

Developing neuropsychological rehabilitation plan for stroke patients in Bangladesh



**This thesis is submitted for partial fulfillment of the requirements of the M.Phil degree
in Clinical Psychology by the University of Dhaka**

Submitted by-

Md. Hafizur Rahaman

Registration no: 74

Session: 2017-18

Department of Clinical Psychology

University of Dhaka

21 september, 2025

DECLARATION

I certify that the thesis entitled " Developing neuropsychological rehabilitation plan for stroke patients in Bangladesh" submitted for fulfillment of the requirements for the M. Phil degree in Clinical Psychology by the University of Dhaka is my own research. This thesis, in whole or in part, has not been submitted for an award, including a higher degree, to any other University or Institution.

Name: Md. Hafizur Rahaman

Registration no: 74

Session: 2017-18

Department of Clinical Psychology

University of Dhaka

Signature :

Date :

APPROVAL LETTER

This is to certify that we have read the overview of the thesis report entitled "Developing neuropsychological rehabilitation plan for stroke patients in Bangladesh," a study among thirty-two stroke patients completed by Md. Hafizur Rahaman. This is for the fulfillment of the requirements for the M.Phil degree in Clinical Psychology. He carried out this thesis report under our supervision and guidance. This is his original research work, and we appreciate his labor; he tried his best.

We recommended its submission for examination.

Professor Kamal Uddin Ahmed Chowdhury

Department of Clinical Psychology

University of Dhaka

Professor (Retd.) Dr. Muhammad Mahmudur Rahman

Department of Clinical Psychology

University of Dhaka

ABSTRACT

Stroke survivors experienced neuropsychological impairment along with other health complications. So it requires neuropsychological rehabilitation with other management. Developing a neuropsychological rehabilitation plan was the aim of the present study, ie, attention, memory, emotion, executive functioning, and communication of stroke patients in Bangladesh. Thirty-two stroke patients were recruited for the study by purposive sampling from the Center for the Rehabilitation of the Paralyzed (CRP) in Bangladesh. To conduct the study Addenbroke's Cognitive Examination-ACE-III (Bangladesh version-2016), DASS 21 (Depression Anxiety Stress Scale Bangla Version, Demographic questionnaires, and Neuropsychological rehabilitation strategy chosen form (random selection) were used.

After analyzing, it was found that the maximum number of patients preferred in attention strategies (attention beam 100%), in memory (making association 93.75%), in emotion (mindfulness 96.87%), in executive functions energization or doing (structured routines 100%), cognition or thinking (stop/think 100%), emotional and behavioral self-regulation/feeling and acting (understanding the problem 100%), metacognition/awareness and socialization (feedback 100%), in communication (active listening 100%).

Specific neuropsychological rehabilitation strategies were chosen in attention, the attention beam strategy by 100%, and the external distraction strategy by 75%. Memory-related strategies were more preferable, like making an association 93.75%, chunking 93.75%, and keywords 87.50%. In emotion management, the patients preferred the mindfulness strategy 96.87%, calming breaths 84.37%. The patients were less familiar with executive functions, and more strategies were preferred from here. In communication, the active listening strategy is preferred by 100%, and maintaining conversation and taking turns is 68.75%. High strength and low strength, there is no mean difference in preferred strategies.

Both depressed and non-depressed stroke patients 100% choose the neuropsychological strategies, attention beam, mindfulness, structured routines, stop/think, understanding the problem, and feedback. Making association and chunking 96.15% in non-depressed patients.

Both anxious and non-anxious stroke patients 100% choose the neuropsychological strategies, attention beam, mindfulness, structured routines, stop/think, understanding the problem, feedback, and active listening. Making associations and chunking 95.83% in non-anxious patients. Non-stressed stroke patients 100% choose the neuropsychological strategies, attention beam, mindfulness, structured routines, stop/think, understanding the problem, feedback, and active listening. Making associations and chunking 95.83% in non-anxious patients.

All the findings of the present study would have helped to develop a neuropsychological rehabilitation plan for stroke patients in Bangladesh.

Keywords: Neuropsychological rehabilitation, neuropsychological rehabilitation strategies.

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List of Acronyms and Abbreviations

NR: Neuropsychological rehabilitation

NRS: Neuropsychological Rehabilitation Strategies

NRSAttenBeam: Neuropsychological Rehabilitation Strategies in Attention is Attention Beam

NRSAttenLight: Neuropsychological Rehabilitation Strategies in Attention is Lighthouse

NRSAttenRED: Neuropsychological Rehabilitation Strategies in Attention is Reducing External Distraction

NRSAttenRID: Neuropsychological Rehabilitation Strategies in Attention is Reducing Internal Distraction

NRSMemoAsso: Neuropsychological Rehabilitation Strategies in Memory is Making Association

NRSMemoChunk: Neuropsychological Rehabilitation Strategies in Memory is Chunking

NRSMemoKey: Neuropsychological Rehabilitation Strategies in Memory is Key Words

NRSMemoIma: Neuropsychological Rehabilitation Strategies in Memory is Visual Imagery

NRSEmoMind: Neuropsychological Rehabilitation Strategies in Emotion is Mindfulness

NRSEmoBrea: Neuropsychological Rehabilitation Strategies in Emotion is Calming Breaths

NRSEmoCom: Neuropsychological Rehabilitation Strategies in Emotion is Compassionate Imagery

NRSEmoPMR: Neuropsychological Rehabilitation Strategies in Emotion is Progressive Muscle Relaxation

NRSExeDoRoutin: Neuropsychological Rehabilitation Strategies in Executive Function at Energization (Doing) is Structured Routines

NRSExeDoAlert: Neuropsychological Rehabilitation Strategies in Executive Function at Energization (Doing) is Alerts

NRSExeDoSelf: Neuropsychological Rehabilitation Strategies in Executive Function at Energization (Doing) is Self-Instruction

NRSExeThinkStop: Neuropsychological Rehabilitation Strategies in Executive Function at Executive Cognition (Thinking) is Stop/Think

NRSExeThinkZoom: Neuropsychological Rehabilitation Strategies in Executive Function at Executive Cognition (Thinking) is Zoom In/Out

NRSExeThinkTPM: Neuropsychological Rehabilitation Strategies in Executive Function at Executive Cognition (Thinking) is Time Pressure Management

NRSExeThinkGMF: Neuropsychological Rehabilitation Strategies in Executive Function at Executive Cognition (Thinking) is Goal Management Framework

NRSExeFeelUnder: Neuropsychological Rehabilitation Strategies in Executive Function at Emotional and Behavioral Self-Regulation (Feeling and Acting) is Understanding the problem

NRSExeFeelEarly: Neuropsychological Rehabilitation Strategies in Executive Function at Emotional and Behavioral Self-Regulation (Feeling and Acting) is Recognizing Early signs of rising emotion

NRSExeFeelCalm: Neuropsychological Rehabilitation Strategies in Executive Function at Emotional and Behavioral Self-Regulation (Feeling and Acting) is Using Calming Strategies

NRSExeAwarZoom: Neuropsychological Rehabilitation Strategies in Executive Function at Metacognition (Awareness and Socialization) is Zoom In/Out

NRSExeAwarFeed: Neuropsychological Rehabilitation Strategies in Executive Function at Metacognition (Awareness and Socialization) is Feedback

NRSExeAwarBeha: Neuropsychological Rehabilitation Strategies in Executive Function at Metacognition (Awareness and Socialization) is Behavioral Experiments

NRSCommListen: Neuropsychological Rehabilitation Strategies in Executive Function at Communication is Active Listening

NRSCommStart: Neuropsychological Rehabilitation Strategies in Executive Function at Communication is Starting Conversations

NRSCommMaintain: Neuropsychological Rehabilitation Strategies in Executive Function at Communication is Maintaining Conversations and Taking Turns

NRSCommEnd: Neuropsychological Rehabilitation Strategies in Executive Function at Communication is Ending Conversations

ACKNOWLEDGEMENT

First of all, I would like to express my gratitude to the Almighty Allah for giving me the necessary strength, competence, and determination to conduct the research and complete the report.

Beside this, I am extremely grateful to my supervisor Professor Kamal Uddin Ahmed Chowdhury Department of Clinical Psychology University of Dhaka & co- supervisor Professor Dr. M. Mahmudur Rahman Department of Clinical Psychology University of Dhaka, for their active support, intellectual guidance, constructive instruction and continuous encouragement during the research work: Their cordial support and guidance provided me the expedience and an exquisite perception of all the technical knowledge for conducting the research and preparing the thesis report. It would have been quite impossible for me to carry out this study without their help, direction, and cooperation. I am grateful to them again.

Important to mention, my special gratitude goes to, Executive Director of the Center for the Rehabilitation of the Paralysed (CRP).

There is no way without feeling gratitude. I am also indebted to writers, researchers, and their publications from which I collected the necessary information in finalizing the report properly.

Last of all, I am thankful to all the participants who helped me by participating in the research. I am also thankful to all of my family members, friends, and well-wishers for their support and helping hand in completing this research and research report.

DEDICATION TO MY MOTHER

CHAPTER ONE

INTRODUCTION

1.1 WHAT IS STROKE

Stroke is a cerebrovascular accident that leads to the sudden death of some brain cells due to a lack of oxygen when the blood flow to the brain is impaired by blockage or rupture of an artery to the brain. Different effects, depending on where it happens in the brain. The body, including thinking, feeling, and communication, is affected by a stroke. Stroke is the most common cause of severe disability (Adamson et al., 2004).

World Health Organization (WHO) defines stroke as "A stroke is a clinical syndrome characterized by rapidly developing clinical symptoms and/or signs of focal, and at times global (applied to patients in deep coma and those with subarachnoid hemorrhage), loss of cerebral function, with symptoms lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin (Hatano, 1976).

1.2 TYPES OF STROKE

There are two types of stroke, ischemic and hemorrhagic. When the blood supply to the brain is cut off or blocked, it is an ischemic stroke. When bleeding occurs in or around the brain, it is a hemorrhagic stroke..

Hemorrhagic strokes are less common; in fact, only 15 percent of all strokes are hemorrhagic, but they are responsible for about 40 percent of all stroke deaths (State of the Nation Stroke statistics -January 2016).

1.2.1 Ischemic stroke

An ischemic stroke occurs by a blood clot when a blood vessel carrying blood to the brain is blocked. Blood is unable to reach the brain due to this cause. High blood pressure is the most important risk factor for this type of stroke. Ischemic strokes account for about 85% of all strokes (State of the Nation Stroke Statistics -January 2016).

An ischemic stroke can occur in two ways:

1.2.1.a.1 Embolic Stroke

A blood clot plaque fragment forms in the body (usually the heart) and travels to the brain. The clot travels to a blood vessel and blocks its passage in the brain. The clot lodges there, blocking the blood vessel and causing a stroke. About 15% of embolic strokes occur in people with atrial fibrillation (Afib) (Warren J Manning, 2016). An embolus is the medical word for this type of blood clot.

1.2.1.a.2 Thrombotic Stroke

The blood clot that forms inside one of the arteries that supply blood to the brain is a thrombotic stroke. This type of stroke is usually seen in people with high cholesterol levels and atherosclerosis. The medical word for a clot that forms on a blood deposit is thrombus.

Two types of blood clots can cause thrombotic stroke: large vessel thrombosis and small vessel disease.

1.2.1.a.2.1 Large Vessel Thrombosis

The most common form of thrombotic stroke (large vessel thrombosis) occurs in the brain's larger arteries. In most cases, it is caused by long-term atherosclerosis in combination with rapid blood clot formation. High cholesterol is a common risk factor for this type of stroke.

1.2.1.a.2.2 Small Vessel Disease

Another form of thrombotic stroke happens when blood flow is blocked to a very small arterial vessel (small vessel disease). The causes of this type of stroke is little known, but it is closely linked to high blood pressure.

1.2.1.a.2.2.a Mini-stroke

A transient ischemic attack, or TIA, is also known as a mini-stroke. It is the same as a stroke. The symptoms typically last for a short period, no longer than 24 hours. It is a temporary blockage that stops blood from getting to the brain. Arteries become harder and narrower and are blocked with age. Certain medical conditions and lifestyle factors can speed up this process. It increases the risk of having a stroke. All strokes are different. Some people are more affected, which makes them dependent on other people, and some are not.

1.2.2 Hemorrhagic stroke

A hemorrhagic stroke occurs when a brain aneurysm bursts or a weakened blood vessel leaks. Blood spreads into or around the brain and creates swelling and pressure, damaging cells and tissue in the brain.

There are two types of hemorrhagic stroke called intracerebral and subarachnoid.

1.2.2.a.1 Intracerebral Hemorrhage

The most common hemorrhagic stroke happens when a blood vessel inside the brain bursts and leaks. Blood spread surrounding brain tissue (intracerebral hemorrhage). The bleeding causes brain cells to die in the affected part of the brain. High blood pressure and aging blood vessels are the most common causes of this type of stroke.

Sometimes intracerebral hemorrhagic stroke can be caused by an arteriovenous malformation (AVM). It is a genetic condition of an abnormal connection between arteries and veins. If it occurs in the brain, vessels can break and bleed into the brain.

1.2.2.a. 2 Subarachnoid Hemorrhage

Subarachnoid hemorrhage stroke involves bleeding in the area between the brain and the tissue covering the brain. It is known as the subarachnoid space. This type of stroke is most often caused by a burst aneurysm. Other causes include: AVM, bleeding disorders, head injury, and blood thinners.

Not everyone survives – around one in eight people die within 30 days of having a stroke (www.stroke.org.uk). That's why it's so important to be able to recognize the symptoms and get medical help as quickly as possible.

1.3 THE MAJOR RISK FACTORS FOR STROKE

Common established risk factors of stroke, e.g., age, sex, family history, hypertension, diabetes, ischemic heart disease, smoking, obesity, dyslipidemia, alcoholism, use of oral contraceptive pill, lack of fresh fruit consumption, etc.

High blood pressure: It is the main risk factor for stroke. Blood pressure is considered high when it stays at or above 140/90 millimeters of mercury (mmHg) over time. If you have diabetes or chronic kidney disease, high blood pressure is defined as 130/80 mmHg or higher.

Diabetes: Diabetes is a disease in which the blood sugar level is high because the body doesn't make enough insulin or doesn't use its insulin properly. Insulin is a hormone that helps move blood sugar into cells where it's used for energy.

