BIOPSYCHOSOCIAL DETERMINANTS OF HEALTH SEEKING BEHAVIOUR AMONG STROKE SURVIVORS IN EDO STATE. A MIXED STUDY DESIGN

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CERTIFICATION

This dissertation by MARTINA ODUAH is accepted in its present form as satisfying the dissertation requirement of the degree of Bachelor of Physiotherapy of the School of Basic Medical Sciences, College of Medical Sciences of the University of Benin.

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DEDICATION

I dedicate this dissertation to God Almighty (EL-ROI) for his love, grace, wisdom and knowledge bestowed upon me throughout this project work and my stay in University of Benin and to my wonderful parents Mr. and Mrs. ODUAH for their love, encouragement and support throughout .

ABSTRACT

Background: In Nigeria, stroke is a major cause of death and disability, and recovery are greatly impacted by health-seeking behaviour (HSB). According to the biopsychosocial (BPS) model, these behaviours are shaped by a combination of biological, psychological, and social factors; however, little is known about how these factors interact among stroke survivors in Edo State, Nigeria.

Purpose: This study aimed to use a mixed-methods design to examine the Biopsychosocial determinants of Health Seeking Behaviour among stroke survivors in Edo State.

Methods: For the quantitative arm, a convergent parallel mixed-methods approach was used to recruit 55 stroke survivors through multistage sampling. Structured questionnaires (NIHSS, MAS, Berg Balance Scale, HADS, MSPSS) were used to evaluate Biopsychosocial factors and Health Seeking Behaviour. From this group, ten individuals were specifically chosen to participate in in-depth qualitative interviews. While qualitative data was subjected to thematic analysis, quantitative data was subjected to descriptive and inferential statistics (chi-square tests) using SPSS version 27.0.

Results: No statistically significant correlations ($p > 0.05$) were found between Health Seeking Behaviour and any of the Biopsychosocial variables (such as social support, anxiety, comorbidities, and stroke severity). However, a qualitative analysis revealed five major themes that impact HSB: coping strategies, emotional reactions, family, community, and spiritual influences, clinical features and perceived cause, and health-system barriers. Notably, family support, financial limitations, and cultural beliefs played a significant role in the pathways and decisions surrounding care-seeking.

Conclusion: Although there was no statistically significant correlation between HSB and standard BPS measures in this sample, qualitative findings highlight the significant impact of systemic, social, and cultural factors. The results emphasize the need for stroke rehabilitation services in Edo State that are accessible, family-inclusive, and culturally sensitive.

Keywords: Stroke, Health-Seeking Behaviour, Biopsychosocial Model, Determinants, Mixed-Methods.

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CHAPTER 1

INTRODUCTION

1.1 Background of the study

Stroke is a serious public health concern worldwide, accounting for the second largest cause of death and the third leading cause of disability. Stroke is defined by the World Health Organisation as a sudden disruption in cerebral function lasting more than 24 hours or resulting in death, with no known cause other than vascular origin (Sacco *et al.,* 2013). However, a new definition proposed by the American Stroke Association incorporates clinical and tissue criteria, broadening the scope of the stroke to include objective evidence of permanent brain, spinal cord, or retinal cell death caused by a vascular aetiology, with or without clinical symptoms (Donkor, 2018).

There are two types of strokes based on blood flow disruption: ischaemic stroke, which occurs when blood vessels supplying the brain become blocked, often due to blood clots or plaque, and haemorrhagic stroke, which occurs when an artery in the brain leaks or ruptures, putting pressure on brain cells and causing damage (CDC, 2022). Early stroke therapies date back to the 1800s, when surgeons first performed surgery on the carotid arteries, which provide blood to the brain (Karenberg, 2020). Recognising the need of assisting stroke survivors in regaining mobility, strength, and coordination, which are typically compromised following a stroke, physical therapy was adopted as an integral component of stroke management. Physical therapy attempts to improve range of motion, balance, and functional capacities by implementing personalised exercise programs and therapeutic approaches, as well as enhancing motor control, reducing muscular stiffness, and encouraging neuroplasticity and the relearning of important motions (Shahid, 2023).

Stroke is the world's second greatest cause of disability and death, with 87% of stroke-related impairment occurring in low- and middle-income countries (LMICs) (DALY ,2015). This burden is exacerbated by a shortage of rehabilitation experts in many parts of the world. On average, LMICs have only 10 skilled rehabilitation experts per million people, whereas high-income countries have over 400 occupational therapists, 900 physical therapists, 400 speech therapists, and 20 physical medicine and rehabilitation physicians per million people (WHO, 2017). Overall, a World Stroke Organisation survey found that specialised stroke rehabilitation services were present in only 18% of responding LMICs, compared to 91% of HICs, highlighting the lack of rehabilitation opportunities available to stroke survivors in the majority of LMICs (Owolabi *et al.,* 2021). The World Health Organization's Rehabilitation 2030 Action Plan recognises that rehabilitation, the most effective technique for improving long-term stroke outcomes following acute therapies, is a critical component of excellent healthcare (Gimigliano & Negrini, 2017).

According to a report, only 8.6% of hospitals in Nigeria have a dedicated stroke unit, and even in those units, access to thrombolytic therapy is limited due to cost and delayed patient arrival. This imbalance has been reported to be exacerbated by diluted access to quality healthcare, particularly in rural areas (Babawale *et al.,* 2022). To address this imbalance, a previous study recommended the establishment of more dedicated stroke units in Nigerian hospitals, which have been shown to improve patient outcomes (Babawale *et al.,* 2022).

Modern medical stroke management takes a multidisciplinary approach, with doctors, nurses, physiotherapists, occupational therapists, neuropsychologists, speech specialists, audiologists, and nutritionists all contributing at different stages of the process (Sanchetee, 2021). According to the CDC (2022), stroke management consists of three stages: diagnosis, treatment, and rehabilitation. The diagnostic phase includes studies to determine the kind of stroke, while therapy consists of preserving or restoring homeostasis, delivering thrombolytic

medicines, anticoagulants (which are contraindicated in haemorrhagic CVA), and surgery (Jarvis, 2022). Rehabilitation begins early after the stroke and can span weeks, months, or even years, focusing on speech, physical, and occupational therapy to retrain speech, movement, coordination, and daily tasks (Babawale *et al.,* 2022).

Traditional stroke medicine in Nigeria relies heavily on herbal care and spiritual interventions, with scant available literature (Jarvis, 2022). In Nigeria, traditional medicine is frequently preferred over medical care due to its perceived availability and the idea that it is safer due to its natural origin (Okoro *et al.,* 2021). The global burden of stroke has shifted from industrialised to developing countries in recent decades (Kalkonde *et al.,* 2018). In Nigeria, the increased stroke burden can be linked to a lack of facilities and human resources for stroke prevention, diagnostic procedures, acute care, and rehabilitation. As a result, patients had restricted access to rehabilitation treatments and overall stroke care.

Health behaviour is an effective and practical way to prevent stroke (Krishnamurthi *et al.,* 2019; Larsson *et al.,* 2015) and is defined as a range of overt behaviour patterns, actions, and habits that relate to health maintenance, health restoration, and health improvement (Heijmans *et al.,* 2017). Numerous scholars have thoroughly investigated the interaction between knowledge and belief, and an individual's comprehension of a certain event is influenced by the information they collect, whilst beliefs are based on the knowledge perceived by the individual (Menkin *et al.,* 2019). Previous research has shown that stroke patients with better knowledge, strong health attitudes, and social support have significantly improved their health behaviour (Faiz *et al.,* 2019; Zhang *et al.,* 2018).

Health-seeking behaviours are influenced by a variety of factors, including sociocultural views and economic restrictions, which might impede timely access to care in emergency conditions such as stroke (Nnanna, 2020; Zhang *et al*., 2023). Financial constraints,

geographic distance to healthcare facilities, and cultural stigma surrounding neurological disorders all complicate the caregiving landscape, frequently resulting in inadequate care and poorer health outcomes for stroke survivors (Nnanna, 2020; Zhang *et al.*, 2023). Individuals at risk of stroke rarely follow recommended lifestyle modifications, ranging from harmful to health-promoting behaviours (Tibebu *et al.,* 2017). Most investigations on the elements that determine health behaviour have been little influenced by a theoretical framework. As a result, using behavioural models to identify health behaviours may yield valuable insights into effective treatments to improve health-promoting behaviours. The capability opportunity motivation and behaviour (COM-B) model is a model of behaviour modification (Michie *et al.,* 2011). The theory states that behaviour is the result of the interaction of capability (psychological or physical ability, such as knowledge), opportunity (physical and social environment, such as environmental resources and social impacts), and motivation (reflective and automatic mechanisms, such as self-efficacy and emotion) (Zou *et al.,* 2017). Motivation mediates the link between capability, opportunity, and conduct. This paradigm can assist researchers in determining what has to be altered to attain the target behaviour, hence aiding in the design of behaviour modification interventions (Zou *et al.,* 2017). In previous studies, the COM-B revealed significant explanatory power for health behaviours (Zou *et al.,* 2017; Shoesmith *et al.,* 2022).

The biopsychosocial model, established by Dr. George Engel and Dr. John Romano in the 1970s, examines mental and physical health through a multi-systems lens, taking into account the impact of biology, psychology, and social environment (Engel, 1997). Furthermore, rehabilitation is challenging since stroke patients suffer from depression. As a result, they feel physically humiliated and emotionally helpless, with concerns about long-term rehabilitation (Oh *et al.,* 2017). Above all, good rehabilitation outcomes are dependent on the patient's active engagement, which includes their volition and motivation. In this scenario,

rehabilitation is hampered by the patient's lack of motivation to heal, even though the therapeutic treatments given by doctors and occupational therapists are exceptional. As a result, it is critical to investigate the psychosocial elements that boost stroke patients' motivation for recovery. Furthermore, some recent studies have highlighted on the usefulness of psychosocial therapies, rather than relying solely on medical approaches, to improve stroke patients' quality of life (Kim *et al.,* 2017).

In addition to stroke, mood issues are frequent all around the world. Depression affects around 280 million people globally (WHO, 2023). In the United States, it is estimated that 21 million adults aged 18 and up have experienced depression, accounting for around 8.4% of the adult population. According to standard diagnostic criteria, the twelve-month and lifetime prevalences of major depressive disorder are 10.4% and 20.6%, respectively (Hasin *et al*., 2018). However, stroke is one of the most incapacitating medical illnesses in the United States (Centres for Disease Control and Prevention, 2023). Not only do stroke patients have marked changes in functional and psychosocial functioning. Psychiatric problems can also cause disabling conditions. Depression is the number one cause of disability in the United States. (CDC, 2023). When stroke and mood disorders coexist, the implications are often severe for both the individual and society. Numerous research conducted over the last few decades have shown that post-stroke psychological consequences can be variable and widespread (Zhang *et al*., 2020). Stroke-related psychological sequelae include sadness, anxiety, post-traumatic stress disorder (PTSD), mania, psychosis, irritability, and apathy, among other emotional and behavioural symptoms (Robinson *et al*., 2016). Surprisingly, psychological aspects are frequently missed in contemporary stroke studies; for example, they were not included in a recent systematic review on biopsychosocial determinants of long-term engagement after stroke (Ezekiel *et al.,* 2019).

1.2 Statement of the Problem

Stroke is a primary cause of long-term disability and mortality worldwide, with low- and middle-income countries, including Nigeria, bearing an increasing burden. According to anecdotal evidence and health facility statistics in Edo State, many stroke survivors postpone or shun conventional medical treatment, instead choosing for alternative therapy based on traditional or spiritual beliefs. Such habits have a major impact on outcomes, increasing disability, secondary complications, and stroke recurrence rates.

Stroke survivors' health-seeking behaviour is influenced by a complex combination of biological, psychological, and social factors. Biologically, stroke-related deficits, such as hemiplegia, speech difficulties, and cognitive decline, can limit survivors' capacity to seek prompt care. Depression, denial, anxiety, and a lack of self-efficacy can also reduce motivation to seek or maintain care. Poverty, limited access to health care, poor social support, cultural prejudices, and a lack of health insurance all impede access to critical rehabilitation and follow-up services.

Despite the availability of rehabilitation treatments in Edo State, stroke survivors underutilise these services, raising concerns. Several research have been conducted to investigate how these biopsychosocial factors combine to influence the health-seeking behaviours of stroke survivors (Zhang *et al.,* 2024; Mengxia *et al.,* 2024). There is a lack of empirical research on how biopsychosocial variables interact to influence health-seeking decisions in Benin city distinct sociocultural setting.

This information gap prevents healthcare practitioners and policymakers from developing effective, culturally acceptable treatments to improve stroke outcomes. A thorough understanding of the biopsychosocial determinants of health-seeking behaviour among stroke

survivors is thus essential for improving patient care, promoting rehabilitation, and lowering the long-term burden of stroke in Edo State.

1.3 Research Questions

i. How do biological factors (e.g., stroke severity, comorbidities, motor function , balance) influence health-seeking behaviours among stroke survivors in Edo State?

ii. What psychological factors (e.g., depression, anxiety, coping strategies) are associated with delays or adherence to stroke rehabilitation?

iii. How do social determinants (e.g., family support, cultural beliefs, economic status) shape preferences for traditional vs. Medical care?

iv. What are the lived experiences of stroke survivors and caregivers regarding healthcare access?

