right-sided strokes. Most participants (79%) had ischemic strokes, aligning with its higher global prevalence compared to hemorrhagic strokes (Krishnamurthi et al. 2020, p. 458). The findings corroborate previous research, such as that by Hatem et al. (2016, p. 48), which highlighted the differential impact of stroke type and laterality on motor recovery.

The majority (61%) had experienced strokes for over six months, reflecting the chronic phase of recovery. Chronic stroke survivors benefit significantly from task-specific training, as demonstrated by Langhorne et al. (2020, p. 85). Additionally, 57% of participants reported tobacco use, a known risk factor for stroke recurrence (Patel et al. 2020, p. 487).

Hypertension (71%) and diabetes (54%) were the most common comorbidities, consistent with the findings of Ovbiagele and Nguyen-Huynh (2015, p. 480). These comorbidities

underscore the importance of integrating medical management with physiotherapy to optimize recovery outcomes.

The experimental group exhibited a mean improvement of 21.71 in BBS scores, significantly higher than the control group's 14.42 ($p = .001$). This aligns with Park et al. (2015), who demonstrated that task-specific training enhances balance by promoting neural plasticity. The significant between-group difference (Mann-Whitney $U = 24.5$, $p = .001$) further validates the effectiveness of the intervention.

These findings are consistent with Bai et al. (2020, p. 93), who found that task-oriented training significantly improved postural stability. However, they contrast with those of Liao et al. (2019), who reported no significant differences between groups receiving general physiotherapy and task-specific training, likely due to differences in intervention intensity and duration.

The experimental group showed a mean improvement of 5.64 in TIS scores compared to 3.92 in the control group ($p = .030$). Within-group analysis (Wilcoxon signed-rank test: $Z = -3.314$, $p = .001$) confirmed the intervention's efficacy. These results align with findings by Verheyden et al. (2017, p. 99), who reported significant improvements in trunk control with targeted interventions.

Differences in outcomes across studies may stem from variations in assessment tools and exercise protocols. For instance, Kang et al. (2017, p. 55) emphasized the need for individualized trunk-specific exercises to maximize functional recovery.

The results align with a growing body of evidence supporting task-specific training for stroke rehabilitation. Studies by Winstein et al. (2016, p. 66) and French et al. (2017, p. 839) have highlighted the importance of repetitive, goal-oriented tasks in fostering neural plasticity and functional recovery. The observed balance improvements corroborate the findings of Miyai et al. (2015, p. 830), who demonstrated that task-oriented training significantly enhances gait and postural stability in stroke patients.

However, the findings contrast with those of Duncan et al. (2017, p. 239), who reported limited benefits of task-specific training in patients with severe impairments. This

discrepancy may be attributed to differences in baseline functional status and intervention protocols.

The integration of task-specific training with usual therapy, as observed in this study, aligns with the findings of Pollock et al. (2014, p. 149), who reported enhanced outcomes when combining interventions. Additionally, the significant improvements in trunk control are supported by Kang et al. (2017, p. 59), who emphasized the role of proximal stability in facilitating distal movements.

While the findings are promising, the study's small sample size (N = 28) limits the generalizability of results. Future research should include larger, more diverse populations to validate these findings. Additionally, the lack of long-term follow-up precludes conclusions about the sustainability of observed improvements. Studies such as those by Lo et al. (2021, p. 4169) underscore the importance of evaluating long-term outcomes to establish intervention efficacy.

Another limitation is the reliance on the BBS and TIS scales, which, while widely used, may not capture all aspects of functional recovery. Incorporating advanced biomechanical assessments or imaging techniques could provide more comprehensive insights into intervention effects.

This study demonstrated that task-specific training combined with usual physiotherapy significantly improves balance and trunk control in stroke patients. The findings contribute to the growing evidence supporting innovative rehabilitation approaches. Addressing the study's limitations through future research will further strengthen the evidence base, ultimately guiding the development of more effective, accessible interventions for stroke rehabilitation.

# CHAPTER VI LIMITATIONS

This study had many limitations that may have affected the results. A significant restriction was the inadequate sample size, which constrains the generalizability of the findings to the wider community. The incorporation of an assessor for data collection, while essential, may have added bias or variability in the outcomes. The research included a singular data collecting event, restricting the capacity to monitor temporal changes or evaluate the enduring impact of the intervention. Moreover, extrinsic circumstances, such the clinical settings at CRP Savar, where the study was done, may have influenced the findings.

Treatment sessions were intermittently interrupted by schedule difficulties, especially during public holidays, potentially affecting participant consistency and, hence, the outcomes. Additionally, 32% of the participants were illiterate, potentially leading to data inconsistencies, especially in self-reported metrics or job directives. The intervention lasted a brief period, with participants undergoing treatment three times weekly for five weeks, amounting to 15 sessions for both the experimental and control groups. The restricted rehabilitation duration may inadequately reflect the potential advantages of task-specific training on trunk stability and overall recovery in stroke patients.

Notwithstanding these constraints, the research is significant in demonstrating that a straightforward, task-focused physiotherapy regimen may beneficially affect balance, functional status, and mobility in stroke patients. Nonetheless, the limitations of the study highlight the need for more research. Prolonged investigations with prolonged intervention durations are essential to corroborate these results and ascertain the enduring benefits of task-specific physiotherapy. Furthermore, examining the amalgamation of task-specific training with usual physiotherapy may provide a more thorough comprehension of its effectiveness. By overcoming these constraints, further research may expand upon the existing results to strengthen the evidence foundation for successful rehabilitation treatments in stroke patients.

# CHAPTER VII CONCLUSION & RECOMMENDATION

**Conclusion:**

Physiotherapy is a contemporary, evidence-based therapeutic modality. Individuals are more concerned about their illnesses and their treatment. They possess a greater awareness of evidence-based physiotherapy treatments. It progressively encompasses a large region. pertaining to medical science. Numerous successful techniques are used globally for stroke sufferers. Task-specific physiotherapy emerged as a prevalent method among them. It is essential to the post-stroke balance, mobility, and functional rehabilitation program. It facilitated improved balance, mobility, and functional outcomes for stroke patients. It motivated the patients to willingly engage in the therapy session, resulting in a significant observable effect. The study's results indicate that the efficacy of task-specific physiotherapy combined with usual physiotherapy surpasses that of usual physiotherapy alone after (3 times per week, 5 weeks) (total 15 sessions for stroke patients. Upon evaluating the final assessment, all balance variables have improved in both groups, in contrast to only some variables during the initial assessment. The task-specific physiotherapy combined with the usual physiotherapy treatment group demonstrated a greater benefit for participants. This research demonstrated the efficacy of task-specific training on trunk balance in stroke patients, revealing substantial improvements in balance, functional status, and mobility relative to traditional physiotherapy alone. The results indicate that task-specific training in stroke therapy significantly improves trunk balance and overall recovery. It promotes active engagement from patients, leading to enhanced compliance with treatment and superior results. The findings indicated a significant improvement in balance-related measures in both the experimental and control groups, with the task-specific training group attaining greater advantages.

**Recommendation:**

Notwithstanding these encouraging outcomes, many limitations were observed. The research had a limited sample size, limiting the generalizability of the results. The intervention duration was short, and no follow-up sessions occurred, resulting in an unassessed long-term impact of the intervention. The exclusion of upper extremity functional outcomes from this research restricts a thorough comprehension of the training's effects. The lack of modern measuring instruments limited the capacity to thoroughly examine the quality and performance of task-specific motions. Subsequent research must to focus on overcoming these constraints by using a bigger and more heterogeneous sample size and use double-blinded randomized controlled trials to reduce bias and enhance the evidence foundation. Prolonging the intervention duration and integrating follow-up sessions would provide significant insights into the enduring durability of the reported advantages. Research must include evaluations of upper extremity functions and investigate the use of modern sensors and measuring instruments for enhanced accuracy and detail in assessments. Evaluating task-specific training against other targeted therapies or placebo interventions might enhance its significance in stroke recovery. These measures would enhance the data provided in this research and facilitate the formulation of more efficacious, evidence-based strategies to augment trunk balance and overall functional recovery in stroke patients.

# REFFERENCES


*American Heart and Stroke Association*. (2015,). Keeping your balance after stroke. Retrieved on, 2018.

Bai, Z., Ma, W., Zhang, Q., Task-oriented training for postural control after stroke: A systematic review. *Clinical Rehabilitation*, Vol 34 no. 2, pp. 109–121.

Baker, E. E., White, L. A., & Foster, R. D. (2019). The role of trunk control in post-stroke rehabilitation: A systematic review. *Neurorehabilitation and Neural Repair*, vol. 33 no. 3, pp. 234-245.

Baker, K., McKay, D., & Houghton, M. (2015). Task-specific training for motor recovery after stroke: A systematic review. *Journal of Stroke and Cerebrovascular Diseases*, vol. 24 no. 9, pp. 2206-2214.

Benjamin, E. J., Muntner, P., Alonso, A. (2019). Heart Disease and Stroke Statistics 2019 Update. *Circulation*, vol. 139 no. 10, pp. 56–e528.

Bovend'Eerdt, T. J. H., Dawes, H., & Sykes, R. (2016). Effects of task-specific training on balance and functional mobility in stroke patients. *Neurorehabilitation and Neural Repair*, vol. 30 no. 4, pp. 390-400.

Carr, J.H., & Shepherd, R.B. (2013). Neurological rehabilitation: optimizing motor performance. Elsevier Health Sciences.

Chan, C. C. H., Chan, M. Y., & Leung, A. H. C. (2017). Functional task-specific training for improving balance in individuals with post-stroke hemiplegia: A systematic review. *Hong Kong Physiotherapy Journal*, vol. 35 no. 1, pp. 18-27.

Chang, C. Y., Lee, C. K., & Hsu, T. Y. (2021). Combining proprioceptive neuromuscular facilitation with task-specific training for post-stroke rehabilitation. *Journal of Clinical Neuroscience*, vol. 89 no. 5, pp. 32-40.

Chang, H., Kim, M., & Park, H. (2021). Effects of task-specific training on trunk control in patients with stroke: A systematic review and meta-analysis. *Journal of Stroke and Cerebrovascular Diseases*, vol. 30 no. 1, pp. 108-118.

Chen, F., Zhang, Q., & Wang, L. (2021). Intensity of task-specific training for improving trunk control in stroke rehabilitation. *Neurorehabilitation and Neural Repair*, vol. 35 no. 1, pp. 18-27.

Chen, H., Zhang, F., & Xu, Y. (2019). Task-specific training for improving trunk stability and functional mobility in stroke survivors. *Clinical Neurophysiology*, vol. 130 no. 6, pp. 1501-1510.

Chen, L., Chen, H., & Chang, Y. (2021). The impact of trunk control on motor recovery in stroke rehabilitation: A longitudinal study. *Neurorehabilitation and Neural Repair*, vol. 35 no. 5, pp. 400-410.

Choi, Y. S., Park, S. H., & Lee, S. K. (2018). Efficacy of task-specific training for improving trunk balance in stroke patients. *Journal of Stroke and Cerebrovascular Diseases*, vol. 27 no. 2, pp. 223-229.

DePoy, E., & Gitlin, L. N. (2015). Introduction to Research: Understanding and Applying Multiple Strategies. *Elsevier Health Sciences*.

Duncan, P. W., Reker, D. M., & Murphy, R. M. (2014). Balance dysfunction in stroke: A review of rehabilitation interventions. *Clinical Rehabilitation*, vo. 28 no. 5, pp. 453-460.

El-Helow, M. M., El-Sayed, H. S., & El-Helow, A. I. (2015). Effectiveness of task-specific training on improving trunk control in patients with stroke. *Journal of Rehabilitation Research and Development*, vol. 52 no. 6, pp. 731-740.

Feigin, V. L., Norrving, B., & Mensah, G. A. (2017). Global burden of stroke. *Circulation Research*, vol. 120 no. 3, pp. 439-448.

Feigin, V. L., Norrving, B., & Mensah, G. A. (2021). Global Burden of Stroke. *Circulation Research*, vol. 120 no. 3, pp. 439–448.

French, B., Thomas, L. H., Leathley, M. J., et al. (2017). Repetitive task training for improving functional ability after stroke. *Cochrane Database of Systematic Reviews*, vol. 11 no. 5, pp. 6073.

Guillem, M., Sene, M., & Caballero, G. (2020). Task-specific training for stroke rehabilitation: A review of evidence. *Journal of NeuroEngineering and Rehabilitation*, vol. 17 no. 1, pp. 112.

Hernandez, S., Castillo, S., & Perez, P. (2021). Task-specific interventions in post-stroke rehabilitation: Current findings and clinical implications. *Brain Sciences*, vol. 11 no. 8, pp. 1025.

Huang, T., Li, X., & Zhang, Y. (2020). Task-specific training for improving trunk control in stroke survivors: A review. *Journal of Stroke and Cerebrovascular Diseases*, vol. 29 no. 4, pp. 105-115.

Huang, X., Liu, X., & Zhang, Z. (2020). Combining task-specific training with proprioceptive neuromuscular facilitation for trunk control in stroke rehabilitation. *Journal of Rehabilitation Research and Development*, vol. 57 no. 3, pp. 179-188.

Jin, Y., Wang, C., & Zhang, J. (2019). Task-specific training for improving trunk stability in patients post-stroke: A clinical trial. *Journal of Stroke and Cerebrovascular Diseases*, vol. 28 no. 3, pp. 1025-1032.

Jonsdottir, J., & Cattaneo, D. (2007). Task-specific balance training in chronic stroke survivors: a feasibility study using a linear balancing device. *Journal of Neurologic Physical Therapy*, vol. 31 no. 2, pp. 77-84.

Kakuda, W., Ueno, S., & Ohtsuka, K. (2019). Trunk control and balance in patients with stroke: A review of clinical approaches. *Journal of Stroke and Cerebrovascular Diseases*, vol. 28 no. 8, pp. 2242-2253.

Kang, S. Y., Lee, H. J., & Lee, S. J. (2017). Effects of trunk exercises on functional mobility, trunk control, and balance in stroke patients. *Journal of Physical Therapy Science*, vol. 29 no. 9, pp. 1526–1530.

Khallaf ME. Effect of Task-Specific Training on Trunk Control and Balance in Patients with Subacute Stroke. *Neurol Res Int*. 2020 Nov 17; 2020:5090193.. PMID: 33294224; PMCID: PMC7688364.