Heart diseases: Coronary heart disease, cardiomyopathy, heart failure, and atrial fibrillation can cause blood clots that can lead to a stroke.

Smoking: It can damage blood vessels and raise blood pressure. Smoking also may reduce the amount of oxygen that reaches the body's tissues. Exposure to secondhand smoke can also damage the blood vessels.

Age and gender: The risk of stroke increases as people get older. At younger ages, men are more likely than women to have strokes. However, women are more likely to die from strokes. Women who take birth control pills are also at slightly higher risk of stroke.

Race and ethnicity: Strokes occur more often in African American, Alaska Native, and American Indian adults than in white, Hispanic, or Asian American adults.

Personal or family history of stroke or TIA. If one has had a stroke, the family members are at a higher risk of having another one. The risk of having a repeat stroke is the highest after a stroke. A TIA also increases the risk of having a stroke, as does having a family history of stroke.

Brain aneurysms or arteriovenous malformations (AVMs): Aneurysms are balloon-like in an artery that can stretch and burst. AVMs are tangles of faulty arteries and veins that can rupture (break open) within the brain. AVMs may be present at birth, but often aren't diagnosed until they rupture.

Other risk factors for stroke, many of which can be controlled:

Alcohol and illegal drug use, including cocaine, amphetamines, and other drugs, certain medical conditions, such as sickle cell disease, vasculitis (inflammation of the blood vessels), and bleeding disorders, lack of physical activity, overweight and obesity, stress and depression, unhealthy cholesterol levels, and unhealthy diet.

Use of nonsteroidal anti-inflammatory drugs (NSAIDs), but not aspirin, may increase the risk of heart attack or stroke, particularly in patients who have had a heart attack or cardiac bypass surgery. The risk may increase the longer NSAIDs are used. Common NSAIDs include ibuprofen and naproxen. <https://www.nhlbi.nih.gov/health/health-topics/topics/stroke/atrisk>

The majority of the stroke events occurred after the age of forty (82.3%), and ischemic stroke (72%) is the most common. Apart from non-modifiable risk factors (advancing age, sex, Family history of stroke) hypertension was the most common modifiable risk factor found in stroke patients (57.6%) followed by smoking (44.6%), tobacco use (24.3%), OCP use in female (40% of female stroke), diabetes (23%), ischemic heart disease (17.1%), obesity (10.6%) and dyslipidemia (5.3%). Lack of fresh fruit consumption and alcoholism were found in some of the patients. Stroke is common after the age of forty. Ischemic events are the most common type of stroke. Hypertension, smoking, tobacco use, diabetes, and ischemic heart disease were the five most common risk factors of stroke. Outlining the common stroke risk factors in the settings may help physicians and caregivers in managing this disabling disease properly. Certain traits, conditions, and habits can raise the risk of having a stroke or transient ischemic attack (TIA). These traits, conditions, and habits are known as risk factors.

1.4 COMMON SYMPTOMS OF STROKE

There are common symptoms in stroke patients.

Table 1. Common symptoms in stroke patients

Physical	Psychological	Behavioral
Facial Weakness	Difficulty finding words	Speech Problems
Arm Weakness	Sudden confusion	Unsteadiness
Sudden weakness or numbness on one side of the body	Communication problems	Changes to behavior
Loss of sight	Emotional changes	Anger
Dizziness	Problem with memory and thinking	Disinhibition
Headache	Continence problems	

Problems with movement and
balance

Pain

Tiredness and fatigue

Vision problems

Swallowing problems

Changes to taste and smell

Problems controlling your
bladder and bowels

Muscle weakness or paralysis

1.5 WORLDWIDE SCENERIO OF STROKE

In the UK, stroke occurs approximately 152,000 times a year; that's one every 3 minutes and 27 seconds (State of the Nation Stroke statistics -January 2016). But no two strokes are the same. Whilst most people who have a stroke are older, younger people can have strokes too, including children. One in four strokes in the UK happens in people under the age of 65. A stroke is a medical emergency. If we, or someone else, show any signs of having a stroke, we need to seek immediate medical attention.

In the United States, nearly 800,000 (approximately 795,000) people have a stroke every year, with about three in four being first-time strokes. It is the No. 5 cause of death in the United States, killing nearly 130,000 people a year (128,978). That's one in every 20 deaths. Someone in the United States has a stroke every 40 seconds. Every four minutes, someone dies of a stroke. It is a leading cause of long-term disability and the leading preventable cause of disability. More women than men have strokes each year, in part because women live longer. Estimates of the overall annual incidence of stroke in US children are 6.4 per 100,000 children (0 to 15 years), with approximately half being hemorrhagic strokes. Almost 87% of strokes are

classified as ischemic. African Americans are more impacted by stroke than any other racial group within the American population. (www.strokeassociation.org/STROKEORG/AboutStroke/Impact-of-Stroke-Stroke)

In South Asia, three of the world's top 10 most populous countries are located in South Asia. The health-care problems of this region are different from those in the developed world, and the rapidly changing socioeconomic scenario, fast-increasing urbanization, and longevity, changes in dietary patterns, and decrease in mortality from infectious diseases have made chronic illnesses of old age, such as coronary artery disease and stroke, an important area of focus. This article reviews stroke epidemiology and management issues in four South Asian countries: India, Pakistan, Sri Lanka, and Bangladesh. The available literature is limited and mostly hospital-based, and differing study methodologies make direct comparisons difficult. The high prevalence of traditional risk factors, including hypertension, diabetes, dyslipidaemia, and smoking, in these countries is alarming, and several nontraditional risk factors, such as water-pipe use, desi ghee, chewable tobacco, and infectious causes of stroke, are understudied. Access to tertiary stroke care is limited, and the use of tissue plasminogen activator is scarce. In addition, public and caregiver awareness of stroke risk factors and management is disappointing, and the interest of governments and policymakers in stroke is suboptimal. Interventions to reduce stroke burden and stroke-related mortality in South Asia should have a substantial impact at the global level.

1.5.1 In Bangladesh, stroke is the third leading cause of death. According to the latest WHO data published in May 2014, Stroke Deaths in Bangladesh reached 48,951 or 6.72% of total deaths. The age-adjusted death rate is 53.59 per 100,000 of the population, ranking Bangladesh 124th in the world. Anyone can have a stroke, although some things make us more at risk than others. We may think that strokes only happen to older people, but a stroke can strike anyone at any time. Hospital-based studies conducted in the past decades have indicated that hypertension is the main cause of ischemic and hemorrhagic stroke in Bangladesh. The high number of disability-adjusted life-years lost due to stroke (485 per 10,000 people) shows that stroke severely impacts Bangladesh's economy. Although two non-governmental organizations, BRAC and the Centre for the Rehabilitation of the Paralysed, are actively involved in primary stroke prevention strategies, the Bangladeshi government needs to emphasize healthcare development to cope with the increasing population density and to reduce stroke occurrence. “Prevalence of stroke in the rural community of Bangladesh” study was

completed in CIPRB's Raiganj field from 10th March to 20th April 2016, supported by the National Institute of Neuro Science (NINS). Stroke is a major cause of disability in the elderly, and now it is also affecting the younger generations. In Bangladesh, 15 people per 1000 are affected by Stroke.

1.6 LONG-TERM IMPACT OF STROKE

1.6.1 Problems with communication:

Many people have difficulty with speech and language after their stroke. A common communication problem, which affects around one-third of stroke survivors, is aphasia. People with aphasia find it difficult to speak and understand what other people are saying to them, as well as to read and write.

1.6.2 Problems with memory and thinking:

It's very common to find that their short-term memory and concentration are affected by stroke, but it can also affect other thinking processes as well, such as problem-solving, planning, and finding their way around.

1.6.3 Changes to emotions:

Stroke has an emotional impact, which can lead to problems like depression and anxiety, and control emotions (emotionalism), frustration, anger, mania, and euphoria. Changes in behavior: Some behavioral changes occur after a stroke, such as increased anger.

1.6.4 Neuropsychological impairment:

Attention, memory, language and communication, executive functioning, visuo-spatial, voluntary movement, number processing, and calculation. (Laura H. Goldstein and Jane E. McNeil, 2014)

1.6.4.1 Memory:

Memory impairment is one of the most common symptoms of brain injury or disease. There are two types of memory: short-term or working memory and long-term memory. Working memory stores information temporarily, for a matter of seconds. Long-term memory is the permanent memory for a few minutes to a few decades ago. Working memory was originally thought to involve three components (Baddeley, 1986).

- i. stimulus modality,
- ii. accessibility to conscious recollection,

iii. type of information.

1.6.4.2 Language and communication:

Expressive language is much harder than language comprehension. In a stroke, expressive language is typically more vulnerable than receptive language.

1.6.4.3 Executive Functioning:

Executive functions refer to those cognitive abilities that enable a person to determine goals and formulate new and useful ways of achieving them. People can resolve effectively the challenges in everyday life and cope with new situations (Burgess and Simons, 2005).

Dysexecutive problems in a mixed aetiology neurological group (adapted from Burgess and Robertson, 2002; data originally from the study by Wilson, Alderman and Burgess, 1996) Planning problem, distractibility, lack of insight, poor decision-making, social unconcern, euphoria, restlessness, apathy, lack of concern for others feelings, perseveration, aggression, temporal sequencing problems, social disinhibition, shallow affect, impulsivity, response inhibition problems, poor abstract thought, knowing - doing dissociation, variable motivation, confabulation.

1.6.4.4 Visuo-Spatial:

As a result of damage to the brain, some common problems can arise in visuo-spatial function. Stroke is the most common cause of visual field loss, occurring in between 20 and 40% of patients to some degree (Hier, Mondlock, and Caplan, 1983).

1.7 LITERATURE REVIEW

Wilson (2013) notes that neuropsychological rehabilitation (NR) is a comprehensive approach for managing cognitive, emotional, psychosocial, and behavioral deficits resulting from a brain insult, and all are interlinked. It's a goal-planning approach, a combination of patients, their families, and professionals.

The primary aim of neuropsychological rehabilitation is to improve neuropsychological functions, including attention, memory, and executive functions. The evidence suggests that neuropsychological rehabilitation can improve functional outcomes in individuals of patients and enhance neuropsychological abilities (Cicerone et al., 2005).

The quality of life and the functional outcomes must be considered throughout the rehabilitation process (Stocchetti & Zanier, 2016).

1.8 THEORETICAL BACKGROUND OF THE STUDY

A closely related concept to neuropsychological rehabilitation is cognitive stimulation, it prefers general cognitive functioning or a specific domain like attention, language, and

memory. Almost the basis for all recently existing cognitive rehabilitation programs are the three principles (compensation, substitution, and direct training) outlined by Oliver Zangwill.

The REHACOP program: An integrative neuropsychological rehabilitation program was designed at the University of Deusto in Spain by neuropsychology experts.

REHACOP's three basic principles:

Restoration of lost function	Compensation of lost function	Residual functions optimization
By means of stimulation, altered cognitive functions can be restored by repetitive performance of specific tasks.	Alternative strategies that can supply the cognitive alteration and encourage the performance of functional.	Ensure the correct functions of the altered ones by training the preserved cognitive functions.

Tasks are divided into eight modules: a. attention, b. learning and memory c. language d. executive functions e. social cognition f. social skills g. activities of daily living, and h. psychoeducation.

Implemented as in REHACOP:

- a. weeks 1 to 4 - attention retraining (sustained, selective, divided, and shifting attention)
- b. weeks 5 to 7 – learning and memory training
- c. weeks 8 to 10 – language training (grammar, syntax, vocabulary, etc.)
- d. weeks 11 to 12 – executive function training (planning, analogies, etc.); and
- e. week 13 – social cognition training

1.9 REHABILITATION

Rehabilitation is the process or action of restoring the individual to achieve the highest level of functioning to health or normal life through training and therapy after imprisonment, addiction, or illness. Rehabilitation has different parts and different purposes. Such as

- a. Physiotherapy - strength, balance, and walking, mobility
- b. Occupational therapy- activities of daily living and hand functioning
- c. Speech and language therapy - speech and communication

- d. Neuropsychology - thinking, memory, and intelligence
- e. Special education - learning in a special child
- f. Orthosis / Prosthesis - assistive devices/ splints
- g. Art/music/ drama therapies - creatively expressed feelings
- h. Social worker - community integration
- i. Dietetics - healthy eating

1.10 NEUROPSYCHOLOGICAL REHABILITATION

Neuropsychological rehabilitation is a process that helps individuals who have sustained brain injuries achieve their optimal physical, emotional, psychological, and vocational well-being (McLellan, 1991). Issues in rehabilitation are assessment, formulation, goal setting, awareness, case complexity, and group or individual work. Neuropsychological rehabilitation may involve addressing attention, memory, executive functions, communication, fatigue, mood, and working with individuals experiencing identity change, as well as supporting families. Neuropsychological rehabilitation is based on two main mechanisms:

- a. Plasticity of the brain, which has an inherent capability to recover from damage
- b. Adaptability of the person, which allows us to adjust to new circumstances by changing our behavior.

Types of neuropsychological rehabilitation ;

- a. Restorative rehabilitation: Restorative rehabilitation helps the patients to recover brain functions which was impaired. It reached the level of functioning that the patients had before the stroke.
- b. Compensatory rehabilitation: Compensatory rehabilitation helps the patients to cope with and compensate for permanent impairment.

1.11 A BRIEF HISTORY OF THE GROWTH OF NEUROPSYCHOLOGICAL REHABILITATION

1.11.1 Ancient Egypt:

An Egyptian document of 2500 to 3000 BC is a known description of the earliest treatment of brain injury. Edwin Smith in Luxor in 1862 was discovered the papyrus (described by Walsh, 1987).

1.11.2 World War One:

Modern rehabilitation began in World War One (WW1). Kurt Goldstein, a German neurologist and psychiatrist, was a pioneer in modern neuropsychology. “The Institute for Research into the Consequences of Brain Injuries” was established by Goldstein following WW1, and developed a theory of brain-mind relationships.