1.4 Aim of the Study

To investigate the biopsychosocial determinants of health-seeking behaviours among stroke survivors in Edo State Nigeria, using a mixed-methods approach.

1.4.1 Specific Objectives

i. To assess the biological factors (e.g., stroke severity, comorbidities, motor function, balance) influencing health-seeking behaviours.

ii. To evaluate the psychological factors (e.g., depression, anxiety, coping strategies) associated with health-seeking behaviours.

iii. To explore the social factors (e.g., family support, cultural beliefs, economic status) impacting health-seeking behaviours.

iv. To integrate qualitative insights from stroke survivors and caregivers on barriers and facilitators to seeking care.

1.5 Hypotheses

1.5.1 Main Hypotheses

There would be no significant association between biopsychosocial determinants and health-seeking behaviours among stroke survivors in Edo State.

1.5.2 Sub-Hypotheses

i. There would be no significant association between stroke severity and health-seeking behaviours among stroke survivors in Edo State.
ii. There would be no significant association between comorbidities and health-seeking behaviours among stroke survivors in Edo State.
iii. There would be no significant association between motor function and health-seeking behaviours among stroke survivors in Edo State.
iv. There would be no significant association between balance and health-seeking behaviours among stroke survivors in Edo State.
v. There would be no significant association between depression and health-seeking behaviours among stroke survivors in Edo State.
vi. There would be no significant association between anxiety and health-seeking behaviours among stroke survivors in Edo State.
vii. There would be no significant association between coping strategies and health-seeking behaviours among stroke survivors in Edo State.
viii. There would be no significant association between family support and health-seeking behaviours among stroke survivors in Edo State.

ix. There would be no significant association between cultural beliefs and health-seeking behaviours among stroke survivors in Edo State.

x. There would be no significant association between economic status and health-seeking behaviours among stroke survivors in Edo State.

1.6 Significance of the Study

This study has the potential to enhance stroke care outcomes in Nigeria by guiding the establishment of comprehensive, patient-centred health policies and treatments. The purpose of the study:

- **Contribute to evidence-based practice:** By offering insights into biopsychosocial factors of health-seeking behaviour among stroke survivors.
- **Inform public health interventions:** Aiming at increasing stroke rehabilitation uptake and adherence in Edo State.
- **Guide governments and healthcare practitioners:** In developing culturally sensitive, patient-centred methods to improve healthcare access and utilisation.
- **Researcher:** Encourage more research by providing baseline data for future studies on stroke rehabilitation in Nigeria and other low-resource settings.
- **Patient Outcome:** Identifying barriers can lead to faster access to therapy and less impairment.
- **Advocacy:** Empowers stroke survivors by allowing them to share their loved ones' stories and inform advocacy methods for inclusive rehabilitation programs.

1.7 Scope and Delimitation of the Study

This study investigates the biopsychosocial factors of health-seeking behaviours among stroke survivors in Edo State, Nigeria. The study includes adult stroke survivors who had

been diagnosed with either ischaemic or haemorrhagic stroke and are in the post-acute or rehabilitative phase of recovery in selected facilities in Edo State. Both quantitative and qualitative methodologies was used to evaluate the biological, psychological, and social aspects that influence their healthcare-seeking decisions. To capture all important characteristics, data was collected via structured questionnaires, in-depth interviews, and medical record reviews.

The study is delimited to:

- **Geographical Location:** Stroke survivors reside in Edo state.
- **Population:** Adult stroke survivors aged 18 and above who can give informed consent and participate in interviews or surveys. Individuals diagnosed with an ischaemic or haemorrhagic stroke; other concomitant diseases will not be studied.
- **Determinants of Interest:** The study focuses on biological (e.g., age, comorbidities), psychological (e.g., beliefs, attitudes, mental health status), and social (e.g., social support, cultural practices) factors that influence health-seeking behaviour. Data was collected over a period of 6 to 8 weeks.

1.8 Limitation of the Study

The study was confined to Ovia North-East Local Government Area, Edo State. The findings may not be representative of the diverse cultural and healthcare landscape across other regions of Nigeria.

1.9 Definition of Terms

i. **Biopsychosocial Model:** A framework that explains health and illness outcomes as a result of interactions between biological, psychological, and social factors.

ii. **Stroke:** Stroke is an objective evidence of permanent brain, spinal cord and retina cell death due to vascular origin based upon pathological or imaging evidence with or without the presence of clinical symptoms.

iii. **Stroke survivor:** An individual who has experienced a stroke and is living with its sequel.

iv. **Health-seeking behaviours:** Actions taken by individuals to address health needs, including medical care, traditional medicine, or self-management.

v. **Mixed Methods Study:** A research design that combines both quantitative (survey) and qualitative (interviews) approaches to gain comprehensive understanding of a research problem.

1.10 List of Abbreviations

CDC – Communicable Disease Center

COM-B – Capability , Opportunity , Motivation and Behaviour

CVA – Cerebrovascular Accident

DALYS – Disability adjusted life years

LMICs – Low-and Middle-Income Countries

WHO - World Health Organization

CHAPTER 2

LITERATURE REVIEW

Conceptual Framework

The series of corrective measures that individuals take to address perceived ill-health is referred to as health-seeking behaviour (HSB). It includes decisions on when, where, and how to seek care, as well as options for formal healthcare systems and alternative treatments (Oberoi *et al.,* 2016). HSB in stroke survivors is affected by a complex combination of biological, psychological, and social factors.

George Engel proposed the Biopsychosocial (BPS) Model, which integrates these components to explain human health and illness. According to Engel (1977), health outcomes and behaviours are the consequence of a dynamic interplay between biological vulnerability (e.g., stroke complications), psychological disposition (e.g., attitudes, beliefs, depression), and social context (e.g., support, stigma, access to care).

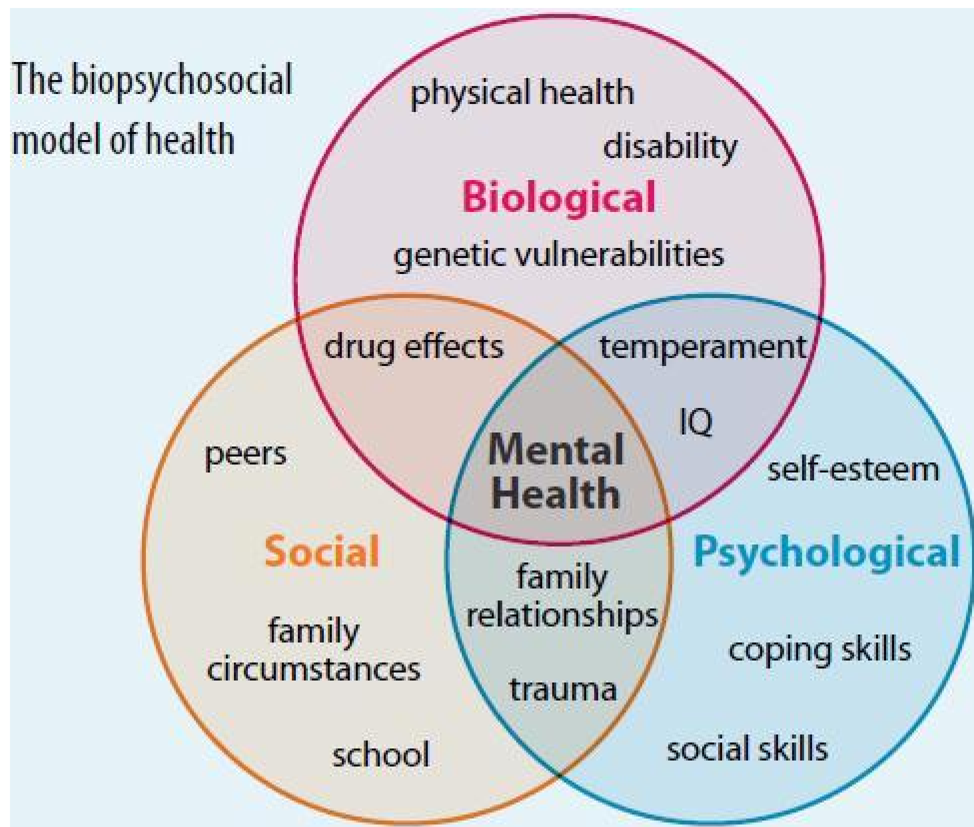


Figure 1: **The Biopsychosocial Model of Health**

Image Source: http://savvywillingandable.wordpress.com/2013/09/25/the-biopsychosocial-model-explained/

2.1 Introduction

2.1.1 Stroke

The World Health Organisation defined stroke as 'rapidly acquired clinical symptoms of focal (or global) impairment of cerebral function, lasting more than 24 hours or leading to death, with no clear cause other than vascular origin' (Aho *et al.,* 1980). Although still widely used,

the World Health Organisation definition relies heavily on clinical symptoms and is now considered outdated by the American Heart Association and the American Stroke Association due to significant advances in the 'nature, timing, clinical recognition of stroke and its mimics, and imaging findings that require an updated definition' (Sacco *et al.,* 2013).

The American Heart Association/American Stroke Association changed their endorsed definition of stroke in 2013 to include silent infarction (cerebral, spinal, and retinal) as well as silent haemorrhage (Sacco *et al.,* 2013). The American Heart Association/American Stroke Association still uses the 'conventional' clinical definition of stroke, but the addition of 'silent' pathology is significant. The rationale for such a modification was to shift to a radiological demonstration (tissue-based definition) of infarction or haemorrhage.

2.1.2 Epidemiology of Stroke

Stroke is the world's second greatest cause of disability and death, with low- and middle-income countries bearing the majority of the disease's burden. In 2016, there were 13.7 million new event strokes worldwide, with ischaemic strokes accounting for 87% and haemorrhagic strokes accounting for 10% to 20% (Saini *et al.,* 2021). In 2017, the Global Burden of Disease (GBD) Study revealed 11.9 million occurrences, 104.2 million prevalent, 6.2 million fatal stroke cases, and 132.1 million stroke-related DALY (disability-adjusted life-years).Although stroke incidence, prevalence, mortality, and DALY rates decreased between 1990 and 2017, the absolute number of persons who suffered a new stroke, died, survived, or stayed incapacitated than doubled. Stroke-related disease affects primarily low- and middle-income countries, accounting for 80% of all incidents, 77% of survivors, 87% of deaths, and 89% of DALYs (Krishnamurthi *et al.,* 2020). On the other hand, the annual number of strokes and stroke-related deaths grew significantly between 1990 and 2019, despite significant reductions in age-standardized rates, notably among persons over the age of 70.However, among those under the age of 70, prevalence rates climbed by 22.0%, while incidence rates

increased by 15.0%. According to the 2019 GBD study, the age-standardized stroke-related death rate was 3.6 times greater in the World Bank low-income group than in the World Bank high-income group, as was the age-standardized stroke-related DALY rate. In 2019, ischaemic stroke accounted for 62.4% of all incident strokes (7.63 million), with intracerebral haemorrhage accounting for 27.9% (3.41 million) and subarachnoid haemorrhage accounting for 9.7% (1.18 million) (Feigin *et al.,* 2021).In 2019, the five leading risk factors for stroke were high systolic blood pressure (79.6 million DALY or 55.5% of total stroke), high body-mass index (34.9 million DALY or 24.3%), high fasting plasma glucose (28.9 million DALY or 20.2%), ambient particulate matter pollution (28.7 million DALY or 20.1%), and smoking (25.3 million DALY or 17.6%) (Feigin *et al.,* 2021).

Stroke occurs at 316 per 100,000 people in Africa, while it is reported at 26 per 100,000 people in Nigeria each year (Akinyemi *et al.,* 2021). Stroke has emerged as the primary cause of adult neurological admissions in several studies undertaken in the West African subregion, accounting for up to 65% of such admissions (Ekenze, 2010). Furthermore, it is the leading cause of admissions for hypertension-related disorders, accounting for 40% of hypertensive complications (Onwuchekwa & Chinenye, 2010).

There has been little research into the epidemiology of stroke in Nigeria. Enwereji et al. (2014) reported a stroke prevalence of 1.63 per 1,000 people in 2011. Males had a higher prevalence (1.99 per 1,000) than females (1.28 per 1,000 population). According to Adeloye et al. (2019), the annual incidence of stroke in Nigeria is 26.0/100,000 people, with men having a higher rate (34.1/100,000 people) than women (21.2/100,000 people). Furthermore, Adeloye et al. (2019) reported that the prevalence of stroke survivors in Nigeria was 6.7/1000 population of stroke victims, with men having a higher prevalence (6.4/1000) than women (4.4/1000). Furthermore, Adeloye *et al.,* (2019) identified geographical inequalities,

suggesting that the prevalence of stroke survivors was highest in the South-South area (13.4/100,000 population) and among rural residents (10.8/100,000).

