

Effectiveness of Mindfulness Based Intervention on Mental Health Outcomes in Patients with Stroke: A Quasi-Experimental Study

By

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Student's Declaration

- This work has not previously been accepted in substance for any degree and is not concurrently submitted in candidature for any degree.
- This dissertation is being submitted in partial fulfillment of the requirements for the MSc in Occupational Therapy.
- This dissertation results from my independent work/investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references. A Bibliography is appended.
- I confirm that if anything is identified in my work that I have done is plagiarism or any form of cheating, that will directly award me a failure. I am subject to disciplinary actions of authority.

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Thesis Supervisor's Statement

As supervisor of Fayzullah Hasan Abid's MSc in Occupational Therapy Thesis work, I have certify that his **“Effectiveness of Mindfulness-Based Intervention on Mental Health Outcomes in Patients with Stroke: A Quasi-Experimental Study”** is suitable for examination.

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List of Abbreviations

BHPI	Bangladesh Health Profession Institute
CRP	Centre for the Rehabilitation of the Paralysed
HADS	Hospital and Anxiety Depression scale
MBIs	Mindfulness-Based Interventions
OT	Occupational Therapy
SD	Standard Deviation
SRU	Stroke Rehabilitation Unit
WEMWBMS	Warwick-Edinburgh Mental Well-being Scale

Abstract

Background: Survivors of stroke often suffer from depression (20–35%) and anxiety (10–30%) concurrently, which slows down rehabilitation and reduces their quality of life. Furthermore, there is a lack of focus in the rehabilitation system on mental health issues and on the overall burden of potentially life-changing mental health issues after a stroke.

Aim: To assess the effectiveness of mindfulness-based interventions (MBI) in improving mental health outcomes, including psychological well-being, anxiety, and depression, in patients recovering from stroke.

Methods and Materials: A quasi-experimental, one-group pre–post design was used in the research. Over the span of 6 weeks, 15 stroke survivors with cognitive impairment underwent the MBI protocol and every week participated in 60-minute sessions. Their mental health outcomes were analyzed through the Hospital Anxiety and Depression Scale and the Warwick–Edinburgh Mental Wellbeing Scale, both at the start and at the end of the intervention. Statistics were derived and analyzed with SPSS version 25, using both descriptive and inferential techniques.

Results: All outcome measures indicated the absence of all three components of anxiety and depression, which indicates having more mental health and positive psychological well-being. Scores on the Psychological Well-being improved 41.80 ± 2.56 and 48.07 ± 3.27 ($p = 0.001$). Anxiety improved with a more substantial decrease, classified as normal anxiety, 6.7% to 40% and abnormal anxiety from 80% to 13.3%, Anxiety: 11.73 ± 2.49 and 7.60 ± 2.13 ; $P = 0.001$). With abnormal classification decreasing from 73.3% to 20%, the depression severity also decreases. Depression: 9.39 ± 2.76 , 7.20 ± 2.93 ; $P = 0.003$).

Conclusions: MBI is an adjunct to standard stroke rehabilitation and is clinically and statistically significant. It addresses the psychological aspects of recovery, which are most often neglected.

Key words: Mindfulness based intervention, Stroke Rehabilitation, Mental Health, Occupational therapy.

CHAPTER I: INTRODUCTION

1.1 Background

Strokes are the second leading cause of death and long-term disability globally, with survivors frequently encountering considerable mental health issues, including depression, anxiety, and post-stroke emotionalism (World Health Organization (WHO),2023). Stroke, or cerebrovascular accident (CVA), describes a variety of disorders characterized by the sudden onset of neurological deficits caused by vascular injury to the brain (Radomski & Trombly, 2014). Globally, millions of people experience strokes every year (Murrell et al., 2021). The prevalence of stroke is highest in developing countries (Gillen, 2011). An estimated 550,000 strokes occur each year, resulting in 150,000 deaths and more than 300,000 individuals with significant disability (Gillen, 2011). In 2022, the World Health Organization (WHO) reported that 1 in 4 people are estimated to have a stroke in their lifetime (WHO, 2022). In the last two decades (1990-2019) increase the number of incident strokes increased by 70%, the number of prevalent strokes by 85%, deaths from stroke by 43%, and the number of disability-adjusted life-years by 32%. According to Potter et al. (2022) stroke is the third leading cause of disability (Potter et al., 2022).

Stroke would involve a variety of clinical deficits such as the impairments of motor, sensory, perception, attention, cognition and language and these deficits are affected to perform daily functional activities (Ahn et al., 2017). Cognitive impairment is a common impairment after stroke. In stroke survivors, besides physical impairments and functional limitations, cognitive impairments are a common form of disability. The link

between post-stroke conditions and mental health is intricate, underscoring the necessity for treatments that address both physical disabilities and psychological disorders during stroke rehabilitation. Medical practice today still downplays the aforementioned aspects, which is a form of neglect that, from an ethics practice stance, requires intervention. The psychological consequences of a stroke are only secondary to the burden of physical and psychological struggles and show equally how the rest of the rehabilitation needs to come to terms with the mental aspects of recovery, which are so often ignored. There has been substantial progress in the development of rehabilitation therapies, which target the consequences of stroke; however, the neglect of psychosocial elements of recovery is still a huge barrier.

This gap highlights the need for proactive and appropriately tailored frameworks for this population. Research increasingly demonstrates that mindfulness-based interventions (MBIs) exert positive effects on mental health and, in turn, enhance cognitive functioning. Contemporary scholarship conceptualizes mindfulness as a form of mental training that cultivates purposeful attention and temporary regulation of cognitive processes (Lindsay & Creswell, 2021). Although its methodological roots draw from Buddhist contemplative traditions, modern MBIs have been systematically adapted for clinical and psychotherapeutic use (Crane et al., 2023). Recent empirical studies show that MBIs can reduce stress, improve emotional regulation, and support executive functioning across diverse groups, underscoring their relevance for populations requiring enhanced cognitive and psychological resilience (Goldberg et al., 2022; Wielgosz et al., 2024). In various populations, mindfulness-based programs, such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT), have

demonstrably reduced depression and anxiety (Gotink et al., 2015). The case of stroke recovery, however, still seems to be very much in doubt as to how relevant Mindfulness-Based Interventions (MBIs) would be.

While initial research indicates that after a stroke, as well as in general in life, exercise may cause depression (Lawrence et al, 2021; Vancampfort et al, 2019), only a great deal of speculation exists. These deficiencies concern small sample sizes, differences in treatment strategies, and a failure to track the long-term results of the interventions to assess the sustained change. Mindfulness-based therapy types, like mindfulness-based stress reduction and mindfulness-based cognitive therapy, have shown to be effective in reducing anxiety and depression in various populations (Gotink et al, 2015).

There is a paucity of research concerning the effectiveness (or otherwise) of MBIs for stroke patients. Initial research indicates that it can enhance the life satisfaction and mitigate the depressive states of post-stroke patients (Lawrence et al., 2021; Vancampfort et al., 2019). Such findings, however, are of marginal utility as the sample sizes are small, the interventions are somewhat heterogeneous, and the paucity of longitudinal data leaves unanswered how issues will resolve. It is also the case that a considerable number of rehabilitation practices focus on the physical recovery whilst neglecting the equally important mental components of, recovery which, in my view, is a flawed paradigm. There is a clear need for more work on whether MBIs can afford post-stroke patients with enduring mental health benefits, which, in turn, will also improve the integration of stroke care.

1.2 The Rationale of the Study

The psychological toll of stroke recovery is an underappreciated public health concern. The interrelation of anxiety and depression aggravates both psychosocial functioning and post-stroke recovery, forming a vicious cycle that compounds the already disorienting process of rehabilitation. The frameworks and paradigms that dominantly define stroke rehabilitation need a paradigm shift that focuses on the psychosocial aspects of recovery.

Mindfulness-based interventions are one of the emerging and validated tools for resolving such complex problems. The ability to intentionally focus on the present and manage one's emotions is beneficial for stroke survivors, as they often find themselves trapped in a cycle of frustration, powerlessness, and fear of recurrent stroke. Mindfulness-based interventions are non-invasive and transcend contextual barriers, thus they are easy to teach and implement within the existing healthcare structures. This study investigates clinically relevant knowledge gaps, analyses such interventions with an intention to provide high granularity evidence that would enable appropriate evidence-based policy formulation and practice. This study aims to prove the efficacy of MBIs and consequently, encourage their integration and promotion in stroke rehabilitation programs on a global scale.

1.3 Operational Definition

1.3.1 Mindfulness based Interventions

Mindfulness-based interventions (MBIs) are designed to help people be more present in the moment and avoid being judgmental through techniques such as breath-focused meditation, body scans, mindful movement and daily informal mindfulness. Such interventions typically involve group-based practice on a daily basis to target stress reduction, relapse prevention for depressive episodes, and well-being in both mental and physical health (Wrapson et al., 2021; Segal et al., 2002). Many are familiar with the terms mindfulness-based stress reduction and mindfulness-based cognitive therapy (Wrapson et al., 2021; Segal et al., 2002).

There is evidence from randomized trials and meta-analyses that it can aid stress, anxiety, chronic pain, prevent depressive episodes and some health-related quality of life outcomes (Grossman, Niemann, Schmidt & Walach 2004; Kuyken et al., 2016). Attention control, decreased rumination, improved emotion regulation, and altered self-referential processing are some of the proposed mechanisms. Imaging and psychophysiological investigations have demonstrated that these processes are related in the brain (Chiesa & Serretti, 2010). Most clinical programs are 8 weeks long and involve weekly group meetings as well as daily exercises that you do at home. Clinicians are instructed to use a trauma-informed theory and pay attention to the short-term increase in distress in high-risk participants (Segal et al., 2002; Kuyken et al., 2016).

1.3.2 Stroke Rehabilitations

The rehabilitation of stroke is a person-centered, coordinated, and multidisciplinary process that begins as soon as a person is medically stable and continues from the inpatient setting to outpatient and community settings, allowing persons to achieve the highest level of motor function, communication skills, cognitive function, and psychosocial health. The aim is to facilitate self-care (independence in activities of daily living), prevent secondary complications and support return to work and social roles (Winstein et al., 2016; National Institute for Health and Care Excellence, 2023).

There is data to suggest that higher-dose, early, multidisciplinary rehabilitation leads to functional gains and a decrease in dependency. Effective programs would involve task-oriented training focused on specific goals, intensive and repetitive motor practice (e.g. gait training), therapies for speech-swallowing disorders, cognitive rehabilitation, psychological support to patients and caregivers, education of the caregiver and assistance with appropriate aids technologies and environmental modifications (Evidence-Based Review of Stroke Rehabilitation, 2016; Winstein et al., 2016). New neuroplasticity-related instruments such as robotics, virtual reality, non-invasive brain stimulation, brain-computer interfaces and pharmacological enhancers have potential in some patients and can be advanced through larger, more focused studies with biomarker-driven patient selection (González-Fernández et al., 2023; Advances in Stroke Neurorehabilitation). Seventh International Conference on Cerebral Reorganization: Fiber Tracts Updating during Motor Act Ischemic Perfusion Processes Microvascular coupling Vascular Neural Rush Focal Manipulation of the Cortical Motor System Transcranial magnetic Stimulation Neuromodulation Active Check-reference-in-the-brain

Nature Medicine 489 Infection Control Weekly Report. The voices of people who have had a stroke illustrate why individualized packages, access to therapy for the rest of life and good-quality information is so vital (Psychosocial support and prompt feedback are required to maintain people's motivation and progress, yet gaps remain across the globe in provision, continuity and ease of navigation around services (Zhao et al., 2025; Evidence-Based Review of Stroke Rehabilitation, 2016). Early assisted discharge, and good provision of community services, such as therapy or opportunities to have practice in the environment where the skilled therapy occurred at home, can be a cost-effective way of maintaining intensive therapy input and participation if provided with appropriate resources (National Institute for Health and Care Excellence, 2023; Winstein et al., 2016).

1.3.3 Mental Health

Anxiety and depression after a stroke are common, and they often overlap. Many stroke survivors share these issues, typically a quarter to a third of them within the first year. These conditions make life much less pleasant, make a rehab visit more challenging to get to, make people more needy, and make long-term problems worse (Mead et al. (2021). Some things that increase a person's chances of being at risk are being female, prior mental illness history, disability, cognitive impairment, aphasia and lesion location (where the brain tumor is), as well as low social support. Multifactorial mechanisms are involved as well with abnormalities of the monoamines, neuro inflammation, alterations in the hypothalamic-pituitary adrenal axis and disruption of mood-regulating neural networks being only some (Robinson & Jorge, 2020; Sagen et al., 2018). Moderators it is suggested that when screening in general practice, the use of validated and successful

tools should also be used. This incorporates stepped care, including structured psychological therapies (for example, cognitive behavioural therapy and problem-solving approaches) and, if needed, medication (selective serotonin reuptake inhibitors). It puts important cross sector partnership message for those who work in mental health and stroke rehabilitation, carers needing help (a major contribution of getting safety and suicide assessments completed), monitoring with on-going care to enhance mood, adherence to therapy and outcomes after stroke despite mixed trial results (larger studies that are more mechanistically-based required) alongside it (Mead et al., 2021; Robinson & Jorge, 2020; Sagen et al., 2018).

CHAPTER II: LITERATURE REVIEW

The literature review chapter provides an overview of contemporary research examining the impact of mindfulness-based group therapy for stroke survivors. Recent studies consistently highlight the importance of integrating structured psychological assessment into stroke rehabilitation, with screening using validated tools such as the Hospital Anxiety and Depression Scale (HADS) or the Patient Health Questionnaire (PHQ) recommended as a best-practice approach to early identification of psychological distress (Morris et al., 2023). Evidence also supports embedding early stepped-care models that combine structured psychotherapies, including cognitive behavioral therapy (CBT) and problem-solving therapy, with pharmacological approaches such as selective serotonin reuptake inhibitors (SSRIs) when appropriate (House et al., 2022). Such models aim to address the complex mental health needs that arise post-stroke while also ensuring ongoing monitoring, suicide-risk assessments, and career involvement to enhance therapy engagement and long-term rehabilitation outcomes (Stroke Association Clinical Guidelines Group, 2023).

A critical yet often underestimated dimension of stroke recovery involves addressing the psychological sequelae of the condition. Beyond physical impairments, stroke survivors frequently experience depression, anxiety, emotional dysregulation, and post-stroke fatigue, all of which contribute to diminished quality of life and slower functional recovery (Hackett & Pickles, 2014; Robinson & Jorge, 2020). This relationship creates a cyclical effect in which psychological distress undermines participation in rehabilitation, thereby prolonging disability (Towfighi et al., 2017).

Despite the prevalence of these difficulties, conventional rehabilitation approaches have historically prioritized physical outcomes while insufficiently addressing emotional and cognitive recovery needs, a gap increasingly recognized as a significant limitation in contemporary stroke care (Mead et al., 2021; PLoS Medicine Consortium, 2023; Sagen et al., 2018).

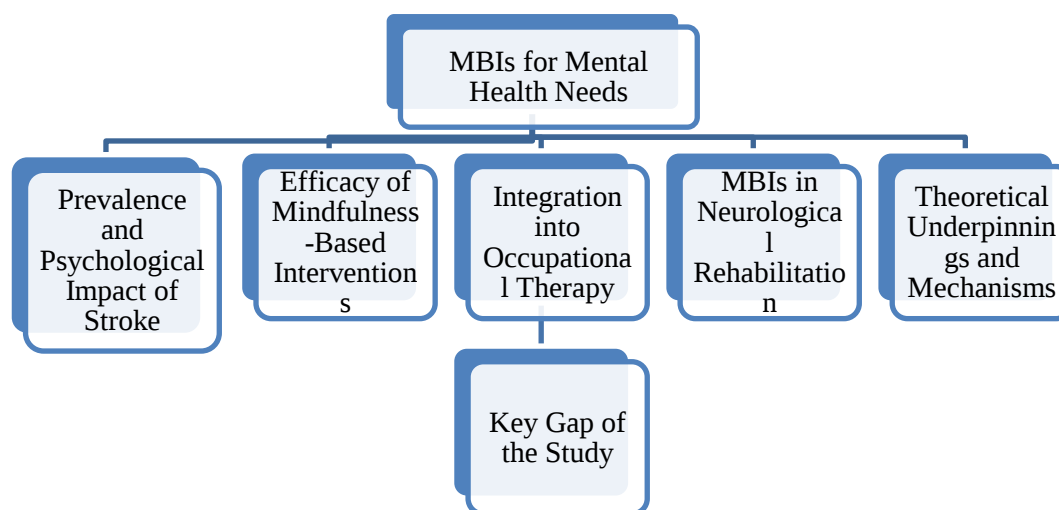
Mindfulness-based interventions (MBIs) have gained growing recognition as promising approaches for enhancing mental health outcomes across various clinical populations. Rooted in contemplative traditions and refined through evidence-based frameworks, MBIs aim to cultivate present-moment awareness, emotional regulation, and non-judgmental acceptance of experience (Wrapson et al., 2021). Established programmes such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT) have demonstrated effectiveness in reducing depression, anxiety, and psychological distress, while improving resilience and self-efficacy (Gotink et al., 2015; Khoury et al., 2022).