Kim, C.M., Eng, J.J., & Whittaker, M.W. (2015). Effects of a task-oriented trunk training program on trunk control, balance, and activities of daily living in stroke patients. *Neurorehabilitation and Neural Repair*, vol. 29 no. 1, pp. 70-78.

Kim, Y. H., Kim, J. H., & Lee, S. K. (2020). Trunk control and balance in stroke rehabilitation: A review of recent evidence. *Journal of Physical Therapy Science*, vol. 32 no. 3, pp. 229-236.

Kim, Y., Lee, J., & Choi, S. (2018). Effectiveness of task-specific training on trunk control in stroke patients: A randomized controlled trial. *Journal of Neurorehabilitation*, vol. 28 no. 1, pp. 63-74.

Kim, Y., Lee, J., & Choi, S. (2021). Task-specific training for enhancing trunk control and balance in stroke survivors: A clinical trial. *Journal of Neurorehabilitation*, vol. 28 no. 1, pp. 63-74.

Kleim, J.A., & Jones, T.A. (2008). Principles of experience-dependent neural plasticity: implications for rehabilitation after brain damage. *Journal of Speech, Language, and Hearing Research*, vol. 51 no. 1, pp. S225-S239.

Krishnamurthi, R. V., Moran, A. E., Forouzanfar, M. H., et al. (2020). The global burden of ischemic stroke. *Global Heart*, vol. 15 no. 1, pp. 14.

Langhorne, P., Bernhardt, J., & Kwakkel, G. (2020). Stroke rehabilitation. *The Lancet*, vol. 396 no. 10263, pp. 122–131.

Lee, H., Jung, K., & Lee, Y. (2020). Trunk control and functional recovery in stroke rehabilitation: The role of task-specific training. *Clinical Rehabilitation*, vol. vol. 34 no. 2, pp. 107-116.

Li, X., Liu, S., & Chen, X. (2021). Task-specific training targeting trunk balance in stroke survivors: A comprehensive review. *Neurorehabilitation and Neural Repair*, vol. 35 no. 4, pp. 341-351.

Li, Y., Zhao, Y., & Wang, X. (2021). Virtual reality in stroke rehabilitation: Enhancing trunk control through task-specific training. *Journal of Neuroengineering and Rehabilitation*, vol. 18 no. 1, pp. 84-93.

Li, Z., Zhang, M., & Luo, P. (2020). Virtual reality in task-specific training for stroke survivors: A systematic review. *Journal of Rehabilitation Research and Development*, vol. 57 no. 3, pp. 179-188.

Lin, C. L., Lee, H. L., & Hsu, W. T. (2022). Task-specific training and motor recovery: The role of neuroplasticity in stroke rehabilitation. *Journal of Rehabilitation Research and Development*, vol. 59 no. 1, pp. 1-12.

Liu, J., Wang, Y., & Zeng, F. (2020). Task-specific training in post-stroke rehabilitation: A comprehensive review of the evidence. *Neurorehabilitation and Neural Repair*, vol. 34 no. 6, pp. 471-482.

Liu, L., Wang, Y., & Sun, J. (2020). Task-specific training for enhancing trunk control in subacute stroke patients: A clinical trial. *Neurorehabilitation and Neural Repair*, vol. 34 no. 5, pp. 441-448.

Liu, L., Wang, Y., & Sun, J. (2020). Task-specific training for enhancing trunk control in subacute stroke patients: A clinical trial. *Neurorehabilitation and Neural Repair*, vol. 34 no. 5, pp. 441-448.

Liu, T., Liu, Y., & Zhang, M. (2020). Enhancing trunk control through task-specific training in patients with stroke. *Journal of Neurorehabilitation*, vol. 43 no. 1, pp. 45-50.

Liu, T., Wang, C., & Liu, Y. (2022). The role of trunk control in post-stroke rehabilitation: A critical review. *Journal of Stroke and Cerebrovascular Diseases*, vol. 31 no. 1, pp. 16-25.

Liu, Y., Wang, Y., & Li, L. (2021). The effectiveness of task-specific training on improving balance in post-stroke patients: A systematic review. *Frontiers in Neurology*, vol. 12, no. 66 pp. 7989.

Lo, A. C., Guarino, P. D., Richards, L. G., et al. (2021). Robot-assisted therapy for long-term upper-limb impairment after stroke. *The New England Journal of Medicine*, vol. 385 no. 5, pp. 463–474.

Luo, J., Zhou, J., & Li, Z. (2022). The impact of proprioceptive feedback combined with task-specific training on trunk control in stroke patients. *Journal of Neuroengineering and Rehabilitation*, vol. 19 no. 1, pp. 58.

Luo, Z., Xu, W., & Wu, Z. (2019). A personalized approach to task-specific training for stroke patients with severe trunk instability. *Journal of Stroke and Cerebrovascular Diseases*, vol. 28 no. 7, pp. 973-981.

Ma, S., Zhang, L., & Wei, X. (2020). Neuroplasticity and task-specific training for trunk balance in stroke rehabilitation. *Journal of Neuroengineering and Rehabilitation*, vol. 17 no. 1, pp. 90-101.

Ma, S., Zhang, L., & Wei, X. (2021). Robotic-assisted task-specific training for improving trunk stability in stroke survivors. *Journal of Neurorehabilitation*, vol. 38 no. 1, pp. 45-56.

Ma, S., Zhang, L., & Zhao, Y. (2020). The role of task-specific training in promoting trunk stability and postural control in stroke survivors. *Neurorehabilitation and Neural Repair*, vol. 34 no. 2, pp. 94-104.

Ma, Z., Liu, Z., & Zhang, W. (2020). Robotic-assisted rehabilitation in improving trunk balance in stroke patients: A review of recent advances. *Journal of Rehabilitation Research and Development*, vol. 57 no. 4, pp. 319-330.

Michaelsen, S. M., Dannenbaum, R., & Levin, M. F. (2006). Task-specific training with trunk restraint on arm recovery in stroke: randomized control trial. *Stroke*, vol. 37 no. 1, pp. 186-192.

Nguyen, T. T., Park, C. H., & Lee, J. H. (2020). The role of neuroplasticity in improving trunk control post-stroke: A comprehensive review. *Journal of Neurophysiology*, vol. 124 no. 2, pp. 274-283.

Noh, H., Lee, J., & Choi, J. (2021). The effectiveness of robotic-assisted task-specific training for post-stroke trunk control. *Journal of Neurorehabilitation and Neural Repair*, vol. 35 no. 4, pp. 405-416.

Page, S. J., & Schmid, A. A. (2014). Task-specific training for individuals with stroke: A review of current research. *Neurorehabilitation and Neural Repair*, vol. 28 no. 9, pp. 859-869.

Pang, M. Y. C., Ng, S. S. M., & Chung, R. C. K. (2020). Effects of task-specific training on balance and trunk stability in individuals with stroke: A systematic review. *Journal of Stroke and Cerebrovascular Diseases*, vol. 29 no. 1, pp. 45-52.

Park, J., Lee, W., & Choi, J. (2019). Task-specific training for enhancing trunk stability in patients with stroke: Evidence from recent trials. *Neurorehabilitation and Neural Repair*, vol. 33 no. 9, pp. 840-849.

Park, S. W., Cho, Y. J., & Choi, Y. S. (2020). The effects of task-specific training on trunk control in patients with stroke: A randomized controlled trial. *Neurorehabilitation and Neural Repair*, vol. 34 no. 2, pp. 163-171.

Raghavendra, S., Hegde, S., & Sharma, K. (2020). Task-specific training for improving balance and trunk control in post-stroke patients. *Stroke Research and Treatment*, vol. 20 no. 20, pp. 1-9.

Reyes, F., Reyes, R., & Gomez, G. (2020). Effect of task-specific training on trunk stability and functional outcomes in post-stroke patients: A systematic review. *Clinical Rehabilitation*, vol. 34 no. 9, pp. 1003-1011.

Salavati, M., Fathi, M., & Ghaffari, M. (2020). Task-specific training for improving balance in stroke rehabilitation. *Topics in Stroke Rehabilitation*, vol. 27 no. 1, pp. 22-29.

Salavati, M., Moghimi, S., & Ansari, N. (2020). Impact of trunk control on functional recovery after stroke: A systematic review. *Neurorehabilitation and Neural Repair*, vol. 34 no. 5, pp. 419-431.

Salbach, N.M., Mayo, N.E., Robichaud-Ekstrand, S., Hanley, J.A., Richards, C.L., & Wood-Dauphinee, S. (2005). Balance self-efficacy and its relevance to physical function and perceived health status after stroke. *Archives of Physical Medicine and Rehabilitation*, vol. 86 no. 12, pp. 2257-2263.

Shen, Y., Wang, S., & Zhang, Y. (2017). The relationship between trunk control and functional outcomes in stroke patients. *Journal of NeuroPhysical Therapy*, vol. 34 no. 3, pp. 182-190.

Sherrington, C., Fairhall, N., Kirkham, C., Clemson, L., Howard, K., Vogler, C., ... & Sonnabend, D. (2016). Exercise and fall prevention self-management to reduce mobility-related disability and falls after fall-related lower limb fracture in older people:

protocol for the RESTORE (Recovery Exercises and STepping On after Fracture) randomized controlled trial. *BMC Geriatrics*, vol. 16 no. 1, pp. 34.

Tang, L., Chen, Y., & Li, Z. (2022). Task-specific training for chronic stroke patients with trunk instability: A randomized controlled trial. *Clinical Rehabilitation*, vol. 36 no. 3, pp. 312-321.

Tang, X., Li, C., & Yang, Y. (2020). Effects of task-specific training on trunk control in stroke patients: A randomized controlled trial. *Neurorehabilitation and Neural Repair*, vol. 34 no. 3, pp. 224-232.

Timmermans, A. A., Spooren, A. I., Kingma, H., & Seelen, H. A. (2010). Influence of task-oriented training content on skilled arm-hand performance in stroke: a systematic review. *Neurorehabilitation and Neural Repair*, vol. 24 no. 9, pp. 858-870.

Tyson, S.F., & Hanley, M. (2006). Chill out: a review of cryotherapy. *Physical Therapy Reviews*, vol. 11, no. 2, pp. 125-135.

Ueda, T., Takeda, Y., & Okamoto, T. (2021). Relationship between trunk control and functional mobility in stroke survivors: A comprehensive review. *Stroke Research and Treatment*, 2021, Article ID 6798880.

Veldema, J. A., Kooijman, M. W., & Brocaar, E. (2020). Relationship between trunk control and functional mobility after stroke: A longitudinal study. *Archives of Physical Medicine and Rehabilitation*, vol. 101 no. 8, pp. 1412-1419.

Wang, Y., Zhang, X., & Tang, L. (2020). Task-specific training for improving trunk control and balance in stroke patients. *Clinical Rehabilitation*, vol. 34 no. 2, pp. 98-108.

Wang, Z., Zhang, Y., & Zhao, H. (2020). Enhancing trunk balance after stroke using task-specific training: A randomized controlled trial. *Clinical Rehabilitation*, vol. 34 no. 6, pp. 763-772.

Winstein, C. J., Stein, J., Arena, R., et al. (2016*). Guidelines for Adult Stroke Rehabilitation and Recovery. Stroke*, vol. 47 no. 6, pp. e98–e169.

Winstein, C. J., Wolf, S. L., Dromerick, A. W., Lane, C. J., Nelsen, M. A., Lewthwaite, R., ... &Azen, S. P. (2016). Effect of a task-oriented rehabilitation program on upperextremity recovery following motor stroke: the ICARE randomized clinical trial. *Jama*, vol. 315 no. 6, pp. 571-581.

Xue, M., Li, W., & Zhang, W. (2021). The impact of task-specific training on motivation and functional outcomes in stroke rehabilitation. *Journal of Neurorehabilitation and Neural Repair*, vol. 35 no. 3, pp. 301-312.

Yamada, M., Shimada, H., & Watanabe, T. (2021). Effect of task-specific training on trunk stability in chronic stroke patients: A randomized controlled trial. *Journal of Stroke and Cerebrovascular Diseases*, vol. 30 no. 6, pp. 2224-2232.

Zhang, H., Liu, Q., & Wu, X. (2019). A tailored approach to task-specific training for patients with severe trunk instability post-stroke. *Journal of Rehabilitation Research and Development*, vol. 56 no. 5, pp. 725-735.

Zhang, X., Li, W., & Tan, L. (2020). Role of task-specific training in improving balance and trunk stability in stroke rehabilitation: A clinical trial. *Journal of Neurorehabilitation*, vol. 38 no. 2, pp. 120-129.

Zhang, X., Wu, Q., & Yang, Y. (2021). Effects of task-specific training on trunk control and balance in stroke patients: A randomized controlled trial. *Journal of Rehabilitation Research and Development*, vol. 58 no. 2, pp. 137-145.

Zhao, L., Xu, W., & Guo, W. (2018). Repetitive task-specific practice and cortical reorganization in stroke patients. *Neurorehabilitation and Neural Repair*, vol. 32 no. 7, pp. 575-583.

Zhao, M., Li, P., & Liu, Z. (2020). Neuroplasticity and task-specific training for trunk balance in stroke rehabilitation. *Journal of Stroke and Cerebrovascular Diseases*, vol. 29 no. 4, pp. 105-115.

Zhao, P., Yang, L., & Liu, Y. (2021). Trunk control interventions in stroke rehabilitation: Task-specific training approaches. *Journal of Rehabilitation Research and Development*, vol. 58 no. 3, pp. 225-234.

# Appendix – A

## Institutional Review Board (IRB) Letter

SCMST-BPT/IRB/.....06-23/041.....

Date: 6th June, 2024
To
Kazi Asif Ahmed Masum
4th Year Student of B.Sc. in Physiotherapy
Session: 2018-2019, Reg No:10414
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

**Subject:** Approval of the thesis proposal **"Effectiveness of Task-specific Training on Trunk Balance in Patients with Stroke"** by ethics committee.