2.1.3 Pathophysiology of Stroke

Differential Pathophysiology of Ischaemic and Hemorrhagic Stroke. Clinical research comparing ischaemic (IS) and hemorrhagic strokes have yielded inconsistent results. Stroke is one of the leading causes of disability and death worldwide. Acute therapy have transformed ischaemic stroke, which accounts for 87% of all strokes, into a time-dependent condition (Lopes & Agrawa, 2023). There are two types of hemorrhagic strokes: intracerebral haemorrhage (3% of all strokes) and aneurysmal subarachnoid haemorrhage (10%) (Lopes & Agrawa, 2023).

In 2017, the top causes of mortality were ischaemic stroke (2.7 million), intracerebral haemorrhage (3 million), and aneurysmal subarachnoid haemorrhage (0.4 million) (Lopes & Agrawa, 2023). Ischaemic stroke patients have a better overall prognosis than hemorrhagic stroke patients, who have a greater fatality rate, especially in the early and late phases (Lopes & Agrawa, 2022; Chaudhary *et al.,* 2024).

a. **Ischaemic stroke**

Ischaemic strokes occur when a blocked or "clogged" blood artery restricts blood flow to a specific area of the brain. Within minutes, brain cells and tissues begin to perish from a lack of oxygen and nutrition. A thrombotic stroke occurs when a blood clot forms in the brain's arteries (Dhume & Agrawal, 2003; Dhume *et al.,* 2003). Risk factors for stroke development include post-operative atrial fibrillation and high-risk anaesthesia techniques (Rao *et al.,* 2014; Trinh et al., 2024). This type of stroke primarily affects the elderly, and it is more likely in people with diabetes, high cholesterol, or atherosclerosis (the hardening of arterial walls caused by fat and lipid accumulation). Atherosclerotic plaques become unstable as a result of

increased inflammation, death of carotid artery smooth muscle cells, and increased matrix metalloproteinases that breakdown extracellular matrix (Velpuri & Agrawal, 2024; Khwaja *et al.,* 2021; Patel & Agrawal, 2023). Many inflammatory mediators and cytokines play a role in plaque instability, which causes plaque particles and thrombus to migrate to brain arteries and arterioles, resulting in ischaemia and stroke symptoms (Doyle *et al.,* 2008 ; Unnithan *et al.,* 2023 ; Chamorro *et al.,* 2016 ; Shaheryar *et al.,* 2012). This abrupt start of symptoms, particularly in the middle of the night or first thing in the morning, is typical with thrombotic stroke (Dhume & Agrawal, 2003). Sometimes it happens quickly, and other times it takes hours or days. Preceding thrombotic strokes are "mini strokes," often known as transient ischaemic attacks (TIA). TIAs are a typical precursor to strokes and can last anywhere from a few minutes to a full day.

TIA symptoms are frequently slight and transitory, yet they are similar to stroke symptoms. A lacunar infarction is a type of stroke that occurs in the brain's small blood vessels. Originating in Latin, the name "lacunar" implies "hole" or "cavity." Diabetes and hypertension are frequent causes of lacunar infarctions. A blood clot, or embolus, that forms elsewhere in the body and travels to the brain via the circulatory system is a common cause of embolic strokes.

Strokes induced by embolism can occur unexpectedly and without warning signs; they are common complications of heart disease or cardiac surgery. Individuals with atrial fibrillation, a heart rhythm problem characterised by inadequate pumping of the upper chambers, account for roughly 15% of all embolic strokes (Rao *et al.,* 2014; Lian *et al.,* 2021).

b. **Hemorrhagic stroke**

A hemorrhagic stroke occurs when a blood artery leading to the brain rupture and bleeds. When an artery bleeds into the brain, brain cells and tissues receive insufficient oxygen and

nutrients. Increased pressure in surrounding tissues can lead to inflammation and swelling, exacerbating existing brain injury.

High blood pressure is the leading cause of intracerebral haemorrhage. Blood begins to flow immediately and rapidly. Coma or death may ensue from bleeding that has no apparent cause. A meningeal haematoma occurs when blood from the brain enters the subarachnoid space. The most prevalent causes of this type of bleeding are aneurysms and arteriovenous malformations (AVMs). Traumatic situations can also cause these disorders (Xue *et al.,* 2021).

2.1.4 Risk Factors for Stroke

As previously stated, the risk of stroke rises with age, doubling in both men and women after the age of 55. When a person has a pre-existing medical condition such as hypertension, coronary artery disease, or hyperlipidaemia, their risk increases. Approximately 60% of strokes occur in persons who have had a transient ischaemic attack (TIA). Some of the risk factors for stroke can be modified, while others cannot.

2.1.4.1 Non-Modifiable Risk Factors

These include age, gender, ethnicity, TIA, and inherited traits. In the United States in 2005, the average age of stroke occurrence was 69.2 years (Mozaffarian *et al.,* 2016; Roger *et al.,* 2012). Recent research has shown that adults aged 20 to 54 are at an increased risk of stroke, most likely due to pre-existing secondary causes (George *et al.,* 2011). Women are at equal or higher risk of stroke than men, regardless of age (Kapral *et al.,* 2005). According to US research, Hispanic and black populations are at a higher risk of stroke than white populations; specifically, the incidence of hemorrhagic stroke is significantly higher in black people than in age-matched white populations (Cruz-Flores *et al.,* 2011; Kleindorfer *et al.,* 2006; Zahuranec *et al.,* 2006).

Transient ischaemic attack is regarded as a small stroke, with the same underlying mechanism as a full-blown stroke. A TIA occurs when the blood flow to a portion of the brain is temporarily cut off. It serves as a warning indication before to the actual event, allowing time to adjust lifestyle and begin drugs to lower the risk of stroke (Ferro *et al.,* 1996; Easton *et al.,* 2009).

Genetics influences both modifiable and non-modifiable risk factors for stroke. Genetic risk is related to the individual's age, gender, and race (Seshadri *et al.,* 2010; Touzé *et al.,* 2008), however a variety of genetic processes can raise the risk of stroke. For starters, having a parent or family history of stroke enhances one's chances of developing this neurological condition. Second, a rare single gene mutation, such as cerebral autosomal dominant arteriopathy, can contribute to pathogenesis with stroke as the major clinical manifestation. Third, stroke is one of numerous side consequences of several diseases induced by genetic mutations, such as sickle cell anaemia. Fourth, some common genetic variations, such as the 9p21 genetic polymorphism, have been linked to an elevated risk of stroke (Matarin *et al.,* 2008).

A genome-wide association study of stroke found significant heredity (about 40%) for big blood vessel illness but low heritability (16.7%) for small vessel abnormalities. Recent data suggests that investigating heredity would increase our understanding of stroke sub-types, improve patient management, and allow for earlier and more efficient prognosis (Bevan *et al.,* 2012).

2.1.4.2 Modifiable Risk Factors

These are critical because prompt and appropriate medical intervention can lower the risk of stroke in vulnerable people. Hypertension, diabetes, inactivity, alcohol and drug misuse,

cholesterol, nutrition management, and genetics are the most modifiable risk factors for stroke.

Hypertension is one of the leading risk factors for stroke. In one study, a blood pressure (BP) of at least 160/90 mmHg and a history of hypertension were deemed equally important predispositions for stroke, with both features accounting for 54% of the stroke-affected population (O'Donnell *et al.,* 2010; Lewington *et al.,* 2002). In both hypertensive and normal persons, blood pressure and stroke prevalence are associated. A study found that lowering blood pressure by 5-6 mm Hg reduced the relative risk of stroke by 42% (Collins *et al.,* 1990). Randomized trials of therapies to control hypertension in adults aged 60+ have showed comparable results, reduced the rates of stroke symptoms by 36% and 42%, respectively (Staessen *et al.,* 1997).

Diabetes raises the risk of ischaemic stroke and increases mortality by approximately 20%. Furthermore, diabetic individuals have a worse prognosis after a stroke than non-diabetic patients, with greater rates of severe impairment and delayed recovery (Vermeer *et al.,* 2006; Banerjee *et al.,* 2012). Tight glycaemic control alone is inadequate; pharmacological intervention combined with behavioural changes may assist diabetics reduce the severity of their stroke (Lukovits *et al.,* 1999).

Atrial fibrillation (AF) is a significant risk factor for stroke, increasing the risk by two to five times depending on the individual's age (Wolf *et al.,* 1991). It accounts for 15% of all strokes and results in more severe disability and mortality than non-AF-related strokes (Romero *et al.,* 2008). According to research, in AF, reduced blood flow in the left atrium produces thrombosis and embolism in the brain. However, other studies have challenged this finding, citing a lack of evidence of a sequential timing of AF and stroke incidence, as well as the fact that in some cases, AF is documented only after a stroke. In some cases, individuals with AF-

specific genetic alterations may experience strokes long before the onset of AF (Brambatti *et al.,* 2014; Disertori *et al.,* 2013). As a result, we require more effective techniques of monitoring cardiac rhythms related with vascular risk factors for AF and thrombosis.

Hyperlipidaemia is a major cause of coronary heart disease, although its link to stroke is complicated. Total cholesterol raises the risk of stroke, whereas high-density lipoprotein (HDL) lowers the risk (Iribarren *et al.,*1996; Denti *et al.,* 2003; Iso *et al.,* 1989). As a result, evaluating the lipid profile allows for the calculation of the risk of stroke. Low HDL levels (<0.90 mmol/L), high total triglyceride levels (>2.30 mmol/L), and hypertension were linked to a two-fold increase in the risk of stroke-related death in a study (Denti *et al.,* 2003).

Alcohol and drug abuse: The link between stroke risk and alcohol intake is curvilinear, with the risk proportional to the amount of alcohol consumed daily. Low to moderate alcohol consumption (≤2 standard drinks per day for males and ≤1 for women) lowers stroke risk, while excessive intake raises it. In contrast, even light alcohol use increases the risk of hemorrhagic stroke (Gill *et al.,* 1986; Hillbom *et al.,*1999; Klatsky *et al.,* 2001). Regular use of illegal substances such as cocaine, heroin, phencyclidine (PCP), lysergic acid diethylamide (LSD), cannabis/marijuana, or amphetamines is linked to an elevated risk of all types of strokes (Esse *et al.,* 2011). Individuals under the age of 35 are more likely to have a stroke if they consume illicit drugs. According to US research, the proportion of illicit drug users among stroke patients aged 15 to 44 years was six times greater than among age-matched patients admitted with other serious disorders (Kaku *et al.,* 1990). However, no substantial evidence supports these findings, and the link between these medicines and stroke is anecdotal (Brust *et al.,* 2002).

Smoking: Tobacco use is directly connected to an increased risk of stroke. An typical smoker is twice as likely to have a stroke as a nonsmoker. Smoking accounts for 15% of stroke-

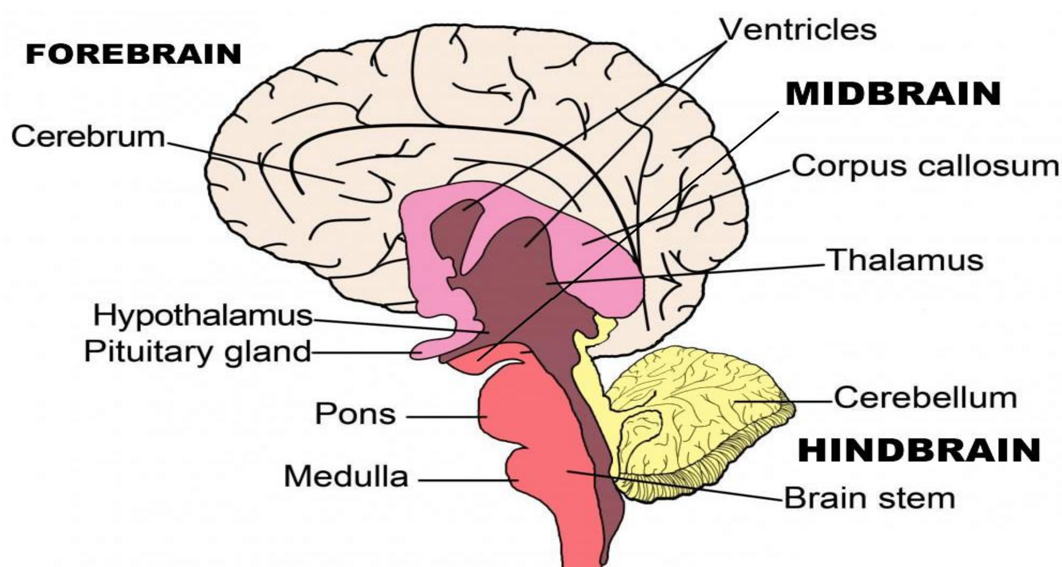
related death. According to research, quitting smoking reduces the relative risk of stroke, however extended second-hand smoking increases the risk of stroke by 30% (Bhat *et al.,* 2008; Song *et al.,* 2008; Shinton *et al.,* 1989).

Physical inactivity and a bad diet might raise the risk of stroke. A lack of exercise raises a person's risk of having a stroke. Insufficient physical activity has also been connected to various health issues such as high blood pressure, obesity, and diabetes, all of which are associated with a higher stroke incidence (Zhou *et al.,* 2007; Manson *et al.,* 1991). A poor diet increases the risk of stroke by contributing to hypertension, hyperlipidaemia, obesity, and diabetes. Certain dietary components are well established to increase risk; for example, excessive salt consumption is associated to high blood pressure and stroke. A diet rich in fruits and vegetables, on the other hand, has been proven to reduce the incidence of stroke (Larsson *et al.,* 2011; Estruch *et al.,* 2013; Appel *et al.,* 2006; Li *et al.,* 2012; He *et al.,* 1999).