However, applying MBIs specifically within stroke rehabilitation is still an emerging field. Although early findings suggest potential benefits including reductions in emotional distress, improved coping, and enhanced neuroplasticity existing studies often suffer from methodological limitations such as small sample sizes, heterogeneous protocols, and limited follow-up periods (Lawrence et al., 2021; Vancampfort et al., 2019; Burton et al., 2022). Consequently, larger, mechanistically informed trials are needed to determine how MBIs influence cognitive, emotional, and functional outcomes within neurorehabilitation.

This literature review synthesizes five central strands: (1) the prevalence of stroke and its psychological impact, (2) the efficacy of mindfulness-based interventions, (3) their applicability within occupational therapy (OT) practice, (4) their potential integration into neurorehabilitation frameworks, and (5) the theoretical underpinnings explaining how MBIs exert their effects. The purpose of the review is to consolidate what is currently known, highlight gaps, and underscore the potential for MBIs to serve as an adjunctive therapeutic approach that may enhance stroke rehabilitation outcomes. Developing a nuanced understanding of these themes is essential for designing interventions that meet the psychological and functional needs of stroke survivors.

2.1 figure

Overview of literature findings based on MBIs and stroke



2.1 Prevalence and psychological impact of stroke

Stroke is one of the leading causes of death and long-term disability around the world. In 2023, an estimated 93.8 million people were living with disability caused by stroke, and 11.9 million people experienced a new stroke during that year. This represents a major global health challenge, with a total economic cost of roughly 890 billion USD-about 0.66% of all global economic output (Feigin et al., 2025). Although stroke is often described in terms of its physical consequences, research now shows that the psychological and cognitive effects are equally important in shaping long-term outcomes. Emotional health, mental well-being, and cognitive abilities after stroke play a key role in determining how well individuals recover, how independent they become, and how they reintegrate into their everyday lives.

Depression is the most common psychological complication following stroke. Meta-analytic evidence shows that stroke survivors have almost three times higher odds of developing depression compared to individuals who have not had a stroke (Almuzel et al., 2024). Liu et al. (2023) found that approximately 27% of stroke survivors develop depression, although more recent estimates place the prevalence closer to 35%. Most cases appear in the first three months after the stroke, with around 71% of depressive episodes beginning in this early period. Unfortunately, more than half of these early cases become chronic and persist long after the first year, while only a minority recover fully. Anxiety disorders are also widespread, affecting roughly 24% of survivors, and they often appear together with depression, making rehabilitation more difficult and increasing overall emotional distress (Campbell Burton et al., 2013). These emotional disorders limit daily functioning, reduce participation in rehabilitation, and can delay physical recovery.

Other psychological complications, particularly cognitive impairment and post-stroke fatigue, are also common and can have major consequences for recovery. Cognitive impairment affects between 30% and 70% of survivors and includes problems with memory, concentration, processing speed, and problem-solving. Such difficulties interfere with the ability to complete daily tasks and engage meaningfully in rehabilitation programs. Post-stroke fatigue affects 25% to 85% of survivors and is often described as overwhelming, persistent, and unrelated to physical activity. Carrick et al. (2025) found that greater fatigue is linked with poorer occupational functioning and that larger areas of brain damage are associated with more severe psychological symptoms. This suggests that emotional and cognitive problems after stroke arise not only from emotional reactions to disability but also from the direct effects of brain injury itself.

Recent research, supported by neuroimaging studies, has shown that psychological symptoms such as depression, anxiety, fatigue, and cognitive impairment do not arise from damage in only one specific part of the brain. Instead, they are linked to widespread changes in brain networks, including disruptions in white matter connections, limbic pathways, and frontal regulatory circuits. These disturbances affect the communication between brain regions responsible for memory, emotion regulation, attention, and executive functions. Mechanisms such as neuro-inflammation, monoamine imbalance, microglial activation, and long-term dysregulation of the hypothalamic–pituitary-adrenal axis have also been linked to symptoms that persist well beyond the acute phase (OX CHRONIC Consortium, 2023; NONEs, 2023). This growing evidence supports the idea that stroke should be viewed as a condition that affects the entire brain, not just the area directly injured by the stroke.

Long-term studies show that psychological symptoms after stroke can last for many years. A major longitudinal study from King's College London reported in 2025 that one-third of stroke survivors continued to experience depressive symptoms even three months after the stroke, and these individuals had a 30% higher risk of death over the next ten years compared to survivors without depression. This indicates that depression is not a temporary or secondary problem but a serious long-term health issue. Similar findings show that untreated post-stroke depression is linked to greater disability, slower recovery, increased hospital readmissions, and a reduced chance of returning to work or meaningful social roles (Towfighi et al., 2017; PLOS Medicine Consortium, 2023). These outcomes highlight the importance of recognizing psychological health as a critical component of stroke rehabilitation.

Psychological problems after stroke also place a heavy burden on caregivers. Many caregivers develop depression or anxiety because of the emotional strain, physical demands, and long hours required to support a family member with a stroke. Studies show that caregivers with poor mental health are less able to provide effective support, which can further slow the survivor's recovery (Spring et al., 2024). Additionally, healthcare systems are affected because individuals with untreated psychological complications tend to have longer hospital stays, more visits to healthcare providers, and higher long-term costs to the system (NHS England, 2019; Perkins et al., 2021). Therefore, improving psychological care after stroke is not only beneficial for survivors but also essential for reducing strain on caregivers and health services.

Several risk factors increase the likelihood of developing psychological disorders after stroke. These include the severity of the initial neurological impairment, the level of physical disability, cognitive deficits, aphasia, and lesions in frontal and limbic brain regions, a previous history of mental health problems, female gender, poor social support, and stressful life events. Psychosocial challenges such as sudden loss of independence, changes in family roles, reduced social interaction, feelings of burden, unemployment, or bereavement can further increase vulnerability (Perkins et al., 2021; OX CHRONIC Consortium, 2023). Many survivors report that their emotional concerns are overlooked, and they feel unprepared for the psychological changes that occur after stroke.

Despite the high prevalence of psychological problems, emotional health often receives less attention than physical rehabilitation. Screening tools for depression, anxiety, fatigue, and cognitive impairment are not used consistently across healthcare settings, leading to under-detection and under treatment. Recent guidelines call for routine psychological assessment at multiple points throughout recovery, including at hospital discharge, during rehabilitation, and in community follow-up. Integrated care models where mental health professionals work closely with occupational therapists, physiotherapists, speech therapists, and social workers are strongly recommended to ensure that emotional needs are addressed alongside physical recovery (NHS England, 2019; OX CHRONIC Consortium, 2023). Stepped-care models, involving psychological therapies, medication when needed, social support, and vocational rehabilitation, are considered essential for improving long-term outcomes.

Overall, recent evidence shows that the psychological impact of stroke is profound and long-lasting. Psychological symptoms frequently persist or recur, affecting recovery, independence, quality of life, and survival. When psychological care is neglected, survivors face higher risks of disability, recurrent stroke, and death. For this reason, psychological assessment and treatment should be viewed as central elements of stroke rehabilitation rather than optional additions. Addressing emotional and cognitive health early and consistently can greatly improve long-term outcomes for survivors and reduce the emotional and financial burden on caregivers and health systems.

2.2 Efficacy of Mindfulness Based Interventions

The use of MBIs is consistent with current evidence aimed at lessening psychological distress while remaining mindful of the level of distress experienced. Unlike standard psychological techniques in the West such as cognitive-behavioral therapy (CBT) or pharmacotherapy, MBIs are a new form of intervention that aims at focusing on the moment rather than the distress or the symptoms of thought control. It is this particular underneath that MBIs are perhaps particularly well-suited to addressing the multifaceted psychological difficulties experienced by stroke survivors. A meta-analysis of Khoury et al. (2013) found that there were moderate changes in the experience of depression, anxiety and stress across heterogeneous populations participating in mindfulness-based stress reduction or mindfulness-based cognitive therapy. Similarly, Gotink et al. (2015) demonstrated the wide-reaching effectiveness of MBIs, persisting in positive mental health outcomes post-intervention cessation. These findings suggest that MBIs are flexible to suit a wide range of patient populations, for example other patient groups with

chronic diseases like cardiovascular disease and diabetes, and thus could also be used in the context of stroke rehabilitation.

With the support of the most recent meta-analytic evidence, MBIs have been proven effective in treating the psychological issues that arise from strokes. Tao et al. (2022) was the first to conduct a meta-analysis focusing on mindfulness intervention with stroke survivors and synthesized seven RCTs (n=502 participants) and found that mindfulness meditation significantly reduced depressive symptoms in the stroke participant populations relative to the control groups (SMD = -0.93 , 95% CI -1.40 to -0.45 , $p < 0.001$) and this effect remained in participants with diagnoses of clinical depression (SMD = -1.07 , $p < 0.001$) and those without any psychiatric diagnosis (SMD = -0.46 , 95% CI -0.75 to -0.17 , $p = 0.002$). Broader meta-analytic syntheses examining mindfulness meditation across diverse populations further corroborate these findings; Fu et al. (2024) examined 26 RCTs published during the COVID-19 pandemic and found significant overall effects of mindfulness meditation on depressive symptoms (SMD = -1.14 , 95% CI -1.45 to -0.83 , $p < 0.001$) and particularly stronger effects on interventions lasting more than eight weeks (SMD = -1.44) relative to shorter interventions, though effects remained elevated at follow up (SMD = -1.28), indicating that mindfulness is a practice that has lasting effects. In their review Mak et al. (2023), the authors found studies examining mindfulness interventions across 16 different strokes, remarking that study summaries indicated observations related to mental fatigue, cognitive, and even life quality improvement, despite systemic variations in measurable mood and functioning across studies. While still acknowledging barriers to practicing mindfulness, Gray et al. (2020) proposed the ‘Mindfulness-Based Stroke Recovery (MBRS)’ model, through

which participants complete eight weeks of the intervention and benefit from it. Based on frameworks like this, an integrated and axial systems approach, which is the result of long evidence-based translations of traditional MBSR practice to the stroke context.

2.3 Integration into Occupational Therapy

Occupational therapy is a fundamental part of comprehensive rehabilitation following a stroke, and as such, therapists examine the interaction between survivors' changes in motor, sensory, cognitive, and perceptual functions and their ability to perform daily life activities, self-care, and meaningful tasks (Persson et al., 2025). In the randomized, controlled trial (EOTIPS) conducted by García-Perez et al. (2024), early post-stroke occupational therapy was found to significantly improve quality of life (SAQOL-39 $p = 0.029$), independence (mRS $p = 0.004$), perceptual cognitive skills (MoCA $p = 0.012$), and depressive symptoms (BDI-II $p = 0.011$) as compared to control groups. There is strong conceptual alignment between the inclusion of mindfulness exercises in occupational therapy, as identified by Hardison and Roll (2016). The discipline of occupational therapy focuses on increasing participation and engagement in meaningful, valued activities, and mindfulness fosters participation in optimal psychological states, or flow, where challenge meets skill and immersion becomes effortless and rewarding.

Occupational therapists apply mindfulness in practice as (1) mindful movements in which therapists rehabilitate by having survivors attend to muscle sensations like breath flow and tremors to facilitate muscle control and anxiety reduction; (2) body scan and sensory awareness exercises to assist in limb reconnection and sensory reconciliation awareness, in particular to those having a loss of sensory neglect; (3) combined mindful and unmindful walking practices where graded breathing and step activities enhance

spatial awareness and balance; and (4) brief (3 minutes or less) cognitive rehabilitation “brain breaks” rest practices that purposefully schedule rest to alleviate neuro-fatigue and restore attention. Gray et al. (2020) claim that these types of movement practices could be offered in various forms, such as in-person group lessons, real-time videoconferencing over the internet, and structured self-directed programs using videos in the comfort of one's own home.

2.4 MBIs in Neurological Rehabilitation

In stroke survivors, MBIs represent a novel therapeutic alternative for managing cognitive and emotional dysfunctions. Lawrence et al. (2021) found that an 8-week MBSR intervention significantly lowered depressive symptoms and increased the emotional well-being in stroke patients. Another study by Vancampfort et al. (2019) underscored that mindfulness may lead to adaptive coping strategies, resulting in increased psychological resilience. Importantly, Wong et al. (2022) reported enhancements in sleep quality and declines in fatigue among stroke survivors who received MBSR, suggesting potential benefits that extend beyond typical mental health outcomes.

Even with these positive results, there are still problems to solve. For example, de Diego-Cordero et al. (2020) pointed out that there were methodological differences between studies, such as differences in the length of the interventions and the ways that the outcomes were measured. Sharma et al. (2021) also stressed the need for more diverse participant samples to make sure that results can be applied to a wider range of situations. These problems show how important it is to have standardized protocols and larger studies to learn more about how well MBIs work in stroke patients.

2.5 Theoretical Underpinnings and Mechanisms

MBIs are thought to work in part through influencing stress reactivity and emotion regulation (Hölzel et al., 2011). In the setting of stroke recovery, this modulation has been associated with better psychosocial adjustments (decreased anxiety and less negative emotional coping strategies) and increased resilience overall, which all support considering MBIs as a promising complementary intervention to standard rehabilitation programs.

Neuroimaging research indicates that mindfulness-based therapies/techniques (e.g., prefrontal cortex and amygdala) activate brain regions involved in attention, self-integration, and emotion regulation processes (Tang et al., 2015). Such findings imply that MBIs could protect against neurocognitive and emotional consequences of stroke. Additionally, Hölzel et al. (2013) found that experienced meditators had more grey matter in brain areas linked to learning and memory. This suggests that there is a neurological basis for the positive effects seen here.

2.6 Key Gap of the study

- As the study topic is an uncommon topic so very limited literature was found about the topic. Mindfulness-based intervention group therapy is a unique intervention used by occupational therapists to improve mental health outcomes among the participants. Moreover, the effectiveness of Mindfulness-based intervention group therapy for stroke patients is more uncommon. So, as per the literature search, a small amount of literature was found.
- This topic was also found in other conditions like Traumatic Brain Injury, Multiple Sclerosis, and mental health conditions etc. as investigated in the literature.

- Most of the literature was Quasi-experimental study, some are Randomized Control Trial and some qualitative, meta-analysis studies were also found related to this topic. One of them feasibility in one participants.
- Most of the literature were conducted in New Zealand, Korea, Iran, Thailand, and South Asian countries studies. Most of the studies conducted in the hospital or rehabilitation centered setting.
- Age range of the participants were 16-70 and sample size were varying from eight to thirty-four. Quasi-experimental studies which have no control group they used one or seventy-two participants for group therapy sessions.

CHAPTER III: METHODS AND MATERIALS

3.1 Study Question, Aim, Objective

3.1.1 Study Question

What is the effectiveness of mindfulness-based intervention on mental health outcomes in patients who have experienced a stroke?

3.1.2 Aim of the study

To assess the effectiveness of mindfulness-based interventions (MBIs) in improving mental health outcomes, including psychological well-being, anxiety, and depression, in patients recovering from stroke.

3.1.3 Objectives

- To know the overview data of the socio-demographic information of the participants.
- To identify the effectiveness of mindfulness-based interventions on stroke patients' psychological well-being.
- To evaluate the effectiveness of mindfulness-based interventions on anxiety levels in stroke patients.
- To assess the efficacy of mindfulness-based interventions in reducing symptoms of depression among stroke survivors.
- To find out the association between the socio-demographic data, psychological well-being, anxiety and depression of people living with stroke.

3.2 Study Design

3.2.1 Study Method

The researcher followed the quantitative method for this study. In order to obtain results, a quantitative research method deals with quantifying and analyzing variables. It entails applying particular statistical approaches to analyze and answer the questions. The purpose of quantitative research methods is to provide an explanation for a problem or phenomenon by collecting data and evaluating it using mathematical methods, specifically statistics (Apuke, 2017). In this research, the researcher collected data from participants and then performed a statistical test to measure the outcome, so the researcher selected a quantitative design for this study.