Dear Kazi Asif Ahmed Masum
Congratulations.
The Institutional Review Board (IRB) of SCMST has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the principal investigator. The following documents have been reviewed and approved:

| Sr. No. | Name of the Documents |
|---|---|
| 1 | Dissertation Proposal |
| 2 | Questionnaire (English version) |
| 3 | Information sheet & consent form. |

The purpose of the study is to find out the Effectiveness of Task-specific Training on Trunk Balance in Patients with Stroke which is supervised by Professor Md. Obaidul Haque, Vice Principle Department of Physiotherapy, BHPI, CRP, Savar, Dhaka. The study involves face-to-face interviews by using a semi-structured questionnaire to assess the Effectiveness of Task-specific Training on Trunk Balance in Patients with Stroke in the Neurology unit, CRP. It may take 20 to 30 minutes to fill in the questionnaire and there is no likelihood of any harm to the participants. The members of the Ethics Committee have approved the study to be conducted in the presented form at the meeting held at 09.00 AM on 28th September 2023 at SCMST.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring during the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to the Nuremberg Code 1947, the World Medical Association Declaration of Helsinki, 1964 - 2013, and other applicable regulations.

Best regards,
06.06.24.
Dr. Abul Kasem Mohammad Enamul Haque
Principal, SCMST &Chairman, Institutional Review Board (IRB)
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

## Appendix –B

## Application for Data Collection Permission

**Permission Latter**

Date: 11th August, 2024

Head of physiotherapy department

Centre for the Rehabilitation of the Paralyzed (CRP),

Savar, Dhaka-1343

**Subject:** Prayer for permission to collect data from the Neurology unit of CRP-Savar.

Sir,

With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at Saic College of Medical Science and Technology (SCMST). As part of our course curriculum, we have to conduct a research project to partially fulfill the requirement for the degree of B.Sc. in Physiotherapy. My research title is **"Effectiveness of task specific training on trunk balance in patients with stroke."** and the study aims to explore the Effectiveness of activity based Mirror therapy on the gait in patients with stroke. This is a experimental study under the supervision of Professor Md. Obaidul Haque, Vice Principal, BHPI, CRP, Savar, Dhaka. I have chosen the Neurology unit of CRP-Savar to collect data from Stroke patients who will come to CRP for physiotherapy treatment.

So, I pray and hope that you would be kind enough to permit data collection to help me complete my study.

Yours Faithfully

Kazi Asif Ahmed.

Kazi Asif Ahmed Masum

B.Sc. in Physiotherapy

Session: 2018-2019

Saic College of Medical Science and Technology (SCMST)

Mirpur-14, Dhaka-1216, Bangladesh

Approved

Kindly contact with, Farjana Sharmin Raman, as a coordinator of data collection process.

11/08/24

Prof. Dr. Mohammad Anwar Hossain, PhD
Professor, Physiotherapy Dept, BHPI
Senior Consultant & Head, Physiotherapy Dept,
CRP, Savar, Dhaka-1343

## Appendix – C

## Consent From Bangla and English

## অনুমতি পত্র

### অংশগ্রহনকারীকে পড়ার জন্য অনুরোধ করা হইল

আসসালামু আলাইকুম!

আমি কাজী আসিফ আহমেদ মাসুম, ঢাকা বিশ্ববিদ্যালয়ের চিকিৎসা অনুষদের অন্তর্ভূক্ত সাইক কলেজ অব মেডিকেল সায়েন্স এন্ড টেকনোলজির বি.এস.সি. ইন ফিজিওথেরাপীর ৪র্থ বর্ষের ২০১৮-১৯ সেশনের একজন শিক্ষার্থী। আমি একটি গবেষনা পরিচালনা করছি। আমার গবেষনার শিরোনাম "স্ট্রোকের রোগীদের মধ্যে ট্রাঙ্ক ব্যালেন্সের উপর টাস্ক-নির্দিষ্ট প্রশিক্ষণের কার্যকারিতা"। এই গবেষণার মাধ্যমে,আমি স্ট্রোক রোগীদের জন্য ট্রাঙ্ক ব্যালেন্সের উপর টাস্ক-নির্দিষ্ট প্রশিক্ষণের প্রভাব খুঁজে বের করতে চাই।

আমি আপনার সামাজিক জনতাত্ত্বিক_সংক্রান্ত, ভারসাম্য, এবং ট্রাঙ্ক বৈকল্য-সম্পর্কিত প্রশ্নগুলির বিষয়ে কিছু তথ্যের জন্য অনুরোধ করছি। দয়া করে মনে রাখবেন যে এই একাডেমিক গবেষণা প্রকল্পটি সম্পূর্ণ হতে প্রায় ২০-৩০ মিনিট সময় লাগবে। এই গবেষণায় অংশগ্রহণ করা আপনার বর্তমান বা ভবিষ্যতের চিকিৎসাকে কোনোভাবেই প্রভাবিত করবে না। এটি উল্লেখ করা গুরুত্বপূর্ণ যে সংগৃহীত তথ্য শুধুমাত্র একাডেমিক গবেষণার উদ্দেশ্যে ব্যবহার করা হবে, এবং আপনার দেওয়া সমস্ত তথ্য গোপন রাখা হবে। কোনো প্রতিবেদন বা প্রকাশনার ক্ষেত্রে, আমরা নিশ্চিত করব যে আপনার পরিচয় গোপন থাকবে।

এই অধ্যয়নে আপনার অংশগ্রহণ স্বেচ্ছায় এবং আপনি এই অধ্যয়ন চলাকালীন যেকোনো সময় কোনো নেতিবাচক পরিণতি ছাড়াই নিজেকে প্রত্যাহার করতে পারেন। সাক্ষাত্কারের সময় আপনি পছন্দ করেন না বা উত্তর দিতে চান না এমন একটি নির্দিষ্ট প্রশ্নের উত্তর না দেওয়ার অধিকারও আপনার রয়েছে।

অধ্যয়ন বা অংশগ্রহণকারী হিসাবে আপনার অধিকার সম্পর্কে আপনার কোন প্রশ্ন থাকলে, অনুগ্রহ করে নির্দ্বিধায় আমার এবং/অথবা আমার গবেষণা তত্ত্বাবধায়কের সাথে যোগাযোগ করতে পারেন। অধ্যাপক ডা. মো. ওবায়দুল হক, উপাধ্যক্ষ, বিএইচপিআই, সিআরপি, সাভার, ঢাকা- ১৩৪০।

আমি শুরু করার আগে আপনার কোন প্রশ্ন আছে?

| | |
|---|---|
| হ্যা | না |

ইন্টারভিউ নিয়ে এগিয়ে যাওয়ার জন্য আমি কি আপনার সম্মতি পেতে পারি?

| | |
|---|---|
| হ্যা | না |

অংশগ্রহণকারীর স্বাক্ষর _____ তারিখ.....

সাক্ষাত্কারকারীর স্বাক্ষর _____ তারিখ.....

ফিজিওথেরাপিস্টের স্বাক্ষর _____ তারিখ.....

**CONSENT STATEMENT (English)**

## Please Read It Carefully

Assalamualaikum!

I am Kazi Asif Ahmed Masum, a student of B.Sc. in physiotherapy, 4th year 2018-19 session, at Saic College of Medical Science & Technology, affiliated with the University of Dhaka under the faculty of Medicine. I am conducting a research program entitled "Effectiveness of Task-specific Training on Trunk balance in Patients with Stroke." In this study, I would like to find out the effect of task-specific training on trunk balance for stroke patients.

I would like to request some information regarding your sociodemographic, balance, and trunk impairment-related questions. Please note that this academic research project will take approximately 20-30 minutes to complete. Participating in this study will not affect your current or future treatment in any way. It is important to mention that the information collected will only be used for academic research purposes, and all your provided data will be kept confidential. In the case of any report or publication, we will ensure that your identity remains anonymous.

Your participation in this study is voluntary, and you may withdraw at any time during this study without any negative consequences. You also have the right not to answer a question you don't like or do not want to answer during the interview.

If you have any questions regarding the study or your rights as a participant, please feel free to contact the investigator Kazi Asif Ahmed Masum or the research supervisor Professor Dr. Md. Obaidul Haque, Vice Principal, BHPI, CRP, Savar, Dhaka.

Do you have any questions before I start?

| Yes | No |
|---|---|

So may I have your consent to proceed with the interview?

| Yes | No |
|---|---|

Signature of the Participant_____ Date……

Signature of the Interviewer _____ Date……

Signature of the Physiotherapist _____ Date……

# Appendix – D

## Questionnaire Bangla and English

### প্রশ্নপত্র (বাংলা)

**শিরোনাম: "স্ট্রোকের রোগীদের মধ্যে ট্রাঙ্ক ব্যালেন্সের উপর টাস্ক নির্দিষ্ট প্রশিক্ষণের কার্যকারিতা"**

**রোগীর তথ্যাবলি**

এই প্রশ্নপত্রটি ট্রাঙ্কের দুর্বলতার মাত্রা এবং স্ট্রোকের রোগীর স্থিতিশীল এবং গতিশীল ভারসাম্য মূল্যায়ন করার জন্য তৈরি করা হয়েছে এবং এই বিভাগটি একটি ফিজিওথেরাপিস্ট একটি কলম ব্যবহার করে পূরণ করবেন।

| | | |
|---|---|---|
| রোগীর আইডিঃ | | |
| মূল্যায়নের তারিখঃ | | |
| অংশগ্রহণকারীদের নামঃ | | |
| কোডঃ | | |
| ঠিকানাঃ | গ্রামঃ<br><br>উপজেলাঃ | পোষ্ট অফিসঃ<br><br>জেলাঃ |
| ফোন নাম্বারঃ | | |

**পার্ট-১ঃ সামাজিক-জনতাত্ত্বিক তথ্য**

**[সঠিক উত্তর চিহ্নিত করতে টিক(√) ব্যবহার করুন]**

| ইং | প্রশ্ন | উত্তর |
|---|---|---|
| ১.১ | বয়স | …….. বছর |
| ১.২ | লিঙ্গ | ০= পুরুষ<br>১= মহিলা |
| ১.৩ | বৈবাহিক অবস্থা | ০ = অবিবাহিত<br>১ = বিবাহিত |

| | | |
|---|---|---|
| ১.৪ | শিক্ষাগত যোগ্যতা | ০ = নিরক্ষর<br>১ = প্রাথমিক<br>২ = এসএসসি<br>৩ = এইচএসসি<br>৪ = স্নাতক<br>৫ = মাস্টার্স বা উচ্চতর |
| ১.৫ | পেশা (স্ট্রোকের আগে) | ০ = সার্ভিস হোল্ডার<br>১ = ব্যবসায়ী<br>২ = গৃহিণী<br>৩ = ছাত্র<br>৪ = শিক্ষক<br>৫ = শ্রমিক<br>৬ = কৃষক<br>৭= অন্যান্য..... |
| ১.৬ | বাসস্থানের ধরন | ০ = গ্রামীণ<br>১ = শহুরে |
| ১.৭ | পারিবারিক ধরন | ০ = একক পরিবার<br>১ = বর্ধিত পরিবার |
| ১.৮ | রাস্তার ধরণ | ০ = মাটির রাস্তা<br>১ = ইটের রাস্তা<br>২ = পিচের রাস্তা |

## পার্ট-২: নৃতাত্ত্বিক তথ্য

| নং | প্রশ্ন | উত্তর |
|---|---|---|
| ২.১ | উচ্চতা | ……... |
| ২.২ | ওজন | .....কেজি |

| | | |
|---|---|---|
| ২.৩ | বিএমআই | ..... |

## পার্ট-৩: স্ট্রোক সম্পর্কিত তথ্য

| ইং | প্রশ্ন | উত্তর |
|---|---|---|
| ৩.১ | স্ট্রোকের ঘটনার তারিখ | দিন / মাস /বছর..... |
| ৩.২ | আক্রান্ত পাশ | ০= বাম<br>১= ডান |
| ৩.৩ | স্ট্রোকের ধরন | ০= ইস্কেমিক<br>১= রক্তক্ষরণজনিত |
| ৩.৪ | স্ট্রোকের সময়কাল | ০= ৩ মাসের কম<br>১= ৩ মাসের বেশি<br>২= ৬ মাসের বেশি<br>৩= ১ বছরের বেশি<br>৪= ২ বছরের বেশি |
| ৩.৫ | আপনি কতটি ফিজিওথেরাপী চিকিৎসা পেয়েছেন? | ০ = ১-২ সেশন<br>১ = ৩-৪ সেশন<br>২ = ৫-৬ সেশন<br>৩ = ৭-৮ সেশন<br>৪ = > ৮ সেশন |
| ৩.৬ | ধুমপান অভ্যাস | ০= না<br>১= হ্যা |

## পার্ট-৪: সহ-অসুস্থতার তথ্য

| ইং | প্রশ্ন | উত্তর |
|---|---|---|
| ৪.১ | আপনার কি উচ্চ রক্তচাপ আছে? | ০ = না<br>১ = হ্যাঁ |
| ৪.২ | আপনার কি ডায়াবেটিস আছে? | ০ = না<br>১ = হ্যাঁ |
| ৪.৩ | আপনার কি জন্মগত হৃদরোগ আছে? | ০ = না<br>১ = হ্যাঁ |

## প্রি-টেষ্ট

## পার্ট-৫ঃ বার্গ-ব্যালেন্স স্কোর দ্বারা ভারসাম্যের মূল্যায়ন

এই প্রশ্নাবলী স্ট্রোক রোগীদের জন্য তাদের স্ট্যাটিক এবং গতিশীল ভারসাম্য মূল্যায়ন করার জন্য ডিজাইন করা হয়েছে। বার্গ ব্যালেন্স স্কেল হল একটি সাধারণভাবে ব্যবহৃত ক্লিনিকাল মূল্যায়ন যা একজন ব্যক্তির স্ট্যাটিক এবং গতিশীল ভারসাম্য বজায় রাখার ক্ষমতা মূল্যায়ন করে। এটি ক্যাথরিন বার্গের জন্য নামকরণ করা হয়েছে, এটির বিকাশে অবদানকারীদের একজন

১৪ টি আইটেমের এই স্কেল একটি পরিমাণগত ভারসাম্য মূল্যায়ন প্রদান করে। আইটেমগুলি ০ থেকে ৪ পর্যন্ত একটি স্কেলে মূল্যায়ন করা হয়, যেখানে ০ এর স্কোর কার্য সম্পাদনে অক্ষমতা নির্দেশ করে এবং ৪ এর স্কোর সহায়তা ছাড়াই কার্যকলাপের সফল সমাপ্তি নির্দেশ করে। সর্বাধিক ৫৬টি অর্জনযোগ্য পয়েন্টের উপর ভিত্তি করে একটি ক্রমবর্ধমান স্কোর গণনা করা হয়। ফিজিওথেরাপিস্ট একটি বলপয়েন্ট কলম ব্যবহার করে এই প্রশ্নাবলীর উপাদানটি সম্পূর্ণ করবেন যা হয় কালো বা নীল রঙের।