2.1.5 Relevant Anatomy of the brain

The Brain

The human brain is possibly the most complex of all biological systems, with the mature brain made up of over 100 billion information-processing cells known as neurones. Stiles and Jernigan, 2010. The brain is an organ composed of nerve tissue that regulates task-related reactions, movement, senses, emotions, language, communication, thinking, and memory.



The three main sections of the human brain are the cerebrum, cerebellum, and brainstem.

Figure 2: Anatomy of the Brain

Image Source: https://www.nbia.ca/brain-structure-function/

The Cerebrum

The cerebrum is the brain's biggest component. It is separated into right and left hemispheres. The corpus callosum is a network of white matter fibres that connects the hemispheres. Each cerebral hemisphere is further divided into four lobes: frontal, parietal, temporal, and occipital. Some people believe that the medial temporal lobe components are part of the limbic lobe.

The Cerebral Cortex

The cortex is the cerebrum's outermost layer, and it has a faint grey appearance, hence the moniker "grey matter." The brain has a folded structure; each fold is known as a gyrus, and each groove between the folds is known as a sulcus. This cortical folding has recently been linked to improved cognitive processes and neural connections. (Netter, 2022; Dziedzic *et al.,* 2021; Chauhan *et al.,* 2021).

The Brain Stem

The brainstem is located in the centre of the brain and connects the cerebrum to the spinal cord. It includes the midbrain, pons, and medulla (Fernández-Gil *et al.,* 2010).

Midbrain

The midbrain, also known as the mesencephalon, is the uppermost section of the brainstem and is involved in a variety of processes, including movement, vision, and hearing. The midbrain is composed of numerous major components. (Netter, 2022; Ruchalski & Hathout, 2012). The superior and inferior colliculi are two distinct protrusions on the midbrain's posterior surface. The superior colliculi mediate the vestibulo-ocular reflex, while the inferior colliculi are involved in sound localisation.

Pons

The pons is an important region in the brainstem, situated above the medulla and beneath the midbrain. It connects many areas of the brain, most notably the cerebellum and cerebrum. The pons receives blood predominantly via branches of the basilar artery (Netter, 2022; Árraga *et al.,* 2016). The pons is divided into two sections: the ventral (basilar) pons and the pontine tegmentum. The pontine nuclei and transverse pontocerebellar fibres are located in the ventral pons, whereas the cranial nerve nuclei and ascending and descending tracts are found in the pontine tegmentum. (Netter, 2022; Árraga *et al.,* 2016). The pons is an important portion of the brainstem anatomy, acting as a conduit for information between different regions of the nervous system while also hosting key nuclei that regulate a variety of physiological processes. (Netter, 2022); Árraga et al., 2016).

Medulla oblongata

The medulla oblongata, or simply medulla, is continuous and located above the cervical spinal cord. The medulla has various exterior anatomical features that are apparent on a gross level.

The Cerebellum

The cerebellum is located in the posterior fossa, dorsally to the pons and medulla. It primarily modulates motor control, allowing for perfectly coordinated body movements. The cerebellum, like the cerebrum, has gyri and sulci, but with finer folia and fissures that enhance surface area. The cerebellum is made up of two hemispheres joined by a midline structure called the vermis. Unlike the cerebrum's neocortex, the cerebellar cortex is divided into three layers: molecular, Purkinje, and granular. The four deep cerebellar nuclei are fastigial, globose, emboliform, and dentate, in order of medial to lateral location. These deep nuclei collaborate with other brain regions to coordinate movement (Netter, 2022; Zhang *et al.,* 2023; Aparicio *et al.,* 2021). The superior, middle, and inferior cerebellar peduncles house the afferent and efferent routes to and from the cerebellum, respectively. These networks provide afferent and efferent signals necessary for motor coordination and sensory processing (Netter, 2022; Zhang *et al.,* 2023; Aparicio *et al.,* 2021).

2.1.6 Arterial Blood supply of the Brain

The brain receives blood from two sources: the internal carotid arteries, which arise at the point in the neck where the common carotid arteries bifurcate, and the vertebral arteries . The internal carotid arteries branch to form two major cerebral arteries, the anterior and middle cerebral arteries. The right and left vertebral arteries come together at the level of the pons on the ventral surface of the brainstem to form the midline basilar artery. The basilar artery joins the blood supply from the internal carotids in an arterial ring at the base of the brain (in the vicinity of the hypothalamus and cerebral peduncles) called the circle of Willis. The confluence of the posterior cerebral arteries, anterior communicating arteries, and two tiny bridging arteries occurs here. Conjoining the two primary sources of cerebral vascular supply via the circle of Willis increases the likelihood that any region of the brain will continue to receive blood if one of the major arteries becomes clogged (Purves *et al.,* 2001).

Circle of Willis

Structure

The Willis circle is a ring of veins that connects the brain's anterior and posterior circulations. A single anterior communicating artery (ACom), which joins the bilateral anterior cerebral arteries (ACA), forms the ring's anterior boundary.

Function

The circle of Willis provides collateral blood flow between the brain's anterior and posterior circulations, protecting against ischaemia in the case of vascular illness or damage in one or more locations.

2.1.7 Clinical Signs, Symptoms and Complications of Stroke

Common symptoms of an ischaemic stroke include sudden paralysis or numbness in the face, arm, or leg, difficulty speaking or understanding, visual abnormalities, dizziness, loss of balance and coordination, and severe headaches. A hemorrhagic stroke, on the other hand, is distinguished by a sudden and severe headache, often accompanied by symptoms such as nausea and vomiting. Weakness or numbness in the arms, legs, or face, convulsions, and loss of consciousness (Johnston *et al.,* 2018). Other signs of a stroke include trouble swallowing, difficulty speaking, sensory and cognitive loss, hemineglect, and a propensity to push away from the weaker side (Martin & Kessler, 2015). When the blood flow to a specific area of the brain is disrupted, the functions regulated by that region become dysfunctional. The clinical signs of arterial occlusion differ according to the afflicted artery.

2.1.8 Diagnosis of Stroke

A review of medical history, together with a comprehensive physical examination and many diagnostic procedures, can help diagnose a stroke by defining its type, location, and severity (Choi *et al.,* 2022).

Patient History: Obtaining a good patient history is critical for identifying underlying pathology and making treatment recommendations. Open-ended inquiries enable patients to express their views, symptoms, and worries, thereby providing critical information. The start, symptoms, course, duration, related factors, and initial response to sickness are all important components of history taking (Nichol *et al.,* 2023).

Physical Examination: Physical examination is a systematic and continuous process in which anatomical abnormalities are objectively assessed. The clinician evaluates the patient's gait, usage of ambulatory aids, orthotic devices, speech, and extremities manipulation. The examination involves observation and palpation to identify indications such lacerations, redness, oedema, muscular atrophy, asymmetry, and abnormalities.

Neurological Assessment: A neurological assessment assesses an individual's neurological health, including mental status, cranial nerves, motor coordination, sensory examination, and gait assessment.

Mental Status Assessment: Evaluates consciousness, alertness, orientation, cognitive capacity, memory, speech, and language. Tools such as the mini-mental status exam scale (MMSE), Glasgow coma scale (GCS), Grady coma scale, and others help to measure various elements of mental status.

Cranial Nerves Examination: The evaluation of cranial nerves, which is an important part of neurological assessment, guarantees that they are working properly. These nerves, which originate in different parts of the brain, perform critical roles in motor, sensory, and

autonomic activities of the head and neck. Any damage in the connected brain regions can result in reduced cranial nerve function (Reese *et al.,* 2023).

Motor Examination: The motor examination focuses on assessing muscle integrity and function. Overlying muscles are thoroughly inspected for evidence of lacerations, bruising, oedema, muscle atrophy, and deformities. Outcome measures include muscle strength and tone testing with the Oxford Muscle Grading System and the modified Ash -worth scale (MAS). Furthermore, ROM is compared on the afflicted and unaffected sides.

Sensory Examination: This test entails evaluating responses to stimuli and finding any absent, decreased, exaggerated, or delayed responses. Possible causes include problems with peripheral nerve terminals, the spinal cord, tracts, thalamus, brainstem, or cortex (Shahrokhi & Asuncion, 2023). Sensory receptors distinguish different sensations.

• Superficial Sensation: Exteroceptors detect external stimuli such as pain, temperature, and touch.

Pin-prick testing for pain, thermal discrimination testing for temperature, and light touch with the tail end of a cotton swab are some of the assessment procedures.

• Deep Sensation: Proprioceptors activate reactions in joints, muscles, ligaments, tendons, and fascia. Kinaesthesia, vibration sense, and position sense (proprioception) are assessed with joint movement tests and Romberg's test.

Cortical Sensation: Sensations such as stereognosis, barognosis, two-point discrimination, graphesthesia, texture recognition, and tactile localization are tested.

Motor coordination is assessed by tests such as dysmetria and dysdiadochokinesia, which evaluate rhythm and rapid alternating movements.

Gait: Begin by observing the patient's walk for any anomalies that may reveal underlying concerns. Specific gait patterns, such as a high steppage gait, convey information about potential limitations or abnormalities.

2.1.8.1 Radiological investigations

Neuroimaging is critical in the evaluation of stroke patients, particularly those with acute ischaemic strokes. It is critical in identifying stroke from other illnesses that cause similar symptoms, such as migraine headaches, tumors, seizures, metabolic problems, and peripheral or cranial nerve disorders. Furthermore, neuroimaging aids in the early detection of hemorrhagic stroke, distinguishing between irreversible infarcted tissues and salvageable tissue, identifying vascular malformations, planning for intravenous thrombolysis and intra-arterial thrombectomy, and predicting outcomes (Hand *et al.,* 2006).

Some radiological imaging techniques include Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Ultrasonography, and Angiography.

2.1.8.2 Laboratory Investigations

Laboratory studies are an effective tool for detecting stroke, ruling out other illnesses, and guiding therapy options. Some of the laboratory tests include:

- Full Blood Count (FBC): This test assesses platelet levels, which are essential for blood clotting. The test also involves evaluating electrolyte levels to assess renal function.

- Coagulation Assessment: Tests such as Prothrombin Time (PT) and Partial Thromboplastin Time (PTT) can evaluate the rate of blood clotting. Prolonged clotting time may suggest a bleeding problem.

2.1.9 Management of Stroke

2.1.9.1 Medical Management of Stroke

Management of Ischaemic Stroke:

When no haemorrhage is detected, several key strategies are used to control the condition.

Thrombolytic Therapy:

Eligible patients receive intravenous recombinant tissue plasminogen activator, such as alteplase, while avoiding anticoagulants and antiplatelets for 24 hours until a CT scan confirms the absence of haemorrhage (Prasad *et al.,* 2011). If the patient is not eligible for intravenous recombinant tissue plasminogen activator, aspirin is supplied, and other important indicators such as blood oxygen levels, blood pressure, and blood glucose are constantly monitored and maintained (WHO, 2012).

Anticoagulant and Anti-platelet Therapy:

Aspirin is the principal treatment for low-grade stenosis of both the anterior and posterior circulation, as well as high-grade intracranial and extracranial carotid stenosis when warfarin is contraindicated. Warfarin is used to treat symptomatic low-grade stenosis in the anterior and posterior circulation, as well as symptomatic high-grade intracranial and extracranial carotid stenosis. Other anticoagulants, such as heparin, clopidogrel, and enoxaparin, could be considered (WHO, 2012).

Management of Hemorrhagic Stroke:

If imaging shows haemorrhage, the management techniques vary:

Coagulate and thrombocytopenia-related intracranial haemorrhage (1CH): Give platelets and coagulation factors (Prasad *et al.,* 2011). For warfarin-related ICH in cardioembolic

cerebral infarction, discontinue warfarin and explore vitamin K or fresh frozen plasma therapy (Prasad *et al.,* 2011; WHO, 2012).

High blood pressure can be controlled using drugs including hydralazine, esmolol, labetalol, and enalapril (Prasad *et al.,* 2011; WHO, 2012).

Low blood pressure: Begin with volume replenishment (e.g., normal saline), then administer medicines such as dopamine or phenylephrine (Prasad *et al.,* 2011; WHO, 2012). To manage blood glucose, use a titration scale with insulin to treat elevated levels (WHO, 2012). Low blood glucose: Give dextrose (WHO, 2012).

These tailored interventions address the specific characteristics of ischemic and hemorrhagic strokes, optimizing patient care and outcomes.

2.1.9.2 Physiotherapy management

The primary goal of rehabilitative physiotherapy is to reduce disability and disabilities so that stroke survivors can resume their normal self-care and daily activities as independently as possible (Dobkin & Dorsch, 2013). Different physiotherapy treatments or concepts have been created to treat stroke sufferers. Physiotherapy techniques in stroke management often include:

Strengthening exercise: Stroke often causes muscle weakness and reduced motor performance. Strengthening exercises are a crucial aspect of stroke therapy to help restore muscular strength, improve mobility, and enhance functional abilities. These exercises should be adapted to each person's unique needs, talents, and stage of recuperation. These exercises often include repetitive and progressive resistance training aimed at specific muscle areas affected by stroke-related weakness. Depending on the individual's disabilities, the workouts might target both the upper and lower extremities (Dobkin & Dorsch, 2013).