3.2.2 Study Approach

In this research, the researcher conducted a Quasi-experimental study with Pre-Test and post-test without a control group. A quasi-experimental study design involves manipulating the independent variable to observe its effects on the dependent variable, but it lacks at least one of the two characteristics of a true experimental design: randomization or a control group. Quasi-experimental designs are more frequently used because they are more practical and feasible for conducting research in health-related areas, where, in the absence of large sample sizes, randomization and/or the availability of control groups are not always possible (White & Sabarwal, 2014). This design is better suited to real-world natural settings than to true experimental research designs. It helps researchers to evaluate the impact of quasi-independent variables under naturally occurring conditions. It may be able to establish a causal relationship. In this study, one group received an intervention. The researcher collected pre-test data from the group

before the treatment session. At the end of the six weeks of the treatment session, post-test data were collected. The researcher compared both pre-test and post-test data.

3.3 Study Setting and Period

3.3.1 Study Setting

The study was conducted at the CRP-Mirpur Stroke Rehabilitation Unit, where stroke survivors are admitted and receive ongoing care.

3.3.2 Period

The study lasted from May 2025 to July 2025.

3.4 Study Participant(s)

3.4.1 Study Population

Patients aged 18 and older who have experienced a stroke within the past one month.

3.4.2 Sample Size

The sample size depended on the availability of stroke patients in the CRP. Approximately 15 participants.

3.4.3 Sampling Techniques

The Researcher used simple random sampling, a type of probability sampling in which the researcher randomly selects a subset of participants from a population within a hospital. This method focuses on selecting individuals who can provide rich and meaningful data about the impact of mindfulness-based interventions (MBIs) on mental health outcomes in stroke survivors.

3.4.4 Inclusion Criteria

- Patients who are diagnosed with stroke.
- Ability to provide informed consent.
- Adults who have experienced a stroke within the past one month to 3 years and are experiencing psychological distress, anxiety, or depression.
- No severe cognitive impairment.

3.4.5 Exclusion Criteria

- Patients who have cognitive impairments measured by the clinician.
- Patients with active psychiatric disorders requiring immediate intervention.
- Patients currently participating in other psychological interventions.

3.4.5 Participant Overview

From June 2025 to July 2025, screening the participants who meet the inclusion criteria included in the group session. Those who met exclusion criteria were excluded.

3.5 Intervention Protocol

Structure for Each Session

- Greetings and establishing a rapport
- Important thought-provoking query on the practice from the previous week
- Practice (a different practice each week)
- Considering and talking about experience and some theoretical foundations (digging deeper), and distributing the information sheet
- Talking about, researching, and recording self-practice for the upcoming week.

Table: 3.1*Mindfulness-based interventions protocol*

Week 1	Week 2	Week 3
Meeting each other and getting to know each other Main thing to do: Being aware of the body-breathing anchor and getting to know the breath Finding more detailed information: Start of the course. What does mindfulness mean? Being aware in daily life	Mindfulness of the body, body scan and welcoming the body are the main practices. For more information, read about how important formal and informal practice are.	Main practice: Being aware of your body, like when you walk or move. Moving without any trouble, finding more detailed information: Start with mindful movement, like walking or doing other everyday things
Week 4	Week 5	Week 6
Open heart-loving kindness practice is the main practice. Looking into something more: After being kind to yourself. The good thing about enjoying small things	Main practice: Being aware of your thoughts and feelings; easing the edges of anger Looking for more in-depth information: recognizing how thoughts affect us. The good thing about recognizing or accepting experience	Main practice: Being aware of your thoughts and feelings; easing the edges of anger Looking for more in-depth information: recognizing how thoughts affect us. The good thing about recognizing or accepting experience

Mindfulness Group Therapy Procedure

Table: 3.2

Mindfulness Course – Weekly Session Chart (1 Hour Each)

Week 1 – Breath Awareness

Segment	Time	Activity/Content	Details
Welcome & Introductions	10 min	Icebreaker & Course Overview	Names, reasons for joining, explain structure and goals
Reflective Question	5 min	“What brought you here today?”	Explore motivations & intentions
Practice	15–20 min	Mindfulness Breath	Focus on nostrils or abdomen, observe breath, return gently
Reflection & Theory	10–15 min	What is mindfulness?	Formal vs. informal practice. Handout: Intro to Mindfulness
Self-Practice Planning	10–15 min	5 min breath practice daily	Practice during transitions, journal brief notes

Week 2 – Body Awareness

Segment	Time	Activity/Content	Details
Check-in	5 min	Reflections on breath practice	Normalize distractions, encourage curiosity
Reflective Question	5 min	“Where did you feel grounded or distracted?”	Connect to body experience

Practice	20 min	Body Scan	Move attention through body, welcome all sensations
Reflection & Theory	10–15 min	Importance of body awareness	Reconnecting with physical presence. Handout: Body Scan & Daily Practice
Self-Practice Planning	10–15 min	10-min body scan 3–4x/week	Add short daily “body check-ins”

Week 3 – Movement Awareness

Segment	Time	Activity/Content	Details
Check-in	5 min	Body scan reflections	What body signals emerged last week?
Reflective Question	5 min	“What happens when you’re in a rush?”	Recognizing body-mind states
Practice	15–20 min	Mindful Walking/Movement	Focus on steps or movement; slow and intentional
Reflection & Theory	10–15 min	Mindfulness in motion	Integrating awareness into daily life. Handout: Mindful Movement Tips
Self-Practice Planning	10–15 min	5–10 min walking daily	Apply mindfulness to daily actions like brushing teeth, walking

Week 4 – Loving Kindness

Segment	Time	Activity/Content	Details
Check-in	5–10 min	Experiences with mindful movement	What felt different while moving with

			awareness?
Reflective Question	5 min	“When did you last offer kindness to yourself?”	Explore self-compassion
Practice	15–20 min	Loving Kindness	Repeat phrases; extend kindness to self, others, all beings
Reflection & Theory	10–15 min	Power of self-kindness	Kindness lowers stress, builds resilience. Handout: Loving Kindness Practice
Self-Practice Planning	10–15 min	5-min kindness daily	Notice simple joys, journal kindness moments

Week 5 – Thoughts & Feelings

Segment	Time	Activity/Content	Details
Check-in	5 min	Reflections on kindness	Share insights or resistance
Reflective Question	5 min	“What thoughts or feelings repeat under stress?”	Introduce observation without judgment
Practice	15–20 min	Watching Thoughts & Emotions	Label thoughts (“thinking”, “judging”), notice and return
Reflection & Theory	10–15 min	Thoughts $\neq$ Facts	Emotional awareness improves choice. Handout: Mind & Emotion Awareness
Self-Practice Planning	10–15 min	“3-minute breathing space” daily	Track emotions or common thought

 loops in journal

Week 6 – Mindful Listening / Integration

Segment	Time	Activity/Content	Details
Check-in	5 min	Reflect on favorite practices	What has been most meaningful?
Reflective Question	5 min	“How has your listening changed?”	Link mindfulness to relationships
Practice	15–20 min	Mindful Listening or Repeat Favorite	Speak & listen in pairs; reflect without advice
Reflection & Theory	10–15 min	Mindful communication	Presence enhances empathy. Handout: Communication + Course Summary
Self-Practice Planning	10–15 min	Pick 1–2 practices to continue	Create a self-practice routine

3.6 Variables

3.6.1 Socio-demographic Variables

- Age
- Gender
- Level of education
- Occupation
- Marital Status
- Number of Family Members
- Number of caregivers
- Affected side after stroke

3.6.2 Hospital Anxiety and Depression Scale (HADS)

- I feel tense or 'wound up'
- I still enjoy the things I used to enjoy
- I get a sort of frightened feeling as if something awful is about to happen
- I can laugh and see the funny side of things
- Worrying thoughts go through my mind
- I feel cheerful
- I can sit at ease and feel relaxed
- I feel as if I am slowed down
- I get a sort of frightened feeling like 'butterflies' in the stomach
- I have lost interest in my appearance
- I feel restless as I have to be on the move
- I look forward with enjoyment to things
- I get sudden feelings of panic
- I can enjoy a good book or radio or TV program

3.6.3 The Warwick–Edinburgh Mental Well-being Scale (WEMWBS)

- I've been feeling optimistic about the future
- I've been feeling useful
- I've been feeling relaxed
- I've been feeling interested in other people
- I've had energy to spare
- I've been dealing with problems well

- I've been thinking clearly
- I've been feeling good about myself
- I've been feeling close to other people
- I've been feeling confident
- I've been able to make up my own mind about things
- I've been feeling loved
- I've been interested in new things
- I've been feeling cheerful

3.7 Data Source

The data were collected using the HADS and WEMWBS scale.

3.8 Ethical Consideration

As a statement of ethical principles for medical research, the World Medical Association (WMA) created the Declaration of Helsinki (World Medical Association Declaration of Helsinki, 2022).

3.8.1 Ethical Clearance

The proposal was reviewed, and ethical approval was obtained from the Institutional Review Board (IRB) at the Department of Occupational Therapy, Bangladesh Health Professions Institute (BHPI). The IRB approval number is CRP-BHPI/IRB/05/2025/1081 (please see Appendix A for details). Permission was also obtained from the Head of the Occupational Therapy department, BHPI, the Deputy General Manager in CRP-Mirpur, and the Stroke Rehabilitation unit in charge to collect data from the Stroke rehabilitation

unit of the CRP-Mirpur. The study followed ethical guidelines set forth by the World Medical Association (World Medical Association, 2022).

3.8.2 Informed Consent

Participants were informed sufficiently about the purpose and procedure of the study, and the researcher had followed the ethical standards of the Declaration of Helsinki guideline (World Medical Association, 2022). Before conducting the study, each participant was given two written consent forms for participation and withdrawal from the study. Besides these, the researcher maintained 100% confidentiality about participants' information. The participants signed the consent form, and they were also informed that they had the opportunity to withdraw at any time during the study period.

3.8.3 Unequal relationship

As the study was conducted at the Stroke Rehabilitation Unit (SRU) at the Centre for the Rehabilitation of the Paralysed (CRP), Mirpur and the researcher also worked as an occupational therapist in this center, so there was definitely a chance to make a power relationship between the researcher and participant. To avoid the power relationship, the researcher tried to take help from other occupational therapists to select the participants from the target population and also involved four volunteer occupational therapists to implement the program.

3.8.4 Risk and beneficence

The study faced several risks. For example, data was collected from stroke patients receiving occupational therapy at the SRU unit of the occupational therapy department. Since these patients were inpatients receiving intervention, there was a risk of dropouts

during the study. This risk was present because patients have a history of self-discharging due to personal issues, illness, or other reasons. To reduce this risk, the researcher selected most participants who were new residents at CRP-Mirpur.

3.8.5 Confidentiality

The researcher was dedicated to protecting the confidentiality of participants' information. According to the information sheet, only the supervisors had access to this data. Participants were explicitly informed about confidentiality via the information sheet.

3.8.6 Volunteer recruitment

The research study recruited four volunteers. The researcher circulated information to recruit volunteers and found four volunteers. The volunteers were provided a small honorarium. Following the recruitment, the researcher provided enough training about the group protocol and the way of implementing the sessions to provide the group intervention accurately and effectively. After the training, each volunteer conducted one trial session with the supervision of the researcher. Finally, the volunteers run the group sessions effectively.

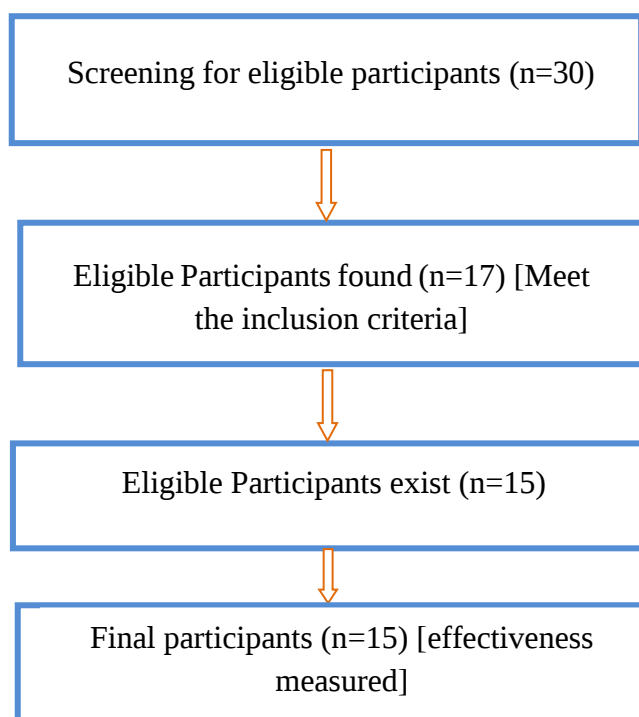
3.9 Data Collection Process

3.9.1 Participant Recruitment Process

Participants were approached in rehabilitation centers and provided with study details.

Figure 3.1

Overview of the participant's recruitment process



3.9.2 Data Collection Method

The Researcher was introduced himself to the participant. Then, obtained verbal or written consent from them. After that, data were collected through a questionnaire during face-to-face conversations with the participants. The data was collected from the SRU unit of CRP-Mirpur. The researcher first conducted a survey to identify potential study participants and then conducted preliminary screening using the HADS and WEMWBS. Occupational therapists working in the OT department assisted the researcher in

identifying stroke patients receiving occupational therapy services at that time. The researcher found 17 stroke participants who met the inclusion criteria. Among these, 15 stroke patients agreed to participate and gave informed consent for the study. Four volunteers conducted the mindfulness-based intervention sessions. Before starting the group therapy, a pre-test was administered to the participants using HADS and WEMWBS. After completing all group sessions, 15 participants were tested again using the same tools.

3.9.3 Data Collection Instrument

The reliable measurement of psychological constructs requires the use of psychometrically sound, well-accepted instruments. The selection of HADS and WEMWBS was meticulously chosen as primary data collection tools for this study, accounting for the additional perspectives each can bring to the mental health profile for the study.

The first version of this text is a summary and analysis of HADS and it is HADS-A and HADS-D components. Based on his research, Zigmond and Snaith assert that HADS is fundamentally a system of psychometrically quantifying their own and other non-psychiatric clinical entities across a clinical spectrum. He then gathered 14 discrete items, which were classified into 2 sub-scales: HADS-Anxiety and HADS-Depression. Within these sub-scales, items were allocated 21 points on a 4-point scale (0-3), with 0 indicating no symptoms. This scale indicates, 0-7 = Normal, 8-10 = Borderline abnormal, 11-21 = Abnormal. Authors such as Bjelland and Snaith have explored the psychometric properties of the HADS and provided evidence of its internal consistency, test-retest

reliability, and discriminant validity. Indeed, the scale is described as psychometrically robust across various countries and cultures. Portions of the scale have been clinically proven to distinguish anxiety and depression while detecting sensitivity to change, and such attributes render the scale useful in this research.

At the same time, the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) has been utilized to capture the overarching aspects of mental health. This fourteen item scale, originated from the University of Warwick and the University of Edinburgh, “WEMWBS: Developing and updating a instrument for the evaluation of mental health of a population” (Tennant et al, 2007), is appropriate at measuring the full spectrum of mental wellbeing and integrates both hedonic (being relaxed and happy) and eudemonic dimensions (being useful, having energy to spare, and being decisive). Each of the items is scored from a 5-point scale ranging from 1 (none of the time) to 5 (all of the time) with a minimum possible score of 14 and a maximum possible score of 70. This indicates Very low- 14-40, Average- 45-59, Above Average- 60-70. Higher scores represent better mental health. The WEMWBS has been heavily scrutinized and validated, and has demonstrated strong internal consistency, reliability and construct validity in varying contexts of population (Stewart et al, 2011). Moreover, with the ability of the instrument to respond to attitude change and positive mental health promotion, C whores the data are suited to capture more easily interpretable upward changes in positive psychological states.

Both instruments are self-administered, which reduces bias on the part of the interviewer and the burden on the participant, making data collection more efficient.

Their combined use gives a detailed and complete picture of the participants' mental health and well-being profiles in relation to the study's goals.

3.10 Data Analysis

The data were analysed by using the Statistical Package for the Social Sciences (SPSS) 25.0 versions. Descriptive data were analysed through simple frequency analysis (mean, standard deviation, and percentage). In the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS), the normality test, data were not normally distributed, so the Wilcoxon signed-rank test, a non-parametric analysis method, was used to compare and test the pre-post values of mindfulness-based group intervention. On the other hand, the normality test of the Hospital Anxiety and Depression Scale, data were normally distributed, so the paired-samples t-test, a parametric analysis method, was used to compare pre and post-test values in the mindfulness-based group intervention. The Fisher's exact test was used to assess the association between socio-demographic variables and the total score.