**[সঠিক উত্তর চিহ্নিত করতে টিক(√) ব্যবহার করুন]**

| ইং | কার্যকলাপ | স্কোর |
|---|---|---|
| ৫.১ | **বসা থেকে দাঁড়ানো** (আপনার হাতের সাহায্য ছাড়া চেষ্টা করুন)<br>৪= হাত ব্যবহার না করে দাড়াতে এবং নিজে নিজে ভারসাম্য রাখতে পারে।<br>৩= হাত ব্যবহার করে ভারসাম্য রাখতে পারা।<br>২= বেশ কয়েকবার চেষ্টা করে ভারসাম্য রাখতে পারা।<br>১= দাড়াতে বা স্থিতিশীল হতে নূন্যতম সহায়তা প্রয়োজন।<br>০= দাড়াতে মাঝারি বা সর্বাধিক সহায়তা প্রয়োজন। | |
| ৫.২ | **সাহায্য ছাড়া দাঁড়ানো** (২ মিনিট)<br>৪= ২ মিনিট নিরাপদে দাড়াতে সক্ষম।<br>৩= পর্যবেক্ষণ ও দেখাশুনার মাধ্যমে ২ মিনিট দাড়াতে সক্ষম।<br>২= ৩০ সেকেন্ড দাড়াতে সক্ষম।<br>১= বেশ কয়েকবার চেষ্টার পর ৩০ সেকেন্ড দাড়াতে সক্ষম।<br>০= ৩০ সেকেন্ড দাড়াতে অক্ষম। | |
| ৫.৩ | **সাহায্য ছাড়া বসা** (পিঠে সাহায্য ছাড়া এবং পা টুলের উপরে রেখে)<br>৪= ২ মিনিটের জন্য নিরাপদে বসতে সক্ষম। | |

| | | |
|---|---|---|
| | ৩= পর্যবেক্ষন ও দেখাশুনার মাধ্যমে ২ মিনিট বসতে সক্ষম।<br>২= ৩০ সেকেন্ড বসতে সক্ষম।<br>১= ১০ সেকেন্ড বসতে সক্ষম।<br>০= ১০ সেকেন্ড সাহায্য ছাড়া বসতে অক্ষম। | |
| ৫.৪ | **দাঁড়ানো থেকে বসা**<br>৪= হাতের কিছুটা সাহায্য নিয়ে বসতে পারে।<br>৩= হাতের সাহায্য নিয়ে নিচে পড়ে যাওয়া নিয়ন্ত্রন করতে পারে।<br>২= পায়ের পিছন দিক ব্যবহার করে নিচে পরে যাওয়া নিয়ন্ত্রন করতে পারে।<br>১= নিজে নিজে বসতে পারে কিন্তু নিচে পড়ে যাওয়া নিয়ন্ত্রন করতে পারে না।<br>০= বসতে সাহায্য লাগে। | |
| ৫.৫ | **স্থানান্তর** (স্থানান্তরের জন্য চেয়ার বা বিছানা ব্যবহার করুন)<br>৪= হাতের সামান্য ব্যবহার করে নিরাপদ স্থানে বসতে সক্ষম।<br>৩= হাতের যথাযথ ব্যবহার করে নিরাপদ স্থানে বসতে সক্ষম।<br>২= মৌখিক ইঙ্গিত দ্বারা স্থানান্তর করতে সক্ষম।<br>১= স্থানান্তরের জন্য একজন ব্যাক্তি প্রয়োজন।<br>০= নিরাপদে স্থানান্তরের জন্য দুইজন ব্যাক্তি প্রয়োজন | |
| ৫.৬ | **চোখ বন্ধ করে দাঁড়ানো** (১০ সেকেন্ড দাঁড়িয়ে থাকা)<br>৪= ১০ সেকেন্ড নিরাপদে দাড়াতে সক্ষম।<br>৩= পর্যবেক্ষন ও দেখাশুনার মাধ্যমে ১০ সেকেন্ড দাড়াতে সক্ষম।<br>২= ৩ সেকেন্ড দাড়াতে সক্ষম।<br>১= ৩ সেকেন্ড চোখ বন্ধ করে দাড়াতে অক্ষম কিন্তু নিরাপদে দাঁড়িয়ে থাকতে পারে।<br>০= পড়ে যাওয়া রোধ করতে সাহায্যের প্রয়োজন। | |
| ৫.৭ | **দুই পা একসাথে করে দাঁড়ানো** (আপনার পা একসাথে রেখে সাহায্য ছাড়া দাঁড়িয়ে থাকুন)<br>৪= নিজে নিজে পা রেখে নিরাপদে ১ মিনিট দাড়াতে সক্ষম।<br>৩= নিজে নিজে পা রেখে নিরাপদে ১ মিনিট দাড়াতে সক্ষম কিন্তু পর্যবেক্ষন প্রয়োজন।<br>২= অবস্থান ঠিক রাখতে পারে কিন্তু ৩০ সেকেন্ড এর বেশি বা একসাথে রাখতে অক্ষোম।<br>১= অবস্থান অর্জনের জন্য সাহায্যের প্রয়োজন কিন্তু একসাথে ১৫ সেকেন্ড দাঁড়াতে সক্ষম<br>০= অবস্থান ঠিক রাখতে সাহায্য প্রয়োজন কিন্তু ১৫ সেকেন্ড পা একসাথে রাখতে পর্যবেক্ষন প্রয়োজন। | |

| | | |
|---|---|---|
| ৫.৮ | **হাত দিয়ে দূরবর্তী জিনিস ধরা** (বাহু ৯০° উঠান এবং হাত সামনে বাড়িয়ে দিন)<br>৪= আত্মবিশ্বাসের সাথে ২৫ সেমি এগিয়ে যেতে পারে।<br>৩= ১২ সেমি এগিয়ে যেতে পারে।<br>২= ৫ সেমি এগিয়ে যেতে পারে।<br>১= সামনে পৌঁছাতে পারে কিন্তু পর্যবেক্ষনের প্রয়োজন।<br>০= সামনে এগিয়ে যাওয়ার সময় ভারসাম্য হারায়। | |
| ৫.৯ | **মেঝে থেকে জিনিস তোলা** (জুতা তুলে নিন যা আপনার পায়ের সামনে আছে)<br>৪= নিরাপদে ও সহজেই জুতা তুলে নিতে পারে।<br>৩= জুতা তুলতে সক্ষম কিন্তু পর্যবেক্ষণের প্রয়োজন।<br>২= তুলতে অক্ষম কিন্তু স্লিপার থেকে ২-৫ সেমি সামনে চলে যায় কিন্তু ভারসাম্য ধরে রাখতে পারে।<br>১= তুলতে অক্ষম কিন্তু ভারসাম্য রাখতে পর্যবেক্ষণ প্রয়োজন।<br>০= চেষ্টা করতে অক্ষম এবং ভারসাম্য হারায়। | |
| ৫.১০ | **পিছেন ঘুরে তাকানো** (বাম দিকে ঘুরে তাকান। ডান দিকে পুনরাবৃত্তি করুন)<br>৪= উভয়পাশ থেকে ভালোভাবে তাকাতে পারে এবং সমান ওজন বিনিময় করতে পারে।<br>৩= একপাশে তাকাতে পারে এবং একদিকে কম ওজন বিনিময় করতে পারে।<br>২= একপাশে তাকাতে পারে কিন্তু ভারসাম্য রাখতে পারে না।<br>১= ঘুরে যাবার সময় পর্যবেক্ষণ প্রয়োজন হয়।<br>০= ঘুরে যাবার সময় পড়ে যাওয়া রোধ করতে সাহায্যের প্রয়োজন হয়। | |
| ৫.১১ | **৩৬০° ডিগ্রী ঘুরে যাওয়া** (একটি পূর্ণ বৃত্ত ঘুরুন এবং বিপরীত দিক থেকে চেষ্টা করুন)<br>৪= ৪ সেকেন্ড বা তার কম সময়ে ৩৬০° ডিগ্রী ঘুরতে সক্ষম।<br>৩= ৪ সেকেন্ড বা তার কম সময়ে ৩৬০° ডিগ্রী নিরাপদে শুধুমাত্র একদিক থেকে ঘুরতে সক্ষম।<br>২= নিরাপদে ধীরে ধীওে ৩৬০° ডিগ্রী ঘুরতে সক্ষম।<br>১= মৌখিক ইঙ্গিত প্রয়োজন।<br>০= ঘুরার সময় সাহায্য প্রয়োজন। | |
| ৫.১২ | **টুলের ওপর বিপরীত পা রাখা** (দুই পা দিয়ে অন্তত চারবার চেষ্টা করুন)<br>৪= স্বাধীনভাবে এবং নিরাপদে দাড়াতে এবং ২০ সেকেন্ডের মধ্যে ৮ টি ধাপ সম্পন্ন করতে পারে।<br>৩= স্বাধীনভাবে এবং নিরাপদে দাড়াতে এবং ২০ সেকেন্ডের অধিক সময়ের মধ্যে ৮ টি ধাপ সম্পন্ন করতে পারে।<br>২= পর্যবেক্ষণ ছাড়াই ৪ টি ধাপ সম্পূর্ণ করতে পারে।<br>১= কিছুটা সাহায্য দ্বারা ২ টির কম পদক্ষেপ দিতে পারে।<br>০= পড়ে যাওয়া থেকে রক্ষা পেতে সাহায্য প্রয়োজন। | |

| | | |
|---|---|---|
| **৫.১৩** | **সামনে এক পা দিয়ে দাঁড়ানো**<br>৪= স্বাধীনভাবে একপা সামনে দিয়ে দাড়াতে পারে এবং বিপরীত পা দিয়ে সমান ভাবে পারে এবং ৩০<br>সেকেন্ড ধরে রাখতে পারে ।<br>৩= স্বাধীনভাবে একপা সামনে দিয়ে দাড়াতে পারে এবং বিপরীত পা দিয়ে সমান ভাবে পারে না এবং ৩০ সেকেন্ড ধরে রাখতে পারে ।<br>২= পদক্ষেপের জন্য সাহায্যের প্রয়োজন কিন্তু ৩০ সেকেন্ড ধরে রাখতে পারে।<br>১= পদক্ষেপের জন্য সাহায্যের প্রয়োজন কিন্তু ১৫ সেকেন্ড ধরে রাখতে পারে।<br>০= পদক্ষেপ বা দাড়ানোর সময় ভারসাম্য রাখতে পারে না। | |
| **৫.১৪** | **এক পায়ে দাঁড়ানো** (যতক্ষন আপনি পারেন এক পায়ে দাঁড়িয়ে থাকুন ধরে না রেখে)<br>৪= স্বাধীনভাবে পা তুলতে পারে এবং ১০ সেকেন্ড এর বেশি সময় ধরে রাখতে পারে।<br>৩= স্বাধীনভাবে পা তুলতে এবং ৫-১০ সেকেন্ড এর বেশি সময় ধরে রাখতে পারে।<br>২= স্বাধীনভাবে পা তুলতে পারে এবং ৩ সেকেন্ড বা এর কম সময় ধরে রাখতে পারে।<br>১= স্বাধীনভাবে পা তুলতে পারে এবং ৩ সেকেন্ড ধরে রাখতে পারে না কিন্তু স্বাধীনভাবে দাঁড়িয়ে থাকতে পারে।<br>০= পড়ে যাওয়া থেকে রক্ষা পেতে সাহায্য প্রয়োজন। | |

**মোট পরীক্ষা স্কোরঃ**

**তারিখঃ** ..... **পরীক্ষকের স্বাক্ষরঃ**.....

## ট্রাঙ্ক ইমপেয়ারমেন্ট স্কেল

### পার্ট-৬: স্ট্রোকে আক্রান্ত রোগীর জন্য ট্রাঙ্ক ইমপেয়ারমেন্ট স্কেলের মূল্যায়ন:

সমস্ত আইটেমের জন্য শুরু করার সময় রোগীর অবস্থানঃ শোজা হয়ে বসা, পায়ের পাতা সমতল, হাটু এবং কোমর ৯০ ভাজ, পিঠের পেছনের দিকে অবলম্বন ছাড়া, হাত কোলের ওপর বিশ্রাম। বিষয় প্রতিটি আইটেমের জন্য সেরা কর্মক্ষমতা স্কোর করা হয়। পর্যবেক্ষক পরীক্ষার মধ্যে নির্দেশনা মৌখিক এবং ইশারার মাধ্যমে দিতে পারবেন।