1.11.3 World War Two:

Alexander Romanovich Luria, who is often called the grandfather of neuropsychology, worked during World War Two (WW2). The sooner wounds to the head were treated, the better the prognosis was realized by Cairns, in Oxford the United Kingdom. Traumatic brain injury mortality rate dropped from 50 percent in WW1 to 5 percent in WW2 (Quare, 2003) with penicillin and sooner treatment by Mobile Neurosurgical Units.

1.11.4 The Yom Kippur War:

Yehuda Ben-Yishay, an American Israeli worked for rehabilitation in the Yom Kippur War (YKW) of 1973.

1.11.5 More recent times:

The Cognitive Rehabilitation Program was opened by Leonard Diller in New York in 1976 (Diller, 1976). Cognition, emotion, and behaviour are interlinked, which was recognized by Goldstein (1919, 1942) and Ben-Yishay (1996). The holistic programme in Oklahoma City was started by George Prigatano (1986). The Oliver Zangwill Centre in Cambridgeshire, England, was established in 1996 by Wilson and her colleagues (Wilson et al., 2000)

1.12 PRINCIPLES OF NEUROPSYCHOLOGICAL REHABILITATION

The neuropsychological rehabilitation program at OZC (Oliver Zangwill Centre) in Ely, Cambridgeshire, United Kingdom, is based on six core components:

1. Therapeutic milieu: Holistic rehabilitation refers to the organization of the complete environment of maximum support in the process of adjustment and increased social participation. It means a strong sense of safety, trust, and cooperation that can lead to working alliances between clients and clinicians.

2. Meaningful goals: Meaningful functional activity refers to daily activities that form the basis for social participation. This can be categorized into vocational, educational, recreational, social, and independent living activities.

3. Shared understanding: In a rehabilitation context, it refers to mutual understanding among clients, families, and staff. It comes from the use of formulation in clinical practice (Butler, 1998).

4. Psychological intervention: It's a way of understanding feelings and behavior. For guidance, psychological models are applied to an individual's needs. Positive change and managing specific problems, the team members help to engage.

5. Compensatory strategies and retraining: In managing cognitive impairments, compensatory strategies and retraining are the two principal approaches. Compensatory strategies are the alternative ways of management. A specific brain function or a particular task or activity is improved by retraining. When a skill is lost through lack of use, it is also addressed by retraining strategies.

6. Families and caregivers: Families and caregivers are essential in neuropsychological rehabilitation. Significant burden is felt by families and caregivers after caring for the clients, and they need support.

Prigatano (1996) described 13 principles of neuropsychological rehabilitation:

1. The clinician must begin with the patient's subjective or phenomenological experience to reduce their frustration and confusion to engage them in the rehabilitation process.
2. The patient's symptom picture is a mixture of premorbid cognitive and personality characteristics as well as neuropsychological changes directly associated with brain pathology.
3. Neuropsychological rehabilitation focuses on both the remediation of higher cerebral disturbances and their management in interpersonal situations.
4. Neuropsychological rehabilitation helps patients observe their behaviour and thereby teaches them about the direct and indirect effects of stroke. This may help patients avoid destructive choices and better manage their catastrophic reactions.

5. Failure to study the intimate interaction of cognition and personality leads to an inadequate understanding of many issues in cognitive (neuro)sciences and neuropsychological rehabilitation.
6. Little is known about how to retrain a brain-dysfunctional patient cognitively, because the nature of higher cerebral functions is not fully understood. General guidelines for cognitive remediation, however, can be specified.
7. Psychotherapeutic interventions are often an important part of neuropsychological rehabilitation because they help patients (and families) deal with their personal losses. The process, however, is highly individualized.
8. Working with brain-dysfunctional patients produces affective reactions in both the patient's family and the rehabilitation staff. Appropriate management of these reactions facilitates the rehabilitative and adaptive process.
9. Each neuropsychological rehabilitation program is a dynamic entity. It is either in a state of development or decline. Ongoing scientific investigation helps the rehabilitation team learn from their successes and failures and is needed to maintain a dynamic, creative rehabilitation effort.
10. Failures to identify which patients can and cannot be helped by different (neuropsychological) rehabilitation approaches create a lack of credibility for the field.
11. Disturbances in self-awareness after stroke are often poorly understood and mismanaged.
12. Competent patient management and planning innovative rehabilitation programs depend on understanding the mechanisms of recovery and deterioration of direct and indirect symptoms after stroke.
13. The rehabilitation of patients with higher cerebral deficits requires both scientific and phenomenological approaches. Both are necessary to maximize recovery and adaptation to the effects of stroke.

1.13 GENERAL ISSUES IN NEUROPSYCHOLOGICAL REHABILITATION

1.13.1 Assessment:

Assessment is essential before any treatment process. Sundberg and Tyler (1962) described assessment as the process of systematic collection, organization, and interpretation of information about the client and his or her circumstances. In assessment procedures, there are two main types: standardized assessment tools and functional or behavioral measures.

Standardized tests help to compare the clients with the same age or same diagnosis, and cognitive strengths and weaknesses are also found. Functional or behavioral measures help with coping strategies of the client's family, the major problems seen by the client self, compensatory strategies that have been tried, and whether the client can return to home or work, and what learning strategies will help the client to teach the new information. Beginning with the end in mind also helps in assessment. Components of a comprehensive assessment are pre-injury history, physical limitation, current medical status, current and past history of psychopathology, substance abuse, and non-brain injuries, family and social context, educational and vocational history, and strength and weakness at present in cognitive, emotional, behavioral, and physical functioning

1.13.2 Formulation:

After the complete assessment next step is formulation. In an interdisciplinary rehabilitation team, the formulation helps to compile the results of assessment into a single frame. In the formulation, cognitive, emotional, and behavioral issues will be noticed. The development goals are based on this formulation.

1.13.3 Goal Setting:

Goal setting is a direction of rehabilitation, in which intervention will be applied that prioritizes what is evaluated, team functioning, and cooperation, and better outcomes (Nair & Wade, 2003). Goals should be SMART (Specific, Measurable, Achievable, Realistic, and Timely; McMillan & Sparkes, 1999; Evans, 2012).

1.13.4 Awareness:

Unawareness of the client hampered the neuropsychological rehabilitation. The pyramid model of Crosson et al. (1989) conceptualizes awareness by intellectual, emergent, and anticipatory awareness. Intellectual awareness encompasses understanding the deficit and its implications in day-to-day life. An in-the-moment awareness is defined as emergent awareness. The ability to anticipate future difficulties is a high level of awareness.

1.13.5 Case complexity:

The neuropsychological rehabilitation will include the client's age at the time of assessment, the time of the stroke or insult, the nature and severity of the brain damage, the undamaged

brain, personality, previous cognitive functioning, occupation, rehabilitation received, family support, and motivation. In a vegetative or minimally conscious state, rehabilitation helps the clients (Wilson et al., 2016)

1.13.6 Group or Individual work:

Both group and individual therapy are provided in holistic treatment programs, also in OZC (Trexler et al., 2000). A sense of isolation, loss of roles and purpose are experienced after a stroke or brain injury (Malley et al., 2009). The isolation is overcome by shared identities, roles, and peer support through group therapy.

1.14 REHABILITATION AROUND THE WORLD

The origins of rehabilitation go back a long way, as witnessed in the Edwin Smith surgical papyrus document acquired by Smith in 1862 (described by Walsh, 1987). Modern-day rehabilitation probably began during the First World War (Goldstein, 1942). During the Second World War, Luria (1963) in the Soviet Union and Zangwill (1947) in the United Kingdom were both working. Ben-Yishay was developing his therapeutic milieu programme in the Rancho Los Amigos Hospital in California (Malkmus et al., 1980). The first programme to call itself a 'cognitive rehabilitation programme' was probably that of Diller in New York (Diller, 1976). Wilson and colleagues opened the Oliver Zangwill Centre for Neuropsychological Rehabilitation in Cambridgeshire, England, in 1996 (Wilson et al., 2000).

1.14.1 Rehabilitation in the UK

The neuropsychological rehabilitation program at OZC (Oliver Zangwill Centre) in Ely, Cambridgeshire, United Kingdom, is based on six core components:

1. Therapeutic milieu
2. Meaningful goals
3. Shared understanding
4. Psychological intervention.
5. Compensatory strategies and retraining
6. Families and caregivers.

1.14.2 Rehabilitation in India:

A paper on the hidden epidemic of neurological disability in India (Das et al., 2012) indicated that there has been a marked increase in disabilities due to traumatic brain injury, dementias, and stroke. There are an estimated 1100 neurologists, 400 physiatrists, a few hundred

therapists, and a dozen neuropsychologists catering to a population of over a billion people. Neuropsychological rehabilitation is in its nascent stage and emerged as a sub-specialty only in the mid-1980s at the National Institutes.

1.14.3 Rehabilitation in Iran:

An integrative national rehabilitation programme including neuropsychological rehabilitation was initially formulated in 1986 (WHO, 2006). The main components were advocacy, promotion, prevention, treatment, and rehabilitation services. Recently, Iran has had significant development of the facilities, infrastructure, and human resources, basically needed for neuropsychological rehabilitation. One of the best practices in this regard is the integration of rehabilitation programmes, including neuropsychological screenings, assessments, and rehabilitation for common brain disorders in Primary Health Care.

1.14.4 Rehabilitation in Russia:

Neuropsychological practice remains strongly under the influence of Luria. Clinical neuropsychologists in Russia are well versed in the analysis of higher mental function using principles and tests developed by Luria. There are more than 5000 qualified CPs and 1000 CNPs, of whom more than 200 work in Moscow and St Petersburg. Until the recent setting up of stroke rehabilitation teams, all CPs and CNPs had worked independently, reporting their findings to referring doctors with no structured system for regular interchange of information with other professionals or joint discussions and decision-making. Those who have suffered from a stroke may, at best, have received up to four weeks' rehabilitation in a ward with a multidisciplinary team that includes a CP.

1.14.5 Rehabilitation in Taiwan:

In 1953, the first clinical psychologist was hired as a part-time employee in the Department of Psychiatry, National Taiwan University Hospital. At present, more than 1500 licensed clinical psychologists are working. The birth of clinical neuropsychology can be traced back to Professor Mau-Sen Hua, who earned a doctoral degree from the University of Wisconsin-Madison in 1985. Yang et al. (2007, 2009, 2013) have been working on three domains of PCS (Post-Concussion Symptoms), mainly containing six aspects: I. Understanding the PCS II. Intervention for physical symptoms; III. Intervention for cognitive symptoms; IV. Intervention

for emotional symptoms; V. Intervention for sleep disturbances; and VI. Stress/coping strategies.

1.14.6 Rehabilitation in USA

University Hospital Neurological Institute, Jill Winegardner, PhD.

After stroke, patients thinking and feeling are normal response as they present.

- a. Assessment
- b. Psychoeducation
- c. Tools and strategies
- d. Cognitive rehabilitation such as attention
- e. Strategies in practice
- f. Psychological support to cope of patients and family

1.15 NEUROPSYCHOLOGICAL REHABILITATION STRATEGIES

In neuropsychological rehabilitation, many strategies have been developed for different purposes. Some of the mentions here:

1.15.1 Attention: Attention was first defined as the taking possession by the mind, in clear and vivid form, of one out of what seems simultaneously possible objects or trains of thought in 1890 by William James. In 2014, INCOG, an international group of experts, published findings from a review of clinical guidelines and literature to generate an authoritative set of clinical recommendations on cognitive rehabilitation after brain injury (Ponsford et al., 2014). In neuropsychological rehabilitation, some strategies for attention are below:

a. Attention Beam:

This strategy focuses on some things and ignores others, like a flashlight in a darkened room (Fish et al., 2017). All our attention is like a flashlight beam that can be shone on different corners of a room, allowing us to move our attention from place to place. Some patients prefer to think of the beam as a miner's lamp, a spotlight, a car headlight, or a searchlight. Attention can be improved through repetitive practice (Evans et al., 2009).

b. Lighthouse:

A lighthouse is an extension of the attention beam. It helps supermarket shelves find items and things in drawers or cupboards at home. The patients with a visuospatial attention problem can use the lighthouse strategy. Explain to them that their eyes are like the lights inside the top, to help the ships at sea to safety by sweeping to the left and right of the horizon. Ask them if the lighthouse lit only the right or left side of the ocean and the horizon. Demonstrate the patient turning their head from side to side to allow their eyes to sweep left and right like a lighthouse beam. To increase alertness, the physical movements, like aligning the tip of the chin with the top of the right shoulder, then move the head slowly around so that the chin is in line with the top of the left shoulder. A strong link exists between alertness and spatial attention.

c. Reducing External Distractions:

Reduce background noise such as TV, radio, and music. Use a quiet room and switch off your mobile phone and noise-canceling headphones. To minimize visual distractions, avoid sitting opposite a window.

d. Reducing Internal Distractions:

Clients' thoughts, feelings, and physical sensations, such as pain, distract from focusing on tasks. Ask clients to practice focusing on a single spot or closing their eyes for two minutes, and find the physical sensation and thoughts, and use the attention beam to back to the central focal point. The patients may use the mood management strategies to reduce internal distractions.

1.15.2 Memory

a. Making Association:

Linking one thing to another supports memory. Such as putting a pair of shoes beside the door to remind you to take a walk with friends (Kim, 2015).

b. Chunking:

Splitting information will make together a smaller version, groups or units to store it easier (e.g., 532 306 428 is easier to remember than 532306428).

c. Keywords:

It can be a good way of putting a large amount of information into a word (e.g., "I want to buy ingredients to make biriani" is easier than remembering "I want to buy beef, rice, oil, salt, mashala, onion, tomato sauce").

d. Visual Imagery:

A mental picture of something also helps memory; it can be said that the mind's eye (e.g., Hatir pool)

1.15.3 Emotion:

a. Mindfulness:

Fully focused on the present experience is mindfulness.

b. Calming Breaths:

Exercise can help manage the sensation of anxiety.

c. Compassionate Imagery:

The clients can develop images of a safe place, or with a person, or be compassionate themselves.

d. Progressive Muscle Relaxation:

An awareness of muscular stress and the ability to release the stress.