CHAPTER IV: RESULTS

This chapter presents the findings of the study. The study's findings are presented in tables and figures in this chapter, with an emphasis on the sociodemographic information, statistical indicators of HADS and WEMWBS components during the pre-test and post-test, and levels of Anxiety, Depression, and Psychological well-being impairments during pre-test and post-test among people living with stroke. Descriptive statistics are first provided to summarize the socio-demographic characteristics of the participant, followed by inferential statistics of the HADS and WEMWBS scores. Detailed results of the analyses are outlined below.

4.1 Socio-demographic Status

The socio-demographic characteristics of the participants, crucial for understanding the study's context and generalizability, are summarized in the initial table. A total of 15 participants were included in the study.

Table: 4.1

Sociodemographic information among the participants

Variables	Category	Frequency (n)	Percentage (%)
Age	35-55 years	6	40.0
	56-75 years	9	60.0
	Median=60 years, IQR= 44-65 years, Maximum= 73 years, Minimum= 35 years		
Gender	Male	13	86.7
	Female	2	13.3
Living area	Rural	10	66.7

	Urban	5	33.3
The highest level of education acquired	Primary education	6	40.0
	Secondary education	4	26.7
	Higher secondary	1	6.7
	Tertiary education	4	26.7
Present occupational status	Govt. service Holder	1	6.7
	Private Service Holder	1	6.7
	Business	2	13.3
	Farmer	3	20.0
	Homemaker	2	13.3
	Unemployed	3	20.0
	Others	3	20.0
Diagnosis	Hemorrhagic Stroke	7	46.7
	Ischemic Stroke	8	53.3
Disability	Right-side hemiplegia	6	40.0
	Left side Hemiplegia	9	60.0
Type of comorbidities	Diabetes	2	13.3
	Hypertension	10	66.7
	Musculoskeletal disorders	2	13.3
	Cardiac	1	6.7

The age distribution showed that most participants 60.0% (n=9) were in the 56-75 year old age group, while 40.0% (n=6) were between 35 and 55 years old. The median age

was 60 years, with an Interquartile Range (IQR) of 44-65 years, reflecting a wide age range among the participants. The youngest age recorded was 35, and the oldest was 73.

A significant gender imbalance existed in our sample; most were male 86.7% (n=13) while the female representation was minimal 13.3% (n=2). This, in turn, may affect the external validity of certain conclusions and should be noted in future studies.

The sample was also diverse with respect to domicile; 66.7% (n=10) were classified as rural and 33.3% (n=5) were urban dwellers. This suggests that variably slum-added urban setting origin populations are likely to have faced, or benefited from, certain unique socio-economic advantages during recovery and subsequent health in later years.

Level of Education Achieved: The Educational level of participants was different. The most common level of education was primary education 40.0% (n=6), followed by secondary and tertiary levels of education at 26.7% (n=4), respectively. A further minority 6.7% (n=1) had also completed higher secondary education. Such diversity in educational background reflects different literacy and access to knowledge, which may affect the way that they comprehend or use an intervention.

The participants were from very different occupation structures. The majority of the victims were farmers 20% (n=3), unemployed 20% (n=3) as well as "Others" 20% (n=3) like possibly but not limited to any unspecified job. 13.3% (n=2) were shopkeepers and homemaker each. Government and private sector workers were each fewer (6.7%, n=1 each). The state of individuals' economic conditions, as reflected in the high

proportion of farmers and the unemployed among the repatriated, might affect their general welfare and healthcare access.

The patients were stratified according to stroke etiology. The slightly majority had an ischemic stroke 53.3% (n=8), and 46.7% (n=7) had a hemorrhagic stroke. The distinction is important because the two types of stroke can be very different in terms of their causes, outcomes and rehabilitation needs.

Concerning disability, 60% (n=9) of the subjects suffered from left-side hemiplegia and 40% (n=6) right-side hemiplegia. Stroke is a common cause of hemiplegia, and the affected side may have important implications for activities of daily living (ADL) and rehabilitation approach.

Comorbidities are important in the context of stroke rehabilitation. Hypertension was the most prevalent comorbidity, present in 66.7% (n=10) of participants. Diabetes and musculoskeletal conditions were present in 13.3% (n=2) in both cases. Cardiac comorbidity occurred at the lowest frequency, in 6.7% (n=1) of all subjects. The significant hypertension rate emphasizes the necessity for control of this risk factor in stroke patients.

4.2 Status of psychosocial well-being among the participants

Participants' psychosocial well-being was evaluated pre- and post-intervention, with significant differences observed.

Table: 4.2

Measured Variable Results of WEMWBS within pretest and post-test

	Frequency (n)	Mean±SD	Z value/t value	p-value
Psychological well-being				
Pre-test	15	41.80±2.56	t=-5.538	.001
Post-test	15	48.07±3.27		

Note: Paired-samples t-test

For psychological well-being, there is a statistically significant pre-test to post-test difference. The WEMWBS score averaged 41.80 (SD ±2.56), indicating a moderate level of well-being among respondents at the pre-test stage. The WEMWBS mean increased to 48.07 SD ±3.27, after the intervention.

A paired-samples t-test was undoubtedly carried out in order to evaluate the significance of this change, and it produced a value of $t = -5.538$. The associated p-value was $< .001$, far less compared to the standard level of confidence $< .05$. Such a low value of p is highly sensitive and means that the observed improvement in psychological well-being is extremely unlikely to be due to chance. The mean WEMWBS score increased by 6.27 points from baseline to follow-up; this indicates that the intervention had a positive and meaningful effect on the overall mental well-being of the participants, making them feel more optimistic, useful, relaxed and better able to deal with life's challenges. Since

the WEMWBS is a measure of positive mental health, this shows very clearly that people reported they felt better and did things more effectively after the intervention.

Figure: 4.1

Psychosocial well-being among the participants

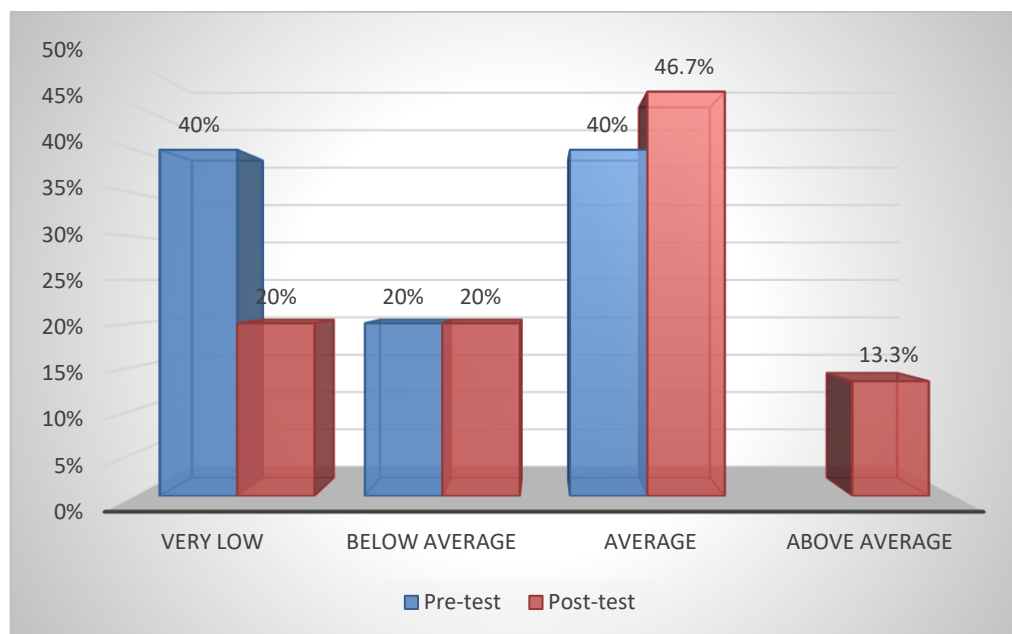


Figure 4.1 shows that pre-intervention, according to the WEMWBS scale, 40% (n=6) of participants reported "Very low" psychosocial well-being, and a further 20% (n=3) reported "Below average". 40% (n=6) rated their own well-being as "Average" and none as "Above average". This indicates a marked underlying decline in psychosocial well-being amongst the study group.

A step forward was made after the intervention. Those with "Very low" well-being down to 20% (n=3), and no longer varied based on this measure, as did those with "Below average" well-being. Importantly, the percentage of participants that reported "Average" well-being rose up to 46.7% (n=7), and for the first time, 13.3% (n=2) of the

sample reported feeling "Above average" in this domain. This rise in wellbeing categories can be interpreted as an indication that the intervention positively affects psychosocial well-being.

This is also evident in the bar graph presented, where we can observe a decrease in the "Very low" and an increase in "Average" and "Above average" from pre-test to post-test. This visual evidence documents the beneficial effect of the intervention on psychosocial well-being.

4.3 Status of Anxiety among the participants

The comparison of anxiety levels prior to and after the intervention indicated a significant enhancement.

Table: 4.3

Measured Variable Results of HADS-Anxiety within pretest and post-test

	Frequency (n)	Mean±SD	Z value	p-value
Anxiety				
Pre-test	15	11.73±2.492	Z=-3.329	.001
Post-test	15	7.60±2.131		

Note: Wilcoxon signed-rank test

The results in anxiety (HADS-Anxiety) also do show a significant reduction from pre-test to post-test. The average HADS-Anxiety score was 11.73 and ranged with a mean SD± 2.492 before the intervention. Such score would ordinarily signal to anxiety at a clinically significant level and would even warrant further assessment and/or intervention. Having post-intervention, the mean score for HADS-Anxiety was 7.60 (SD ± 2.131). Anxiety was reduced post-intervention, and the reduction was significant.

A Wilcoxon signed-rank test (indicated by a Z-value for non-normally distributed data, which is typically the case with most psychological scales) was likely used for the paired samples, resulting in a Z-value of -3.329. The p-value for this is $< .001$, which is in this case, as with so many others, highly statistically significant ($p < .05$). This reduction of 4.13 points in average HADS-Anxiety score of the test is highly indicative of the effectiveness of the intervention in clinically driven anxiety level reduction. This almost certainly means that fewer self-reported panic, worry, and tension symptoms were experienced, which indicates that intervention was successful in anxiety management. Anxiety, particularly psychological anxiety, and over active anxious reflections is what the HADS-Anxiety scale measures, and their reduction indicates a direct improvement in realities and emotions of participants.

Figure: 4.2

Anxiety among the participants

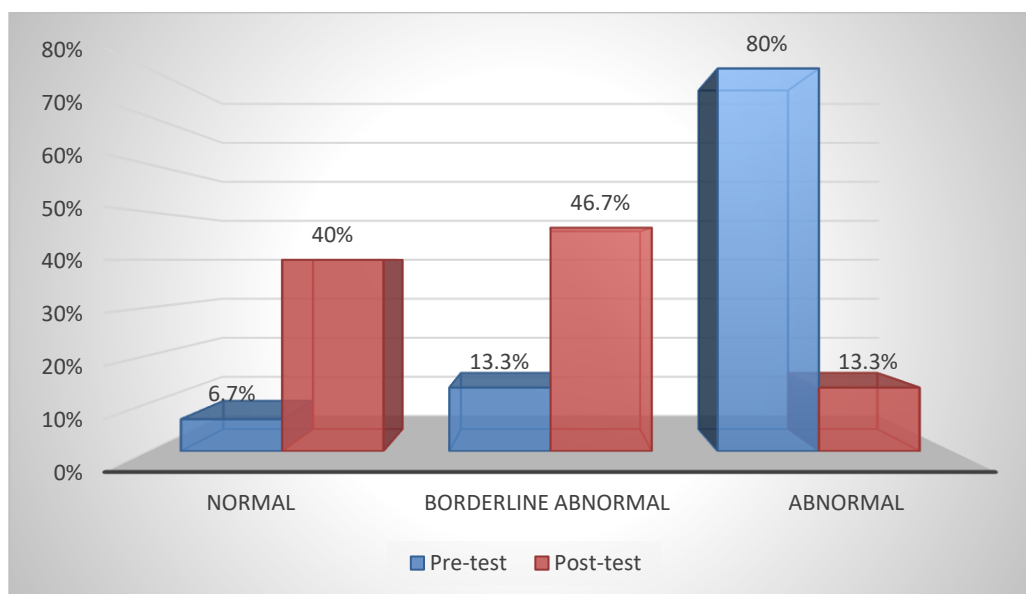


Figure 4.2 define that no participant was categorized as “normal” for anxiety prior to the intervention 6.7% (n =1). Only 13.3% (n=2) had “Borderline Abnormal” for anxiety,

with the majority of them, 80% (n=12), meeting the criteria for being “Abnormal.” This indicates a high prevalence of anxiety in recipients at baseline.

There was significant improvement after the intervention. There was significant increase in "normal" for anxiety 40%, (n=6) by the number of participants. The "Borderline Abnormal" anxiety had also increased to 46.7% (n=7). Moreover, the proportion of women with “abnormal” anxiety was markedly reduced to 13.3% (n=2). A larger decline in abnormal and an increase in normal and borderline anxiety categories amply supported that the intervention was effective in the reduction of anxiety symptoms.

This shift is evident from the bar chart, as a key transition from "Abnormal" to "Normal" and "Borderline Abnormal" appears post mindfulness group therapy, demonstrating a clear reduction in anxiety by the mindfulness-based group therapy.

4.4 Status of Depression among the participants

Pre-and post-intervention monitoring on depression revealed a significant improvement.

Table: 4.4

Measured Variable Results of HADS-Depression within pretest and post-test

	Frequency (n)	Mean±SD	Z value	p-value
Depression				
Pre-test	15	9.39±2.764	Z=-2.943	.003
Post-test	15	7.20±2.933		

Note: Wilcoxon signed-rank test

Finally, depression results as measured by the HADS Depression sub scale also decrease significantly from pre to post test. The average HADS-Depression score at pre-test was 9.39 (SD±2.764). This score would generally indicate mild to moderate depression symptoms. After intervention, the average HADS-Depression score fell to 7.20 (SD±2.933).

As with the anxiety values, a Wilcoxon signed-rank was probably used and produced a Z-value of -2.943. The corresponding p-value was ($<.003$, which is also a highly statistically significant difference ($p <.05$). Such a major decrease of 2.19 points on average in the mean HADS-Depression score demonstrates that, by and large, the intervention had successfully reduced depressive symptoms among them. It indicates a lower level of anhedonia (inability to feel pleasure), low mood, and lack of energy on the HADS-Depression Dimension. This result highlights the intervention's impact on enhancing emotional well-being and alleviating depressive symptoms among participants. The average drop of 2.19 points in the mean HADS-Depression score shows that the intervention worked to lower depressive symptoms in most of the people who took part. It shows that the person has a lower level of depression (the inability to feel pleasure), a low mood, and a lack of energy on the HADS-Depression Dimension. This result shows how the intervention helped participants feel better emotionally and less depressed.

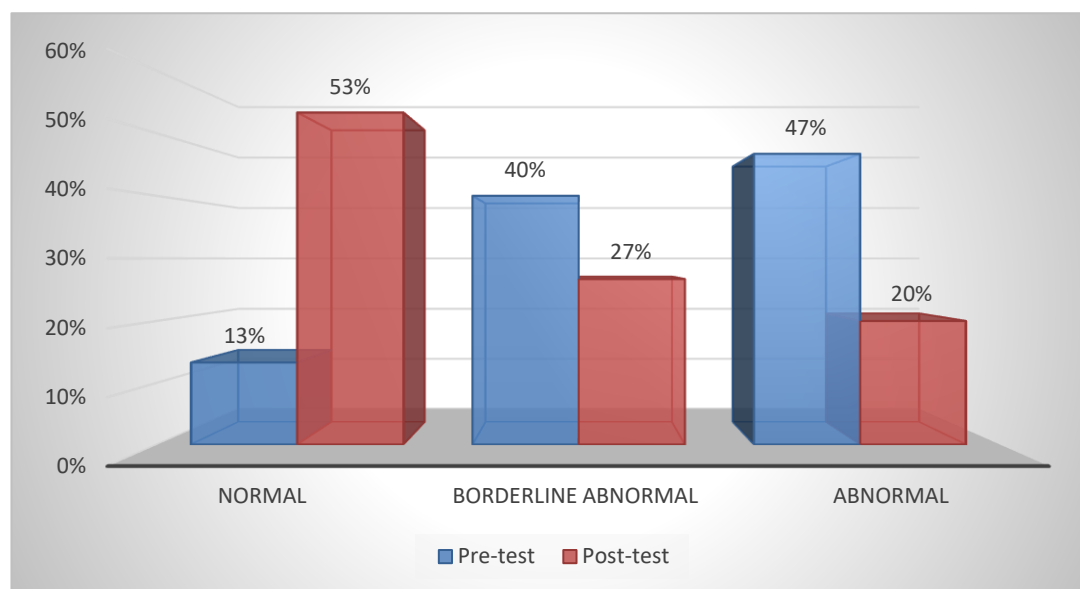
Figure: 4.3*Depression among the participants*

Figure 4.3 shows that 13.3% (n=2) of participants reported "Normal" depression category before intervention. Of these, 13.3% (n=2) were "Borderline Abnormal" and the majority, 73.3% (n=7), were considered to be "Abnormal". This implies a high level of depression in the stroke survivor cohort at baseline.