Constraint-induced movement therapy (CIMT): CIMT aims to prevent "learnt non-use" by restricting movement of the unaffected limb while aggressively exercising the affected one. This increases the usage and relearning of motor skills in the afflicted limb, resulting in functional recovery (Dobkin & Dorsch, 2013).

Functional electrical stimulation (FES): FES is a stroke rehabilitation treatment that improves muscle strength, mobility, and function. Electrical stimulation is used to activate specific muscles or muscle groups that have been weakened or paralyzed as a result of a stroke. FES can help people regain movement and enhance their motor control. Electrodes are applied to the skin over the targeted muscles or nerve pathways. When electrical impulses are supplied, they cause rigged muscle contractions, allowing paralyzed or weak muscles to contract and execute Involvements (Dobkin & Dorsch, 2013).

Balance and coordination training: Stroke patients often experience impaired balance, coordination, and postural control, which can increase the risk of falls. Specialized training programs address specific balance and coordination impairments, including weight shifting, static standing balance, and dynamic balance.

Proprioceptive Neuromuscular facilitation (PNF): PNF is a physical therapy rehabilitation treatment that helps stroke patients improve their motor function, strength, and mobility. It combines movement patterns and diagonal resistance patterns to improve motor learning and neuromuscular control. PNF exercises for stroke rehabilitation are primarily focused on functional movements, with a therapist directing the patient through precise movement patterns. Depending on the individual's limitations, these approaches can be used on various body areas, including the upper and lower extremities (Dobkin & Dorsch, 2013).

Sustained Passive Stretching (SPS): Stroke frequently results in muscular stiffness and reduced joint movement. SPS entails long-term stretching of muscles and connective tissues

to improve relaxation, muscular length, joint range of motion, and, ultimately, functional outcomes (Dobkin & Dorsch, 2013).

Mirror Therapy: This intervention uses a mirror to give the impression of mobility in the affected limb by mirroring the movement of the unaffected limb. Mirror treatment helps to retrain the brain, facilitate motor learning, and promote motor function recovery by activating mirror neurons and fostering neuroplasticity (Dobkin & Dorsch, 2013).

Virtual Reality (VR): VR-based therapy use immersive computer-generated worlds to help with motor and cognitive rehabilitation. These interactive and engaging environments promote motor learning, give sensory feedback, and activate cognitive processes. Customisable and realistic virtual environments can boost motivation, focus, and active engagement in rehabilitation programs. According to Dobkin & Dorsch (2013), virtual reality (VR) can enhance stroke rehabilitation by providing compelling and customisable experiences that promote functional recovery.

2.1.9.3 Surgical Management of Stroke

This includes surgical treatments for stroke management. Some of these procedures include simple and complex intracranial bypass, aneurysm clipping, stereotactic radiosurgery, coil embolisation, thromectomy, ventriculostomy, surgical removal of pooling blood, hemispheric decompression, carotid endarterectomy for aneurysm and arteriovenous malformation, endovascular surgery, and suboccipital craniotomy (Feigin *et al.,* 2016).

2.2 Health seeking behaviours

Pushpalata & Chandrika (2017) defined health-seeking behaviour as a set of corrective measures made to address perceived ill health and restore good health. Olenja (2004) emphasised that while this might be an action, it could also be inaction, but it should be taken seriously by persons who feel themselves to be facing a health challenge with the goal of

finding an acceptable remedy to restore good health. MacKian (2003) provided a more extensive description, categorizing illness or sick-term behaviour as health seeking behaviour. Health seeking conduct refers to efforts made to maintain good health, prevent illness, and recover good health. According to Atchessi *et al.,* (2018) and MacKian (2003), gender, age, employment status, education, income, and place of living may all have an impact. Other characteristics to consider include knowledge of sickness prevention and health maintenance, trust in physicians, the existence of chronic conditions, satisfaction, and desire to seek care (Carriere, 2005; Iron *et al.,* 2003; Nabalamba & Millar, 2007). The choice of healthcare provider and trust in the healthcare provider are crucial factors that impact health-seeking behaviour in general. This trust is typically associated with belief in a healthcare provider's ability to improve health outcomes and boost satisfaction, given that people with chronic diseases and various health issues prefer to engage in positive health seeking behaviour (Zheng, 2015; Thom *et al.,* 2002).

However, there appears to be a gender discrepancy in health seeking activity among rural dwellers. Males are often socialized to believe they are stronger than females, who are more vulnerable to illness. Thus, in order to demonstrate their masculinity, they engage in negative health seeking activity till their condition deteriorates. In the same line, there appears to be a significant gap in the level of health information between genders. While this material is thought to be widely available, particularly on the internet, most males do not appear to have obtained it. This has left them ignorant of the necessary precautions to avoid and treat health problems.

On the other hand, even if it is assumed that females have positive health seeking conduct, they may face greater financial constraints in getting proper healthcare than their male counterparts, leaving them vulnerable to the worst health conditions. More concerning is the

delay in receiving adequate and appropriate healthcare, as well as the high mortality rate that often occurs as a result.

2.2.1 Factors influencing health seeking behaviours

Perceived susceptibility: is one element that influences health-seeking behaviour. This is related to beliefs about the danger of developing a disease (Hayden 2013). Thus, when one perceives he or she is vulnerable, there is a possibility of engaging in good behaviours. To lower his or her vulnerability, the individual engages in health-seeking behaviour.

Perceived severity: refers to the notion that an individual would suffer the worst effects if appropriate treatment is not provided (Hayden, 2013). This belief is influenced by previous

encounters with the illness, as well as the disease's health, social, and economic effects (Rosenstock *et al.,* 1988).

Perceived threat: this is a combination of perceived vulnerability and perceived severity of the illness (Orji *et al.,* 2012). A perceived threat frequently prompts positive health-seeking behaviour and facilitates continuity of care.

Perceived benefits: refer to the perceived advantages of adopting and maintaining a healthy lifestyle (Hayden, 2013).

Perceived hurdles: These were the anticipated barriers to engaging in health-seeking behaviour (Hayden, 2013).

Self-efficacy: is achieved when the perceived benefits of a health seeking behaviour outweigh the perceived disadvantages (Champion & Skinner, 2008).

Cues to action include information and beliefs regarding ill health and their origins, which can be internal (symptoms, past experiences) or external (health care workers, friends, family,

and the media). This may not be related to perceived risks, but it does induce the perceived threat to prompt decision-making in health-seeking behaviour.

2.2.2 Biological Determinants of Health-Seeking Behaviour

Age, sex, stroke severity, physical handicap, and comorbidities all have a major impact on stroke survivors' care-seeking behaviours. Stroke severity has been linked to increased healthcare use, although milder patients may delay or avoid accessing rehabilitation services due to perceived self-recovery (Akinyemi *et al.,* 2020).

Certain biological and genetic factors have a greater impact on specific populations than others. For example, older adults are naturally predisposed to poorer health than teenagers due to the physical and cognitive impacts of ageing.

Sickle cell disease is a common example of a hereditary factor influencing health. Sickle cell is a condition that is inherited when both parents contain the sickle cell gene. People with ancestors from West Africa, the Mediterranean, South or Central America, Caribbean islands, India, and Saudi Arabia are the most likely to carry the gene.

2.2.3 Psychological Determinants of Health-Seeking Behaviour

Depression, dread, and anxiety are all psychological components (Kalu *et al.,* 2022), dread of falling relates to mobility limitations. According to Paulsen *et al.* (2018), fall-related concerns are more prevalent in women than men. Approximately 55% reported physiological-related falls. It's also been linked to physical withdrawal. An older adult's psyche is heavily influenced by physical exercise and the environment. People face a number of challenges as they age, including neglect, abuse, the loss of loved ones, and the advent of chronic health conditions. These incidents may have an influence on mental health, increasing the likelihood of anxiety and sadness (Lawrence *et al.,* 2023). Self-reported

depression was linked to mobility impairment, car accidents, limited driving, and lower Life Space Assessments (Kalu *et al.,* 2022).

Personality traits are one of the components of psychology since they assist predict human behaviour in many contexts (Ndubuaku *et al.,* 2023). Personality traits are derived from behaviour, attitudes, feelings, and habits that are relatively stable, consistent, and enduring (Smith, 2021). The five-factor model categorizes personality qualities as extraversion, agreeableness, conscientiousness, neuroticism, and openness. Extravert are sociable, aggressive, and outgoing (Diener & Lucas, 2019). They are more energetic and joyful than those with low extraversion and enjoy meeting new people (Klaous, 2023). People with a high level of conscientiousness are well-organized, reliable, and hard-working. They are less inclined to procrastinate or be reckless, and are more likely to set and achieve goals (Diener & Lucas, 2019).

According to the American Psychological Association (2023), neuroticism is characterized by emotional instability and vulnerability to stress. Individuals with high neuroticism tend to struggle with negative emotions such as despair, wrath, and anxiety (Zhou *et al.,* 2023). Also, they are more likely to become easily overwhelmed and struggle to deal with difficult situations (Diener & Lucas, 2019). A high level of agreeability makes a person approachable, helpful, and trustworthy (Apostolou, 2023). They are more likely to get along with others and be perceived as Helpful and friendly. Individuals who score well in this area are naturally curious, innovative, and creative (Diener & Lucas, 2019). They are more likely to be open to new experiences and eager to master new skills.

Personality traits show basic differences among individuals (Matthew *et al.,* 2009). Mobility is heavily influenced by personality factors. Kalu *et al*. (2022) discovered that older persons who were easily upset were more likely to have mobility disabilities.

2.2.4 Social Determinants of Health-Seeking Behaviour

Loneliness and social interaction with others are both social elements (Kalu *et al.,* 2022). Social aspects include social engagement, social isolation, social networks, social support,

and living arrangements (Kalu *et al.,* 2022; Nwachuwku *et al.,* 2023). Loneliness is defined as a negative stressful or unpleasant experience related to social connection (Ong *et al.,* 2016). Ageing brings a slew of problems and losses (Smith, 2012). Older female individuals who live alone are more likely to feel lonely and isolated, which can lead to health problems like heart disease and depression (Lim *et al.,* 2022). Living with family or friends. Increases the likelihood that elderly people will receive social care, which can help them preserve independence and good health (Benam *et al.,* 2023).

Social isolation is a condition in which one has no social interaction with others. Living with family or friends provides social support for older individuals, promoting independence and good health. It's important to note that social isolation and loneliness are not synonymous. Moeyersons *et al.,* (2022) found that older adults who live in their community and have social support are less likely to experience loneliness. Loneliness is a common loss for elderly people who live in communities, including independence and social relationships. Loneliness and social belonging are significant predictors of mobility limitation (Moeyersons *et al.,* 2022), and social engagement is linked to good physical health (Gao *et al.,* 2020). Social engagement is the participation in activities that enable for social connection with other members of the community or society (Borghi *et al.,* 2023). Mobility and social activity are inextricably linked. Mobile people are more likely to be socially involved, and socially engaged people are more inclined to travel. This is so that we may maintain our physical health and mobility, which allows us to participate in social events and interact with other people. Kalu *et al.* (2022) found that improved walking and driving results among older adults were associated with higher social activity, engagement, support, and networks.

Social well-being is an important part of social factors. It is a person's total contentment with their social contacts, how others see them, and how they interact with social institutions and the community (Kalu *et al.,* 2022).

2.3 EMPIRICAL REVIEW OF LITERATURE ON BIOPSYCHOSOCIAL DETERMINANTS OF HEALTH SEEKING BEHAVIOUR AMONG STROKE SURVIVORS

A brief summary of some previous studies on biopsychosocial determinants on health seeking behaviours among stroke survivors are provided to guide understanding of the present study .