**[সঠিক উত্তর চিহ্নিত করতে টিক(√) ব্যবহার করুন]**

| আইটেম | কার্য বিবরণ | স্কোর বিবরণ | স্কোর |
|---|---|---|---|
| **স্ট্যাটিক/ স্থির বসার ভারসাম্য** | | | |
| ৬.১.১ | ১০ সেকেন্ডের জন্য শুরু অবস্থান রাখুন<br>পড়ে যাওয়ার অবস্থা অথবা হাতের সহায়তা প্রয়োজন<br>***(এই স্কোর ০ হলে, মোট টি আই এস স্কেল স্কোর ০ হবে)*** | পড়ে যাওয়ার অবস্থা অথবা হাতের সহায়তা প্রয়োজন | ০ |
| | | ১০ সেকেন্ডের জন্য অবস্থান বজায় রাখতে সক্ষম | ২ |
| ৬.১.২ | থেরাপিষ্টের সাহায্যে দুর্বলতম পায়ের উপর শক্তিশালী পা আড়াআড়ি উঠিয়ে ১০ সেকেন্ডের জন্য অবস্থান বজায় রাখবেন | পড়ে যাওয়ার অবস্থা অথবা হাতের সহায়তা প্রয়োজন | ০ |
| | | ১০ সেকেন্ডের জন্য অবস্থান বজায় রাখতে সক্ষম | ২ |
| ৬.১.৩ | রোগী নিজেই দুর্বলতম পায়ের উপর শক্তিশালী পা উঠিয়ে আড়াআড়ি করে ১০ সেকেন্ডের জন্য অবস্থান ধরে রাখবেন | পড়ে যাওয়ার অবস্থা | ০ |
| | | হাতের সহায়তা প্রয়োজন | ১ |
| | | শরীরের ১০ সেমি এর মত স্থানচ্যুতি অথবা হাতের সহায়তা প্রয়োগ | ২ |
| | | শরীর অথবা হাতের সহযোগিতা ব্যতীত নাড়তে সক্ষম | ৩ |
| **উপমোট** | | | /৭ |
| **ডায়নামিক / চলতি বসার ভারসাম্য** | | | |
| ৬.২.১ | ডান কনুই দিয়ে সীল স্পর্শ করুন, প্রারম্ভিক অবস্থানে ফিরে যান (কাজ অর্জিত বা না) ***(এই স্কোর ০ হলে,*** | সিট, ফলস বা ব্যবহারকারীদের হাত পর্যন্ত পৌঁছায় না | ০ |
| | | সাহায্য ছাড়া আসন স্পর্শ | ১ |

| | | | |
|---|---|---|---|
| | **৬.২.২+ ৬.২.৩ আইটেম *স্কোর ০ হবে)*** | | |
| **৬.২.২** | আইটেম ৬.২.১ পুনরাবৃত্তি করুন (মূল্যায়ন ট্রাঙ্ক নড়াচড়া) ***(এই স্কোর ০ হলে,* ৬.২.৩ আইটেম *স্কোর ০ হবে)*** | কোন উপযুক্ত ট্রাঙ্ক আন্দোলন নড়াচড়া | ০ |
| | | উপযুক্ত ট্রাঙ্ক নড়াচড়া (ডান দিক ছোট করা, বাম দিকে লম্বা করা) | ১ |
| **৬.২.৩** | আইটেম ৬.২.১ পুনরাবৃত্তি করুন (ক্ষতিপূরণ কৌশল ব্যবহৃত বা না) | ব্যবহৃত ক্ষতিপূরণ (বাহু, কোমর, হাঁটু, পা) | ০ |
| | | কোন ক্ষতিপূরণ কৌশল ব্যবহার করা হয় নি | ১ |
| **৬.২.৪** | বাম কনুই দিয়ে সিট স্পর্শ করুন, প্রারম্ভিক অবস্থানে ফিরে যান (কাজ অর্জিত বা না) ***(এই স্কোর ০ হলে,* ৬.২.৫+৬.২.৬ আইটেম *স্কোর ০ হবে)*** | সিটে পৌঁছায় না, পড়ে যায় বা হাত ব্যবহার করে না | ০ |
| | | সাহায্য ছাড়া আসন স্পর্শ | ১ |
| **৬.২.৫** | আইটেম ৬.২.৪ পুনরাবৃত্তি করুন (মূল্যায়ন ট্রাঙ্ক নড়াচড়া) ***(এই স্কোর ০ হলে,* ৬.২.৬ আইটেম *স্কোর ০ হবে)*** | কোন উপযুক্ত ট্রাঙ্ক আন্দোলন নড়াচড়া | ০ |
| | | উপযুক্ত ট্রাঙ্ক নড়াচড়া (বাম দিকে ছোট করা, ডান দিকে লম্বা করা) | ১ |
| **৬.২.৬** | আইটেম ৬.২.৪ পুনরাবৃত্তি করুন (ক্ষতিপূরণ কৌশল ব্যবহৃত বা না) | ব্যবহৃত ক্ষতিপূরণ (বাহু, কোমর, হাঁটু, পা) | ০ |
| | | কোন ক্ষতিপূরণ কৌশল ব্যবহার করা হয় নি | ১ |
| **৬.২.৭** | আসন থেকে পেলভিসের ডান দিকে তুলুন, শুরুতে ফিরে যান, অবস্থান (ট্রাঙ্কের গতিবিধি মূল্যায়ন করুন) ***(এই স্কোর ০ হলে,* ৬.২.৮ আইটেম *স্কোর ০ হবে)*** | কোন উপযুক্ত ট্রাঙ্ক নড়াচড়া | ০ |
| | | উপযুক্ত ট্রাঙ্ক নড়াচড়া (ডান দিক ছোট করা, বাম দিকে লম্বা করা) | ১ |
| **৬.২.৮** | আইটেম ৭ পুনরাবৃত্তি করুন (ক্ষতিপূরণ কৌশল ব্যবহৃত বা না) | ব্যবহৃত ক্ষতিপূরণ (বাহু, কোমর, হাঁটু, পা) | ০ |
| | | কোন ক্ষতিপূরণ কৌশল ব্যবহার করা হয় নি | ১ |
| **৬.২.৯** | আসন থেকে পেলভিসের বাম দিকে তুলুন, প্রারম্ভিক অবস্থানে ফিরে আসুন (ট্রাঙ্ক মূল্যায়ন করুন নড়াচড়া) ***(এই স্কোর ০ হলে,* ৬.২.১০ আইটেম *স্কোর ০ হবে)*** | কোন উপযুক্ত ট্রাঙ্ক নড়াচড়া | ০ |
| | | উপযুক্ত ট্রাঙ্ক নড়াচড়া (বাম ছোট করা পাশ, ডান দিকে লম্বা করা) | ১ |

| | | | |
|---|---|---|---|
| **৬.২.১০** | আইটেম ৬.২.৯ পুনরাবৃত্তি করুন<br>(ক্ষতিপূরণ কৌশল ব্যবহৃত বা না) | ব্যবহৃত ক্ষতিপূরণ (বাহু, কোমর, হাঁটু, পা) | ০ |
| | | কোন ক্ষতিপূরণ কৌশল ব্যবহার করা হয় নি | **১** |
| **উপমোট** | | | /১০ |
| **সমন্বয়** | | | |
| ৬.৩.১ | কাঁধের কোমরটি ৬ বার ঘোরান (প্রতিটি কাঁধ ৩ বার এগিয়ে নিয়ে যান) ***(এই স্কোর ০ হলে, ৬.৩.২ আইটেম স্কোর ০ হবে)*** | ডান দিকে ৩ বার নড়াচড়া করে না | ০ |
| | | অপ্রতিসম ঘূর্ণন | **১** |
| | | প্রতিসম ঘূর্ণন | ২ |
| ৬.৩.২ | আইটেম ৬.৩.১ পুনরাবৃত্তি করুন, ৬ সেকেন্ডের মধ্যে সম্পাদন করুন | অপ্রতিসম ঘূর্ণন | ০ |
| | | প্রতিসম ঘূর্ণন | **১** |
| ৬.৩.৩ | পেলভিস কোমর ৬ বার ঘোরান (প্রতিটি হাঁটুকে ৩ বার সামনে নিয়ে যান)<br>***(এই স্কোর ০ হলে, ৬.৩.৪ আইটেম স্কোর ০ হবে)*** | ডান দিকে ৩ বার নড়াচড়া করে না | ০ |
| | | অপ্রতিসম ঘূর্ণন | **১** |
| | | প্রতিসম ঘূর্ণন | ২ |
| ৬.৩.৪ | আইটেম ৬.৩.৩ পুনরাবৃত্তি করুন, ৬ সেকেন্ডের মধ্যে সম্পাদন করুন | অপ্রতিসম ঘূর্ণন | ০ |
| | | প্রতিসম ঘূর্ণন | **১** |
| **উপমোট** | | | /৬ |

**মোট ট্রাঙ্ক বৈকল্য স্কেল পরীক্ষা স্কোরঃ /২৩**

**তারিখঃ** ..... **পরীক্ষকের স্বাক্ষরঃ**.....

## পোষ্ট- টেষ্ট

## পার্ট-৫ঃ বার্গ-ব্যালেন্স স্কোর দ্বারা ভারসাম্যের মূল্যায়ন

এই প্রশ্নাবলী স্ট্রোক রোগীদের জন্য তাদের স্ট্যাটিক এবং গতিশীল ভারসাম্য মূল্যায়ন করার জন্য ডিজাইন করা হয়েছে। বার্গ ব্যালেন্স স্কেল হল একটি সাধারণভাবে ব্যবহৃত ক্লিনিকাল মূল্যায়ন যা একজন ব্যক্তির স্ট্যাটিক এবং গতিশীল ভারসাম্য বজায় রাখার ক্ষমতা মূল্যায়ন করে। এটি ক্যাথরিন বার্গের জন্য নামকরণ করা হয়েছে, এটির বিকাশে অবদানকারীদের একজন

১৪ টি আইটেমের এই স্কেল একটি পরিমাণগত ভারসাম্য মূল্যায়ন প্রদান করে। আইটেমগুলি ০ থেকে ৪ পর্যন্ত একটি স্কেলে মূল্যায়ন করা হয়, যেখানে ০ এর স্কোর কার্য সম্পাদনে অক্ষমতা নির্দেশ করে এবং ৪ এর স্কোর সহায়তা ছাড়াই কার্যকলাপের সফল সমাপ্তি নির্দেশ করে। সর্বাধিক ৫৬টি অর্জনযোগ্য পয়েন্টের উপর ভিত্তি করে একটি ক্রমবর্ধমান স্কোর গণনা করা হয়। ফিজিওথেরাপিস্ট একটি বলপয়েন্ট কলম ব্যবহার করে এই প্রশ্নাবলীর উপাদানটি সম্পূর্ণ করবেন যা হয় কালো বা নীল রঙের।

**[সঠিক উত্তর চিহ্নিত করতে টিক(√) ব্যবহার করুন]**

| ইং | কার্যকলাপ | স্কোর |
|---|---|---|
| ৫.১ | **বসা থেকে দাঁড়ানো** (আপনার হাতের সাহায্য ছাড়া চেষ্টা করুন)<br>৪= হাত ব্যবহার না করে দাড়াতে এবং নিজে নিজে ভারসাম্য রাখতে পারে।<br>৩= হাত ব্যবহার করে ভারসাম্য রাখতে পারা।<br>২= বেশ কয়েকবার চেষ্টা করে ভারসাম্য রাখতে পারা।<br>১= দাড়াতে বা স্থিতিশীল হতে নূন্যতম সহায়তা প্রয়োজন।<br>০= দাড়াতে মাঝারি বা সর্বাধিক সহায়তা প্রয়োজন। | |
| ৫.২ | **সাহায্য ছাড়া দাঁড়ানো** (২ মিনিট)<br>৪= ২ মিনিট নিরাপদে দাড়াতে সক্ষম।<br>৩= পর্যবেক্ষণ ও দেখাশুনার মাধ্যমে ২ মিনিট দাড়াতে সক্ষম।<br>২= ৩০ সেকেন্ড দাড়াতে সক্ষম।<br>১= বেশ কয়েকবার চেষ্টার পর ৩০ সেকেন্ড দাড়াতে সক্ষম।<br>০= ৩০ সেকেন্ড দাড়াতে অক্ষম। | |
| ৫.৩ | **সাহায্য ছাড়া বসা** (পিঠে সাহায্য ছাড়া এবং পা টুলের উপরে রেখে)<br>৪= ২ মিনিটের জন্য নিরাপদে বসতে সক্ষম। | |

| | | |
|---|---|---|
| | ৩= পর্যবেক্ষন ও দেখাশুনার মাধ্যমে ২ মিনিট বসতে সক্ষম।<br>২= ৩০ সেকেন্ড বসতে সক্ষম।<br>১= ১০ সেকেন্ড বসতে সক্ষম।<br>০= ১০ সেকেন্ড সাহায্য ছাড়া বসতে অক্ষম। | |
| ৫.৪ | **দাঁড়ানো থেকে বসা**<br>৪= হাতের কিছুটা সাহায্য নিয়ে বসতে পারে।<br>৩= হাতের সাহায্য নিয়ে নিচে পড়ে যাওয়া নিয়ন্ত্রন করতে পারে।<br>২= পায়ের পিছন দিক ব্যবহার করে নিচে পরে যাওয়া নিয়ন্ত্রন করতে পারে।<br>১= নিজে নিজে বসতে পারে কিন্তু নিচে পড়ে যাওয়া নিয়ন্ত্রন করতে পারে না।<br>০= বসতে সাহায্য লাগে। | |
| ৫.৫ | **স্থানান্তর** (স্থানান্তরের জন্য চেয়ার বা বিছানা ব্যবহার করুন)<br>৪= হাতের সামান্য ব্যবহার করে নিরাপদ স্থানে বসতে সক্ষম।<br>৩= হাতের যথাযথ ব্যবহার করে নিরাপদ স্থানে বসতে সক্ষম।<br>২= মৌখিক ইঙ্গিত দ্বারা স্থানান্তর করতে সক্ষম।<br>১= স্থানান্তরের জন্য একজন ব্যাক্তি প্রয়োজন।<br>০= নিরাপদে স্থানান্তরের জন্য দুইজন ব্যাক্তি প্রয়োজন | |
| ৫.৬ | **চোখ বন্ধ করে দাঁড়ানো** (১০ সেকেন্ড দাঁড়িয়ে থাকা)<br>৪= ১০ সেকেন্ড নিরাপদে দাড়াতে সক্ষম।<br>৩= পর্যবেক্ষন ও দেখাশুনার মাধ্যমে ১০ সেকেন্ড দাড়াতে সক্ষম।<br>২= ৩ সেকেন্ড দাড়াতে সক্ষম।<br>১= ৩ সেকেন্ড চোখ বন্ধ করে দাড়াতে অক্ষম কিন্তু নিরাপদে দাঁড়িয়ে থাকতে পারে।<br>০= পড়ে যাওয়া রোধ করতে সাহায্যের প্রয়োজন। | |
| ৫.৭ | **দুই পা একসাথে করে দাঁড়ানো** (আপনার পা একসাথে রেখে সাহায্য ছাড়া দাঁড়িয়ে থাকুন)<br>৪= নিজে নিজে পা রেখে নিরাপদে ১ মিনিট দাড়াতে সক্ষম।<br>৩= নিজে নিজে পা রেখে নিরাপদে ১ মিনিট দাড়াতে সক্ষম কিন্তু পর্যবেক্ষন প্রয়োজন।<br>২= অবস্থান ঠিক রাখতে পারে কিন্তু ৩০ সেকেন্ড এর বেশি বা একসাথে রাখতে অক্ষোম।<br>১= অবস্থান অর্জনের জন্য সাহায্যের প্রয়োজন কিন্তু একসাথে ১৫ সেকেন্ড দাঁড়াতে সক্ষম<br>০= অবস্থান ঠিক রাখতে সাহায্য প্রয়োজন কিন্তু ১৫ সেকেন্ড পা একসাথে রাখতে পর্যবেক্ষন প্রয়োজন। | |