1.15.4 Executive Functions:

a. Energization (Doing):

i. Structured Routines: The clients follow a sequence of steps to reach the goal.

ii. Alerts: The external reminders or stimuli that help a person initiate.

iii. Self-Instruction: It helps to prompt initiation and action.

b. Executive Cognition (Thinking):

i. Stop/Think: To encourage patients to pause and reflect on their intentions before implementation. It helps manage impulsivity.

ii. Zoom In/Out: The patients may be asked to think beyond the current moment into the future and to consider future consequences of current behavior. It helps with flexible thinking, broadly, and detail-focused.

iii. Time Pressure Management: TPM (Fasotti, Kovacs, Eling, & Brouwer, 2000) follows awareness, planning, managing, and monitoring.

iv. Goal Management Framework: Set the main goal, identify possible solutions, weigh up pros and cons, choose a solution and plan the steps, do it, monitor, and evaluate progress are the six steps by Levine et al. (2000) which is used at the Oliver Zangwill Centre.

c. Emotional and Behavioral Self-Regulation (Feeling and Acting):

i. Understanding the problem: Psychoeducation about the nature of emotional and behavioral problems is given to the clients.

ii. Recognizing early signs of rising emotion: The clients should be aware of the early warning signs of emotion.

iii. Using calming strategies: Cognitive and mood-oriented strategies are also useful, such as stop/think or a goal management framework.

d. Metacognition (Awareness and Socialization):

i. Zoom in/out: For improving awareness and sensitivity. The clients think beyond their immediate issue.

ii. Feedback: Both other clients and staff can give feedback. Video feedback is more effective than verbal feedback (Schmidt, Fleming, Ownsworth, & Lannin, 2013).

iii. Behavioral Experiments: Clients who have metacognitive difficulties can use behavioral experiments. It is a component of cognitive-behavioral therapy to identify and challenge negative beliefs (Bennett-Levy et al., 2004).

1.15.5 Communication:

a. Active listening: Try understanding the other person's thinking, feeling, or the message's meaning or demand.

b. Starting Conversations: Neutral topics that are inoffensive can be used to start conversations.

c. Maintaining Conversations and Taking Turns: Clients must be aware of their strengths and weaknesses and transition from one topic to another. Repairing conversations and turn-taking also help to continue the conversations.

d. Ending Conversations: For ending the conversations, verbal and nonverbal cues are important.

1.16 RATIONALE OF THE STUDY:

After a stroke, there are some impairments, both physical and neuropsychological. Cognition, emotion, and behavior are how a person responds to a certain set of conditions. Changes in personality and behavior occur in the majority of patients with stroke at some point after stroke and during treatment. In some cases, these changes are so subtle that the patients themselves are more aware of their difficulties than are those around them. Common cognitive changes and personality-related problems and challenges experienced by patients with stroke are usually associated with: Language and Communication: Difficulty with verbal fluency; speaking, reading, and/or writing. Emotion and Personality: Psychiatric symptoms such as depression, anxiety, changes in emotional control, such as irritability, mood swings, or withdrawal, socially inappropriate behavior, and/or denial that the behavior is a problem. Learning and Memory (particularly short-term memory): Difficulty processing, storing, and remembering information; short-term memory loss. Attention and Concentration: Confusion, easy distraction, difficulty multitasking, and planning. Executive Functioning/General Intellectual Abilities: Decreased reasoning ability, impaired judgment, inability to connect cause and effect. Most of the stroke patients received medical support and physiotherapy. Neuropsychological supports are also important for better management. This study will help to understand the neuropsychological rehabilitation and what would be better for treatment and management.

1.17 OBJECTIVE OF THE STUDY:

Stroke is one of the biggest health problems in Bangladesh, which leads to physical and psychological disability, and has very limited resources for recovery and rehabilitation. Moreover, without neuropsychological rehabilitation, all disability will be more complex, but there is no neuropsychological rehabilitation in Bangladesh. Therefore, the general objective of the study is to investigate the neuropsychological rehabilitation plan for stroke patients in Bangladesh. Specific objectives are:

- a. Find out the neuropsychological strength through assessment among stroke patients.
- b. Developing a neuropsychological rehabilitation plan for the patients.

CHAPTER TWO

METHODOLOGY

2.1 SAMPLE

32 participants (Male 23, Female 9) were recruited. For the present study, only participants with ischemic stroke and hemorrhagic stroke were included. Participants were recruited from various sources, including support services, counseling services, and neurosurgery clinics. A purposive sampling method was used to select participants from the population. Data was collected from the indoor and outdoor settings of the Center for Rehabilitation of the Paralyzed (CRP). Demographic information includes name, age, sex, address, phone, educational qualification, occupation, socio-economic status, religion, marital status, habitat, family pattern, family relationship, diagnosis, types of stroke, first date of diagnosis, duration, and previous treatment. The inclusion criteria were: Any type of stroke, hospitalized stroke patients, follow-up stroke patients, communicable clients, and outdoor service receivers. The exclusion was: Dementia, unconscious patients who are not communicative, patients in a coma, and patients with a vulnerable condition.

Table 2. Sociodemographic Characteristics of Participants

Variables		n	%
Sex	Male	23	71.9%
	Female	9	28.1%
Age		57.19 (mean)	11.62 (SD)
Educational Qualification	Below SSC	8	25.0%
	SSC	5	15.6%
	HSC	8	25.0%
	BA/Hons	6	18.8%
	MA/Masters	5	15.6%
Occupation	Job	12	37.5%
	Business	7	21.9%
	Others	13	40.6%
Socio-economic Status	Lower Middle Class	0	0.0%
	Middle Class	13	40.6%
	Higher Middle Class	19	59.4%
Religion	Islam	30	93.8%
	Hindu	2	6.3%
Marital Status	Married	31	96.9%
	Divorce	1	3.1%
Habitant	Rural	9	28.1%
	Semi Rural	8	25.0%
	Urban	15	46.9%
Family Pattern	Single	31	96.9%

	Joint	1	3.1%
Duration of illness in days		324.06 (mean)	622.47 (SD)

Table 2. Displays characteristics of the study participants

The mean age was 57.19. Male 23, female 9. Most of the participants' educational qualifications were below SSC 8, masters 5. Employment condition was job 12, business 7. Habitant condition is rural 9, urban 15.

2.2 MEASURES

To conduct the study following measures were used.

- a. Addenbroke's Cognitive Examination (ACE-III)
- b. DASS-21 (Depression Anxiety Stress Scale) Bangla Version
- c. Demographic questionnaires.
- d. Semi structure questionnaires.

a. Addenbroke's Cognitive Examination:

The ACE-III is a brief cognitive test that assesses five cognitive domains, namely attention/orientation, memory, verbal fluency, language, and visuo-spatial abilities. The total score is 100, among them attention is 18, memory is 26, fluency is 14, language is 26, and visuo-spatial is 16. Higher scores indicate better cognitive functioning. Administration of the ACE-III takes, on average, 15 minutes. In 2013, Hsieh S, Schubert S, Hoon C, Mioshi E, and Hodges JR developed the ACE-III. The reliability and validity are satisfactory.

Bangladesh version 2016 was developed by Hossain, Queen, Monira, and Alam.

b. DASS-21 (Depression Anxiety Stress Scale) Bangla Version:

The DASS-21(Depression Anxiety Stress Scale) is a brief test that assesses depression, anxiety, and stress. There have 21 statement and marking point as 0,1,2 and 3. Every domain have seven statement like depression, anxiety, and stress. Bangla version was used.

Bangla version was translated and validated by Dr. S M Abu Hena Mostafa Alim, BSMMU, Bangladesh.

c. Demographic questionnaires:

In demographic information included sex, age, address, educational qualification, occupation, socio-economic status, religion, marital status, habitant, family pattern, first date of incident, date of experiment, and duration.

d. Semi structure questionnaires:

In semi structured statement there have the chosen option of neuropsychological rehabilitation strategies by the patients. There have twenty nine strategies as random selection for the stroke patients in Bangladesh. For attention there have attention beam, lighthouse, reducing external distraction, reducing internal distraction, for memory making associations, chunking, keywords, visual imagery, for emotion mindfulness, calming breaths, compassionate imagery, progressive muscle relaxation, for executive functions structured routines, alerts, self-instruction, stop/think, zoom in/out, time pressure management, goal management framework, understanding the problem, recognizing early signs of rising emotion, using calming strategies, zoom in/ out, feedback, behavioral experiments, for communication active listening, starting conversations, maintaining conversations and taking turns, ending conversations.

2.3 STRUCTURED INTERVIEW

It was used structured interview method to collect the demographic information. It includes name, age, sex, address, phone number, educational qualification, occupation, socio-economic status, religion, marital status, habitat, family pattern, duration, etc. Each interview took approximately 30-45 minutes to complete.

2.4 PROCEDURE

Following ethical clearance from a university human ethics review committee and informed consent procedures, participants with stroke were individually administered an assessment. First of all took official permission from the departments of the mentioned hospitals. Then, the participants from both indoor and outdoor areas of the department were approached. Written consent from the potential participants was taken. After that, the aim or objective of the research, risks for participating, and confidentiality were described. Demographic data was collected throw structured interviews. Then, used Addenbrooks Cognitive Examination-ACE-III, DASS 21 (Depression Anxiety Stress Scale) Bangla version. The purposive sampling method was used for selecting participants. Some patients didn't agree, refused to complete the full process. Last of all, thanks to the participants. On the basis of the assessment, the rehabilitation plan was developed for stroke patients with a focus on strength.

2.5 DESIGN

To conduct the study non-experimental and descriptive design was followed. It also motivated to link with review types research. All participants was experienced different types of stroke. Stroke patients and significant caregivers was included as participants. There have no used any kind of intervention.

2.6 ETHICAL CONSIDERATION

In this study, the following criteria were followed to ensure the maintenance of ethical values. Formal ethical clearance was obtained from the Ethics Review Committee of the Department of Clinical Psychology, University of Dhaka, for conducting the study. The confidentiality of the information provided by the participants was maintained and observed. An unauthorized person did not access the data. Informal written consent was taken from the participants. The content of the consent requirement was as follows:

- a. Explain the purpose and nature of the study.
- b. Explain the procedure of the study.
- c. Informing them that they have the right to refuse or accept to participate in the study.
- d. The participant did not gain any financial benefit, though we collect information from them.
- e. Follow-up session would be conducted if the participant gains medical stability.
- f. A neuropsychological rehabilitation plan was offered.
- g. We gave them the address or information where they can get the neuropsychological support or treatment.

2.7 ANALYSIS

The SPSS program was used for analyzing the data. The collected data were presented in tables, graphs, and charts. Simple statistical tools such as percent, correlation, and regression were used to interpret the findings of the study.

CHAPTER THREE

RESULTS

Stroke clients were the target population. Different neuropsychological rehabilitation strategies were offered to choose. Fig.1 indicates that neuropsychological rehabilitation strategies attention beam, structured routines, stop/think, understanding the problem, feedback, and active listening, are chosen 100% by the patients.

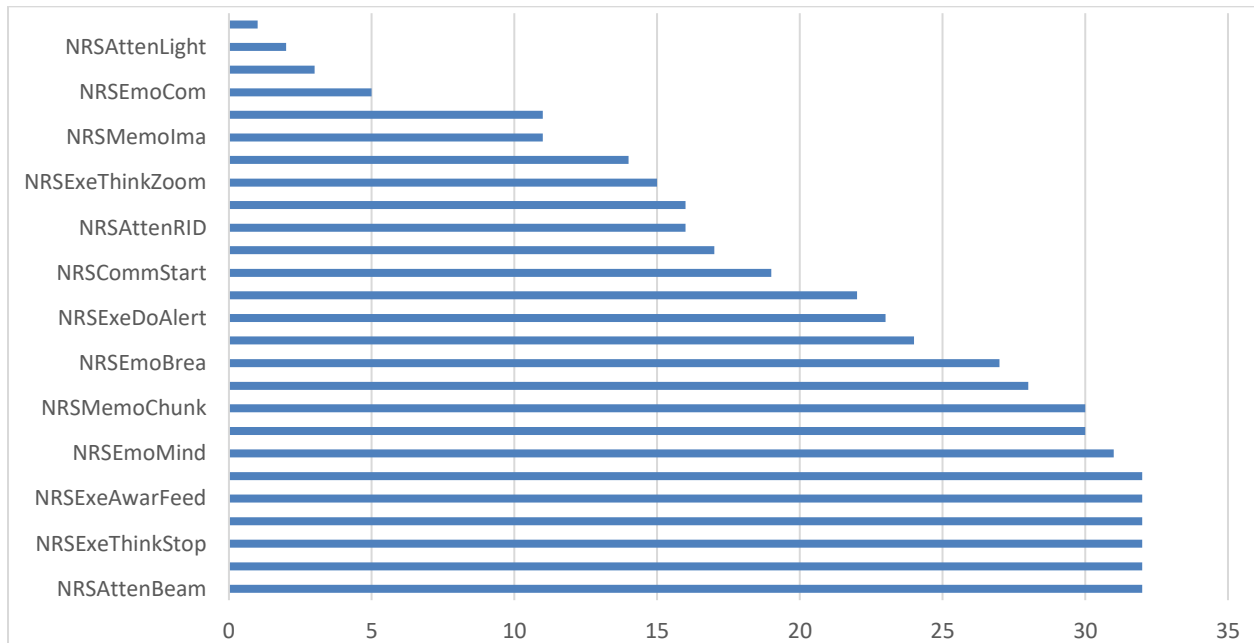


Fig.1. Strategies chosen by the patients

Table 3. Neuropsychological strategies preference percentage

Strategies	n	%
NRSAttenBeam	32	100%
NRSExeDoRoutin	32	100%
NRSExeThinkStop	32	100%
NRSExeFeelUnder	32	100%
NRSExeAwarFeed	32	100%
NRSCommListen	32	100%
NRSEmoMind	31	96.87%
NRSMemoAsso	30	93.75%
NRSMemoChunk	30	93.75%
NRSMemoKey	28	87.5%
NRSEmoBrea	27	84.37%
NRSAttenRED	24	75%
NRSExeDoAlert	23	71.87%
NRSCommMaintain	22	68.75%

NRSCommStart	19	59.37%
NRSExeFeelEarly	17	53.12%
NRSAttenRID	16	50%
NRSExeAwarZoom	16	50%
NRSExeThinkZoom	15	46.87%
NRSCommEnd	14	43.75%
NRSMemoIma	11	34.37%
NRSExeFeelCalm	11	34.37%
NRSEmoCom	5	15.62%
NRSEmoPMR	3	9.37%
NRSAttenLight	2	6.25%
NRSExeDoSelf	1	3.12%
NRSExeThinkTPM	0	0%
NRSExeThinkGMF	0	0%
NRSExeAwarBehav	0	0%

Table. 3 also indicates that the NRS chosen by the patients are mindfulness 96.87%, making association 93.75%, chunking 93.75%, keywords 87.50%, and reducing external distraction 75%. The time pressure management, goal management framework, and behavioral experiment are preferred 0%.