AUTHOR/YEAR /COUNTRY	TITLE	SAMPLE SIZE	AIM OF STUDY	TYPE OF STUDY	OUTCOME MEASURE	FINDINGS
Adeyemi et al. (2024), Nigeria	Quality of sleep and its determinants among Nigerian stroke survivors	n = 150	Assess prevalence and determinants of poor sleep quality	Quantitative cross-sectional	PSQI	50.7% had poor sleep; ischemic stroke and analgesic use were significant predictors
Enato et al. (2020), Nigeria	Assessment of health-related QoL in stroke survivors in Benin City, Edo State	n = 78	Explore QoL domains and socio-demographic influences	Quantitative cross-sectional	NEWSQoL survey	Moderate QoL found; women had significantly poorer ADL scores ($p < 0.05$)
Enato et al. (2025), Nigeria	Eating difficulties among community-dwelli	n = 233	Examine prevalence, correlates, and QoL association of eating	Quantitative cross-sectional	MEOF-II & WHOQOL-BREF	60.9% had eating difficulties; associated with

	ng stroke survivors		difficulties			increased comorbidities, poor mental health, low social support, reducing QoL
Okoro et al. (2021), Nigeria	Stroke survivors' preference of herbal centre to hospital	n = 117	Determine care-seeking patterns post-stroke	Quantitative cross-sectional	Structured interviews	21% chose traditional first, all switched to herbal eventually; dissatisfaction with hospitals (lack of imaging) was key
Olajide et al. (2023), Nigeria	Sleep disturbances and associated factors amongst stroke survivors	n=110	Determine prevalence and predictors of sleep problems in post-stroke survivors	Quantitative cross-sectional	Epworth Sleepiness Scale, insomnia & hypersomnia surveys3	33.6% had sleep disturbances (17.3% insomnia, 9% hypersomnia);

						depression, age, and gender were significant predictors
Olufemi et al. (2020), Benin City	Assessment of health-related QoL in stroke survivors in Edo State	n=78	Assess QoL domains and socio-demographic influences	Quantitative cross-sectional	NEWSQoL instrument	Moderate QoL overall; women scored lower in ADL ($p < 0.05$)

SUMMARY OF LITERATURE

This chapter evaluated available research on stroke and health-seeking behaviour (HSB), giving a solid framework for understanding the varied nature of stroke and its management, as well as individuals' behavioural tendencies while seeking care. The conceptual framework was founded on the Biopsychosocial Model, which emphasizes the interaction of biological, psychological, and social elements in health outcomes and behaviour. The debate on stroke included developing definitions, worldwide and Nigerian epidemiology, pathophysiology, risk factors, clinical symptoms, diagnostic tools, and both medical and rehabilitative therapeutic strategies. Stroke continues to be a serious public health burden, especially in low- and middle-income countries with inadequate access to healthcare and preventive measures .The chapter also delves further into health-seeking behaviour, identifying major determining elements as perceived susceptibility, severity, threat, benefits, and barriers. Biological (e.g., age, gender, comorbidities), psychological (e.g., depression, fear, personality), and social (e.g., support networks, loneliness) factors were identified as key drivers of HSB, particularly among stroke survivors.

Empirical studies from a variety of settings demonstrated how sociodemographic factors such as gender, education, work, and food security influence care-seeking behaviour. Overall, the chapter emphasized the importance of a comprehensive, context-sensitive approach to improving stroke care and encouraging positive health-seeking behaviours, particularly in underprivileged communities.

CHAPTER 3

MATERIALS AND METHODOLOGY

3.1 Participants

The population comprised of stroke survivors living in Edo State, Nigeria. Male and female adults who had suffered a stroke (ischaemic or haemorrhagic) and are receiving rehabilitation or follow-up care at selected tertiary, secondary, and possibly primary health facilities in Edo State.

3.1.1 Inclusion Criteria

i. Individuals diagnosed with either ischemic or hemorrhagic stroke by a qualified medical professional.
ii. Stroke survivors aged 18 years and above.
iii. Stroke survivors who are currently receiving rehabilitation or follow-up care in the selected health facilities within Edo State.
iv. Stroke survivors with sufficient cognitive function to provide informed consent and complete the questionnaires or participate in interviews.
v. Stroke survivors who are willing to share their lived experiences regarding health-seeking behaviour.

3.1.2 Exclusion Criteria

i. Stroke survivors with severe psychiatric disorders.
ii. Survivors with speech disorders affecting communication.

3.2 Materials

3.2.1 Apparatus/ Instruments

i. Pro-forma

ii. National Institute of Health Stroke Scale (NIHSS)
iii. The Motor Assessment Scale (MAS)
iv. Berg Balance Scale
v. The Hospital Anxiety and Depression Scale (HADS)
vi. Multidimensional Scale of Perceived Social Support (MSPSS)
vii. Semi-Structured Interview

3.2.2 Description of Instruments

Pro-forma:

A well-structured pro-forma designed to collect participants' sociodemographic details (age, sex, education level, marital status, occupation, income, etc.) and health-seeking behaviour patterns (use of traditional medicine, rehabilitation attendance, adherence, and delays in seeking care).

National Institute of Health Stroke Scale (NIHSS):

The National Institutes of Health Stroke Scale (NIHSS) is a standardized tool used by healthcare professionals to quantify the impairment resulting from a stroke objectively (severity of stroke). Comprising 11 items, each scored from 0 to 4, the NIHSS assesses specific abilities, with a score of 0 indicating normal function and higher scores indicating varying levels of impairment. The total NIHSS score is obtained by summing individual item scores, ranging from 0 to a maximum of 42. The NIHSS score corresponds to stroke severity, categorizing patients into different levels, ranging from no stroke symptoms to severe stroke. Numerous validations confirm its efficacy in assessing stroke severity and predicting patient outcomes (Muir *et al.,* 1996). The severity of a stroke is closely associated with the volume of the affected brain; larger strokes tend to have more significant consequences (Weimer *et*

al., 2004). The NIHSS scores are reliable predictors of damaged brain volume, where a smaller NIHSS score suggests a smaller lesion volume (Glymour *et al*., 2007).

Reliability and validity: The reliability and validity of the assessment are noteworthy. The interrater reliability remains commendable, evidenced by an excellent intraclass correlation coefficient of 0.82. The assessment's ability to identify patients with excellent outcomes (NIHSS score of ≤5) is marked by a sensitivity of 0.72 and specificity of 0.89. Notably, there are no significant differences observed in these parameters between the initial admission and discharge assessments. This underscores the sustained reliability and validity of the evaluation over the course of the study.

The Motor Assessment Scale (MAS):

The Motor Assessment Scale (MAS) is a performance-oriented measure designed to evaluate everyday motor function in stroke patients (Carr et al., 1985). It employs a task-oriented approach, focusing on functional tasks rather than isolated movement patterns (Malouin et al., 1994). Comprising 8 items, including tasks like walking and upper-arm function, each task is performed three times, with the best performance recorded. Additionally, a general tonus item estimates muscle tone on the affected side (Carr et al., 1985). Scoring involves a 7-point scale (except for the general tonus item), where 6 indicates optimal motor behavior. The general tonus item is scored based on continuous observations, with 4 indicating a consistently normal response and scores > 4 or < 4 indicating persistent hypertonus or varying degrees of hypotonus, respectively (Carr et al., 1985). Item scores (excluding general tonus) can be summed for an overall score out of 48 points (Malouin et al., 1994). Advancing to higher-level tasks implies proficiency in lower-level ones, allowing their omission in the assessment (Sabari et al., 2005).

Reliability: Reliability assessments include test-retest reliability, with excellent correlations ranging from r=0.87 to r=1.00 (Carr et al., 1985). Inter-rater reliability is generally high, with mean correlations of r = 0.95 (Poole & Whitney, 1988).

Validity: Regarding validity, concurrent validity assessments against the Fugl-Meyer Assessment reveal excellent Spearman's correlations (r = 0.96), demonstrating MAS's strong validity in measuring motor recovery. Construct validity is examined for radial deviation, highlighting potential limitations. Convergent and discriminant validity are evident through robust correlations; for instance, the MAS correlates excellently (r = 0.89) with the Mobility Scale for Acute Stroke Patients, underscoring its accuracy in measuring mobility.

Overall, the MAS emerges as a reliable and valid tool, with specific correlation values showcasing its efficacy in assessing motor function and recovery in stroke patients.

Berg Balance Scale:

The Berg Balance Scale (BBS) is a quantitative tool designed to assess balance in older adults, first published in 1989 by Berg, Wood-Dauphinee, Williams, and Maki. The scale consists of 14 items requiring patients to maintain positions and perform moving tasks of varying difficulty, with scores ranging from 0-4. A global score out of 56 is calculated, where 0 signifies inability and 56 indicates independent completion. The BBS categorizes scores: 0-20 as balance impairment, 21-40 as acceptable balance, and 41-56 as good balance. Internal consistency is strong, supported by Cronbach's alphas exceeding 0.83 and 0.97 for elderly residents and stroke patients, respectively.

Reliability: Intra-rater reliability is excellent (ICC=0.88), despite a potential learning effect. Inter-rater reliability is high (ICC=0.98), and validity assessments reveal content validity through item selection based on interviews.

Validity: Concurrent validity is demonstrated through strong correlations with various measures, including Single-Leg Stance, Dynamic Balance Master, Fugl-Meyer, and the Motor Assessment Scale. Predictive validity is evident in predicting falls and length of stay, while construct validity is confirmed through correlations with the Barthel Index, Fugl-Meyer, and Functional Independence Measure. Known groups validity is established by significant differences among groups based on Functional Ambulation Category scores.

The Patient Health Questionnaire-9 (PHQ-9):

The Patient Health Questionnaire-9 (PHQ-9) is a widely used self-report tool designed to screen, diagnose, monitor, and measure the severity of depression in individuals. Developed by Dr. Robert L. Spitzer, Dr. Janet B.W. Williams, and colleagues, the PHQ-9 is a brief and easy-to-administer questionnaire that has been extensively validated across various populations, including stroke patients.

Stroke patients often experience emotional and psychological challenges, including depression. The PHQ-9 has been employed in stroke populations to assess depressive symptoms and aid in the identification of individuals who may require further evaluation and intervention. The PHQ-9 comprises nine items, each corresponding to the nine diagnostic criteria for major depressive disorder in the DSM-IV. Patients rate the frequency of their symptoms over the past two weeks on a scale from 0 to 3 (0 = not at all, 1 = several days, 2 = more than half the days, 3 = nearly every day). The total score ranges from 0 to 27, with higher scores indicating greater symptom severity.

Minimal depression: 0-4, Mild depression: 5-9, Moderate depression: 10-14, Moderately severe depression: 15-19, Severe depression: 20-27

Reliability and Validity: The PHQ-9 has demonstrated good reliability and validity across various populations, including stroke patients. Reliability refers to the consistency of

measurement, and the PHQ-9 has shown high internal consistency, test-retest reliability, and interrater reliability. Validity, which assesses the accuracy of the tool in measuring what it intends to measure, has been supported through comparisons with structured clinical interviews and other established measures of depression. Studies, such as those conducted by Dajpratham *et al.,* (2020) and Yue *et al.,* (2022), have provided evidence of the PHQ-9's psychometric properties in diverse clinical settings.

The Hospital Anxiety and Depression Scale (HADS):

The Hospital Anxiety and Depression Scale (HADS) is a self-administered questionnaire designed to screen for depression and anxiety, providing a practical tool for clinicians in various settings. It consists of 14 items assessing depression and anxiety in the past week, with scores on a 4-point scale. The scores for anxiety and depression can be used separately or combined to give a total score. For the purpose of this study, only the scoring for anxiety (HADS-A) was used. The HADS is one of the only two self-report screening tests for anxiety validated in stroke patients (McCrory *et al*., 2023). Although not a complete diagnostic tool, it aids in identifying general hospital patients requiring further psychiatric evaluation. Scoring involves summing subscale items to obtain anxiety (HADS-A) or depression (HADS-D) scores, or a total score (HADS-T). Higher scores indicate greater distress, with specific cutoffs indicating normal, probable mood disorder, or suggestive of the state.

Reliability: Reliability testing, including internal consistency, demonstrates excellent results, as seen in studies following ischemic stroke patients (Edelstein *et al.,* 2010).

Validity: Validity, particularly concurrent validity, has been examined across populations, showing strong correlations with established anxiety and depression measures. The HADS demonstrates convergent and discriminant validity, with a mean correlation between depression and anxiety subscales considered excellent (Michopoulos *et al*., 2008).

Multidimensional Scale of Perceived Social Support (MSPSS):

The Multidimensional Scale of Perceived Social Support (MSPSS) is a widely used self-report instrument designed to assess an individual's perception of social support from three distinct sources: family, friends, and significant others. It was developed by Zimet and colleagues in 1988 to provide a simple, brief, yet reliable measure of perceived social support, which is a crucial psychosocial factor influencing health behaviours and outcomes (Zimet et al., 1988).

The MSPSS consists of 12 items, each rated on a 7-point Likert scale, ranging from 1 ("Very strongly disagree") to 7 ("Very strongly agree"). The scale is divided into three subscales, with four items each representing:

- Family Support (e.g., "My family really tries to help me.")
- Friend Support (e.g., "I can count on my friends when things go wrong.")
- Significant Other Support (e.g., "There is a special person who is around when I am in need.")

The MSPSS was specifically developed to distinguish between these three sources of support rather than viewing social support as a single, undifferentiated construct. This distinction allows researchers to identify which type of social support is most influential in a particular context (Zimet et al., 1988).

Since its development, the MSPSS has been extensively used in diverse populations, including patients with chronic diseases, mental health conditions, and those recovering from stroke, to assess the role of social support in health outcomes and health-seeking behaviours (Ng et al., 2020; Mohd-Sidik et al., 2019).

The MSPSS is recognized for its strong psychometric properties, demonstrating high reliability and validity across various cultural contexts.

The MSPSS has consistently shown excellent internal consistency. The original study by Zimet et al. (1988) reported Cronbach's alpha coefficients of 0.91 for the total scale, and subscale alphas of 0.87 for the family subscale, 0.85 for the friend subscale, and 0.91 for the significant other subscale. These findings indicate a high level of internal reliability.