| | | |
|---|---|---|
| ৫.৮ | **হাত দিয়ে দূরবর্তী জিনিস ধরা** (বাহু ৯০° উঠান এবং হাত সামনে বাড়িয়ে দিন)<br>৪= আত্মবিশ্বাসের সাথে ২৫ সেমি এগিয়ে যেতে পারে।<br>৩= ১২ সেমি এগিয়ে যেতে পারে।<br>২= ৫ সেমি এগিয়ে যেতে পারে।<br>১= সামনে পৌঁছাতে পারে কিন্তু পর্যবেক্ষনের প্রয়োজন।<br>০= সামনে এগিয়ে যাওয়ার সময় ভারসাম্য হারায়। | |
| ৫.৯ | **মেঝে থেকে জিনিস তোলা** (জুতা তুলে নিন যা আপনার পায়ের সামনে আছে)<br>৪= নিরাপদে ও সহজেই জুতা তুলে নিতে পারে।<br>৩= জুতা তুলতে সক্ষম কিন্তু পর্যবেক্ষণের প্রয়োজন।<br>২= তুলতে অক্ষম কিন্তু স্লিপার থেকে ২-৫ সেমি সামনে চলে যায় কিন্তু ভারসাম্য ধরে রাখতে পারে।<br>১= তুলতে অক্ষম কিন্তু ভারসাম্য রাখতে পর্যবেক্ষণ প্রয়োজন।<br>০= চেষ্টা করতে অক্ষম এবং ভারসাম্য হারায়। | |
| ৫.১০ | **পিছেন ঘুরে তাকানো** (বাম দিকে ঘুরে তাকান। ডান দিকে পুনরাবৃত্তি করুন)<br>৪= উভয়পাশ থেকে ভালোভাবে তাকাতে পারে এবং সমান ওজন বিনিময় করতে পারে।<br>৩= একপাশে তাকাতে পারে এবং একদিকে কম ওজন বিনিময় করতে পারে।<br>২= একপাশে তাকাতে পারে কিন্তু ভারসাম্য রাখতে পারে না।<br>১= ঘুরে যাবার সময় পর্যবেক্ষণ প্রয়োজন হয়।<br>০= ঘুরে যাবার সময় পড়ে যাওয়া রোধ করতে সাহায্যের প্রয়োজন হয়। | |
| ৫.১১ | **৩৬০° ডিগ্রী ঘুরে যাওয়া** (একটি পূর্ণ বৃত্ত ঘুরুন এবং বিপরীত দিক থেকে চেষ্টা করুন)<br>৪= ৪ সেকেন্ড বা তার কম সময়ে ৩৬০° ডিগ্রী ঘুরতে সক্ষম।<br>৩= ৪ সেকেন্ড বা তার কম সময়ে ৩৬০° ডিগ্রী নিরাপদে শুধুমাত্র একদিক থেকে ঘুরতে সক্ষম।<br>২= নিরাপদে ধীরে ধীওে ৩৬০° ডিগ্রী ঘুরতে সক্ষম।<br>১= মৌখিক ইঙ্গিত প্রয়োজন।<br>০= ঘুরার সময় সাহায্য প্রয়োজন। | |
| ৫.১২ | **টুলের ওপর বিপরীত পা রাখা** (দুই পা দিয়ে অন্তত চারবার চেষ্টা করুন)<br>৪= স্বাধীনভাবে এবং নিরাপদে দাড়াতে এবং ২০ সেকেন্ডের মধ্যে ৮ টি ধাপ সম্পন্ন করতে পারে।<br>৩= স্বাধীনভাবে এবং নিরাপদে দাড়াতে এবং ২০ সেকেন্ডের অধিক সময়ের মধ্যে ৮ টি ধাপ সম্পন্ন করতে পারে।<br>২= পর্যবেক্ষণ ছাড়াই ৪ টি ধাপ সম্পূর্ণ করতে পারে।<br>১= কিছুটা সাহায্য দ্বারা ২ টির কম পদক্ষেপ দিতে পারে।<br>০= পড়ে যাওয়া থেকে রক্ষা পেতে সাহায্য প্রয়োজন। | |

| | | |
|---|---|---|
| **৫.১৩** | **সামনে এক পা দিয়ে দাঁড়ানো**<br>৪= স্বাধীনভাবে একপা সামনে দিয়ে দাড়াতে পারে এবং বিপরীত পা দিয়ে সমান ভাবে পারে এবং ৩০<br>সেকেন্ড ধরে রাখতে পারে ।<br>৩= স্বাধীনভাবে একপা সামনে দিয়ে দাড়াতে পারে এবং বিপরীত পা দিয়ে সমান ভাবে পারে না এবং ৩০ সেকেন্ড ধরে রাখতে পারে ।<br>২= পদক্ষেপের জন্য সাহায্যের প্রয়োজন কিন্তু ৩০ সেকেন্ড ধরে রাখতে পারে।<br>১= পদক্ষেপের জন্য সাহায্যের প্রয়োজন কিন্তু ১৫ সেকেন্ড ধরে রাখতে পারে।<br>০= পদক্ষেপ বা দাড়ানোর সময় ভারসাম্য রাখতে পারে না। | |
| **৫.১৪** | **এক পায়ে দাঁড়ানো** (যতক্ষন আপনি পারেন এক পায়ে দাঁড়িয়ে থাকুন ধরে না রেখে)<br>৪= স্বাধীনভাবে পা তুলতে পারে এবং ১০ সেকেন্ড এর বেশি সময় ধরে রাখতে পারে।<br>৩= স্বাধীনভাবে পা তুলতে এবং ৫-১০ সেকেন্ড এর বেশি সময় ধরে রাখতে পারে।<br>২= স্বাধীনভাবে পা তুলতে পারে এবং ৩ সেকেন্ড বা এর কম সময় ধরে রাখতে পারে।<br>১= স্বাধীনভাবে পা তুলতে পারে এবং ৩ সেকেন্ড ধরে রাখতে পারে না কিন্তু স্বাধীনভাবে দাঁড়িয়ে থাকতে পারে।<br>০= পড়ে যাওয়া থেকে রক্ষা পেতে সাহায্য প্রয়োজন। | |

**মোট পরীক্ষা স্কোরঃ**

**তারিখঃ** ..... **পরীক্ষকের স্বাক্ষরঃ**.....

## ট্রাঙ্ক ইমপেয়ারমেন্ট স্কেল

### পার্ট-৬: স্ট্রোকে আক্রান্ত রোগীর জন্য ট্রাঙ্ক ইমপেয়ারমেন্ট স্কেলের মূল্যায়ন:

সমস্ত আইটেমের জন্য শুরু করার সময় রোগীর অবস্থানঃ শোজা হয়ে বসা, পায়ের পাতা সমতল, হাটু এবং কোমর ৯০ ভাজ, পিঠের পেছনের দিকে অবলম্বন ছাড়া, হাত কোলের ওপর বিশ্রাম। বিষয় প্রতিটি আইটেমের জন্য সেরা কর্মক্ষমতা স্কোর করা হয়। পর্যবেক্ষক পরীক্ষার মধ্যে নির্দেশনা মৌখিক এবং ইশারার মাধ্যমে দিতে পারবেন।

**[সঠিক উত্তর চিহ্নিত করতে টিক(√) ব্যবহার করুন]**

| আইটেম | কার্য বিবরণ | স্কোর বিবরণ | স্কোর |
|---|---|---|---|
| **স্ট্যাটিক/ স্থির বসার ভারসাম্য** | | | |
| ৬.১.১ | ১০ সেকেন্ডের জন্য শুরু অবস্থান রাখুন<br>পড়ে যাওয়ার অবস্থা অথবা হাতের সহায়তা প্রয়োজন<br>***(এই স্কোর ০ হলে, মোট টি আই এস স্কেল স্কোর ০ হবে)*** | পড়ে যাওয়ার অবস্থা অথবা হাতের সহায়তা প্রয়োজন | ০ |
| | | ১০ সেকেন্ডের জন্য অবস্থান বজায় রাখতে সক্ষম | ২ |
| ৬.১.২ | থেরাপিষ্টের সাহায্যে দুর্বলতম পায়ের উপর শক্তিশালী পা আড়াআড়ি উঠিয়ে ১০ সেকেন্ডের জন্য অবস্থান বজায় রাখবেন | পড়ে যাওয়ার অবস্থা অথবা হাতের সহায়তা প্রয়োজন | ০ |
| | | ১০ সেকেন্ডের জন্য অবস্থান বজায় রাখতে সক্ষম | ২ |
| ৬.১.৩ | রোগী নিজেই দুর্বলতম পায়ের উপর শক্তিশালী পা উঠিয়ে আড়াআড়ি করে ১০ সেকেন্ডের জন্য অবস্থান ধরে রাখবেন | পড়ে যাওয়ার অবস্থা | ০ |
| | | হাতের সহায়তা প্রয়োজন | ১ |
| | | শরীরের ১০ সেমি এর মত স্থানচ্যুতি অথবা হাতের সহায়তা প্রয়োগ | ২ |
| | | শরীর অথবা হাতের সহযোগিতা ব্যতীত নাড়তে সক্ষম | ৩ |
| **উপমোট** | | | /৭ |
| **ডায়নামিক / চলতি বসার ভারসাম্য** | | | |
| ৬.২.১ | ডান কনুই দিয়ে সীল স্পর্শ করুন, প্রারম্ভিক অবস্থানে ফিরে যান (কাজ অর্জিত বা না) ***(এই স্কোর ০ হলে,*** | সিট, ফলস বা ব্যবহারকারীদের হাত পর্যন্ত পৌঁছায় না | ০ |
| | | সাহায্য ছাড়া আসন স্পর্শ | ১ |

| | | | |
|---|---|---|---|
| | **৬.২.২+ ৬.২.৩ আইটেম *স্কোর ০ হবে)*** | | |
| **৬.২.২** | আইটেম ৬.২.১ পুনরাবৃত্তি করুন (মূল্যায়ন ট্রাঙ্ক নড়াচড়া) ***(এই স্কোর ০ হলে,* ৬.২.৩ আইটেম *স্কোর ০ হবে)*** | কোন উপযুক্ত ট্রাঙ্ক আন্দোলন নড়াচড়া | ০ |
| | | উপযুক্ত ট্রাঙ্ক নড়াচড়া (ডান দিক ছোট করা, বাম দিকে লম্বা করা) | ১ |
| **৬.২.৩** | আইটেম ৬.২.১ পুনরাবৃত্তি করুন (ক্ষতিপূরণ কৌশল ব্যবহৃত বা না) | ব্যবহৃত ক্ষতিপূরণ (বাহু, কোমর, হাঁটু, পা) | ০ |
| | | কোন ক্ষতিপূরণ কৌশল ব্যবহার করা হয় নি | ১ |
| **৬.২.৪** | বাম কনুই দিয়ে সিট স্পর্শ করুন, প্রারম্ভিক অবস্থানে ফিরে যান (কাজ অর্জিত বা না) ***(এই স্কোর ০ হলে,* ৬.২.৫+৬.২.৬ আইটেম *স্কোর ০ হবে)*** | সিটে পৌঁছায় না, পড়ে যায় বা হাত ব্যবহার করে না | ০ |
| | | সাহায্য ছাড়া আসন স্পর্শ | ১ |
| **৬.২.৫** | আইটেম ৬.২.৪ পুনরাবৃত্তি করুন (মূল্যায়ন ট্রাঙ্ক নড়াচড়া) ***(এই স্কোর ০ হলে,* ৬.২.৬ আইটেম *স্কোর ০ হবে)*** | কোন উপযুক্ত ট্রাঙ্ক আন্দোলন নড়াচড়া | ০ |
| | | উপযুক্ত ট্রাঙ্ক নড়াচড়া (বাম দিকে ছোট করা, ডান দিকে লম্বা করা) | ১ |
| **৬.২.৬** | আইটেম ৬.২.৪ পুনরাবৃত্তি করুন (ক্ষতিপূরণ কৌশল ব্যবহৃত বা না) | ব্যবহৃত ক্ষতিপূরণ (বাহু, কোমর, হাঁটু, পা) | ০ |
| | | কোন ক্ষতিপূরণ কৌশল ব্যবহার করা হয় নি | ১ |
| **৬.২.৭** | আসন থেকে পেলভিসের ডান দিকে তুলুন, শুরুতে ফিরে যান, অবস্থান (ট্রাঙ্কের গতিবিধি মূল্যায়ন করুন) ***(এই স্কোর ০ হলে,* ৬.২.৮ আইটেম *স্কোর ০ হবে)*** | কোন উপযুক্ত ট্রাঙ্ক নড়াচড়া | ০ |
| | | উপযুক্ত ট্রাঙ্ক নড়াচড়া (ডান দিক ছোট করা, বাম দিকে লম্বা করা) | ১ |
| **৬.২.৮** | আইটেম ৭ পুনরাবৃত্তি করুন (ক্ষতিপূরণ কৌশল ব্যবহৃত বা না) | ব্যবহৃত ক্ষতিপূরণ (বাহু, কোমর, হাঁটু, পা) | ০ |
| | | কোন ক্ষতিপূরণ কৌশল ব্যবহার করা হয় নি | ১ |
| **৬.২.৯** | আসন থেকে পেলভিসের বাম দিকে তুলুন, প্রারম্ভিক অবস্থানে ফিরে আসুন (ট্রাঙ্ক মূল্যায়ন করুন নড়াচড়া) ***(এই স্কোর ০ হলে,* ৬.২.১০ আইটেম *স্কোর ০ হবে)*** | কোন উপযুক্ত ট্রাঙ্ক নড়াচড়া | ০ |
| | | উপযুক্ত ট্রাঙ্ক নড়াচড়া (বাম ছোট করা পাশ, ডান দিকে লম্বা করা) | ১ |

| | | | |
|---|---|---|---|
| **৬.২.১০** | আইটেম ৬.২.৯ পুনরাবৃত্তি করুন<br>(ক্ষতিপূরণ কৌশল ব্যবহৃত বা না) | ব্যবহৃত ক্ষতিপূরণ (বাহু, কোমর, হাঁটু, পা) | ০ |
| | | কোন ক্ষতিপূরণ কৌশল ব্যবহার করা হয় নি | **১** |
| **উপমোট** | | | /১০ |
| **সমন্বয়** | | | |
| ৬.৩.১ | কাঁধের কোমরটি ৬ বার ঘোরান (প্রতিটি কাঁধ ৩ বার এগিয়ে নিয়ে যান) ***(এই স্কোর ০ হলে, ৬.৩.২ আইটেম স্কোর ০ হবে)*** | ডান দিকে ৩ বার নড়াচড়া করে না | ০ |
| | | অপ্রতিসম ঘূর্ণন | **১** |
| | | প্রতিসম ঘূর্ণন | ২ |
| ৬.৩.২ | আইটেম ৬.৩.১ পুনরাবৃত্তি করুন, ৬ সেকেন্ডের মধ্যে সম্পাদন করুন | অপ্রতিসম ঘূর্ণন | ০ |
| | | প্রতিসম ঘূর্ণন | **১** |
| ৬.৩.৩ | পেলভিস কোমর ৬ বার ঘোরান (প্রতিটি হাঁটুকে ৩ বার সামনে নিয়ে যান)<br>***(এই স্কোর ০ হলে, ৬.৩.৪ আইটেম স্কোর ০ হবে)*** | ডান দিকে ৩ বার নড়াচড়া করে না | ০ |
| | | অপ্রতিসম ঘূর্ণন | **১** |
| | | প্রতিসম ঘূর্ণন | ২ |
| ৬.৩.৪ | আইটেম ৬.৩.৩ পুনরাবৃত্তি করুন, ৬ সেকেন্ডের মধ্যে সম্পাদন করুন | অপ্রতিসম ঘূর্ণন | ০ |
| | | প্রতিসম ঘূর্ণন | **১** |
| **উপমোট** | | | /৬ |