Note: NRS= Neuropsychological Rehabilitation Strategies

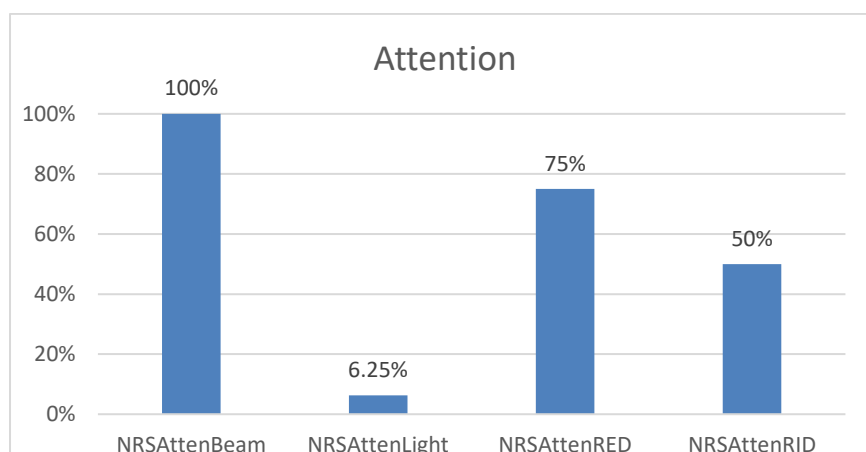


Fig.2. Attention-related strategies preference percentage

Fig. 2 explained that NRS in attention is less followed lighthouse 6.25%.

Note:

NRSAttenBeam= Neuropsychological Rehabilitation Strategies in Attention is Attention Beam

NRSAttenLight= Neuropsychological Rehabilitation Strategies in Attention is Lighthouse

NRSAttenRED= Neuropsychological Rehabilitation Strategies in Attention is Reducing External Distracttion

NRSAttenRID= Neuropsychological Rehabilitation Strategies in Attention is Reducing Internal Distracttion

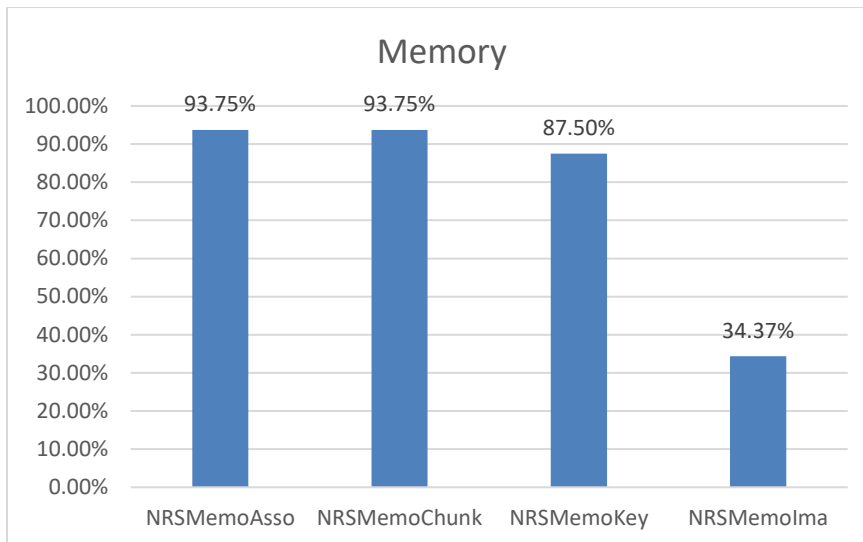


Fig.3. Memory-related strategies preference percentage

Fig.3 describes that making an association is chosen 93.75% and visual imagery is 34.37%.

Note:

NRSMemoAsso= Neuropsychological Rehabilitation Strategies in Memory is Making Association

NRSMemoChunk= Neuropsychological Rehabilitation Strategies in Memory is Chunking

NRSMemoKey= Neuropsychological Rehabilitation Strategies in Memory is Key Words

NRSMemoIma= Neuropsychological Rehabilitation Strategies in Memory is Visual Imagery

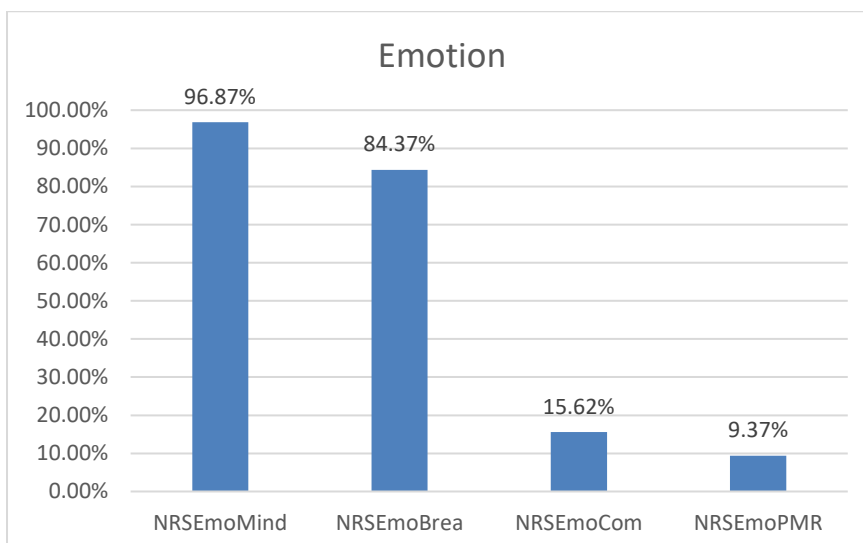


Fig.4. Emotion-related strategies preference percentage

Fig. 4 mentions that two strategies were chosen more like mindfulness 96.87%, calming breaths 84.37%, and two strategies were less like compassionate imagery 15.62%, progressive muscle relaxation 9.37%.

Note:

NRSEmoMind= Neuropsychological Rehabilitation Strategies in Emotion is Mindfulness

NRSEmoBrea= Neuropsychological Rehabilitation Strategies in Emotion is Calming Breaths

NRSEmoCom= Neuropsychological Rehabilitation Strategies in Emotion is Compassionate Imagery

NRSEmoPMR= Neuropsychological Rehabilitation Strategies in Emotion is Progressive Muscle Relaxation

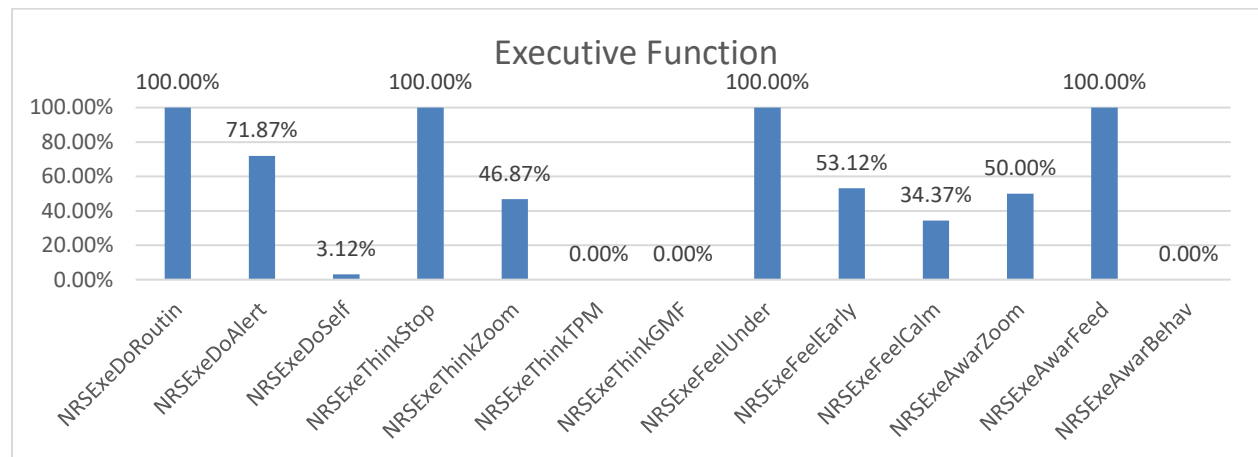


Fig.5. Executive Function-related strategies preference percentage

Fig. 5 explains that four strategies are 100% chosen, like structured routines, stop/think, understanding the problem, and feedback. Three strategies are 0% chosen, like time pressure management, goal management framework, and behavioral experiments.

Note:

NRSExeDoRoutin= Neuropsychological Rehabilitation Strategies in Executive Function at Energization (Doing) is Structured Routines

NRSExeDoAlert= Neuropsychological Rehabilitation Strategies in Executive Function at Energization (Doing) is Alerts

NRSExeDoSelf= Neuropsychological Rehabilitation Strategies in Executive Function at Energization (Doing) is Self-Instruction

NRSExeThinkStop= Neuropsychological Rehabilitation Strategies in Executive Function at Executive Cognition (Thinking) is Stop/Think

NRSExeThinkZoom= Neuropsychological Rehabilitation Strategies in Executive Function at Executive Cognition (Thinking) is Zoom In/Out

NRSExeThinkTPM= Neuropsychological Rehabilitation Strategies in Executive Function at Executive Cognition (Thinking) is Time Pressure Management

NRSExeThinkGMF= Neuropsychological Rehabilitation Strategies in Executive Function at Executive Cognition (Thinking) is Goal Management Framework

NRSExeFeelUnder= Neuropsychological Rehabilitation Strategies in Executive Function at Emotional and Behavioral Self-Regulation (Feeling and Acting) is Understanding the problem

NRSExeFeelEarly= Neuropsychological Rehabilitation Strategies in Executive Function at Emotional and Behavioral Self-Regulation (Feeling and Acting) is Recognizing Early signs of rising emotion

NRSExeFeelCalm= Neuropsychological Rehabilitation Strategies in Executive Function at Emotional and Behavioral Self-Regulation (Feeling and Acting) is Using Calming Strategies

NRSExeAwarZoom= Neuropsychological Rehabilitation Strategies in Executive Function at Metacognition (Awareness and Socialization) is Zoom In/Out

NRSExeAwarFeed= Neuropsychological Rehabilitation Strategies in Executive Function at Metacognition (Awareness and Socialization) is Feedback

NRSExeAwarBeha= Neuropsychological Rehabilitation Strategies in Executive Function at Metacognition (Awareness and Socialization) is Behavioral Experiments

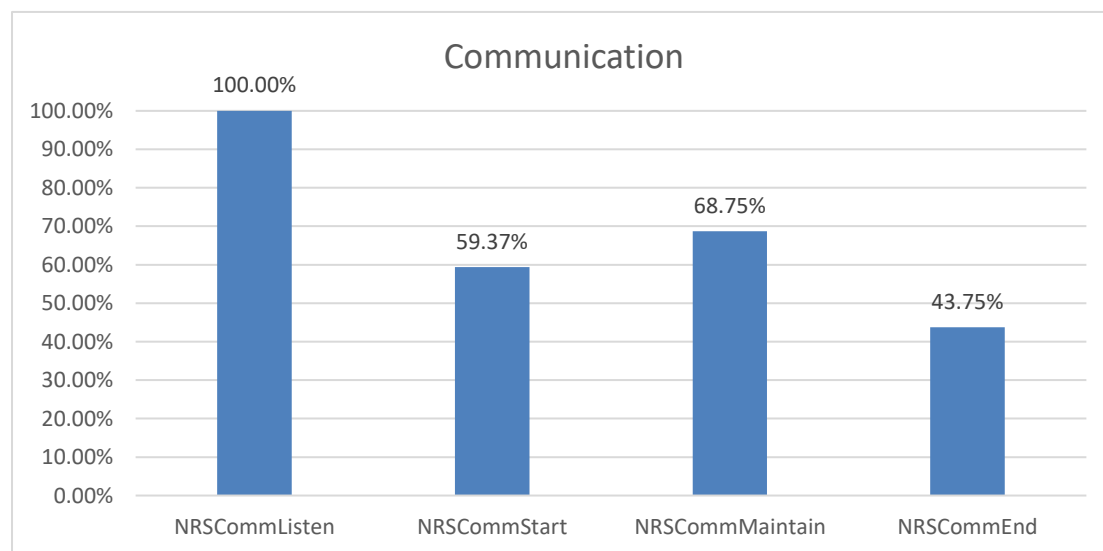


Fig.6. Communication-related strategies preference percentage

Fig. 6 describes in communication strategies chosen, on average, like active listening 100%, maintaining conversation, and taking turns 68.75%, starting conversation 59.37%, and ending conversation 43.75%.