The state of depression improved significantly following the intervention. The proportion who were "Normal" for depression rose to 53.3% (n = 8). The "Borderline Abnormal" category elevated to 26.7% (n=4). The percent of participants with "Abnormal" depression also significantly decreased to 20.0% (n=3). These findings indicate that the intervention successfully decreased depression (symptoms). The bar chart clearly shows this significant change, with a drop in the "Abnormal" category and rises in the "Normal" and "Borderline Abnormal" categories after the intervention, highlighting the benefits for depressive symptoms.

4.5 Association between socio-demographic factors and total Psychological well-being, Anxiety and Depression

Table 4.5

Association between Socio-demographic Factors and WEMWBS Scale Score

Variable	Category	Pre-Test				Post-Test			
		Very Low	Below Average	Average	Above Average	Very Low	Below Average	Average	Above Average
Gender	Male	5	3	5	0	3	2	6	2
	Female	1	0	1	0	0	1	1	0
	Fisher-Exact: 0.807, P-value:1.00					Fisher-Exact: 2.051, P-value:1.00			
Living area	Rural	5	1	4	0	2	3	4	1
	Urban	1	2	2	0	1	0	3	1
	Fisher-Exact: 2.176, P-value:0.336					Fisher-Exact: 2.191, P-value:0.769			
Education	Primary	3	2	1	0	1	2	3	0
	Secondary	2	0	2	0	1	1	2	0
	Higher-secondary	0	1	0	0	0	0	1	0
	Tertiary	1	0	3	0	1	0	1	2
	Fisher-Exact: 6.939, P-value:0.383					Fisher-Exact: 2.176, P-value:0.336			
Occupation	Unemployed	4	1	1	0	2	2	1	1
	Govt service holder	0	0	1	0	0	0	1	0
	Private Service holder	0	0	1	0	0	0	0	1
	Business	1	0	1	0	1	0	1	0
	Farmer	0	2	1	0	0	0	3	0
	Homemaker	1	0	1	0	0	1	1	0
	Fisher-Exact:11.994, P-value:0.430					Fisher-Exact: 18.618, P-value:0.302			

Diagnosis	Hemorrhagic	3	0	4	0	1	2	3	1
	Ischemic	3	3	2	0	2	1	4	1
	Fisher-Exact: 3.263, P-value:0.324					Fisher-Exact: 1.178, P-value:1.00			
Disability	Right-Side hemiplegia	3	0	3	0	2	1	1	2
	Left-Side hemiplegia	3	3	3	0	1	2	6	0
	Fisher-Exact: 2.258, P-value:0.505					Fisher-Exact: 5.390, P-value:0.182			
Age	35-55 years	4	0	2	0	2	2	1	1
	56-75 years	2	3	4	0	1	1	6	1
	Fisher-Exact: 3.409, P-value:0.174					Fisher-Exact: 4.003, P-value:0.291			

This table 4.5 shows that the pre-intervention stage, the distribution of WEMWBS scores, classified as Very Low, Below Average, Average, and Above Average, yielded a Fisher-Exact value of 0.807 and a P-value of 1.00 for males (5, 3, 5, 0) and females (0, 1, 1, 0). This P-value is much higher than the usual significance level, which means that Gender did not affect baseline WEMWBS scores. Following the intervention, the score distributions for males (3, 2, 6, 2) and females (0, 1, 1, 0) exhibited a Fisher-Exact value of 2.051 and a P-value of 1.00. The persistent absence of significance following the intervention indicates that its impact on WEMWBS scores was equivalent across genders, and gender did not notably influence post-intervention well-being.

The pre-intervention analysis, broken down by living area (Rural: 5, 1, 4, 0; Urban: 1, 2, 2, 0), yielded a Fisher-Exact value of 2.176 with a P-value of 0.336. This suggests there was no statistically significant difference in baseline WEMWBS scores based on residence. After the intervention, the distributions for rural (2, 3, 4, 1) and urban

(1, 0, 3, 1) groups yielded a Fisher-Exact value of 2.191 and a P-value of 0.769. Overall, these results indicate that whether participants lived in rural or urban areas did not significantly affect their WEMWBS scores, neither before nor after the intervention.

An analysis of pre-intervention WEMWBS scores across different education levels (Primary: 3, 2, 1, 0; Secondary: 2, 0, 2, 0; Higher-secondary: 0, 1, 0, 0; Tertiary: 1, 0, 3, 0) showed a Fisher-Exact value of 6.939 and a P-value of 0.383. This indicates no significant link between educational background and initial well-being scores. After the intervention, the distribution of scores (Primary: 1, 2, 3, 0; Secondary: 1, 1, 2, 0; Higher-secondary: 0, 0, 1, 0; Tertiary: 1, 0, 1, 2) resulted in a Fisher-Exact value of 2.176 and a P-value of 0.336. The continued lack of significance suggests that educational attainment did not significantly affect WEMWBS scores in this group.

The initial assessment of WEMWBS scores by occupational category (Unemployed: 4, 1, 1, 0; Govt. Service Holder: 0, 0, 1, 0; Private Service Holder: 0, 0, 1, 0; Business: 1, 0, 1, 0; Farmer: 0, 2, 1, 0; Homemaker: 1, 0, 1, 0) resulted in a Fisher-Exact value of 11.994 and a P-value of 0.430. Overall, these categories showed no significant link with baseline well-being. Following the intervention, analysis across the same groups (Unemployed: 2, 2, 1, 1; Govt. Service Holder: 0, 0, 1, 0; Private Service Holder: 0, 0, 0, 1; Business: 1, 0, 1, 0; Farmer: 0, 0, 3, 0; Homemaker: 0, 1, 1, 0) produced a Fisher-Exact value of 18.618 with a P-value of 0.302. These consistent non-significant results suggest occupational status did not significantly influence well-being scores, neither before nor after the intervention.

The pre-intervention WEMWBS scores, categorized by diagnosis (Hemorrhagic: 3, 0, 4, 0; Ischemic: 3, 3, 2, 0), yielded a Fisher-Exact value of 3.263 with a P-value of 0.324. This indicates that diagnosis type (hemorrhagic versus ischemic) did not significantly distinguish baseline well-being. After the intervention, the scores (Hemorrhagic: 1, 2, 3, 1; Ischemic: 2, 1, 4, 1) resulted in a Fisher-Exact value of 1.178 and a P-value of 1.00, consistently showing no significant difference. Overall, diagnosis category did not significantly affect well-being either before or after the intervention.

Analysis of pre-intervention WEMWBS scores based on the type of disability (Right-Side hemiplegia: 3, 0, 3, 0; Left-Side hemiplegia: 3, 3, 3, 0) showed a Fisher-Exact value of 2.258 with a P-value of 0.505. This suggests that the side of hemiplegia did not significantly affect initial well-being. After the intervention, the distributions for Right-Side hemiplegia (2, 1, 1, 2) and Left-Side hemiplegia (1, 2, 6, 0) resulted in a Fisher-Exact value of 5.390 and a P-value of 0.182. Overall, these results indicate that the type of hemiplegia was not a significant predictor of WEMWBS scores, either before or after the intervention.

Pre-intervention WEMWBS scores for the two age groups (35-55 years: 4, 0, 2, 0; 56-75 years: 2, 3, 4, 0) yielded a Fisher-Exact value of 3.409 with a P-value of 0.174. This indicates that age, within these groups, was not significantly linked to baseline well-being. After the intervention, the score distributions for the 35-55 years group (2, 2, 1, 1) and the 56-75 years group (1, 1, 6, 1) resulted in a Fisher-Exact value of 4.003 with a P-value of 0.291. The consistent lack of significance at both time points suggests that age did not significantly influence WEMWBS scores among participants.

Table: 4.6

Association between Socio-demographic Factors and HADS Anxiety Scale score.

Variable	Category	Pre-Test			Post-Test		
		Normal	Borderline Abnormal	Abnormal	Normal	Borderline Abnormal	Abnormal
Gender	Male	1	2	10	5	6	2
	Female	0	0	2	1	1	0
	Fisher-Exact: 1.099, P-value: 1.000			Fisher-Exact: 0.750, P-value: 1.00			
Living area	Rural	1	0	9	2	7	1
	Urban	0	2	3	4	0	1
	Fisher-Exact: 4.090, P-value: 0.095			Fisher-Exact: 6.822, P-value: 0.026			
Education	Primary	1	0	5	1	3	2
	Secondary	0	0	4	1	3	0
	Higher-secondary	0	0	1	1	0	0
	Tertiary	0	2	2	3	1	0
	Fisher-Exact: 7.369, P-value: 0.305			Fisher-Exact: 6.810, P-value: 0.359			
Occupation	Unemployed	0	0	6	1	5	0
	Govt service holder	0	0	1	0	1	0
	Private Service holder	0	1	0	0	0	1
	Business	0	1	1	2	0	0
	Farmer	1	0	2	1	0	2

	Homemaker	0	0	2	1	1	0
	Fisher-Exact: 14.528, P-value: 0.334			Fisher-Exact:14.580,P-value:0.142			
	Hemorrhagic	1	0	6	2	5	0
Diagnosis	Ischemic	0	2	6	4	2	2
	Fisher-Exact: 2.514, P-value: 0.467			Fisher-Exact:3.414,P-value: 0.184			
	Right-Side hemiplegia	0	1	5	2	4	0
Disability	Left-Side hemiplegia	1	1	7	4	3	2
	Fisher-Exact: 1.009, P-value: 1.000			Fisher-Exact: 1.965, P-value: 0.483			
	35–55 years	0	1	5	2	4	0
Age	56–75 years	1	1	7	4	3	2
	Fisher-Exact: 1.009, P-value: 1.000			Fisher-Exact: 1.965, P-value: 0.483			

Table 4.6 shows there is no statistically significant association between gender and HADS anxiety scores in either the pre- or post-intervention assessments, with Fisher-Exact: 0.750, P-value: 1.00. This consistent lack of significance suggests that, in this study group, biological gender did not notably influence anxiety levels or severity before or after the intervention. The distribution of individuals classified as "Normal," "Borderline Abnormal," or "Abnormal" was similar across males and females in both assessments, indicating a strong absence of association. This might reflect a similar anxiety profile across sexes in this population or indicate that other, more influential factors are overshadowing any sex-based differences.

In the preemptive stage, the living area under consideration exhibited a clear trend towards significance (Fisher-Exact: 4.090, P-value: 0.095), albeit failing to meet the significance score. Even so, the preemptive phase suggests divergence. Notably, this association has a statistically significant value post-intervention (Fisher-Exact: 6.822, P-value: 0.026). A closer routinization of the accrued data as well as the distribution among the variables, indicate that there is a higher tendency of rural dwellers to score "Abnormal" in anxiety post intervention as compared to their urban counterparts. Illustratively, rural participants during the post-test phase demonstrated 7 "Borderline Abnormal" and 1 "Abnormal" while in contrast urban participants demonstrated 0 "Borderline Abnormal" and 1 "Abnormal" although this value is in disparity as there is a lower urban sample size in the 'Abnormal' category. This raises the possibility of the intervention having a differential effect, or the socio-environmental variables correlated to the area of residence may have increased anxiety in rural and urban settings or increased resilience post intervention. It is necessary to identify the contextual factors that underlie the disparity in anxiety outcomes in geographically dispersed locations.

There was no significant association between levels of education (Primary, Secondary, Higher-secondary, Tertiary) and HADS anxiety scores. This comparison still held in the pre-intervention (Fisher-Exact: 7.369, P=0.305) and post-intervention periods (Fisher-Exact: 6.810, P=0.359). While it is plausible that higher levels of education could be associated with better coping or greater resources, we see no evidence for direct effects on anxiety across educational groups in this population. The proportion of "Borderline Abnormal" and "Abnormal" anxiety scores were also highly variable between all levels of education with no discernible statistically significant trends. This

implies that some sources other than formal education may play a greater role in anxiety, such as acquired resilience or current stressors.

Occupational status did not significantly influence HADS anxiety scores in the pre/post-intervention (Fisher-Exact: 14.528, P-value: 0.334) or post-intervention analysis (Fisher-Exact: 14.580, P-value: 0.142). Prevalence of anxiety did not follow a clear pattern across levels of occupation (unemployed, business, farmers) as seen for other age groups. It may seem intuitive that there are some jobs that by nature carry more stress and thus higher anxiety; however, our findings did not show a statistically significant association in this sample. The overall pattern of findings was the same for anxiety, but anxiety levels between occupations were not clearly different, which suggests that other factors may have had a relatively strong effect on the outcome variable than the type of employment here.

The specific medical diagnosis, whether hemorrhagic or ischemic, did not show a significant link to HADS anxiety scores, neither before nor after intervention (Fisher-Exact: 2.514, P-value: 0.467) nor post-intervention (Fisher-Exact: 3.414, P = 0.184). This indicates that the type of primary medical diagnosis, in the context of this study, was not a key predictor of anxiety levels. Despite underlying differences in pathology, both groups had similar anxiety score distributions. This may suggest that the psychological impact stems more from the medical condition itself than its specific cause, or that the intervention was equally effective across diagnostic categories in reducing anxiety.

Hemiplegia laterality (right versus left side) showed no significant association with HADS anxiety scores, both before (Fisher-Exact: 1.009, P-value: 1.000) and after (Fisher-Exact: 1.965, P-value: 0.483) the intervention. This suggests that the side of

physical impairment, often associated with different neurological and cognitive outcomes, did not differentially affect anxiety levels in this group. The emotional and psychological impact of disability itself, rather than its specific location, might be a more universal factor influencing anxiety, if any, in this population.

Age groups (35-55 and 56-75 years) showed no significant association with HADS anxiety scores in either the pre- or post-intervention evaluations (Fisher-Exact: 1.009, P-value: 1.000; Fisher-Exact: 1.965, P-value: 0.483). Although age is often a broad predictor of health outcomes, its categorization here did not correlate with anxiety levels. This suggests that other factors or the overall experience of the medical condition and treatment may be more influential than age within these ranges.

Table: 4.7

Association between Socio-demographic Factors and HADS Depression Scale score

Variable	Category	Pre-Test			Post-Test		
		Normal	Borderline Abnormal	Abnormal	Normal	Borderline Abnormal	Abnormal
Gender	Male	2	5	6	8	2	2
	Female	0	1	1	0	1	1
	Fisher-Exact: 0.750, P-value: 1.000			Fisher-Exact:3.122,Pvalue:0.200			
Living area	Rural	0	5	5	4	4	2
	Urban	2	1	2	4	0	1
	Fisher-Exact: 3.952, P-value: 0.172			Fisher-Exact: 2.797, P-value: 0.291			
Education	Primary	0	1	5	0	3	3
	Secondary	0	3	1	3	1	0
	Higher-secondary	0	0	1	1	0	0

	Tertiary	2	2	0	4	0	0
		Fisher-Exact: 10.604, P-value: 0.033			Fisher-Exact: 11.825, P-value: 0.010		
	Unemployed	0	3	3	4	1	1
	Govt service holder	0	0	1	1	0	0
	Private Service holder	1	0	0	1	0	0
Occupation	Business	1	1	0	2	0	0
	Farmer	0	1	2	0	2	1
	Homemaker	0	1	1	0	1	1
		Fisher-Exact: 10.996, P-value: 0.825			Fisher-Exact: 12.839, P-value: 0.308		
	Hemorrhagic	1	3	3	5	2	0
	Ischemic	1	3	4	3	2	3
Diagnosis		Fisher-Exact: 0.434, P-value: 1.000			Fisher-Exact: 3.154, P-value: 0.308		
	Right-Side hemiplegia	1	4	1	4	1	1
	Left-Side hemiplegia	1	2	6	4	3	2
Disability		Fisher-Exact: 3.798, P-value: 0.168			Fisher-Exact: 0.892, P-value: 0.799		
	35–55 years	2	2	2	4	1	1
	56–75 years	0	4	5	4	3	2
Age		Fisher-Exact: 2.987, P-value: 0.294			Fisher-Exact: 0.892, P-value: 0.799		

Table 4.7 stated that similar results were found for anxiety: during both the pre-intervention (Fisher-Exact: 0.750, P-value: 1.000) and post-intervention phases, no statistically significant relationship that agreed with gender could be detected (Fisher-

Exact: 3.122, P-value: 0.200). This consistent lack of significance using gender as an indicator on both anxiety and depression measures is worth noting in itself. It means that neither before nor after the intervention, for those among more than 10% of participants surveyed who supplied such data, did depression levels vary significantly by their gender. This could indicate that in this group of subjects, the causes and expression of depression are influenced more by shared experiences related to health status or other social-environmental factors rather than biological gender.