**মোট ট্রাঙ্ক বৈকল্য স্কেল পরীক্ষা স্কোরঃ /২৩**

**তারিখঃ** ..... **পরীক্ষকের স্বাক্ষরঃ**.....

# Questionnaire (English)

**Title: "Effectiveness of Task-Specific Training On Trunk Balance in Patients With Stroke"**

**Patient Information**

This questionnaire is developed to assess the level of trunk impairment and a physiotherapist using a pen will fill static and dynamic balance of the patient with stroke and this section.

| | | |
|---|---|---|
| **Patient ID:** | | |
| **Date of test:** | | |
| **Name of participants:** | | |
| **Code:** | | |
| **Address:** | **Village:** | **Post-Office:** |
| | **Upazila:** | **District:** |
| **Phone:** | | |

## PART-1: Socio-Demographic Information

**[Please give a tick (√) mark at the left side box of the best correct answer]**

| Question No | Questions/ Information on | Response of the participant |
|---|---|---|
| **1.1** | Age | ……Year |
| **1.2** | Gender | 0= Male<br>1= Female |
| **1.3** | Marital status | 0 = Unmarried<br>1 = Married |

| | | |
|---|---|---|
| **1.4** | Educational Qualification | 0 = Illiterate<br>1 = Primary<br>2 = SSC<br>3 = HSC<br>4 = Graduation<br>5 = Masters or higher |
| **1.5** | Occupation (Before Stroke) | 0 = Service holder<br>1 = Businessman<br>2 = Housewife<br>3 = Student<br>4 = Teacher<br>5 = Labor<br>6 = Farmer<br>7= Other..... |
| **1.6** | Living area | 0 = Rural<br>1 = Urban |
| **1.7** | Family type | 0 = Nuclear family<br>1 = Extended family |
| **1.8** | Access Road | 0 = Mud<br>1 = Brick<br>3 = Pitch |

## PART-2: Anthropometric Information

**[Tick √ the point, which is able to perform patient]**

| **Question No** | **Questions** | **Response of the participants** |
|---|---|---|
| **2.1** | Height | …….... |

| | | |
|---|---|---|
| **2.2** | Weight | ……... |
| **2.3** | BMI | …… |

## Part-3: Stroke Related Information

**[Tick √ the point, which is able to perform patient]**

| Questions No | Question | Response of Participants |
|---|---|---|
| 3.1 | Date of incidence | DD/MM/YEAR ……. |
| 3.2 | Affected side | 0 = Right<br>1 = Left |
| 3.3 | Type of stroke | 0 = Ischemic<br>1 = Hemorrhagic |
| 3.4 | Duration of stroke | 0 = < than 3 month<br>1 = > than 3 month<br>2 = > than 6 month<br>3 = > than 1 year<br>4 = > than 2 year |
| 3.5 | How many sessions of physiotherapy treatment have you received? | 0 = 1-2 session<br>1 = 3-4 session<br>2 = 5-6 session<br>3 = 7-8 session<br>4 = > 8 session |
| 3.6 | Smoking / Tobacco Habit | 0 = No<br>1 = Yes |

## Part-4: Comorbidity Information

**[Tick √ the point, which is able to perform patient]**

| Question No | Questions | Response of the participants |
|---|---|---|
| 4.1 | Do you have Hypertension? | 0 = No<br>1 = Yes |
| 4.2 | Do you have Diabetes mellitus? | 0 = No<br>1 = Yes |
| 4.3 | Do you have congenital heart disease? | 0 = No<br>1 = Yes |

## Pre-Test

## Part 5: Assessment of balance by Burg Balance Scale(BBS)

**[Tick √ the point, which is able to perform patient]**

| No. | INSTRUCTIONS | Score |
|---|---|---|
| 5.1 | **STANDING FROM SITTING** (Try not to use your hand for support)<br>4= Able to stand without using hands and stabilize independently<br>3= Able to stand independently using hands<br>2= Able to stand using hands after several tries<br>1= Needs minimal aid to stand or stabilize<br>0= Needs moderate or maximal assistance to stand | |
| 5.2 | **STANDING UNSUPPORTED**<br>Please stand for two minutes without holding on<br>4= Able to stand safely for 2 minutes<br>3= Able to stand for 2 minutes with supervision<br>2= Able to stand 30 seconds unsupported<br>1= Needs several tries to stand 30 seconds unsupported<br>0= Unable to stand 30 seconds unsupported<br>If a subject is able to stand 2 minutes unsupported, score full points for sitting unsupported.<br>Proceed to item #4. | |
| 5.3 | **SITTING WITH BACK UNSUPPORTED** (Feet Supported On the Floor Or On A Stool)<br>4= Able to sit safely and securely for 2 minutes<br>3= Able to sit for 2 minutes under supervision<br>2= Able to able to sit for 30 seconds<br>1= Able to sit for 10 seconds<br>0= Unable to sit without support 10 seconds | |
| 5.4 | **STANDING TO SITTING**<br>4= Sits safely with minimal use of hands | |

| | | |
|---|---|---|
| | 3= Controls descent by using hands<br>2= Uses the back of legs against the chair to control the descent<br>1= Sits independently but has uncontrolled descent<br>0= Needs assist to sit | |
| **5.5** | **TRANSFERS**<br>Arrange a chair for pivot transfer. Ask the subject to transfer one way toward a seat with armrests and one way toward a seat without armrests. You may use a bed and a chair.<br>4= Able to transfer safely with minor use of hands<br>3= Able to transfer safely definite need of hands<br>2= Able to transfer with verbal cueing and/or supervision<br>1= Needs one person to assist<br>0= Needs two people to assist or supervise to be safe | |
| **5.6** | **STANDING UNSUPPORTED WITH EYES CLOSED (Please close your eyes and stand still for 10 seconds.)**<br>4= Able to stand for 10 seconds safely<br>3= Able to stand for 10 seconds with supervision<br>2= Able to stand 3 seconds<br>1= Unable to keep eyes closed for 3 seconds but stays safely<br>0= Needs help to keep from falling | |
| **5.7** | **STANDING UNSUPPORTED WITH FEET TOGETHER**<br>(Place your feet together and stand without holding on.)<br>4= Able to place feet together independently and stand 1 minute safely<br>3= Able to place feet together independently and stand 1 minute with supervision<br>2= Able to place feet together independently but unable to hold for 30 seconds<br>1= Needs help to attain position but able to stand 15 seconds | |

| | | |
|---|---|---|
| | feet together<br>0= Needs help to attain position and unable to hold for 15 seconds | |
| **5.8** | **REACHING FORWARD WITH OUTSTRETCHED ARM WHILE STANDING INSTRUCTIONS**<br>Lift arm to 90 degrees. Stretch out your fingers and reach forward as far as you can. (Ask the subject to use both arms when reaching to avoid rotation of the trunk.)<br>4= Can reach forward confidently 25 cm (10 inches)<br>3= Can reach forward 12 cm (5 inches)<br>2= Can reach forward 5 cm (2 inches)<br>1= Reaches forward but needs supervision<br>0= Loses balance while trying/requires external support | |
| **5.9** | **PICK UP OBJECT FROM THE FLOOR FROM A STANDING POSITION**<br>Pick up the shoe/slipper, which is placed in front of your feet.<br>4= Able to pick up slippers safely and easily<br>3= Able to pick up slipper but needs supervision<br>2= Unable to pick up but reaches 2-5 cm from slipper and keeps balance independently<br>1= Unable to pick up and needs supervision while trying<br>0= Unable to try/needs assistance to keep from losing balance or falling | |
| **5.10** | **TURNING TO LOOK BEHIND OVER LEFT AND RIGHT SHOULDERS WHILE STANDING**<br>Turn to look directly behind you over toward the left shoulder. Repeat to the right. The examiner may pick an object to look at directly behind the subject to encourage a better twist turn.<br>4= Looks behind from both sides and weight shifts well<br>3= Looks behind one side only the other side shows less weight | |

| | | |
|---|---|---|
| | shift<br>2= Turns sideways only but maintains balance<br>1= Needs supervision when turning<br>0= Needs assistance to keep from losing balance or falling | |
| **5.11** | **TURN 360 DEGREES**<br>Turn completely around in a full circle. Pause. Then turn a full circle in the other direction.<br>4= Able to turn 360 degrees safely in 4 seconds or less<br>3= Able to turn 360 degrees safely on one side in only 4 seconds or less<br>2= Able to turn 360 degrees safely but slowly<br>1= Needs close supervision or verbal cueing<br>0= Needs assistance while turning | |
| **5.12** | **PLACE ALTERNATE FOOT ON THE STEP OR STOOL WHILE STANDING UNSUPPORTED**<br>Place each foot alternately on the step/stool. Continue until each foot has touched the step/stool four times<br>4= Able to stand independently and safely and complete 8 steps in 20 seconds<br>3= Able to stand independently and complete 8 steps in > 20 seconds<br>2= Able to complete 4 steps without aid with supervision<br>1= Able to complete > 2 steps need minimal assist<br>0= Needs assistance to keep from falling/unable to try | |
| **5.13** | **STANDING UNSUPPORTED ONE FOOT IN FRONT**<br>Place one foot directly in front of the other. If you feel that you cannot place your foot directly in front, try to step far enough ahead that the heel of your forward foot is ahead of the toes of the other foot. (To score 3 points, the length of the step should exceed the length of the other foot and the width of the stance should approximate the subject's normal stride width.)<br>4= Able to place foot tandem independently and hold for 30 | |

| | | |
|---|---|---|
| | seconds<br>3= Able to place foot ahead independently and hold for 30 seconds<br>2= Able to take small steps independently and hold for 30 seconds<br>1= Needs help to step but can hold for 15 seconds<br>0= Loses balance while stepping or standing | |
| **5.14** | **STANDING ON ONE LEG**<br>Stand on one leg as long as you can without holding on.<br>4= Able to lift leg independently and hold > 10 seconds<br>3= Able to lift leg independently and hold for 5-10 seconds<br>2= Able to lift leg independently and hold ≥ 3 seconds<br>1= Tries to lift leg unable to hold 3 seconds but remains standing independently<br>0= Unable to try or needs assistance to prevent fall | |

**Total Score:**

Date: ..... Signature of Examiner.....

## Part-6: Assessment of the Trunk Using Trunk Impairment Scale

**[Tick √ the point, which is able to perform patient]**

| Item | Task description | Score Description | test Score |
|---|---|---|---|
| **Static Sitting Balance** | | | |
| **6.1.1** | Keep staring position for 10s *(if 0, total TIS scale is 0)* | Falls or needs arm support | 0 |
| | | Maintains position for 10s | 2 |
| **6.1.2** | The therapist crosses the strongest leg over the weakest leg and keeps position for 10 s | Falls or needs arm support | 0 |
| | | Maintains positions for 10 s | 2 |
| **6.1.3** | The patient crosses the strongest leg over the weakest leg | Falls | 0 |
| | | Needs arm support | 1 |
| | | Displaces trunk 10 cm or assists with arm | 2 |
| | | Moves without trunk or arm compensation | 3 |
| **Sub Total** | | | /7 |
| **Dynamic Sitting Balance** | | | |
| **6.2.1** | Touch seal with right elbow, return to starting position (task achieved or not) *(If 0, items 6.2.2+6.2.3 are also 0)* | Does not reach seat, falls or users arm | 0 |
| | | Touches seat without help | 1 |
| **6.2.2** | Repeat item 1 (evaluate trunk movement) *(If 0, item 6.2.3 is also 0)* | No appropriate trunk movement | 0 |
| | | Appropriate trunk movement (shortening right side, lengthening left side) | 1 |
| **6.2.3** | Repeat item 1 (compensation strategies | Compensation used (arm, hip, knee, foot) | 0 |

| | | | |
|---|---|---|---|
| | used or not) | No compensation strategy used | 1 |
| **6.2.4** | Touch seat with left elbow, return to starting position (task achieved or not) *(If 0, items 6.2.5+6.2.6 are also 0)* | Does not reach seat, falls, or uses arm | 0 |
| | | Touches seat without help | 1 |
| **6.2.5** | Repeat item 4 (evaluate trunk movement) *(If 0, items 6.2.6 are also 0)* | No appropriate trunk movement | 0 |
| | | Appropriate trunk movement (shortening left side, lengthening right side) | 1 |
| **6.2.6** | Repeat item 4 (compensation strategies used or not) | Compensation used (arm, hip, knee, foot) | 0 |
| | | No compensatory strategy used | 1 |
| **6.2.7** | Lift right side of pelvis from seat, return to starting, position (evaluate trunk movement) *(If 0, items 6.2.8 are also 0)* | No appropriate trunk movement | 0 |
| | | Appropriate trunk movement (shortening right side, lengthening left side) | 1 |
| **6.2.8** | Repeat item 7 (compensation strategies used or not) | Compensation used (arm, hip, knee, foot | 0 |
| | | No compensation strategy used | 1 |
| **6.2.9** | Lift left side of pelvis from seat, return to starting position (evaluate trunk movement) *(If 0, items 6.2.10 are also 0)* | No appropriate trunk movement | 0 |
| | | Appropriate trunk movement (shortening left side, lengthening right side) | 1 |

| | | | |
|---|---|---|---|
| **6.2.10** | Repeat item 9 (compensation strategies used or not) | Compensation used (arm, hip, knee, foot) | 0 |
| | | No compensation strategy used | 1 |
| **Sub Total** | | | /10 |
| **Coordination** | | | |
| 6.3.1 | Rotate the shoulder girdle 6 times (move each shoulder 3 times forward) *(If 0, items 6.3.2 are also 0)* | Does not move right side 3 times | 0 |
| | | Asymmetric rotation | 1 |
| | | Symmetric rotation | 2 |
| 6.3.2 | Repeat item 1, perform within 6 s | Asymmetric rotation | 0 |
| | | Symmetric rotation | 1 |
| 6.3.3 | Rotate pelvis girdle 6 times (move each knee 3 times forward) *(If 0, items 6.3.4 are also 0)* | Does not move right side 3 times | 0 |
| | | Asymmetric rotation | 1 |
| | | Symmetric rotation | 2 |
| 6.3.4 | Repeat item 3, perform within 6 s | Asymmetric rotation | 0 |
| | | Symmetric rotation | 1 |
| **Sub Total** | | | /6 |

**Total score:** /23

Date: .....