Note:

NRSCommListen= Neuropsychological Rehabilitation Strategies in Executive Function at Communication is Active Listening

NRSCommStart= Neuropsychological Rehabilitation Strategies in Executive Function at Communication is Starting Conversations

NRSCommMaintain= Neuropsychological Rehabilitation Strategies in Executive Function at Communication is Maintaining Conversations and Taking Turns

NRSCommEnd= Neuropsychological Rehabilitation Strategies in Executive Function at Communication is Ending Conversations

Table 4. High strength and low strength patents mean difference

Strategy	High Strength n=8 (ACE III Score > 72.5)	%	Low Strength n=24 (ACE III Score < 72.5)	%
NRSAttenBeam	8	100	24	100
NRSAttenLight	2	25	0	0
NRSAttenRED	6	75	19	79.17%
NRSAttenRID	4	50	13	54.17%
NRSMemoAsso	8	100	23	95.83%
NRSMemoChunk	8	100%	23	95.83%
NRSMemoKey	7	87.5%	22	91.67%
NRSMemoIma	3	37.5%	8	33.33%
NRSEmoMind	8	100%	24	100%
NRSEmoBrea	8	100%	20	83.33%
NRSEmoCom	4	50%	2	8.33%
NRSEmoPMR	2	25%	1	4.17%
NRSExeDoRoutin	8	100%	24	100%
NRSExeDoAlert	6	75%	17	70.83%
NRSExeDoSelf	1	12.5%	0	0%
NRSExeThinkStop	8	100%	24	100%
NRSExeThinkZoom	4	50%	11	45.83%
NRSExeThinkTPM	0	0%	0	0%
NRSExeThinkGMF	0	0%	0	0%
NRSExeFeelUnder	8	100%	24	100%
NRSExeFeelEarly	6	75%	11	45.83%
NRSExeFeelCalm	3	37.5%	8	33.33%
NRSExeAwarZoom	7	87.5%	9	37.50%
NRSExeAwarFeed	8	100%	24	100%
NRSExeAwarBehav	0	0%	0	0%
NRSCommListen	8	100%	24	100%

NRSCommStart	4	50%	15	62.50%
NRSCommMaintain	7	87.5%	15	62.50%
NRSCommEnd	3	37.5%	11	45.83%

	Low Strength	High Strength
	Mean	Mean
Number of strategies preferred	17	19

Hypothesis Test Summary

	Null Hypothesis	Test	Sig. ^{a,b}	Decision
1	The distribution of Number of strategies preferred is the same across categories of ACE_Type.	Independent-Samples Mann-Whitney U Test	.220 ^c	Retain the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.

c. Exact significance is displayed for this test.

Independent-Samples Mann-Whitney U Test Summary	
Total N	32
Mann-Whitney U	125.000
Wilcoxon W	161.000
Test Statistic	125.000
Standard Error	22.828
Standardized Test Statistic	1.270
Asymptotic Sig.(2-sided test)	.204
Exact Sig.(2-sided test)	.220

Table. 4 indicates that there is no mean difference between strength and non-strength patients

Table 5. Both depressed and non-depressed of stroke patients 100% choose the neuropsychological strategies, attention beam, mindfulness, structured routines, stop/think, understanding the problem, and feedback. Making association and chunking 96.15% in non-depressed patients.

Table 5. Depressed and Non- Depressed patients preference

Strategy	Depressed n=6 (DASS D > 4)	%	Non-Depressed n=26 (DASS D < 5)	%
NRSAttenBeam	6	100.00%	26	100.00%

NRSAttenLight	0	0.00%	2	7.69%
NRSAttenRED	4	66.67%	21	80.77%
NRSAttenRID	4	66.67%	13	50.00%
NRSMemoAsso	6	100.00%	25	96.15%
NRSMemoChunk	6	100.00%	25	96.15%
NRSMemoKey	5	83.33%	24	92.31%
NRSMemoIma	0	0.00%	11	42.31%
NRSEmoMind	6	100.00%	26	100.00%
NRSEmoBrea	5	83.33%	23	88.46%
NRSEmoCom	0	0.00%	6	23.08%
NRSEmoPMR	1	16.67%	2	7.69%
NRSExeDoRoutin	6	100.00%	26	100.00%
NRSExeDoAlert	3	50.00%	20	76.92%
NRSExeDoSelf	0	0.00%	1	3.85%
NRSExeThinkStop	6	100.00%	26	100.00%
NRSExeThinkZoom	2	33.33%	13	50.00%
NRSExeThinkTPM	0	0.00%	0	0.00%
NRSExeThinkGMF	0	0.00%	0	0.00%
NRSExeFeelUnder	6	100.00%	26	100.00%
NRSExeFeelEarly	3	50.00%	14	53.85%
NRSExeFeelCalm	0	0.00%	11	42.31%
NRSExeAwarZoom	2	33.33%	14	53.85%
NRSExeAwarFeed	6	100.00%	26	100.00%
NRSExeAwarBehav	0	0.00%	0	0.00%
NRSCommListen	6	100.00%	26	100.00%
NRSCommStart	2	33.33%	17	65.38%
	1	16.67%	13	50.00%
NRSCommMaintain				

Table 6. Anxious and Non Anxious patients preferences

Strategy	Anxious (DASS A > 3) n=8	%	Non-Anxious n=24 (DASS A < 4)	%
NRSAttenBeam	8	100%	24	100%
NRSAttenLight	0	0%	2	8.33%
NRSAttenRED	6	75%	19	79.17%
NRSAttenRID	4	50%	13	54.17%
NRSMemoAsso	8	100%	23	95.83%
NRSMemoChunk	8	100%	23	95.83%
NRSMemoKey	7	87.5%	22	91.67%
NRSMemoIma	0	0%	11	45.83%
NRSEmoMind	8	100%	24	100%
NRSEmoBrea	7	87.5%	21	87.5%
NRSEmoCom	1	12.5%	5	20.83%
NRSEmoPMR	1	12.5%	2	8.33%
NRSExeDoRoutin	8	100%	24	100%
NRSExeDoAlert	6	75%	17	70.83%
NRSExeDoSelf	0	0%	1	4.17%
NRSExeThinkStop	8	100%	24	100%
NRSExeThinkZoom	3	37.5%	12	50%
NRSExeThinkTPM	0	0%	0	0%
NRSExeThinkGMF	0	0%	0	0%
NRSExeFeelUnder	8	100%	24	100%
NRSExeFeelEarly	4	50%	13	54.17%
NRSExeFeelCalm	1	12.5%	10	41.67%
NRSExeAwarZoom	4	50%	12	50%
NRSExeAwarFeed	8	100%	24	100%
NRSExeAwarBehav	0	0%	0	0%
NRSCommListen	8	100%	24	100%
NRSCommStart	3	37.5%	16	66.67%
NRSCommMaintain	5	62.5%	17	70.83%

Table 6. Both anxious and non-anxious stroke patients 100% choose the neuropsychological strategies, attention beam, mindfulness, structured routines, stop/think, understanding the problem, feedback, and active listening. Making associations and chunking 95.83% in non-anxious patients.

Table 7. Non-stressed of stroke patients 100% choose the neuropsychological strategies, attention beam, mindfulness, structured routines, stop/think, understanding the problem,

feedback, and active listening. Making associations and chunking 95.83% in non-anxious patients.

Table 7. Stressed and Non-stressed patients preference

Strategy	Stressed (DASS S > 7)	n=0 %	Not n=32 (8)	Stressed (DASS S < 8) %
NRSAttenBeam	0	0%	32	100%
NRSAttenLight	0	0%	2	6.25%
NRSAttenRED	0	0%	25	78.12%
NRSAttenRID	0	0%	17	53.12%
NRSMemoAsso	0	0%	31	96.88%
NRSMemoChunk	0	0%	31	96.88%
NRSMemoKey	0	0%	29	90.62%
NRSMemoIma	0	0%	11	34.37%
NRSEmoMind	0	0%	32	100%
NRSEmoBrea	0	0%	28	87.5%
NRSEmoCom	0	0%	6	18.75%
NRSEmoPMR	0	0%	3	9.37%
NRSExeDoRoutin	0	0%	32	100%
NRSExeDoAlert	0	0%	23	71.88%
NRSExeDoSelf	0	0%	1	3.12%
NRSExeThinkStop	0	0%	32	100%
NRSExeThinkZoom	0	0%	15	46.87%
NRSExeThinkTPM	0	0%	0	0%
NRSExeThinkGMF	0	0%	0	0%
NRSExeFeelUnder	0	0%	32	100%
NRSExeFeelEarly	0	0%	17	53.15
NRSExeFeelCalm	0	0%	11	34.38%
NRSExeAwarZoom	0	0%	16	50%
NRSExeAwarFeed	0	0%	32	100%
NRSExeAwarBehav	0	0%	0	0%
NRSCommListen	0	0%	32	100%
NRSCommStart	0	0%	19	59.37%
NRSCommMaintain	0	0%	22	68.75%

CHAPTER FOUR

DISCUSSION

The general objective of the study was to investigate the neuropsychological rehabilitation plan for stroke patients in Bangladesh. In the rehabilitation plan, some strategies were offered to choose from.

Table 3. Indicate the maximum number of patients preferred in attention strategies (attention beam 100%), in memory (making association 93.75%), in emotion (mindfulness 96.87%), in executive functions energization or doing (structured routines 100%), cognition or thinking (stop/think 100%), emotional and behavioral self-regulation/feeling and acting (understanding the problem 100%), metacognition/awareness and socialization (feedback 100%), in communication (active listening 100%).

Fig. 2. In attention rehabilitation, the attention beam strategies are preferred by 100%. It's like a flashlight. Focusing on something other. Reducing the external distraction strategy by 75%.

Fig. 3. Memory-related strategies were more preferable, like making an association 93.75%, chunking 93.75%, and keywords 87.50%.

Fig. 4. In emotion management, mindfulness is 96.87%, calming breaths are 84.37%.

Fig. 5. The patients were less familiar with executive functions, and more strategies were preferred from here.

Fig. 6. In communication, active listening is 100%, and maintaining conversation and taking turns is 68.75%.

Table 4. High strength and low strength, there is no mean difference in preferred strategies.

Table 5. Both depressed and non-depressed of stroke patients 100% choose the neuropsychological strategies, attention beam, mindfulness, structured routines, stop/think, understanding the problem, and feedback. Making association and chunking 96.15% in non-depressed patients.

Table 6. Both anxious and non-anxious stroke patients 100% choose the neuropsychological strategies, attention beam, mindfulness, structured routines, stop/think, understanding the problem, feedback, and active listening. Making associations and chunking 95.83% in non-anxious patients.

Table 7. Non-stressed stroke patients 100% choose the neuropsychological strategies, attention beam, mindfulness, structured routines, stop/think, understanding the problem, feedback, and active listening. Making associations and chunking 95.83% in non-anxious patients.

Neuropsychological Rehabilitation Plan:

- a. Assessment: For the assessment of this study, the Addenbroke's Cognitive Examination (ACE-III), DASS-21 (Depression Anxiety Stress Scale) Bangla Version, and demographic questionnaires were used.
- b. Formulation: The formulation will be done based on the assessment.
- c. Goal Setting: The goal will be set with the collaboration of patients, caregivers, and the professional.
- d. Neuropsychological Rehabilitation Strategies: A randomized twenty-nine strategies were offered to the patients to prefer in the domain of attention, memory, emotion, executive functions, and communication.
- e. Individual and Group Management: For better outcomes, the individual and group management will help.
- f. Families and Caregivers Management: With the management of patients, the families and caregivers are also included.
- g. Implementation: The study planned the neuropsychological rehabilitation strategies and in further research requires the implementation.
- h. Evaluation: After implementation, the evaluation will help with the next goal setting.

Neuropsychological Rehabilitation Plan:

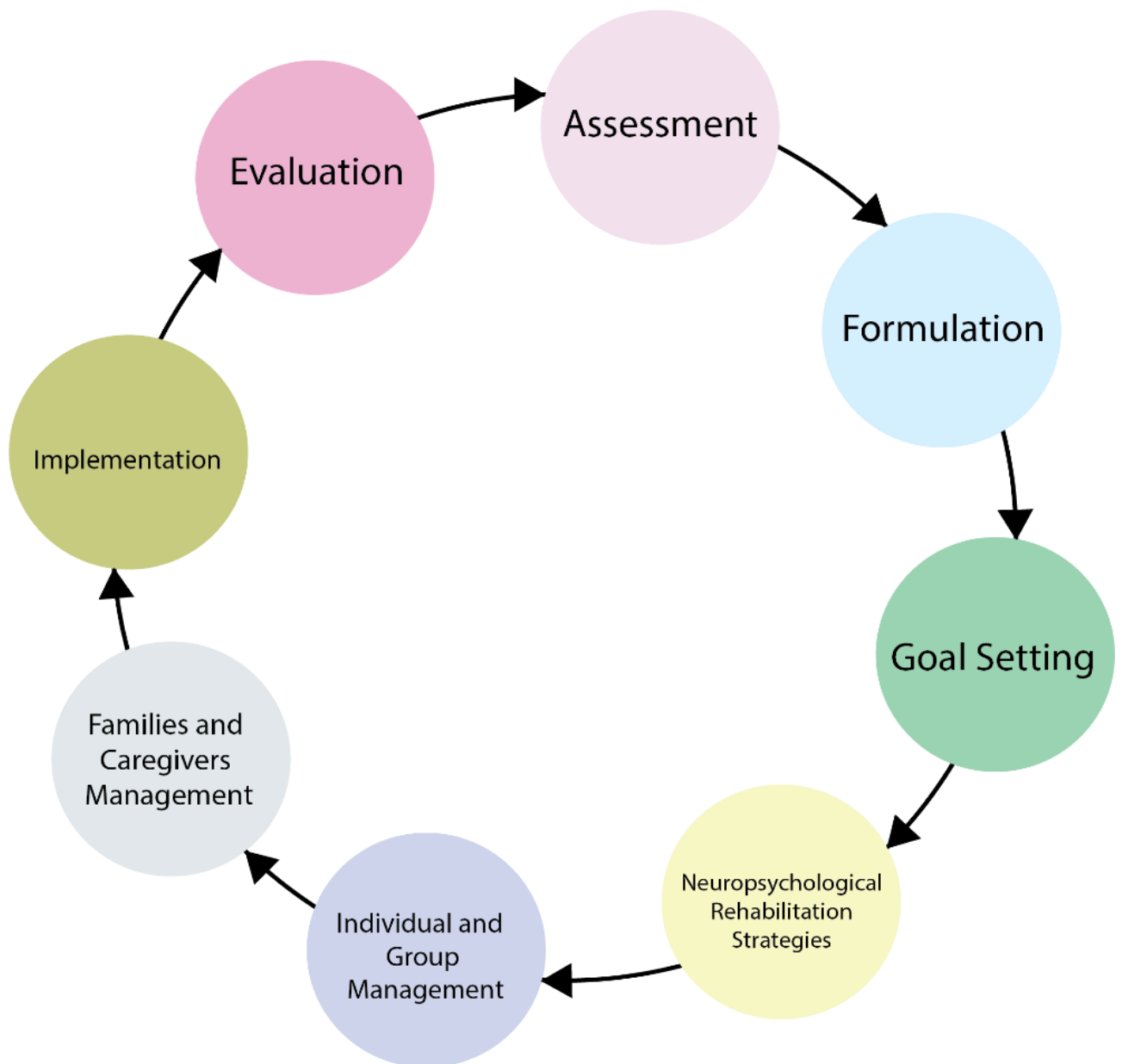


Fig.7. Neuropsychological Rehabilitation Plan

4.1 LIMITATION

The sample size was small, and only the assessment and neuropsychological rehabilitation strategies chosen were done. The rest of the planned domains were undone, like individual and group management, families and caregivers management, implementation, and evaluation.