Reliability**:** Subsequent studies have supported these reliability estimates across different populations. For instance, a study by Ng et al. (2020) reported a Cronbach's alpha of 0.94 for the total scale among Malaysian stroke survivors, further confirming the robustness of the instrument. The scale has also demonstrated strong test-retest reliability, indicating that it produces stable results over time (Vaingankar et al., 2017).

Validity**:** The MSPSS has demonstrated strong construct validity, with factor analyses consistently confirming the three-factor structure representing the family, friends, and significant others subscales (Zimet et al., 1990; Vaingankar et al., 2017). The scale also shows good convergent and discriminant validity. It correlates positively with other measures of social support and negatively with measures of depression and anxiety, supporting its theoretical relevance in assessing the protective role of social support in mental health (Mohd-Sidik et al., 2019).

Additionally, the MSPSS has demonstrated cultural adaptability, with validated translations in numerous languages, including Yoruba, Hausa, and Igbo, making it suitable for use in multi-ethnic and low-resource settings such as Nigeria (Odetola & Ayoola, 2020).

In stroke rehabilitation, perceived social support plays a critical role in influencing recovery outcomes, adherence to therapy, and health-seeking behaviour. The MSPSS has been effectively utilized in studies involving stroke survivors to assess how social support systems,

particularly family and community networks, impact the willingness and ability of patients to access and adhere to rehabilitation services (Ng et al., 2020).

Semi-Structured Interview:

The semi-structured interview is a qualitative data collection method that allows researchers to explore participants' experiences, perceptions, and beliefs in depth while maintaining a flexible structure. Unlike structured interviews that strictly follow a predetermined set of questions, semi-structured interviews provide the interviewer with the freedom to probe further, clarify responses, and explore emerging themes that may not have been initially anticipated (Adams, 2015).

In this study, the semi-structured interview was employed to capture the lived experiences of stroke survivors and their caregivers regarding health-seeking behaviours, healthcare access, and the biopsychosocial factors that influence their rehabilitation choices. This method is particularly well-suited for the qualitative arm of mixed methods research because it encourages open, honest, and detailed responses, allowing participants to describe their unique journeys and the barriers or facilitators they encounter when seeking care.

The semi-structured interview guide for this study was carefully developed based on existing literature on health-seeking behaviours, stroke rehabilitation, and biopsychosocial frameworks. The guide included open-ended questions covering key domains such as:

- Perceptions of stroke and its causes
- Health-seeking pathways (traditional vs. medical care)
- Role of family and community support
- Cultural and religious influences on treatment decisions
- Barriers to healthcare access (e.g., financial, logistical, stigma)
- Personal coping strategies and emotional responses to living with stroke

Interviews were conducted face-to-face in a quiet, private setting within the health facility or at a location convenient for the participant. Each interview lasted 30-60 minutes. With the participants' consent, all interviews were audio-recorded to ensure accurate transcription and to preserve the richness of the data. Field notes were also taken to capture non-verbal cues and contextual information.

3.3 Methods

3.3.1 Research Design

This study employed a mixed method research design, specifically utilizing a convergent parallel mixed method approach.

3.3.2 Sampling Technique/Sample Size Calculation

3.3.2.1 Quantitative Sampling

A multistage sampling technique was used to recruit participants for this study. In the first stage, Edo State was stratified into its three senatorial districts: Edo South, Edo Central, and Edo North. In the second stage, one Local Government Area (LGA) was selected from each senatorial district, with priority given to LGAs housing major health facilities that offer stroke rehabilitation services. In the third stage, from each selected LGA, eligible tertiary and secondary health facilities was identified. The number of stroke survivors to be recruited from each facility was determined using proportionate sampling based on the patient volume of each center. Finally, consecutive sampling was used within each selected facility to recruit stroke survivors who met the inclusion criteria until the required sample size was achieved. This approach ensures geographical diversity and enhances the representativeness of the sample across Edo State.

55 stroke survivors participated in the quantitative aspect of this study. This was determined by power analysis using G-power 3.1 as illustrated below:

Input: Tail(s)	=	One
$Exp(\beta 1)$	=	1.58
α err prob	=	0.05
Power ($1-\beta$ err prob)	=	0.95
Base rate $exp(\beta 0)$	=	0.85
Mean exposure	=	1
R^2 other X	=	0
X distribution	=	Normal
X parm μ	=	0
X parm σ	=	1
Output: Critical z	=	1.6448536
Total sample size	**=**	**55**
Actual power	=	0.9506000

Therefore, **55** stroke survivors participated in the quantitative aspect of this study.

3.3.2.2 Qualitative Sampling

In qualitative research, sample sizes are typically kept small to facilitate a thorough analysis focused on individual cases, which is a key aspect of this study (Sandelowski et al., 1996). So, in this study a total of 10 participants were required. Purposive sampling was used to select

10 stroke survivors from those that partook in the quantitative study, for in-depth interviews. Participants were chosen to reflect diversity in age, gender, socioeconomic status, and care experience.

3.3.3 Research Procedure/ Procedure for Data Collection

The data collection process for this study followed a convergent parallel mixed methods approach, in which both quantitative and qualitative data was collected simultaneously from the same set of participants. This design enabled the researcher to obtain a comprehensive understanding of the biopsychosocial determinants of health-seeking behaviour among stroke survivors in Edo State.

The study commenced using the sampling method outlined above. Upon recruitment, eligible participants were provided with detailed information about the study, including its objectives, procedures, potential risks, and benefits. Written informed consent were obtained from all participants prior to the commencement of data collection.

Quantitative data was collected through the administration of structured questionnaires and standardized assessment tools. The researcher and trained research assistants obtained information on participants' sociodemographic characteristics, stroke severity (using the National Institutes of Health Stroke Scale), motor function (using the Motor Assessment Scale), balance (using the Berg Balance Scale), anxiety and depression levels (using the Hospital Anxiety and Depression Scale), perceived social support (using the Multidimensional Scale of Perceived Social Support), and health-seeking behaviour patterns. All quantitative assessments was conducted in a face-to-face manner within the health facility, and responses were documented promptly.

Simultaneously, a purposive subsample of 10 participants from the quantitative arm were selected for the qualitative component of the study. The selection aimed to capture variation

across key characteristics such as age, gender, stroke severity, type of health-seeking behaviour, and rehabilitation adherence. Semi-structured, in-depth interviews was conducted with these participants to explore their lived experiences, personal beliefs, cultural influences, family support systems, and perceived barriers to healthcare access. The interviews were conducted in a quiet and private setting, audio-recorded with the participants' permission, and lasted between 30 to 60 minutes.

Throughout the data collection process, strict adherence to ethical principles was maintained. Participant confidentiality was protected by ensuring that no identifiable information is disclosed in the study reports. The audio recordings and collected data were securely stored and accessible only to the research team.

3.3.4 Ethical Considerations

Ethical approval was obtained from the relevant Health and Research Ethics Committee of the selected Health Institutions. Informed written consent was obtained from each participant. Anonymity and confidentiality were maintained, and participants were informed of their right to withdraw from the study at any time.

3.3.5 Data Analysis

Data from this study was analyzed using both quantitative and qualitative approaches, following the principles of a convergent parallel mixed methods design. The quantitative and qualitative data were analyzed separately and then integrated during the interpretation phase to provide a comprehensive understanding of the research questions.

Quantitative Data Analysis

The quantitative data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive statistics such as (frequencies, percentages, means, and

standard deviations) were used to summarize participants' sociodemographic characteristics, clinical profiles, and health-seeking patterns.

To address the research questions:

Chi- square tests was used to assess associations between categorical and continuous variables, as appropriate.

A p-value of less than 0.05 was considered statistically significant.

Qualitative Data Analysis

The qualitative data from the semi-structured interviews was transcribed verbatim and analyzed using thematic analysis as described by Braun and Clarke (2006). The analysis involved coding the data, identifying patterns, and developing key themes that reflect the participants' lived experiences and perceptions. This helped to uncover in-depth insights into cultural beliefs, family influences, and personal barriers related to health-seeking behaviours.

Data Integration

Findings from the quantitative and qualitative components were compared, contrasted, and integrated at the interpretation stage to provide a well-rounded, holistic understanding of the biopsychosocial determinants of health-seeking behaviour among stroke survivors in Edo State.

CHAPTER 4

RESULTS

4.1.1 Demographic characteristics of study participants

A total of 55 stroke survivors participated in the study. The largest age group was 41–60 years (50.9%), and males made up a slight majority (50.9%) of the sample. Most participants were married (72.7%), the modal educational attainment was tertiary education (85.4%), and the majority lived in urban areas (87.3%), as shown in table 1.

4.1.2 Clinical information of participants

When asked about time since stroke onset, the modal category was 7–12 months (43.6%). Ischaemic stroke was the most frequently reported stroke type (60.0%), and left-sided stroke laterality was more common (54.5%). The most common number of comorbidities reported was one comorbidity (45.5%), as presented in table 2.

Table 1: Demographic characteristics of study participants (n=55)

Variable	Frequency (n)	Percentage (%)
Gender		
Male	28	50.9
Female	27	49.1
Age Range (Years)		
20 - 40	6	10.9
41 - 60	28	50.9
61 - 80	21	38.2
Marital Status		
Single	6	10.9
Married	40	72.7

Widowed	9	16.4
Divorced	0	0.0
Educational Level		
No formal education	2	3.6
Primary	1	1.8
Secondary	5	9.1
Tertiary	47	85.4
Employment Status		
Employed	31	56.4
Unemployed	8	14.5
Retired	16	29.1
Monthly Income		
Less than ₦30,000	5	9.1
₦30,000 - ₦50,000	5	9.1
₦51,000 - ₦100,000	18	32.7
Above ₦100,000	27	49.1
Place of Residence		
Urban	48	87.3
Rural	7	12.7

Table 2: Clinical information of participants (n=55)

Variable	Categories	Frequency (n)	Percentage (%)
Time since stroke onset	1 - 6 months	19	34.5
	7 - 12 months	24	43.6
	13 - 24 months	8	14.5
	25 - 48 months	2	3.6
	72 months	1	1.8
	180 months	1	1.8
Stroke Type	Ischemic	33	60.0
	Hemorrhagic	13	23.6
	Not sure	9	16.4
Stroke laterality	Left	30	54.5
	Right	25	45.5
Number of Comorbidities	0	16	29.1
	1	25	45.5
	2	11	20.0
	3	2	3.6
	4	1	1.8

4.1.3 Health-seeking behaviour of study participants

From table 3, the modal first place sought after stroke onset was the hospital (65.5%). The plurality sought care immediately after symptom onset (41.8%). Proximity was the leading reason given for choosing the first place of care (25.5%). Most participants reported current adherence to physiotherapy or medical rehabilitation appointments (65.5%) and the majority reported not using alternative or traditional medicine for their stroke (67.3%). Cultural beliefs were the most commonly indicated barrier to accessing healthcare (25.5%).

Table 3: Health seeking behavior of participants (n=55)

Variable		Frequency (n)	Percentage (%)
Where did you first seek care after stroke onset?	Hospital	36	65.5
	Pharmacy	8	14.5
	Traditional healer	6	10.9
	Self-medication	3	5.5
	Others	2	3.6
How long after stroke onset did you seek your first care?	Immediately	23	41.8
	Within 24 Hours	18	32.7
	Within 1-3 days	6	10.9
	After more than 3 days	8	14.5
What was your reason for choosing the first place of care?	Cost	12	21.8
	Proximity	14	25.5
	Cultural beliefs	7	12.7
	Family influence	10	18.2
	Fear	8	14.5
	Others	6	7.3
Do you currently adhere to your physiotherapy or medical rehabilitation appointments?	Yes	36	65.5
	No	19	34.5
If No, what are the reasons for non-adherence?	Financial constraint	1	1.8
	Transportation issues	3	5.5
	Lack of family support	4	7.3

	Belief in traditional medicine	5	9.1
	Others	6	10.9
Have you used any form of alternative or traditional medicine for your stroke?	Yes	18	32.7
	No	37	67.3
What are the barriers you face in accessing healthcare?	Cost	9	16.4
	Distance	6	10.9
	Cultural beliefs	14	25.5
	Fear of hospital	11	20.0
	Lack of family support	6	10.9
	Others	9	16.4

4.1.4 Stroke Severity

Stroke severity among the participants was summarized using the Across NIHSS items scores presented in table 4, the modal responses indicate predominantly preserved consciousness and focal deficits of varying severity. The most common state for level of consciousness was alertness (76.4%). For the level of consciousness questions the modal response was answering both questions correctly (65.5%) and for LOC commands the modal response was performing both tasks correctly (65.5%). Oculomotor examination was largely normal: the modal gaze category was normal (78.2%). Visual field status was most commonly recorded as no visual loss (52.7%). Facial movement was most frequently normal (47.3%).

Upper limb strength showed a pattern of mild impairment on the left arm with no drift the modal response (47.3%), while on the right arm the modal response was some effort against gravity (47.3%). For lower limb strength the modal left-leg response was no drift (49.1%) and the modal right-leg response was drift (41.8%). Limb ataxia was most often absent (74.5%). Sensory function was most commonly normal (65.5%). Language function was most often intact with no aphasia (65.5%). Dysarthria was most frequently recorded as mild to moderate (78.2%). Finally, extinction and inattention most commonly showed no abnormality (52.7%).