The living area was not significantly associated with depression scores, neither before the intervention (Fisher's Exact: 3.952, P-value: 0.172) nor after (Fisher's Exact: 2.797, P-value: 0.291). Although there was a significant decrease in anxiety levels after the intervention, there was a contrary result when it came to the levels of depression for both the urban and rural sides. The difference between depression and anxiety in regard to residing area after the modification suggests that although the two are commonly comorbid, the emotions stem from their own separate sets of socio-environmental circumstances. More so, it suggests that the intervention or the setting had different effects on the levels of depressive and anxiety symptoms, especially depending on the region.

As for educational level reached, while unable to establish significance previously, we subsequently found a strong positive association (Fisher-Exact: 10.604, P-value: 0.033); however, how exactly this incriminated positive association while associated Fisher-Exact: 11.825, P-value: 0.010). Measuring the raw frequencies and proportions across educational categories, “Primary” and “Secondary” group respondents markedly “Abnormal” depression scores post-test. For instance, in the post-test results,

the tally for participants with a Primary education showed 3 “Borderline Abnormal” cases alongside 3 “Abnormal” cases, while those with Tertiary education had a null tally. This is suggestive of a strong consideration of the educational background of subjects in relation to the outcome of depression after the intervention, especially those with lower educational qualifications. Such individuals appear to be in a position where depression, be it chronic or newly presented, is more commonplace. Explanatory factors for this situation could be poor educated in terms of the factors contributing to longer lasting depression and inadequate information, poor health literacy, lack of coping mechanisms, or more socio-economic risks rather than the average population.

Occupational status showed no statistically significant relationship with HADS depression scores in either the pre- or post-intervention analyses (Fisher-Exact: 12.839, P-value=0.825; Fisher-Exact: 12.839, P-value=0.308). Similar to the anxiety results, the variety of occupations did not produce a clear pattern in depressive symptom prevalence. This indicates that work demands or characteristics, as categorized here, were not the main factors influencing depression in this group. It suggests instead that the health condition itself or other personal factors may have had a greater impact on depressive states than occupation.

The type of medical diagnosis (hemorrhagic versus ischemic) showed no statistically significant link to HADS depression scores, both before (Fisher-Exact: 0.434, P-value=1.000) and after the intervention (Fisher-Exact: 3.154, P-value=0.308). Similar to the results for anxiety, the specific diagnosis did not seem to influence the likelihood of depression. This indicates that the overall experience of illness and recovery has a more consistent effect on mental health than the exact pathological category, or that the

intervention was equally successful across different diagnoses in reducing depressive symptoms.

No statistically significant relationship was observed between the side of hemiplegia side and HADS depression scores, either before (Fisher-Exact: 3.798, P-value: 0.168) or after (Fisher-Exact: 0.892, P = 0.799) the intervention. This suggests that the level of functional impairment, rather than the affected side, is the primary factor influencing psychological outcomes. The emotional and physical difficulties related to hemiplegia seem to broadly influence mental health, regardless of which side is affected, and do not specifically increase depression risk based on the side of paralysis.

Within the defined age categories, there was no statistically significant association between age and HADS depression scores at either the pre- or post-intervention assessments (Fisher-Exact: 0.892, P-value: 0.294; Fisher-Exact: 0.892, P-value: 0.799). This indicates that, similar to anxiety, age within these ranges did not stand out as an independent predictor of depression levels. Factors such as the medical condition, the intervention, and other personal variables likely had a greater influence on depressive outcomes than age in this population.

CHAPTER V: DISCUSSION

This study investigated the effectiveness of mindfulness-based interventions (MBI) on psychological outcomes, specifically psychological well-being, anxiety and depression in post-stroke patients. In addition to motor status, psychological problems are a type of disability for these stroke patients. The conclusions offer evidence that mental health outcomes improved after the intervention. The outcome of this study presents useful outcome possibilities in stroke rehabilitation, thereby asserting the need to integrate psychological first aid in these paradigms. This study focuses on whether mindfulness-based group therapy is a useful treatment in the case of psychological challenges after stroke. The investigators used a one-group pre-test-post-test design, based on a standardized treatment protocol including mindfulness-based group therapy interventions to improve psychological health. Study participants were also receiving other therapy services including: physiotherapy, Occupational therapy, and speech & language therapy and group therapies. But this approach was not utilized in additional treatment sessions. In contrast, for other therapy sessions, mindfulness-based functions did not interact with the participants. So, the patients are only having their interventions themselves in their mindfulness-based group therapy interventions. The remainder of this article critically evaluates the results in relation to mean comparisons between religious and non-religious subjects in the broader scientific literature, possible mechanisms through which these outcomes occurred, and consideration of socio-demographic effects.

Average scores on the WEMWBS scale, which gauges psychological well-being, increased dramatically following the intervention, according to the research. This improvement was both statistically and clinically significant, with more individuals

reporting "average" or "above average" levels of well-being and fewer reporting "very low" levels.

These results are consistent with previous research highlighting the advantages of MBIs in building resilience and improving mental health in clinical populations (Khoury et al., 2013; Gotink et al., 2015). A significant amount of emotional discomfort is often experienced by stroke survivors, which negatively impacts their quality of life and participation in rehabilitation activities. As the psychological well-being of survivors improves, they become more equipped to engage in their recovery, which, over time, may also have an influence on their physical outcomes (OX CHRONIC Consortium, 2023).

These findings corroborate with other research which showed that MBIs assist clinical populations increase their mental health and resilience (Khoury et al., 2013, Gotink et al., 2015). Many people who have had a stroke suffer from psychological pain, which can prevent them participating in rehabilitation. Healthy minds make stronger people, and making that a priority could have future implications for their physical health (OX CHRONIC Consortium, 2023).

Mindfulness techniques increase people's awareness of the present and make it easier to control emotions. This can help them escape from negative thinking patterns and learn to accept things as they are. This process lies at the core of well-being gains (Hölzel et al., 2011). Because they have had the opportunity to learn about themselves and how to handle problems, participants may have experienced greater sense of control and hopefulness in their recovery process.

There was a significant reduction in the participant's symptoms of anxiety, and the mean HADS anxiety score substantially decreased following the intervention. Massive decrease in numbers with "abnormal" anxiety, with a massive increase in the numbers having "normal" anxiety. This profile demonstrates that MBIs have a large effect in diminishing anxiety in stroke patients. These findings are also consistent with systematic reviews and meta-analyses reporting on the efficacy of MBIs for addressing anxiety across medical groups, including individuals with neurological illness (Khoury et al., 2013; Lawrence et al., 2021). Anxiety following stroke is frequently not acknowledged or treated, yet it exacerbates disability: making people less motivated, more tired and unable to engage in rehabilitation (Towfighi et al., 2017). Among other things, MBIs disrupt thought cycles that contribute to anxiety, leading individuals to relaxation through instructions such as focused breathing or mindfulness meditation. Excitingly, the anxiety benefits occurred irrespective of participant's gender, age or disability, meaning that a broad array of people could potentially use the intervention. Even so, rural residents experienced a greater increase in anxiety after the intervention, indicating that social and environmental factors can influence mental health.

Depression, which is a common and crippling effect of having a stroke, show the substantial improvement got a lot better in this study. The average HADS depression scores went down a lot, and a lot of the people who took part went from having "abnormal" depression to having "normal" depression after the mindfulness intervention.

Similarly to past investigations centered on the depression spurred post-stroke cognitive mindfulness and stress reduction therapies (Gotink et al., 2015; Lawrence et al., 2021), the outcome of this study also suggests that depression post-stroke is detrimental

to functional recovery, treatment compliance, and mortality (Hackett & Pickles, 2014; Towfighi et al., 2017), it is therefore vital to alleviate the burden of these challenges. The ability to control and accept more difficult feelings, quiet one's mind, and the stereotype decreased autonomously engagement and acceptance MBIs provide molded contemplative obstruction (Hölzel et al., 2011). People stand to gain the capacity to re-center control of their emotions to regulate sadness, and better adapt and accept disabilities and loss.

This is a burnout of the prior works of other scholars. It has already been established that the above factors have psychological ramifications. Gender, age, and occupation do not tremendously alter well-being, anxiety, or depression, which suggests that MBIs are effective in improving the psychological well-being of individuals irrespective of their socio-demographic backgrounds. However, there were two factors that stood out as the main moderators, which are living area and education level. People who lived in rural areas reported greater anxiety post the intervention as compared to their urban counterparts. This might be because of the scarcity of mental health resources, social support, and medical infrastructure that is more prevalent in rural settings. People living in rural areas are more likely to encounter greater geographical isolation, difficulty accessing health services, and a lack of specialized mental health services, which may render anxiety interventions ineffective or may hinder participants from coping with anxiety in the long run. People with low or no education were more likely to be depressed. The phenomena of low health literacy and low socioeconomic status has been documented to correlate with adverse mental health conditions, greater non participation in mental health care, and poor participation in therapeutic programs. Mindfulness

practitioners ought to differentiate between participants who have less education, as unequally offered support may be more counterproductive in interventions.

The significant changes in well-being, anxiety, and depression that we headed may be explained by a number of converging processes in mindfulness theory and neurobiology. Mindfulness, on the other hand, though still in the domain of the theoretical, may assist in the cultivation of awareness and present mental unshackling which in turn may lessen the reliance on the dominantly cognitive, maladaptive processes of rumination, and the catastrophic features of post-stroke depression and anxiety (Hölzel et al., 2011).

Neurobiological changes resulting from the above factors may involve alterations in the functional and structural activity of the prefrontal cortex, amygdala, and hippocampus, as mindfulness practices have been shown to produce, and research links with the modification of neural circuits that underlie emotion regulation (Hölzel et al., 2013). These changes add emotional resilience, lower the stress response, and build what has been termed ‘adaptive coping resources.’ This neural plasticity may be quite beneficial to most stroke survivors, as these individuals often sustain injury or disruption to the very neural circuits due to cerebrovascular damage.

Mindfulness also triggers the relaxation response in the autonomic nervous system which in the lower strokes of ease distress and anxiety, relaxation and the physiological quietness of the lower strokes ease distress and anxiety quietness of the lower strokes ease distress and anxiety coping. Mindfulness increases one’s emotional resilience towards life the stressors in which mental powerlessness and hopelessness

prevail. Mindfulness training tends to produce functional and structural changes in the emotion-regulating systems of the prefrontal cortex, amygdala, and hippocampus (Hölzel et al., 2013). Decreased emotional stress response adaptations and the polishing of coping response helps emotional stress protection. This, and other adaptations, neural plasticity aids survivors of strokes, who ordinarily sustain damage to these structures and the cerebrovascular injury secondary to the disruption of these circuits.

Mindfulness promotes in exercise the relaxation response of the diaphragmatic brethren autonomic nervous system. This mechanism which serves to increase ease the the quietness, physiological of lower relaxation and the strokes ease distress and anxiety coping. In coping, held helplessness. Mindfulness helps in the restructuring of the thinking process and emotions focusing futilely onto feelings of despair (Wrapson et al., 2021; Tang et al., 2015).

CHAPTER VI: CONCLUSION

6.1 Strengths and Limitations

6.1.1 *Strength*

- Mindfulness-based group therapy is a unique intervention strategy for people living with stroke, and in Bangladesh, no study was found regarding the effectiveness of Mindfulness-based group therapy. This study provides valuable insights into the effectiveness of Mindfulness-based group therapy for people living with stroke.
- The intervention was provided by five occupational therapists who were sufficiently trained in the intervention by the researcher. So, they run the group sessions carefully and effectively at the same time, in the same place, with the same group participants.
- Incorporating the socio-demographic factors added extra value to the study.
- Patients and their caregivers were very cooperative throughout the intervention period, which helped to get a positive effect of the study.

6.1.2 *Limitation*

This study has some limitations that need to be considered.

- First, the results from this study might not be generalized to the overall population due to the small sample size. The experiment was conducted with only 15 participants at one rehabilitation centre, and the results cannot be generalized to all people living with stroke because the sample size was too small. This happened because the number of existing stroke patients receiving rehabilitation

services from the Stroke Rehabilitation Unit, CRP-Mirpur, who met the inclusion criteria was small in size.

- Second, there was no control group to compare with conventional interventions as the study was a single-group pre-test post-test design. It was difficult to ensure a true control group due to some ethical issues. So, to ensure the validity of the result, further study with a control group needs to be considered.
- Third, the caregivers of stroke patients, most of whom are paid caregivers. For this, they sometimes did not arrive on time or practice properly.
- Finally, participants of this study were people with stroke who had lower psychological well-being, anxiety and depression levels, mild to severe according to WEMWBS and HADS scale. However, it was found that it is difficult to provide intervention in a group for people with severe depression and lower psychological well-being. They are fed up with their life affected by stroke. So, practice and exercises at home, as well as talking with other people and caregivers, are beneficial for their improvement.

6.2 Practice Implication

6.2.1 Recommendation for future practice

Groups can affect the performance and satisfaction levels of stroke patients. Mindfulness-based group therapy is an effective method that is widely used for the treatment of various conditions, such as stroke. In this study, researchers found the positive mental health outcomes that affect the use of mindfulness-based group therapy, so it can be an effective intervention strategy in occupational therapy for people living with stroke to improve their mental health outcomes, like psychological well-being, anxiety and depression.

Occupational therapists would improve their practice in the field of stroke rehabilitation by incorporating this intervention and by engaging in group-based mindfulness-based interventions. Stroke patients can improve their mental health outcomes, which improves their performance of activities of daily living.

6.2.2 Recommendation for future Research

As there are some limitations of this study, future research needs to be conducted by addressing these limitations. Besides this, some other related research can be conducted regarding stroke and mindfulness-based interventions in mental health outcomes, such as:

- A true RCT to find out the effectiveness of mindfulness-based interventions in group therapy for people living with stroke.
- To find out the Effect of mindfulness-based group therapy on psychological well-being, anxiety, depression, and sleep in chronic Stroke Patients.
- To find out the level of occupational performance and satisfaction after attending in mindfulness-based interventions group therapy sessions.
- To explore the challenges of implementing mindfulness-based group intervention for stroke patients in different settings.

6.3 Conclusion

The primary objectives of this study was to evaluate the level of effectiveness of psychological well-being, anxiety and depression among the people living with strokes. The study revealed that the mindfulness-based interventions has a positive effect and significantly improve the mental health outcomes of the participants. People who living in rural area are more faced anxiety and depression then people who live in urban area because of accessibilities of hospitals and rehabilitation center. Although the people who lower psychological well-being and severe depression were significantly improved, the result showed the statistically decreased after the mindfulness-based group therapy sessions. Additionally, among the participants, more participants moved from abnormal to normal anxiety levels after attending the group therapy session. So, it can be an effective intervention strategy for people living with stroke and can be recommended for occupational therapists to incorporate in their practice in mindfulness-based interventions of stroke rehabilitation.

CHAPTER VI: REFERENCES

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APPENDICES

Appendix A: Ethical Approval Form


বাংলাদেশ হেলথ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)
 (The Academic Institute of CRP)

Ref: CRP-BHPI/IRB/05/2025/1081
 Date: 15.05.2025

To
 Fayzullah Hasan Abid
 M.Sc. in Occupational Therapy, Part-II
 Roll: 06, Student ID: 121230022
 BHPI, CRP, Savar, Dhaka-1343

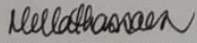
Subject: Approval of the thesis proposal "Effectiveness of Mindfulness-Based Interventions on Mental Health Outcomes in Patients with Stroke: Quasi-Experimental Study" by ethics committee.

Dear Fayzullah Hasan Abid,
 Congratulations.
 The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the principal investigator and Prof. Md. Obaidul Haque, Vice Principal, Bangladesh Health Professions Institute (BHPI) as thesis supervisor. The Following documents have been reviewed and approved:

Sl. No.	Name of the Documents
1	Research Proposal
2	Questionnaire (English & / or Bengali version)
3	Information sheet & consent form.