Recommendation: With the limitations recommended for implementation, the neuropsychological rehabilitation strategies in further researched and evaluated.

Generative AI statement: In this study, Gen AI was not used in the creation of this manuscript.

4.2 CONCLUSION

Stroke leads to physical and psychological disability, and has very limited resources for recovery and rehabilitation. Moreover, without neuropsychological rehabilitation, all disability will be more complex. In Bangladesh, there is no neuropsychological rehabilitation. So this study will help with further processing of the establishment of neuropsychological rehabilitation. In this study, assessment and neuropsychological rehabilitation strategies were chosen by the patients. For further research, the rest of the plan will be conducted like formulation, goal setting, individual and group management, families and caregivers management, implementation, and evaluation.

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APPENDICES

Demographic Information

General Information

Patient ID: _____

Sex :

Male	Female
------	--------

 Age : _____

Address : _____ Phone: _____

Educational Qualification:

Below SSC	SSC	HSC	BA/Hon's	MA/Higher
-----------	-----	-----	----------	-----------

Occupation:

Job	Business	Others
-----	----------	--------

Socio-economic status:

Lower Middle Class	Middle Class	Higher Middle Class
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Religion :

Islam	Hindu	Christian	Buddhist
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Marital Status :

Married	Unmarried	Divorce	Widow
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Habitant:

Rural	Semi Rural	Urban
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Family pattern:

Single	Joint
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Family relationship: _____

Clinical Information

Diagnosis: _____

First date of incident: _____

Date of Experiment : _____

Duration: _____

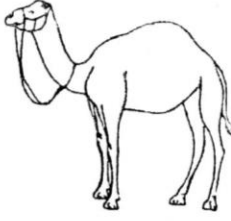
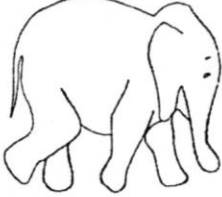
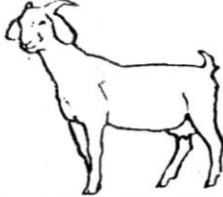
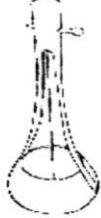
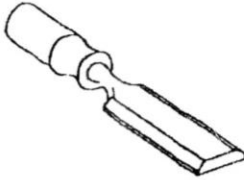
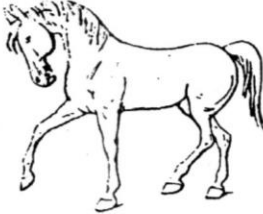
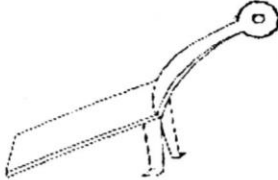
Types of stroke: _____

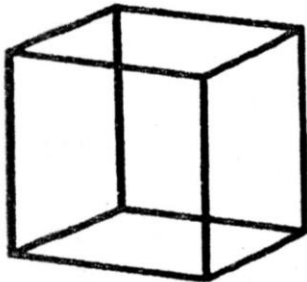
Previous treatments: _____

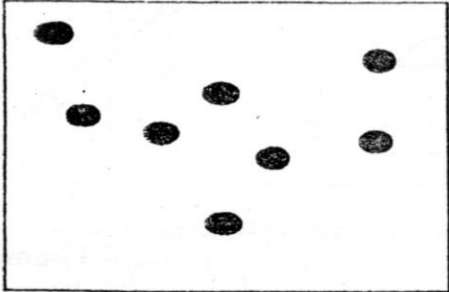
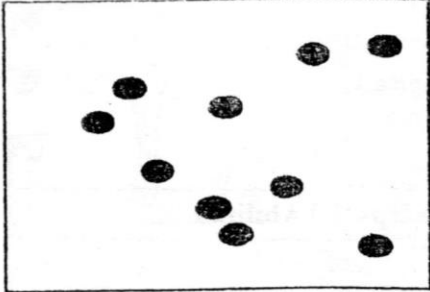
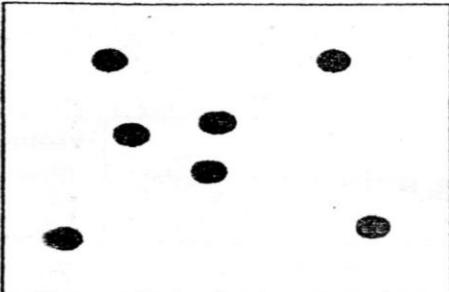
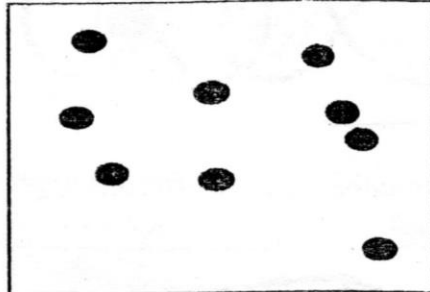
Addenbroke's Cognitive Examination - ACE – III (Bangladesh Version 2016) Shahnur Hossain, Dr. David Queen, Sirajum Monira, Md. Zayeed Bin Alam Department of Clinical Psychology, University of Dhaka, Bangladesh						
নাম: জন্ম তারিখ: হাসপাতাল নং/ ঠিকানা: বয়স (বছর): শিক্ষা: ভাষা:	পরীক্ষার তারিখ: পরীক্ষকের নাম: পূর্বকালীন শিক্ষা ত্যাগ করার সময়কার বয়স: পেশা: ডান/ বাম হাতি:					
Attention						
➤Ask: এটা কোন/ আজ কত	দিন	তারিখ	মাস	সাল	ঋতু	Attention [Score 0 – 5] Attention [Score 0 – 5]
➤Ask: এটা কোন/ কত	তলা	হাসপাতাল/রাস্তা	শহর/জেলা	বিভাগ	দেশ	[Score 0 – 5]
Attention						
➤Tell the subject: “আমি আপনাকে তিনটি শব্দ বলব, আমার বলা হয়ে গেলে, আপনি শব্দগুলো বলবেন - লেবু, চাঁবি, বল। এই শব্দগুলো মনে রাখার চেষ্টা করুন, আমি কিছুক্ষণ পর আবার জিজ্ঞেস করবো।” Score only the first trial (repeat 3 times if necessary). Register number of trials						Attention [Score 0 – 3]
Attention						
➤Ask the subject: “একশো (১০০) থেকে সাত (৭) বাদ দিলে কত হয়?” After that subject responds, “আপনি এরকম করে প্রতিবার সাত (৭) বাদ দিতে থাকবেন, যতক্ষণ না আমি থামতে বলবো।” ➤If subject makes a mistake, do not stop them. Let the subject carry on and check the subsequent answers (i.e. 93, 84, 77, 70, 63 – score 4) ➤Stop after five subtractions (93, 86, 79, 72, 65)						Attention [Score 0 – 5]
Memory						
➤Say: “কিছুক্ষণ আগে আমি যে তিনটি শব্দ আপনাকে মনে রাখতে বলেছিলাম তা বলুন -”						Attention [Score 0 – 3]

Fluency					
➤ অক্ষর Say: আমি আপনাকে একটি অক্ষর বলব, সে অক্ষরটি দিয়ে কোন ব্যক্তি বা জায়গার নাম ছাড়া যতগুলো বাংলা শব্দ বলতে পারেন তা বলতে হবে। যেমন - আমি যদি আপনাকে 'ল' অক্ষর দিয়ে শব্দ বলতে বলি তবে লাল, লোভ, ললনা ইত্যাদি শব্দ বলতে পারেন কিন্তু লালমনিরহাট/ লালবাগ, লতিফ এ জাতীয় শব্দ বলা যাবে না। আপনি কি বুঝতে পেরেছেন? আপনার জন্য নির্ধারিত অক্ষর 'প', যা দিয়ে ১ মিনিটের মধ্যে যতগুলো বাংলা শব্দ বলতে পারেন বলুন।					Fluency [Score 0 – 7]
					>14 7 12 – 13 6 10 – 11 5 8 – 9 4 7 3 6 2 4 – 5 1 3 0 Total Correct
➤ জন্তু/প্রাণী/পত Say: “আপনি যতগুলো পত পাখির/প্রাণীর নাম জানেন বলুন, সেটা যেকোন অক্ষর দিয়ে শুরু হতে পারে। আপনার জন্য সময় ১ মিনিট।					Fluency [Score 0 – 7]
					>14 7 12 – 13 6 10 – 11 5 8 – 9 4 7 3 6 2 4 – 5 1 3 0 Total Correct
Memory					
➤ Tell: আমি আপনাকে একজনের নাম, ঠিকানা বলব। আমার বলা শেষ হলে, আপনি নিজের সেই নাম, ঠিকানা বলবেন, যেন আপনি সেটা মনে রাখতে পারেন। আমরা এভাবে তিনবার চর্চা করব। পরবর্তীতে আমি আপনাকে এই নাম, ঠিকানা আবার জিজ্ঞাসা করব। Score only the third trial					Memory [Score 0 – 7]
শরিফ হাসান ৭৩ মিরপুর রোড ধানমন্ডি ঢাকা	1st Trial 	2nd Trial 	3rd Trial 		
Memory					
➤ ১৯৭৫ সালের আগস্ট মাসে বাংলাদেশের কোন স্বাধীনতা সংগ্রামীকে হত্যা করা হয়েছিল? ➤ বাংলাদেশের প্রথম প্রধানমন্ত্রীর নাম কি? ➤ বাংলাদেশ জাতীয় সংসদের প্রথম মহিলা স্পীকারের নাম কি? ➤ আমেরিকার বর্তমান রাষ্ট্রপতির নাম কি?					Memory [Score 0 – 4]

Language	
➤ Place a pencil and a piece of paper in front of the subject. As a practical trial, ask the subject, “পেন্সিল তুলুন তারপর কাগজটা তুলুন”। If incorrect, score 0 and do not continue further. ➤ If the subject is correct on the practice trial, continue with the following three commands below. • Ask the subject to “কাগজটা পেন্সিলের ওপরে রাখুন” • Ask the subject to “পেন্সিলটা তুলুন কিন্তু কাগজটাকে নয়” • Ask the subject to “পেন্সিলটা আমায় দিয়ে দিন কাগজটাকে ছোঁয়ার পর”	Language [Score 0 – 3]
Language	
➤ Tell: সর্বশেষ ছুটির দিন/ ঈদ/ নববর্ষ কিভাবে কাটিয়েছেন তা সম্পর্কে দুই বা ততোধিক পূর্ণ বাক্য লিখুন। পূর্ণ শব্দ ব্যবহার করে সম্পূর্ণ বাক্য লিখবেন। Give 1 point if there are 2 (or more) complete sentences about the one topic; and give another 1 point if grammar and spelling are correct.	Language [Score 0 – 2]
Language	
➤ Tell: “আমি আপনাকে একটা শব্দ বলবো। আমার বলা শেষ হলে আপনি সেটা আবার বলবেন। এরকম করে আমি কয়েকটা শব্দ বলবো আর প্রতিবার শোনার পর আপনি শব্দটা আবার বলবেন।” Tell: ‘অপব্যবহার’ ‘আজ্ঞানুবর্তী’ ‘অনালোচনীয়’ ‘স্থিতিস্থাপক’ Score 2 if all correct; 1 if 3 are correct; score 0 if 2 or less are correct.	Language [Score 0 – 2]
Language	
➤ Tell: “আমি আপনাকে একটা বাক্য বলবো আমার বলা শেষ হলে আপনিও সেটা পুনরায় বলবেন” “চকচক করলেই সোনা হয় না”	Language [Score 0 – 1]
➤ Tell: “আমি আপনাকে আবার একটা বাক্য বলবো। আমার বলা শেষ হলে আপনিও সেটা পুনরায় বলবেন” “সময়ের এক ফোঁড় অসময়ের দশ ফোঁড়”	Language [Score 0 – 1]

Language		
➤ Tell: আপনি নিচের ছবিগুলোর নাম বলুন		
		
		
		
		
Language		
➤ Using the pictures above, tell the subject উপরের এই ছবিগুলোর মধ্যে কোনটা - • কৃষিকাজের সাথে জড়িত - • আরবদেশে দেখা যায় - • কাঠমিস্ত্রির কাজে ব্যবহৃত হয় - • যাতায়াতের সাথে জড়িত -		
Language		
[Score 0 - 12]		
[Score 0 - 4]		

Language	
➤ Tell: “এই শব্দগুলো পড়ুন” [Score 1 only if all corrected] রশ্মি বিল্ব ধ্বনি ভস্ম শ্বেত	Language [Score 0 – 1]
Visuo Spatial Abilities	
➤ Infinity diagram: Tell: “এই ছবিটা দেখে আঁকুন”	Visuospatial [Score 0 – 1]
	
➤ Wire cube: Tell: “এই ছবিটা দেখে আঁকুন” (For scoring, see instructions guide).	Visuospatial [Score 0 – 2]
	
➤ Say: কাঁটা ও সংখ্যাসহ এমনভাবে একটি ঘড়ি আঁকুন, যেটা পাঁচটা বেজে দশ মিনিট নির্দেশ করবে। For scoring see instruction guide: circle = 1, numbers = 2, hands = 2 if all correct	Visuospatial [Score 0 – 5]

Visuo Spatial Abilities		Visuospatial [Score 0 – 4]
➤ Tell: “এক একটা বক্স এ কয়টি করে বিন্দু আছে, আঙুল ব্যবহার না করে গুনে বলুন।”		
		
		
Visuo Spatial Abilities		Visuospatial [Score 0 – 4]
➤ Tell: “এই অক্ষরগুলো কি বলতে পারবেন?”		
		