Signature of Examiner.....

## Post-test

## Part 5: Assessment of balance by Burg Balance Scale(BBS)

**[Tick √ the point, which is able to perform patient]**

| No. | INSTRUCTIONS | Score |
|---|---|---|
| **5.1** | **STANDING FROM SITTING** (Try not to use your hand for support)<br>4= Able to stand without using hands and stabilize independently<br>3= Able to stand independently using hands<br>2= Able to stand using hands after several tries<br>1= Needs minimal aid to stand or stabilize<br>0= Needs moderate or maximal assistance to stand | |
| **5.2** | **STANDING UNSUPPORTED**<br>Please stand for two minutes without holding on<br>4= Able to stand safely for 2 minutes<br>3= Able to stand for 2 minutes with supervision<br>2= Able to stand 30 seconds unsupported<br>1= Needs several tries to stand 30 seconds unsupported<br>0= Unable to stand 30 seconds unsupported<br>If a subject is able to stand 2 minutes unsupported, score full points for sitting unsupported.<br>Proceed to item #4. | |
| **5.3** | **SITTING WITH BACK UNSUPPORTED** (Feet Supported On the Floor Or On A Stool)<br>4= Able to sit safely and securely for 2 minutes<br>3= Able to sit for 2 minutes under supervision<br>2= Able to able to sit for 30 seconds<br>1= Able to sit for 10 seconds<br>0= Unable to sit without support 10 seconds | |
| **5.4** | **STANDING TO SITTING**<br>4= Sits safely with minimal use of hands | |

| | | |
|---|---|---|
| | 3= Controls descent by using hands<br>2= Uses the back of legs against the chair to control the descent<br>1= Sits independently but has uncontrolled descent<br>0= Needs assist to sit | |
| **5.5** | **TRANSFERS**<br>Arrange a chair for pivot transfer. Ask the subject to transfer one way toward a seat with armrests and one way toward a seat without armrests. You may use a bed and a chair.<br>4= Able to transfer safely with minor use of hands<br>3= Able to transfer safely definite need of hands<br>2= Able to transfer with verbal cueing and/or supervision<br>1= Needs one person to assist<br>0= Needs two people to assist or supervise to be safe | |
| **5.6** | **STANDING UNSUPPORTED WITH EYES CLOSED (Please close your eyes and stand still for 10 seconds.)**<br>4= Able to stand for 10 seconds safely<br>3= Able to stand for 10 seconds with supervision<br>2= Able to stand 3 seconds<br>1= Unable to keep eyes closed for 3 seconds but stays safely<br>0= Needs help to keep from falling | |
| **5.7** | **STANDING UNSUPPORTED WITH FEET TOGETHER**<br>(Place your feet together and stand without holding on.)<br>4= Able to place feet together independently and stand 1 minute safely<br>3= Able to place feet together independently and stand 1 minute with supervision<br>2= Able to place feet together independently but unable to hold for 30 seconds<br>1= Needs help to attain position but able to stand 15 seconds | |

| | | |
|---|---|---|
| | feet together<br>0= Needs help to attain position and unable to hold for 15 seconds | |
| **5.8** | **REACHING FORWARD WITH OUTSTRETCHED ARM WHILE STANDING INSTRUCTIONS**<br>Lift arm to 90 degrees. Stretch out your fingers and reach forward as far as you can. (Ask the subject to use both arms when reaching to avoid rotation of the trunk.)<br>4= Can reach forward confidently 25 cm (10 inches)<br>3= Can reach forward 12 cm (5 inches)<br>2= Can reach forward 5 cm (2 inches)<br>1= Reaches forward but needs supervision<br>0= Loses balance while trying/requires external support | |
| **5.9** | **PICK UP OBJECT FROM THE FLOOR FROM A STANDING POSITION**<br>Pick up the shoe/slipper, which is placed in front of your feet.<br>4= Able to pick up slippers safely and easily<br>3= Able to pick up slipper but needs supervision<br>2= Unable to pick up but reaches 2-5 cm from slipper and keeps balance independently<br>1= Unable to pick up and needs supervision while trying<br>0= Unable to try/needs assistance to keep from losing balance or falling | |
| **5.10** | **TURNING TO LOOK BEHIND OVER LEFT AND RIGHT SHOULDERS WHILE STANDING**<br>Turn to look directly behind you over toward the left shoulder. Repeat to the right. The examiner may pick an object to look at directly behind the subject to encourage a better twist turn.<br>4= Looks behind from both sides and weight shifts well<br>3= Looks behind one side only the other side shows less weight shift | |

| | | |
|---|---|---|
| | 2= Turns sideways only but maintains balance<br>1= Needs supervision when turning<br>0= Needs assistance to keep from losing balance or falling | |
| **5.11** | **TURN 360 DEGREES**<br>Turn completely around in a full circle. Pause. Then turn a full circle in the other direction.<br>4= Able to turn 360 degrees safely in 4 seconds or less<br>3= Able to turn 360 degrees safely on one side in only 4 seconds or less<br>2= Able to turn 360 degrees safely but slowly<br>1= Needs close supervision or verbal cueing<br>0= Needs assistance while turning | |
| **5.12** | **PLACE ALTERNATE FOOT ON THE STEP OR STOOL WHILE STANDING UNSUPPORTED**<br>Place each foot alternately on the step/stool. Continue until each foot has touched the step/stool four times<br>4= Able to stand independently and safely and complete 8 steps in 20 seconds<br>3= Able to stand independently and complete 8 steps in > 20 seconds<br>2= Able to complete 4 steps without aid with supervision<br>1= Able to complete > 2 steps need minimal assist<br>0= Needs assistance to keep from falling/unable to try | |
| **5.13** | **STANDING UNSUPPORTED ONE FOOT IN FRONT**<br>Place one foot directly in front of the other. If you feel that you cannot place your foot directly in front, try to step far enough ahead that the heel of your forward foot is ahead of the toes of the other foot. (To score 3 points, the length of the step should exceed the length of the other foot and the width of the stance should approximate the subject's normal stride width.)<br>4= Able to place foot tandem independently and hold for 30 seconds | |

| | | |
|---|---|---|
| | 3= Able to place foot ahead independently and hold for 30 seconds<br>2= Able to take small steps independently and hold for 30 seconds<br>1= Needs help to step but can hold for 15 seconds<br>0= Loses balance while stepping or standing | |
| **5.14** | **STANDING ON ONE LEG**<br>Stand on one leg as long as you can without holding on.<br>4= Able to lift leg independently and hold > 10 seconds<br>3= Able to lift leg independently and hold for 5-10 seconds<br>2= Able to lift leg independently and hold ≥ 3 seconds<br>1= Tries to lift leg unable to hold 3 seconds but remains standing independently<br>0= Unable to try or needs assistance to prevent fall | |

**Total Score:**

Date: ..... Signature of Examiner.....

## Part-6: Assessment of the Trunk Using Trunk Impairment Scale

**[Tick √ the point, which is able to perform patient]**

| Item | Task description | Score Description | test Score |
|---|---|---|---|
| **Static Sitting Balance** | | | |
| **6.1.1** | Keep staring position for 10s *(if 0, total TIS scale is 0)* | Falls or needs arm support | 0 |
| | | Maintains position for 10s | 2 |
| **6.1.2** | The therapist crosses the strongest leg over the weakest leg and keeps position for 10 s | Falls or needs arm support | 0 |
| | | Maintains positions for 10 s | 2 |
| **6.1.3** | The patient crosses the strongest leg over the weakest leg | Falls | 0 |
| | | Needs arm support | 1 |
| | | Displaces trunk 10 cm or assists with arm | 2 |
| | | Moves without trunk or arm compensation | 3 |
| **Sub Total** | | | /7 |
| **Dynamic Sitting Balance** | | | |
| **6.2.1** | Touch seal with right elbow, return to starting position (task achieved or not) *(If 0, items 6.2.2+6.2.3 are also 0)* | Does not reach seat, falls or users arm | 0 |
| | | Touches seat without help | 1 |
| **6.2.2** | Repeat item 1 (evaluate trunk movement) *(If 0, item 6.2.3 is also 0)* | No appropriate trunk movement | 0 |
| | | Appropriate trunk movement (shortening right side, lengthening left side) | 1 |
| **6.2.3** | Repeat item 1 (compensation strategies | Compensation used (arm, hip, knee, foot) | 0 |

| | | | |
|---|---|---|---|
| | used or not) | No compensation strategy used | 1 |
| **6.2.4** | Touch seat with left elbow, return to starting position (task achieved or not) *(If 0, items 6.2.5+6.2.6 are also 0)* | Does not reach seat, falls, or uses arm | 0 |
| | | Touches seat without help | 1 |
| **6.2.5** | Repeat item 4 (evaluate trunk movement) *(If 0, items 6.2.6 are also 0)* | No appropriate trunk movement | 0 |
| | | Appropriate trunk movement (shortening left side, lengthening right side) | 1 |
| **6.2.6** | Repeat item 4 (compensation strategies used or not) | Compensation used (arm, hip, knee, foot) | 0 |
| | | No compensatory strategy used | 1 |
| **6.2.7** | Lift right side of pelvis from seat, return to starting, position (evaluate trunk movement) *(If 0, items 6.2.8 are also 0)* | No appropriate trunk movement | 0 |
| | | Appropriate trunk movement (shortening right side, lengthening left side) | 1 |
| **6.2.8** | Repeat item 7 (compensation strategies used or not) | Compensation used (arm, hip, knee, foot | 0 |
| | | No compensation strategy used | 1 |
| **6.2.9** | Lift left side of pelvis from seat, return to starting position (evaluate trunk movement) *(If 0, items 6.2.10 are also 0)* | No appropriate trunk movement | 0 |
| | | Appropriate trunk movement (shortening left side, lengthening right side) | 1 |

| | | | |
|---|---|---|---|
| **6.2.10** | Repeat item 9 (compensation strategies used or not) | Compensation used (arm, hip, knee, foot) | 0 |
| | | No compensation strategy used | 1 |
| **Sub Total** | | | /10 |
| **Coordination** | | | |
| 6.3.1 | Rotate the shoulder girdle 6 times (move each shoulder 3 times forward) *(If 0, items 6.3.2 are also 0)* | Does not move right side 3 times | 0 |
| | | Asymmetric rotation | 1 |
| | | Symmetric rotation | 2 |
| 6.3.2 | Repeat item 1, perform within 6 s | Asymmetric rotation | 0 |
| | | Symmetric rotation | 1 |
| 6.3.3 | Rotate pelvis girdle 6 times (move each knee 3 times forward) *(If 0, items 6.3.4 are also 0)* | Does not move right side 3 times | 0 |
| | | Asymmetric rotation | 1 |
| | | Symmetric rotation | 2 |
| 6.3.4 | Repeat item 3, perform within 6 s | Asymmetric rotation | 0 |
| | | Symmetric rotation | 1 |
| **Sub Total** | | | /6 |

**Total score:** /23

Date: .....

Signature of Examiner.....

# Appendix- E

## Treatment Protocol of Control Group

1. Positioning with postural correction
2. Functional activity
3. Neural connectivity exercise
4. Active facilitatory ROM exercise
5. Stretching for U/L and L/L-slow passive stretching
6. Co-ordination practice- Frenkel's exercise
7. Weight shifting and weight bearing
8. Trunk mobilization exercise
9. Bed mobility
10. Strengthening program (Isometric & Isotonic)
11. Gait re-education
    a) Side to side walking
    b) Backward walking
    c) Box walking
    d) Heel walking
    e) Toe walking Parallel bar walking
    f) Straight line walking
12. Proprioceptive exercise
13. Soft tissue mobilization
14. Parallel bar walking
15. Transitional movement Practice
16. Stepping

# Appendix-F

## Treatment Protocol of Experimental Group

| No. | Exercise | Frequency Dose | Duration |
|---|---|---|---|
| 1. | Sit-to-Stand Exercises | 10 Reps × 1 set | 3days/week |
| 2 | Dynamic Balance Activities | 10 Reps × 1 set | 3days/week |
| 3 | Sit-to-Stand-and-Reach Tasks | 10 Reps × 1 set | 3days/week |
| 4 | Balance Training with Dual Tasks | 10 Reps × 1 set | 3days/week |

## Gant Chart

| Activities/ Months | Sep 23 | Oct 23 | Nov 23 | Dec 23 | Jan 24 | Feb 24 | Mar 24 | Apr 24 | May 24 | June 24 | July 24 | Aug 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Proposal presentation | | | | | | | | | | | | |
| Introduction | | | | | | | | | | | | |
| Literature Review | | | | | | | | | | | | |
| Methodology | | | | | | | | | | | | |
| Data collection | | | | | | | | | | | | |
| Data Analysis | | | | | | | | | | | | |
| Result | | | | | | | | | | | | |
| 1st progress presentation | | | | | | | | | | | | |
| Discussion | | | | | | | | | | | | |
| Conclusion And Recommendation | | | | | | | | | | | | |
| 2nd progress presentation | | | | | | | | | | | | |
| Communication with supervisor | | | | | | | | | | | | |
| Final submission | | | | | | | | | | | | |