The purpose of the study is to assess the effectiveness of mindfulness-based interventions (MBI) in improving mental health outcomes, including psychological well-being, anxiety, and depression, in patients recovering from stroke. The study involves use of an Adopted Bengali Version of the protocol and questionnaires to find out the psychological well-being, anxiety, and depression, in patients recovering from stroke, that may take 15 to 20 minutes to answer the questionnaire and there is no likelihood of any harm to the participants and participation in the study may benefit the participants. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 09:00 AM on 13/04/2025 at BHPI (48th IRB Meeting).

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

Best regards,

 Muhammad Millat Hossain
 Associate Professor and Course Coordinator, MRS
 Member Secretary, Institutional Review Board (IRB)
 BHPI, CRP, Savar, Dhaka-1343, Bangladesh

সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ। ফোন: +৮৮ ০২ ২২৪৪৪৫৪৬৪-৫, +৮৮ ০২ ২২৪৪৪১৪০৪, মোবাইল: +৮৮ ০১৭৩০ ০৫৯৬৪৭
 CRP-Chapain, Savar, Dhaka-1343, Bangladesh. Tel: +88 02 224445464-5, +88 02 224441404, Mobile: +88 01730059647
 E-mail : principal-bhpi@crp-bangladesh.org, Web: bhpi.edu.bd

Appendix B: Permission Letter for Data Collection



বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)
 (The academic institute of CRP)
 CRP-Chapain, Savar, Dhaka. Tel: 02224445464, Website: www.bhpi.edu.bd

Date: 25 May, 2025

To
The Deputy General Manager
CRP-Mirpur.

Subject: Regarding data collection for dissertation.

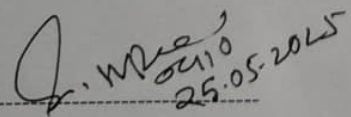
Greeting from Bangladesh Health Professions Institute (BHPI), I would like to inform you that BHPI, the academic institute of Centre for the Rehabilitation of the Paralysed (CRP). CRP is running the Master of Science in Occupational Therapy course. Under the Faculty of Medicine, University of Dhaka.

According to the content of the Master of Science in Occupational Therapy course curriculum, the students have to do Research on different topics to develop their skills. Considering the situation, your institute/organization will be the most appropriate place to collect data.

Master of Science in Occupational Therapy student Fayzullah Hasan Abid would like to collect data in our institute/organization from 26.05.24-31.07.24. The research title is " Effectiveness of Mindfulness-Based Interventions on Mental Health Outcomes in Patients with Stroke: Quasi-Experimental Study".

We shall remain grateful to you if you could kindly allow him in conducting data collection.

With Regards,



25.05.2025

Prof. Sk. Moniruzzaman
 Professor & Head
 Department of Occupational Therapy
 Bangladesh Health Professions Institute (BHPI)
 CRP-Chapain, Savar, Dhaka-1343

Date: 03. 06. 25

To
The Deputy General Manager
CRP-Mirpur,
Plot A/5, Block A, Mirpur 14
Dhaka-1206

Subject: Request for Permission to Conduct an Intervention Group in the Stroke Rehabilitation Unit (SRU)

Respected Sir,

I respectfully write to seek your kind permission to conduct an intervention group within the Stroke Rehabilitation Unit (SRU) at CRP, Mirpur. This initiative is part of a structured program aimed at supporting the psychological and functional well-being of stroke patients through evidence-based therapeutic activities.

The group sessions will be conducted once a week, after official working hours, to avoid any disruption to regular clinical activities. The sessions will be facilitated by a team comprising one staff member and three interns.

To ensure smooth facilitation and proper maintenance of the intervention area during the sessions, we kindly request the allocation of one supporting staff member for assistance.

For your kind review and consideration, I have attached the detailed intervention protocol, which outlines the session structure and anticipated outcomes of the program.

We are committed to upholding CRP's standards of care and professionalism throughout the intervention process and sincerely hope for your approval and support.

Thank you for your time and consideration.

Yours faithfully,

Fayzullah Hasan Abid .
Fayzullah Hasan Abid

Part 2, M.Sc. in Occupational Therapy

Session: 2023-2024, Student ID: 121230022

BHPI, CRP, Savar, Dhaka-1343, Bangladesh

*please easy on +
consider that there will be
no obstruction for SRU
service.*

*Rakib Hossain
1294
3-6-25*

05.06.25

Appendix C: Permission Letter for Scale

Request for Permission to Use Mindfulness-Based Intervention (MBI) Protocol in Academic Research



Fayzullah Hasan Abid <fayzullah.abid@gmail.com>
to wendy.wrapson

Sat, May 31, 11:23 PM ☆ ☺ ↶ ⋮

Dear Madam,

I hope this message finds you well. My name is Fayzullah Hasan Abid, a postgraduate student in the Master of Occupational Therapy program at the Bangladesh Health Professions Institute (BHPI), CRP, Bangladesh.

As part of my academic thesis work, I am conducting a research study titled "*Effectiveness of Mindfulness-Based Intervention on Mental Health Outcomes in Patients with Stroke*." The study aims to evaluate the impact of mindfulness practices on anxiety, depression, and overall mental well-being in stroke survivors.

After conducting a detailed review of the relevant literature, I identified your article, "[A Feasibility Study of a One-to-One Mindfulness-Based Intervention for Improving Mood in Stroke Survivors](#)" as a mindfulness-based intervention (MBI)



Wendy Wrapson <wendy.wrapson@aut.ac.nz>
to me

Aug 12, 2025, 10:59 AM ☆ ☺ ↶ ⋮

Hello again Fayzullah

Apologies for the delay in responding advising what materials might be available to you from our team's own research.

Perhaps if you let me know what type of resources you are interested in, I will be better placed to help you.

If you give me more information about your proposed research project, that might also be helpful.

For example, what is your timeframe? I am about to go on leave for 3 weeks and it may be too late to be of assistance by the time I

Requested for Hospital Anxiety and Depression scale Bangla Version.

Inbox x ⌵ ⌵ ⌵



Fayzullah Hasan Abid <fayzullah.abid@gmail.com>
to islam.msaiful

May 4, 2025, 12:30 PM ☆ ☺ ↶ ⋮

sir,

I hope this email finds you well. My name is Fayzullah Hasan Abid, and I am Master of Occupational Therapy student in Bangladesh Health Professions Institute. For my academic purpose I have to conduct a research. My research title is "Effectiveness of mindfulness based intervention on mental health outcomes in patient with stroke". I recently came across your article regarding psychometric properties of the Bangla version of Hospital Anxiety and Depression Scale.

As part of this research, I aim to assess anxiety and depression among individuals who are recovering from stroke. However, I do not have access to a validated version of the Hospital Anxiety and Depression scale in Bangla, which would be a key tool for my study. I believe that your expertise and resources would be invaluable in helping me carry out this research effectively.

From: Fayzullah Hasan Abid <fayzullah.abid@gmail.com>
Sent: Wednesday, August 13, 2025 1:11 PM
To: Md. Saiful Islam <islam.msaiful@outlook.com>
Subject: Re: Requested for Hospital Anxiety and Depression scale Bangla Version.

One attachment • Scanned by Gmail ⓘ ⌵ Add to Drive



Fayzullah Hasan Abid <fayzullah.abid@gmail.com>
to Saiful

Request for Permission to Use the Warwick–Edinburgh Mental Well-being Scale (WEMWBS) in Academic Research Inbox x



Fayzullah Hasan Abid <fayzullah.abid@gmail.com>
to ventures

Tue, Oct 7, 11:07 PM ☆ ☺ ↶

Dear Sir,

I hope you are doing well. My name is Fayzullah Hasan Abid, and I am currently pursuing a master's degree in Occupational Therapy at the Bangladesh Health Professions Institute (BHPI), Center for the Rehabilitation of the Paralysed (CRP), Savar, Bangladesh.

As part of my academic thesis, I am conducting a research study titled "*Effectiveness of Mindfulness-Based Intervention on Mental Health Outcomes in Patients with Stroke*." In this study, I intend to assess the mental well-being of participants before and after intervention, and the **Warwick–Edinburgh Mental Well-being Scale (WEMWBS)** has been identified as a suitable and validated tool for this purpose.

I would like to kindly request permission to use the **WEMWBS** for academic and non-commercial research purposes. If there are any specific terms use, licensing requirements, or procedures I need to follow to obtain formal permission or access to the scale (including translations, if applicable), would be grateful if you could provide the relevant information or direct me to the appropriate resource.

Thank you very much for your time and consideration. I'm looking forward to hearing back from you.

Activate Windows
Go to Settings to activate



Stafford, Margaret <Margaret.Stafford@warwick.ac.uk>
to me

Wed, Oct 8, 1:00 PM ☆ ☺ ↶

Good Morning,

Thank you for your email, you can find more information and register for the appropriate licence [here](#).

Regards

Maggie

From: Ventures, Resource <ventures@warwick.ac.uk>

Sent: 07 October 2025 18:08

To: WEMWBSLicence, Resource <WEMWBSLicence@warwick.ac.uk>

Subject: FW: Request for Permission to Use the Warwick–Edinburgh Mental Well-being Scale (WEMWBS) in Academic Research

From: Fayzullah Hasan Abid <fayzullah.abid@gmail.com>

Activate Windows
Go to Settings to activate

Submission (ID: 640609148) receipt for the submission of /services/innovations/wemwbs/licenses/non-commercial Inbox x



no-reply@warwick.ac.uk
to me

Wed, Oct 8, 1:25 PM ☆ ☺

Thank you for completing the registration for a Licence to use **WEMWBS** for non-commercial purposes.

You now have access to the scales and the associated resources here on our website

[WEMWBS Licenced Resources Area](#)

We suggest you bookmark this page for future reference.
The information declared on your Registration Form is documented

Activate Windows
Go to Settings to activate

Appendix D: Information Sheet and Consent Form [English Version]

Information sheet

The name of the student researcher is Fayzullah Hasan Abid. He is a student of M.Sc. in Occupational Therapy, Department of Occupational Therapy, and Bangladesh Health Professions Institute (BHPI). As a part of his academic issues, he has to conduct a dissertation this academic year. So, the student researcher would like to invite you to participate in this study. The study's title is “Effectiveness of Mindfulness-Based Interventions on Mental Health Outcomes in Patients with Stroke: Quasi-Experimental Study”.

Your participation is voluntary in the study. You can withdraw your participation anytime. There is no facility to get any pay for this participation. The study will never harm you, but it will help the service user know your experience, which is very important for the service provider to plan for future activities.

Confidentiality of all records will be highly maintained. Your gathered information will not be disclosed anywhere except this study and supervisor. The study will certainly never reveal the name of the participant

If you have any queries regarding the study, please feel free to ask for the contact information stated below:

Fayzullah Hasan Abid

Student of M.Sc. in Occupational Therapy Department of Occupational Therapy

Bangladesh Health Professions Institute (BHPI)

Centre for the Rehabilitation of the Paralysed (CRP)

Chapain, Savar, Dhaka-1343

Consent form

This research is part of the Occupational Therapy course, and the name of the student researcher is Fayzullah Hasan Abid. He is a Bangladesh Health Professions Institute student in M.Sc. in occupational therapy. The study is entitled as “Effectiveness of Mindfulness-Based Interventions on Mental Health Outcomes in Patients with Stroke: Quasi-Experimental Study”.

In this study, I am a participant, and I have been clearly informed about the purpose of the study. I have the right to refuse participation at any time and any stage of the research. I will not be bound to answer to anybody. I understand that there will be no impact of treatment received for participation in the study at present or future.

I am also informed that all the information collected from me used in this study would be kept safe and maintain confidentiality. The student researcher and the supervisor will be eligible to access the data to publish the research result. My name and address will not be published anywhere in this study.

Signature/Fingerprint of the Participant:	Date:
Signature of the Student researcher:	Date:
Signature/Fingerprint of the witness:	Date:

Appendix E: Information Sheet and Consent Form [Bangla Version]

তথ্য পত্র

আমি ফায়জুল্লাহ হাসান আবিদ, বাংলাদেশ হেলথ প্রফেশন্স ইনস্টিটিউট (বিএচপিআই) এর ছাত্র, যা পক্ষাঘাতগ্রস্তদের পুনর্বাসন কেন্দ্র (সিআরপি) এর একটি শিক্ষা প্রতিষ্ঠান। আমি এম.এস.সি ইন অকুপেশনালথেরাপি বিভাগে অধ্যয়নরত আছি। এই কোর্সের অংশ হিসাবে আবশ্যিক ভাবে একটি গবেষণা কর্ম সম্পন্ন করতে হয়। আমি আপনাকে এই গবেষণায় অংশগ্রহন করার জন্য আমন্ত্রন জানাচ্ছি। গবেষণার বিষয় হচ্ছে "স্ট্রোক রোগীদের মানসিক স্বাস্থ্যের ফলাফলের উপর মাইন্ডফুলনেস-ভিত্তিক হস্তক্ষেপের প্রভাব মূল্যায়ন: একটি কোয়াসি-এক্সপেরিমেন্টাল স্টাডি।

এই গবেষণায় অংশগ্রহন সম্পূর্ণ আপনার ইচ্ছাকৃত। আপনি যে কোন সময় আপনার অংশগ্রহণ প্রত্যাহার করতে পারবেন। ইহা আপনার শিক্ষা ক্রমে কোন রূপ ব্যাঘাত ঘটাবে না। গবেষণায় অংশগ্রহণের জন্য কোন উপহারের ব্যবস্থা নাই। আপনি এই গবেষণা থেকে সরাসরি উপকৃত নাও হতে পারেন।

আপনার কাছ থেকে প্রাপ্ত তথ্য গোপনীয়তার সাথে রাখা হবে। শুধুমাত্র গবেষক এবং তার তত্ত্বাবধায়ক তথ্যগুলো ব্যবহার করতে পারবেন। আপনার পরিচয় গবেষণার কোথাও প্রকাশ করা হবে না। গবেষণা সংক্রান্ত আপনার যদি কোন রূপ প্রশ্ন থাকে তাহলে আমাকে দ্বিধাহীন ভাবে জিজ্ঞাসা করতে পারেন। গবেষণা বিষয়ক সকল প্রশ্নের উত্তর দেবার জন্য আমি সচেষ্ট থাকবো।

ফায়জুল্লাহ হাসান আবিদ

এম.এস.সি ইন অকুপেশনাল থেরাপি

অকুপেশনাল থেরাপি বিভাগ

বাংলাদেশ হেলথ প্রফেশন্স ইনস্টিটিউট (বিএচপিআই)

সি আর পি, চাপাইন, সাভার, ঢাকা-১৩৪৩।

সম্মতিপত্র

এই গবেষণাটি এম.এস.সি ইন অকুপেশনাল থেরাপি কোর্সের একটি অংশ এবং গবেষণাকারীর নাম ফায়জুল্লাহ হাসান আবিদ। সে পক্ষাঘাতগ্রস্থ পুনর্বাসন কেন্দ্র (সি আর পি) এর অধিনস্থ বাংলাদেশ হেলথ প্রফেশন্স ইনস্টিটিউটের অকুপেশনাল থেরাপি বিভাগের ছাত্র। এই গবেষণাটির শিরোনাম "স্ট্রোক রোগীদের মানসিক স্বাস্থ্যের ফলাফলের উপর মাইন্ডফুলনেস-ভিত্তিক হস্তক্ষেপের কার্যকারিতা: আংশিক পরীক্ষামূলক গবেষণা"।

এই গবেষণাতে আমি.....একজন অংশগ্রহনকারী এবং পরিষ্কারভাবে এই গবেষণার উদ্দেশ্য সম্পর্কে অবগত। আমার যে কোন সময়ে এই গবেষণা থেকে নিজেকে প্রত্যাহার করার অধিকার আছে। এজন্য আমি প্রশ্নের উত্তর প্রদান করার জন্য করো কাছে দায়বদ্ধ না। এই গবেষণাটির সাথে আমার কোন সম্পৃক্ততা নেই। এই গবেষণাটি বর্তমানে এবং ভবিষ্যতে আমার শিক্ষা ক্রমে ক্ষেত্রে কোন রকম প্রভাব ফেলবে না।

আমি আরও অবগত আছি যে, এই কথোপকথন থেকে নেওয়া সমস্ত তথ্যাবলি নিরাপদে এবং গোপনীয়তার সাথে শুধু মাত্র গবেষণার কাজেই ব্যবহার করা হবে। আমার নাম এবং ঠিকানা কোথাও প্রকাশ হবে না। শুধুমাত্র গবেষণাকারীর এবং তার গবেষণার সমন্বয়কারীর সাথে এই গবেষণার পদ্ধতি সম্পর্কে অথবা যে কোন প্রশ্নের উত্তর জানার জন্য কথা বলতে পারবে।

আমি উপরোক্ত তথ্যগুলো ভালোভাবে জেনে নিজ ইচ্ছায় এই গবেষণায় অংশগ্রহন করছি।

অংশগ্রহনকারীর স্বাক্ষর/আঙুলের ছাপ:	তারিখ:
ছাত্র গবেষকের স্বাক্ষর:	তারিখ:
সাক্ষীর স্বাক্ষর/আঙুলের ছাপ:	তারিখ:

Appendix F: Questionnaire [English Version]

Section: 01 Socio-demographic

1. Age of the participants:
2. Gender:
 1. Male
 2. Female
 3. Transgender
3. Marital status
 1. Married
 2. Unmarried
 3. Separate
 4. Widowed
 5. Divorced (in years)
4. Number of family members:
5. Living area
 1. Rural
 2. Urban
6. Highest level of education acquired:
 1. Primary education
 2. Secondary education
 3. Higher secondary
 4. Tertiary education
7. Present occupational status
 1. Students

2. Govt service holder
3. Private Service holder
4. Business
5. Farmer
6. Homemaker
7. Day labor
8. Unemployed
9. Others (.....)