		

Memory					
> Say: কিছুক্ষণ আগে আমরা একজনের নাম ও ঠিকানা বলেছিলাম, সেটার যা যা মনে আছে বলুন।					
শরিফ হাসান ৭৩ মিরপুর রোড ধানমন্ডি ঢাকা				Memory [Score 0 – 7] 	
Memory					
> This test should be done if subject failed to recall one or more items. If all items were recalled, skip the test and score 5. If only part is recalled start by ticking items recalled in the shadowed column on the right hand side. Then test not recalled items by telling “ok”, I’ll give you some hints: was the name X, Y, Z? and so on. Each recognized scores one point which is added to the point gained by recalling.				Memory [Score 0 – 5] 	
শরিফ ইসলাম		শরিফ হাসান		শ্যামল মিত্র	Recalled
৫৩		৭৩		৩৭	Recalled
মিন্টো রোড		সাতমসজিদ রোড		মিরপুর রোড	Recalled
উত্তরা		ধানমন্ডি		লালবাগ	Recalled
ঢাকা		কুমিল্লা		রাজশাহী	Recalled
Score					
Total ACE – III Score					/100
Attention					/18
Memory					/26
Fluency					/14
Language					/26
Visuospatial					/16

ডাস - ২১ (বাংলা ভার্সন) (DASS - 21 BV)

নাম: _____ তারিখ: _____

অনুগ্রহ করে নিচের প্রতিটি বিবৃতি পড়ুন এবং ০, ১, ২ অথবা ৩ এর মধ্যে গত সপ্তাহব্যাপী আপনার জন্য প্রযোজ্য যেকোন একটি সংখ্যায় গোল চিহ্ন দিন।
এখানে কোন সঠিক বা ভুল উত্তর নেই। কোন বিবৃতির জন্য বেশি সময় ব্যয় করবেন না।

মানদণ্ডটি (রেটিং স্কেল) নিম্নরূপ:

০ আমার জন্য একেবারেই প্রযোজ্য নয়

১ আমার জন্য অল্পমাত্রায় বা কখনো কখনো প্রযোজ্য

২ আমার জন্য বেশ কিছুমাত্রায় বা বেশখানিকটা সময়ের জন্য প্রযোজ্য

৩ আমার জন্য খুব বেশি বা বেশিরভাগ সময়ের জন্য প্রযোজ্য

১. কোন উচ্চতা বা উত্তেজনামূলক কাজের পর আরামণায়ক অবস্থায় ফিরে আসা আমার জন্য কঠিন ছিল	০	১	২	৩	
২. আমি বুঝতে পারতাম যে আমার গলা শুকিয়ে আসছে	০	১	২	৩	
৩. ইতিবাচক কোন অনুভূতি আমার মধ্যে কাজ করত না।	০	১	২	৩	
৪. আমার শ্বাসকষ্টের অনুভূতি হত (যেমন অতিদ্রুত শ্বাসপ্রশ্বাস, শারীরিক পরিশ্রম ছাড়াই নিঃশ্বাস বন্ধ হয়ে আসা)	০	১	২	৩	
৫. নিজে উদ্যোগী হয়ে কোন কাজ শুরু করা আমার জন্য কঠিন হত।	০	১	২	৩	
৬. আমার মধ্যে বিভিন্ন পরিস্থিতিতে অতিরিক্ত প্রতিক্রিয়া করার প্রবণতা ছিল।	০	১	২	৩	
৭. আমার শরীর কাঁপার অভিজ্ঞতা হয়েছিল (যেমন হাত কাঁপা)।	০	১	২	৩	
৮. আমার মনে হত যে আমি খুব বেশী শ্লথ চাপে ভুগছি।	০	১	২	৩	
৯. আমি এমন পরিস্থিতি সম্পর্কে দুটিমুহুর্ত ছিলাম যেখানে আমি তীব্রভাবে আতঙ্কিত হতে পারি এবং এমন কোন কাজ করতে পারি যাতে অন্যরা আমাকে বোকা মনে করবে।	০	১	২	৩	
১০. আমার মনে হচ্ছিল, ভবিষ্যতে আমার ভাল কিছুই আশা নাই।	০	১	২	৩	
১১. আমি অনুভব করতাম যে আমি খুব অস্থির হয়ে যাচ্ছি।	০	১	২	৩	
১২. আরামবোধ করা আমার জন্য কঠিন হত।	০	১	২	৩	
১৩. আমি মনমরা এবং বিষন্ন অনুভব করতাম।	০	১	২	৩	
১৪. আমার কাজে বাধা হয় এমন যেকোন জিনিসই আমার কাছে অসহ্য লাগত।	০	১	২	৩	
১৫. আমার মনে হত এই বুঝি আমি হঠাৎ তীব্রভাবে আতঙ্কিত হচ্ছি।	০	১	২	৩	
১৬. কোন কিছুতেই আমি বেশী আগ্রহী হতে পারতাম না।	০	১	২	৩	
১৭. আমি অনুভব করতাম ব্যক্তি হিসেবে আমার বিশেষ কোন মূল্য নেই।	০	১	২	৩	
১৮. আমি অনুভব করতাম আমি একটুতেই মনে ব্যাথা পাই।	০	১	২	৩	
১৯. শারীরিক পরিশ্রম না করলেও আমি হৃদপিণ্ডের কাজ করা বুঝতে পারতাম (যেমন হৃদস্পন্দন বৃদ্ধির অনুভূতি বা বুক ধরফর করা, হৃদপিণ্ডের স্পন্দনে ব্যাঘাত)	০	১	২	৩	
২০. যথার্থ কারণ ছাড়াই আমি ভীত - সন্ত্রস্ত বোধ করতাম	০	১	২	৩	
২১. জীবনটা অর্থহীন বলে মনে হত।	০	১	২	৩	

মোট

D	A	S
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	Depression	Anxiety	Stress
Normal	0 - 4	0 - 3	0 - 7
Mild	5 - 6	4 - 5	8 - 9
Moderate	7 - 10	6 - 7	10 - 12
Severe	11 - 13	8 - 9	13 - 16
Extremely Severe	14+	10+	17+

Translated and Validated by Dr S M Abu Hena Mostafa Alim, BSMMU, Bangladesh

Neuropsychological Rehabilitation Strategies

1. Attention

- a. Attention beam: Like flashlight
- b. Lighthouse:
- c. Reducing External Distraction:
- d. Reducing Internal Distraction:

2. Memory

- a. Making Association:
- b. Chunking:
- c. Key Words:
- d. Visual Imagery:

3. Emotion

- a. Mindfulness
- b. Calming Breaths
- c. Compassionate Imagery
- d. Progressive Muscle Relaxation

4. Executive Functions

- a. Energization (Doing)
 - i. Structured Routines
 - ii. Alerts
 - iii. Self Instruction
- b. Executive Cognition (Thinking)
 - i. Stop/Think
 - ii. Zoom In/Out
 - iii. Time Pressure Management
 - iv. Goal Management Frame Work
- c. Emotional and Behavioral Self-Regulation (Feeling and Acting)
 - i. Understanding the problem
 - ii. Recognizing early signs of rising emotion.
 - iii. Using Calming strategies
- d. Metacognition (Awareness and Socializing)
 - i. Zoom In/Out
 - ii. Feedback
 - iii. Behavioral Experiments

5. Communication

- a. Active Listening
- b. Starting Conversations
- c. Maintaining Conversations and Taking Turns
- d. Ending Conversations

গবেষণায় অংশগ্রহণের সম্মতিপত্র

আমি মোঃ হাফিজুর রহমান, ঢাকা বিশ্ববিদ্যালয় এর ক্লিনিক্যাল সাইকোলজি বিভাগের এম. ফিল ডিগ্রির অংশ হিসাবে অধ্যাপক ড. মুহাম্মদ মাহমুদুর রহমান এবং অধ্যাপক কামাল উদ্দিন আহমেদ চৌধুরী এর তত্ত্বাবধানে বর্তমান গবেষণাটি পরিচালনা করছি। গবেষণার বিষয় হচ্ছে” Developing neuropsychological rehabilitation plan for stroke patients in Bangladesh.” গবেষণার উদ্দেশ্য হলঃ stroke রোগীদের মনযোগ, স্মৃতিশক্তি, আবেগ, সমস্যা সমাধানের ক্ষমতা ফিরিয়ে আনার জন্য কোন্ ধরনের রিহ্যাবিলিটেশন পরিকল্পনা করা যেতে পারে তা দেখা।

এ ব্যাপারে আপনার সহযোগীতা এবং অংশগ্রহণ একান্তভাবে কামনা করছি। গবেষণায় অংশগ্রহণের ফলে আপনার কোন প্রকার ক্ষতি হওয়ার আশংকা নেই। এই গবেষণায় আপনি যেসব তথ্য দিবেন তা সম্পূর্ণ গোপন রাখা হবে এবং তা কেবল গবেষণার কাজেই ব্যবহার করা হবে। এই সম্মতিপত্রের একটি কপি আপনার কাছে সংরক্ষণের জন্য দেওয়া হবে। এই গবেষণা সংক্রান্ত আপনার যদি কোন প্রশ্ন থাকে তবে আমাকে জিজ্ঞাস করতে পারবেন। আপনি যদি গবেষণায় অংশগ্রহণ করতে ইচ্ছুক থাকেন তবে আপনাকে নিচে স্বাক্ষর করতে অনুরোধ করছি।

আপনার সহযোগিতার জন্য ধন্যবাদ।

অংশগ্রহণকারীর স্বাক্ষর

সম্মতিগ্রহণকারীর স্বাক্ষর



পক্ষাঘাতগ্রস্তদের পুনর্বাসন কেন্দ্র (সিআরপি) Centre for the Rehabilitation of the Paralysed (CRP)

a project of the Trust for the Rehabilitation of the Paralysed
Head Office: CRP- Savar, CRP- Chapain, Savar Dhaka-1343, Bangladesh
 Tel: +880 02 7745464-5, Fax: 7745069, E-mail: contact@crp-bangladesh.org, www. crp-bangladesh.org

Ref:

Date:

CRP-R&E-0401-0423

09.02.2023

To
 Md. Hafizur Rahaman
 M.phil researcher
 Reg:74/2017-2018
 Department of Clinical Psychology
 University of Dhaka.

Ref: *Study Title* “Developing neuropsychological rehabilitation plan for stroke patients in Bangladesh”.

Sub: Approval of documents for *Study Title* “Developing neuropsychological rehabilitation plan for stroke patients in Bangladesh”.

Dear Mr. Rahaman,

The CRP Ethics Committee reviewed and discussed on your application to conduct the research entitled “Developing neuropsychological rehabilitation plan for stroke patients in Bangladesh”. Which was submitted on 29th December 2022.

The following documents were reviewed:

SL. No.	Documents	Version	Dated	Copy
1	Protocol	-		1

The following members of the ethics committee reviewed the protocol on 29.12.2022.

SL. No.	Name	Role in EC	Affiliation with Institute (Yes/No) If yes, Specify.....
1.	Prof. Dr. Mohammad Alamgir Kabir	Chair of CRPEC	No
2.	Md. Shaikhul Hasan	Member Secretary	Yes, Sr. Research, Monitoring & Evaluation Officer
3.	Nasirul Islam	Executive Member	Yes
4.	Dr. Mohammad Sohrab Hossain	Executive Member	Yes

CRP-Mirpur, Dhaka, Plot: A/5, Block- A, Section- 14, Mirpur, Dhaka- 1206, Tel: 02 9025562-4, Fax: 02 9025561, Email: dgm-mirpur@crp-bangladesh.org. CRP-Ganakbari, PO: Dhamsena, PS: Ashulia, Savar, Dhaka, Tel: 02 7789227, Email: ganakbari@crp-bangladesh.org. AK Khan CRP- Chittagong, Kalurghat, Mohra, Chadgaon, Chittagong, Tel: 031- 2573412, Email: chittagong@ crp-bangladesh.org. Afsar Hussain CRP- Rajshahi, House no: 11, Mohishbathan, Rajshahi Court Rajpara, Rajshahi, Tel: 0721 771709, Email: rajshahi@crp-bangladesh.org. CRP Barishal-CARSA Foundation Centre, Syed Enayet Kabir – Naiyer Ara Kabir (SEKNAK) Welfare Trust Building, 12 Ganpara, Kashipur Chowmata, Kashipur, Barishal. Tel: 0431-64858, Email: barisal@crp-bangladesh.org. CRP- Moulvibazar, 836 Sayed Muztaba Ali Road, Poschim Bazar, Tel: 0861 52469, E-mail: moulvibazar@crp-bangladesh.org. CRP, BAU Branch, Mymensingh, Mobile: 01730 059510, E-mail: mymensingh@crp-bangladesh.org
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পক্ষাঘাতগ্রস্তদের পুনর্বাসন কেন্দ্র (সিআরপি) Centre for the Rehabilitation of the Paralysed (CRP)

a project of the Trust for the Rehabilitation of the Paralysed
Head Office: CRP- Savar, CRP- Chapain, Savar Dhaka-1343, Bangladesh
Tel: +880 02 7745464-5, Fax: 7745069, E-mail: contact@crp-bangladesh.org, www. crp-bangladesh.org

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Date: *09-02-23*

5.	Mohammad Anwar Hossain	Executive Member	Yes, Head of Physiotherapy Department, CRP.
6.	Tauhidul Islam	Executive Member	Yes, Acting Head of Occupational Therapy Department.
7.	Tahamina Sultana	Executive Member	Yes, Head of Speech and Language Therapy Department (Acting).
7.	Md Obaidur Rahman	Executive Member	No
8.	Md. Mizanur Rahnan	Executive Member	Yes, Lecturer, BHPI.

We confirm that neither you nor your study team members participated in the deliberations of the Ethics Committee & did not vote on the proposal for this study. He/She promised to CRP Research department, she/he will follow every rule and regulation of CRP and research policy. This Ethical Clearance only for those who will take/collect data from CRP.

We approve the research to be conducted in its presented form at Centre for the Rehabilitation of the Paralysed (CRP).

The CRP Ethics Committee expects to be informed about the progress of the study, any Serious Adverse Effects (SAE) occurring in the course of the study, any changes in the protocol and participant's information / informed consent and asks to be provided a copy of the final report.

Please submit to the Ethical Committee (EC) the published article of the study as per EC Standard Operating Protocol (SOP)'s.

The EC is organized & operates according to the requirements of Declaration of Helsinki and ICH-GCP, local regulatory requirements and guidelines.

Yours sincerely,

Md. Shaikhul Hasan
Sr. Research, Monitoring & Evaluation Officer, CRP.