8. Diagnosis

1. Hemorrhagic Stroke
2. Ischemic Stroke

9. Disability

1. Right-side hemiplegia
2. Left side hemiplegia
3. Bilateral

10. Date of incidence

11. Type of comorbidities:

1. Diabetes
2. Hypertension
3. Musculoskeletal disorders
4. Cardiac
5. Others (.....)

Hospital Anxiety and Depression Scale (HADS)

D	A		D	A	
		I feel tense or 'wound up':			I feel as if I am slowed down:
	3	Most of the time	3		Nearly all the time
	2	A lot of the time	2		Very often
	1	From time to time, occasionally	1		Sometimes
	0	Not at all	0		Not at all
		I still enjoy the things I used to enjoy:			I get a sort of frightened feeling like 'butterflies' in the stomach:
0		Definitely as much		0	Not at all
1		Not quite so much		1	Occasionally
2		Only a little		2	Quite Often
3		Hardly at all		3	Very Often
		I get a sort of frightened feeling as if something awful is about to happen:			I have lost interest in my appearance:
	3	Very definitely and quite badly	3		Definitely
	2	Yes, but not too badly	2		I don't take as much care as I should
	1	A little, but it doesn't worry me	1		I may not take quite as much care
	0	Not at all	0		I take just as much care as ever
		I can laugh and see the funny side of things:			I feel restless as I have to be on the move:
0		As much as I always could		3	Very much indeed
1		Not quite so much now		2	Quite a lot
2		Definitely not so much now		1	Not very much
3		Not at all		0	Not at all
		Worrying thoughts go through my mind:			I look forward with enjoyment to things:
	3	A great deal of the time	0		As much as I ever did
	2	A lot of the time	1		Rather less than I used to
	1	From time to time, but not too often	2		Definitely less than I used to
	0	Only occasionally	3		Hardly at all
		I feel cheerful:			I get sudden feelings of panic:
3		Not at all		3	Very often indeed
2		Not often		2	Quite often
1		Sometimes		1	Not very often
0		Most of the time		0	Not at all
		I can sit at ease and feel relaxed:			I can enjoy a good book or radio or TV program:
	0	Definitely	0		Often
	1	Usually	1		Sometimes
	2	Not Often	2		Not often
	3	Not at all	3		Very seldom

Please check you have answered all the questions

Scoring:

Total score: Depression (D) _____ Anxiety (A) _____

0-7 = Normal

8-10 = Borderline abnormal

11-21 = Abnormal

The Warwick–Edinburgh Mental Well-being Scale (WEMWBS)

STATEMENTS	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future	1	2	3	4	5
I've been feeling useful	1	2	3	4	5
I've been feeling relaxed	1	2	3	4	5
I've been feeling interested in other people	1	2	3	4	5
I've had energy to spare	1	2	3	4	5
I've been dealing with problems well	1	2	3	4	5
I've been thinking clearly	1	2	3	4	5
I've been feeling good about myself	1	2	3	4	5
I've been feeling close to other people	1	2	3	4	5
I've been feeling confident	1	2	3	4	5

I've been able to make up my own mind about things	1	2	3	4	5
I've been feeling loved	1	2	3	4	5
I've been interested in new things	1	2	3	4	5
I've been feeling cheerful	1	2	3	4	5

Warwick–Edinburgh Mental Well-being Scale (WEMWBS) © NHS Health Scotland, University of Warwick and University of Edinburgh, 2006, all rights reserved.

Appendix G: Questionnaire [Bangla Version]

Section: 01 আর্থ-সামাজিক তথ্য

১. অংশগ্রহণকারীদের বয়স: _____ (বছর)

২. লিঙ্গ:

- পুরুষ
- মহিলা
- ট্রান্সজেন্ডার
- তৃতীয় লিঙ্গ

৩. বৈবাহিক অবস্থা:

- বিবাহিত
- অবিবাহিত
- আলাদা হয়ে গেছেন
- বিধবা/বিপত্নীক
- তালাকপ্রাপ্ত

৪. পরিবারের সদস্য সংখ্যা: _____

৫. বসবাস এলাকা:

- গ্রামীণ
- শহরে
- আধা-শহরে

৬. অর্জিত শিক্ষার সর্বোচ্চ স্তর:

- প্রাথমিক শিক্ষা
- মাধ্যমিক শিক্ষা
- উচ্চ মাধ্যমিক
- উচ্চশিক্ষা

৭. বর্তমান পেশাগত অবস্থা:

- ছাত্র/ছাত্রী
- সরকারি চাকুরিজীবী
- বেসরকারি চাকুরিজীবী
- ব্যবসায়ী
- কৃষক
- গৃহিণী
- দিনমজুর
- বেকার
- অন্যান্য (অনুগ্রহ করে উল্লেখ করুন): _____

৮. রোগ নির্ণয়:

- হেমোরজিক স্ট্রোক
- ইস্কেমিক স্ট্রোক

৯. অক্ষমতার ধরন:

- ডান পাশের হেমিপ্লেজিয়া
- বাম পাশের হেমিপ্লেজিয়া
- দ্বিপাক্ষিক

১০. ঘটনার তারিখ:

১১. সহজাত রোগের ধরন:

- ডায়াবেটিস
- উচ্চ রক্তচাপ
- হৃদরোগ
- পেশীবহুল ব্যাধি
- অন্যান্য:

Hospital Anxiety and Depression Scale (HADS)

গত সপ্তাহের বিবেচনায় নিচের প্রশ্নগুলোর জন্য আপনার সবথেকে কাছের উত্তরটি বাছাই করুন।

১. আমি চিন্তিত অনুভব করি?

বেশির ভাগ সময়

সব সময়

মাঝেমধ্যে

একদমই না

২. আমি বই পড়া, মুভি দেখা বা অন্য যেকোনো বিনোদনমূলক কাজ উপভোগ করি?

আগের মতোই

আগের চেয়ে কম

মাঝেমধ্যে

খুবই কম

৩. মাঝেমধ্যে মনে হয় আমার সাথে খারাপ কিছু হতে যাচ্ছে?

খুবই খারাপ ভাবে মনে হয়

মনে হয় কিন্তু তেমন বেশি না

খুবই কম

একদমই না

৪. আমি সব সময় হাসি খুশি থাকার চেষ্টা করি, এবং সব কিছুর ভালো দিক টা দেখি?

সব সময় চেষ্টা করি

এখন তেমন বেশি না

মাঝেমধ্যে

একদমই না

৫. আমি সব সময় কোন না কোন বিষয় নিয়ে চিন্তা করতে থাকি?

সব সময়ই

প্রায় সব সময়ই

মাঝেমধ্যে

খুবই কম

৬. আমি আনন্দিত অনুভব করি?

একদমই না

খুব কম

মাঝেমধ্যে

সব সময়

৭. আমি সাচ্ছন্দ্য/স্থির হয়ে বসে আরাম করতে পারি?

সব সময়

প্রায়ই

খুব কম

একদমই না

৮. আমি অনুভব করি, আমি আমার কাজে পূর্বের চেয়ে ভীষণ মন্থর হয়ে পরেছি?

সবসময়

প্রায়শই

মাঝেমাঝে
কখনোই না

৯. আমি কিছুটা ভীতসন্ত্রস্ত হয়ে পড়ি আমার মনে হয় পেটে অস্বস্তি অনুভব করছি?

কখনোই না
খুবই কম
প্রায়শই
সবসময়

১০. আমি নিজের পোশাক-আশাক নির্বাচন ও সাজসজ্জার প্রতি অনাগ্রহ অনুভব করি?

অনেকাংশে

আমি নিজের ততটা পরিচর্যা করি না যতটা করা উচিত বলে মনে করি।

হয়তোবা আমি আমার নিজের যথেষ্ট পরিচর্যা করি না

আমি আমার নিজের যথেষ্ট পরিচর্যা করি

১১. আমি খুব সহজেই ভীষণ অস্থির এবং অধৈর্য হয়ে পরি যেহেতু আমাকে সবসময় ভীষণ

তাড়াহুড়ো এবং কাজের চাপে থাকতে হয়?

অনেক বেশি

কিছুটা

খুব একটা না

একদমই না

১২. আমি উৎসাহের সাথে নতুন জিনিসের জন্যে অপেক্ষা করি?

পূর্বের মতই

পূর্বের চেয়ে হয়ত কিছুটা কম

পূর্বের চেয়ে অনেক কম

একদমই না

১৩. আমি হঠাৎ করেই ভীষণ আতংকিত অনুভব করি?

অনেক বেশি

কিছুটা

খুব একটা না

একদমই না

১৪. আমি যেকোন একটি ভাল বই অথবা রেডিও কিংবা টেলিভিশনের যেকোন বিনোদনমূলক

অনুষ্ঠান উপভোগ করতে পারি?

প্রায় সবসময়

মাঝেমাঝে

খুব একটা না

না বললেই চলে

ওয়ারউইক-এডিনবার্গ মানসিক সুস্থতা স্কেল (WEMWBS)

নিচে অনুভূতি ও চিন্তা সম্পর্কিত কিছু বিবৃতি দেওয়া আছে। অনুগ্রহ করে প্রতিটি বিবৃতির জন্য গত ২ সপ্তাহের আপনার অভিজ্ঞতার সাথে মিলিয়ে সঠিক বাক্সে টিক দিন।

বিবৃতি	কোনও সময়ই না	কদাচিৎ	কখনও কখনও	প্রায়ই	সব সময়ই
আমি ভবিষ্যৎ নিয়ে আশাবাদী অনুভব করেছি	১	২	৩	৪	৫
আমি নিজেকে উপযোগী মনে করেছি	১	২	৩	৪	৫
আমি শান্ত অনুভব করেছি	১	২	৩	৪	৫
আমি অন্যদের প্রতি আগ্রহী ছিলাম	১	২	৩	৪	৫
আমার অতিরিক্ত শক্তি ছিল	১	২	৩	৪	৫
আমি সমস্যাগুলি ভালোভাবে সামলেছি	১	২	৩	৪	৫
আমি পরীক্ষারভাবে চিন্তা করতে পেরেছি	১	২	৩	৪	৫
আমি নিজের সম্পর্কে ভালো অনুভব করেছি	১	২	৩	৪	৫
আমি অন্যদের সাথে ঘনিষ্ঠ অনুভব করেছি	১	২	৩	৪	৫
আমি আত্মবিশ্বাসী অনুভব করেছি	১	২	৩	৪	৫
আমি নিজের সিদ্ধান্ত নিজেই নিতে পেরেছি	১	২	৩	৪	৫
আমি ভালোবাসা অনুভব করেছি	১	২	৩	৪	৫
আমি নতুন জিনিসে আগ্রহী ছিলাম	১	২	৩	৪	৫
আমি আনন্দিত অনুভব করেছি	১	২	৩	৪	৫

Appendix H: Intervention Protocol

Structure for Each Session

1. Greetings and establishing a rapport
2. Important thought-provoking query on the practice from the previous week
3. Practice (a different practice each week)
4. Considering and talking about experience and some theoretical foundations ("digging deeper"), and distribute the information sheet
5. Talking about, researching, and recording self-practice for the upcoming week.

Mindfulness-based interventions protocol

Week 1	Week 2	Week 3
Meeting each other and getting to know each other Main thing to do: Being aware of the body-breathing anchor; getting to know the breath Finding more detailed information: Start of the course. What does mindfulness mean? Being aware in daily life	Mindfulness of the body, body scan and welcoming the body are the main practices. For more information, read about how important formal and informal practice are.	Main practice: Being aware of your body, like when you walk or move. Moving without any trouble, finding more detailed information: Start with mindful movement, like walking or doing other everyday things
Week 4	Week 5	Week 6

Open heart-loving kindness practice is the main of your thoughts and feelings; easing the edges of anger	Main practice: Being aware of your thoughts and feelings; easing the edges of anger	Main practice: Being aware of your thoughts and feelings; easing the edges of anger
Looking into something more: After being kind to yourself. The good thing about enjoying small things	Looking for more in-depth information: recognizing how thoughts affect us. The good thing about recognizing or accepting experience	Looking for more in-depth information: recognizing how thoughts affect us. The good thing about recognizing or accepting experience

Mindfulness Group Therapy Procedure

Mindfulness Course – Weekly Session Chart (1 Hour Each)

Week 1 – Breath Awareness

Segment	Time	Activity/Content	Details
Welcome & Introductions	10 min	Icebreaker & Course Overview	Names, reasons for joining, explain structure and goals
Reflective Question	5 min	“What brought you here today?”	Explore motivations & intentions
Practice	15–20 min	Mindfulness of Breath	Focus on nostrils or abdomen, observe breath, return gently
Reflection & Theory	10–15 min	What is mindfulness?	Formal vs. informal practice. Handout: Intro to Mindfulness

Self-Practice Planning	10–15 min	5 min breath practice daily	Practice during transitions, journal brief notes
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Week 2 – Body Awareness

Segment	Time	Activity/Content	Details
Check-in	5 min	Reflections on breath practice	Normalize distractions, encourage curiosity
Reflective Question	5 min	“Where did you feel grounded or distracted?”	Connect to body experience
Practice	20 min	Body Scan	Move attention through body, welcome all sensations
Reflection & Theory	10–15 min	Importance of body awareness	Reconnecting with physical presence. Handout: Body Scan & Daily Practice
Self-Practice Planning	10–15 min	10-min body scan 3–4x/week	Add short daily “body check-ins”

Week 3 – Movement Awareness

Segment	Time	Activity/Content	Details
Check-in	5 min	Body scan reflections	What body signals emerged last week?
Reflective Question	5 min	“What happens when you’re in a rush?”	Recognizing body-mind states
Practice	15–20 min	Mindful Walking/Movement	Focus on steps or movement; slow and intentional

Reflection Theory	& 10–15 min	Mindfulness motion	in	Integrating awareness into daily life. Handout: Mindful Movement Tips
Self-Practice Planning	10–15 min	5–10 min walking daily		Apply mindfulness to daily actions like brushing teeth, walking

Week 4 – Loving Kindness

Segment	Time	Activity/Content	Details
Check-in	5–10 min	Experiences with mindful movement	What felt different while moving with awareness?
Reflective Question	5 min	“When did you last offer kindness to yourself?”	Explore self-compassion
Practice	15–20 min	Loving Kindness	Repeat phrases; extend kindness to self, others, all beings
Reflection Theory	& 10–15 min	Power of self-kindness	Kindness lowers stress, builds resilience. Handout: Loving Kindness Practice
Self-Practice Planning	10–15 min	5-min kindness daily	Notice simple joys, journal kindness moments

Week 5 – Thoughts & Feelings

Segment	Time	Activity/Content	Details
Check-in	5 min	Reflections on kindness	Share insights or resistance

Reflective Question	5 min	“What thoughts or feelings repeat under stress?”	Introduce observation without judgment
Practice	15–20 min	Watching Thoughts & Emotions	Label thoughts (“thinking”, “judging”), notice and return
Reflection & Theory	10–15 min	Thoughts ≠ Facts	Emotional awareness improves choice. Handout: Mind & Emotion Awareness
Self-Practice Planning	10–15 min	“3-minute breathing space” daily	Track emotions or common thought loops in journal

Week 6 – Mindful Listening / Integration

Segment	Time	Activity/Content	Details
Check-in	5 min	Reflect on favorite practices	What has been most meaningful?
Reflective Question	5 min	“How has your listening changed?”	Link mindfulness to relationships
Practice	15–20 min	Mindful Listening or Repeat Favorite	Speak & listen in pairs; reflect without advice
Reflection & Theory	10–15 min	Mindful communication	Presence enhances empathy. Handout: Communication + Course Summary
Self-Practice Planning	10–15 min	Pick 1–2 practices to continue	Create a self-practice routine