Furthermore, most participants were classified as having moderate stroke severity (78.2%), as shown in Fig.1.

Table 4: Summary of Stroke Severity using the NIHSS Score (n=55)

Variable	Scale definition	f	(%)
Level of consciousness	0 = Alert; keenly responsive.	42	76.4
	1 = Not alert; but arousable by minor stimulation to obey, answer, or respond	7	12.7
	2 = Not alert; requires repeated stimulation to attend, or is obtunded and requires strong or painful stimulation to make movements (not stereotyped).	5	9.1
	3 = Responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, and areflexic.	0	0.0
LOC questions	0 = Answers both questions correctly.	36	65.5
	1 = Answers one question correctly.	19	34.5
	2 = Answers neither question correctly	0	0.0
LOC commands	0 = Performs both tasks correctly.	36	65.5
	1 = Performs one task correctly.	19	34.5
	2 = Performs neither task correctly.	0	0.0
Best Gaze	0 = Normal.	43	78.2
	1 = Partial gaze palsy; gaze is abnormal in one or both eyes,but forced deviation or total gaze paresis is not present.	9	16.4
	2 = Forced deviation, or total gaze paresis not overcome by the oculocephalic maneuver.	3	5.5
Visual	0 = No visual loss.	29	52.7
	1 = Partial hemianopia.	21	38.2
	2 = Complete hemianopia.	5	9.1
	3 = Bilateral hemianopia (blind including cortical blindness).	0	0.0
Facial palsy	0 = Normal symmetrical movements.	26	47.3
	1 = Minor paralysis (flattened nasolabial fold, asymmetry on smiling).	23	41.8
	2 = Partial paralysis (total or near-total paralysis of lower face).	3	5.5
	3 = Complete paralysis of one or both sides (absence of facial	3	5.5

	movement in the upper and lower face)		
Motor arm (Left)	0 = No drift; limb holds 90 (or 45) degrees for full 10 seconds.	26	47.3
	1 = Drift; limb holds 90 (or 45) degrees, but drifts down before full 10 seconds; does not hit bed or other support.	17	30.9
	2 = Some effort against gravity; limb cannot get to or maintain (if cued) 90 (or 45) degrees, drifts down to bed, but has some effort against gravity.	6	10.9
	3 = No effort against gravity; limb falls.	4	7.3
	4 = No movement.	2	3.6
Motor arm (Right)	1 = Drift; limb holds 90 (or 45) degrees, but drifts down before full 10 seconds; does not hit bed or other support.	12	21.8
	2 = Some effort against gravity; limb cannot get to or maintain (if cued) 90 (or 45) degrees, drifts down to bed, but has some effort against gravity.	26	47.3
	3 = No effort against gravity; limb falls.	8	14.5
	4 = No movement.	9	16.4
Motor leg (Left)	0 = No drift; leg holds 30-degree position for full 5 seconds.	27	49.1
	1 = Drift; leg falls by the end of the 5-second period but does not hit bed.	15	27.3
	2 = Some effort against gravity; leg falls to bed by 5 seconds, but has some effort against gravity.	4	7.3
	3 = No effort against gravity; leg falls to bed immediately.	7	12.7
	4 = No movement.	2	3.6
Motor leg (Right)	0 = No drift; leg holds 30-degree position for full 5 seconds.	16	29.1
	1 = Drift; leg falls by the end of the 5-second period but does not hit bed.	23	41.8
	2 = Some effort against gravity; leg falls to bed by 5 seconds, but has some effort against gravity.	5	9.1
	3 = No effort against gravity; leg falls to bed immediately.	11	20.0
	4 = No movement.	0	0.0
Limb ataxia	0 = Absent.	41	74.5
	1 = Present in one limb.	7	12.7

	2 = Present in two limbs.	6	10.9
Sensory	0 = Normal; no sensory loss.	36	65.5
	1 = Mild-to-moderate sensory loss	19	34.5
	2 = Severe to total sensory loss; patient is not aware of being touched in the face, arm, and leg.	0	0.0
Best language	0 = No aphasia; normal.	36	65.5
	1 = Mild-to-moderate aphasia;	19	34.5
	2 = Severe aphasia	0	0.0
	3 = Mute, global aphasia; no usable speech or auditory comprehension.	0	0.0
Dysarthria	0 = Normal.	43	78.2
	1 = Mild-to-moderate dysarthria	9	16.4
	2 = Severe dysarthria;	3	5.5
Extinction and Inattention (formerly Neglect)	0 = No abnormality.	29	52.7
	1 = Visual, tactile, auditory, spatial, or personal inattention or extinction to bilateral simultaneous stimulation in one of the sensory modalities.	21	38.2
	2 = Profound hemi-inattention or extinction to more than one modality; does not recognize own hand or orients to only one side of space.	5	9.1

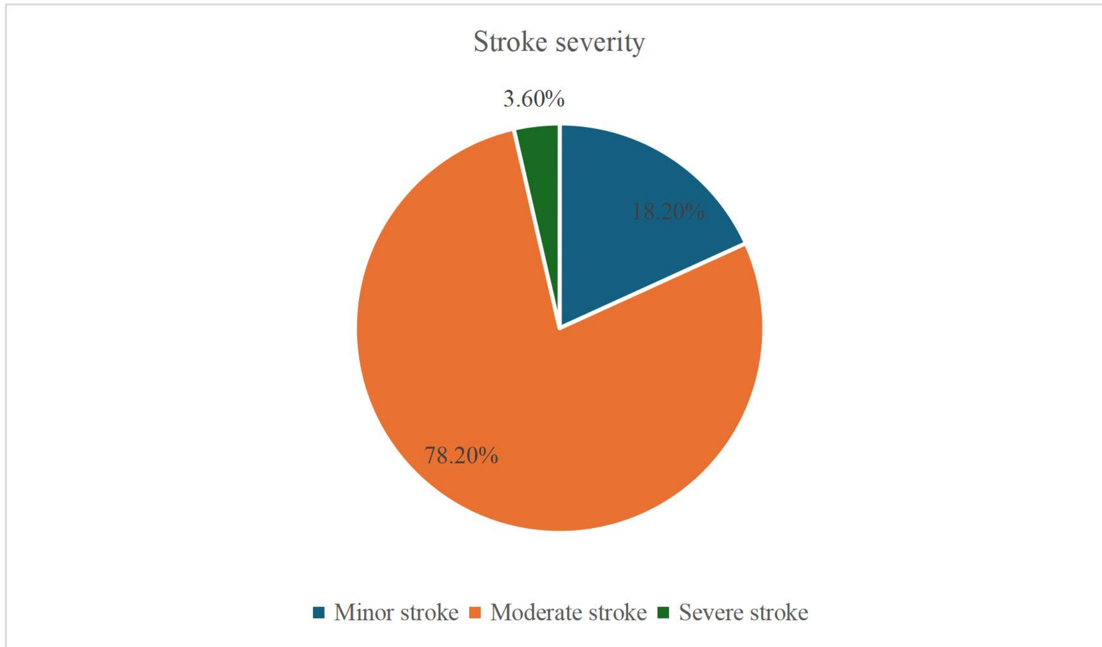


Fig. 1: Pie chart showing NIHSS ranking of stroke severity (n=55)

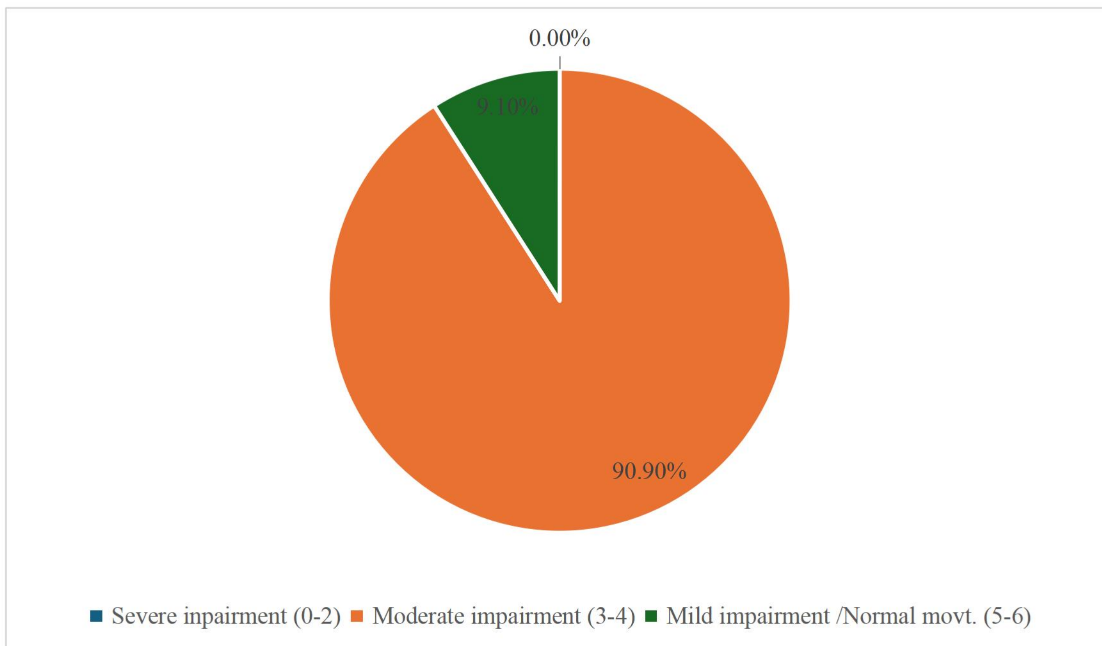


Fig. 2: Pie chart showing the movement level of participants (n=55)

4.1.5 Movement scoring sheet

Across the assessed functional tasks the modal performance was a score of 4 for every item, indicating predominantly limited but present ability. Specifically, the modal scores were as follows: supine to side lying — 4 (43.6%); supine to sitting over side of bed — 4 (49.1%); balanced sitting — 4 (34.5%); sitting to standing — 4 (50.9%); walking — 4 (47.3%); upper arm function — 4 (41.8%); hand movements — 4 (43.6%); advanced hand activities — 4 (36.4%), as shown in table 5.

Table 5: Movement scoring sheet (n=55)

Variable	1	2	3	4	5	6
Supine to side lying	0 (0.0)	6 (10.9)	6 (10.9)	24 (43.6)	17 (30.9)	2 (3.6)
Supine to sitting over side of bed	0 (0.0)	7 (12.7)	7 (12.7)	27 (49.1)	12 (21.8)	2 (3.6)
Balanced sitting	0 (0.0)	9 (16.4)	5 (9.1)	19 (34.5)	17 (30.9)	5 (9.1)
Sitting to standing	0 (0.0)	6 (10.9)	5 (9.1)	28 (50.9)	13 (23.6)	3 (5.5)
Walking	0 (0.0)	6 (10.9)	7 (12.7)	26 (47.3)	13 (23.6)	3 (5.5)
Upper arm function	0 (0.0)	5 (9.1)	10 (18.2)	23 (41.8)	16 (29.1)	1 (1.8)
Hand movements	0 (0.0)	7 (12.7)	8 14.5)	24 (43.6)	13 (23.6)	3 (5.5)
Advanced hand activities	0 (0.0)	8 (14.5)	8 (14.5)	20 (36.4)	16 (29.1)	3 (5.5)

4.1.6 Balance Assessment of Participants using Berg Balance Scale item

Across the Berg items the modal responses show a consistent pattern of limited but present balance capacity with frequent need for assisted performance. For Sit to stand the modal response was score 1 (27.3%). For Standing unsupported the modal response was score 3 (29.1%). For Sitting unsupported the modal response was score 1 (27.3%). For Standing to sitting the modal response was score 1 (29.1%). For Transfers the modal response was score 3 (30.9%). For Standing with eyes closed the modal response was score 1 (27.3%). For Standing with feet together the modal response was score 4 (29.1%). For Reaching forward with outstretched arms the modal response was score 3 (25.5%). For Retrieving an object from the ground three categories tied as modal (scores 0, 2 and 3 each at 23.6%). For Turning to look behind the modal response was score 2 (30.9%). For Turning 360 degrees the modal response was score 2 (25.5%). For Placing an alternate foot on a stool the modal responses were tied at scores 2 and 3 (each 23.6%). For Standing with one foot in front the modal response was score 2 (27.3%). For Standing on one foot the modal response was score 1 (23.6%), as shown in table 6.

Berg scale functional interpretation

When the item-level pattern is summarized, the dominant functional category on the Berg scale was walking with assistance (92.7%), indicating that the majority of participants require assistance for safe ambulation rather than being independently mobile, as illustrated in fig.3.

Table 6: Berg balance scale (n = 55)

Item	0	1	2	3	4
Sit to stand	7 (12.7)	15 (27.3)	13 (23.6)	11 (20.0)	9 (16.4)
Standing Unsupported	12 (21.8)	7 (12.7)	8 (14.5)	16 (29.1)	12 (21.8)
Sitting Unsupported	9 (16.4)	15 (27.3)	8 (14.5)	11 (20.0)	12 (21.8)
Standing to sitting	6 (10.0)	16 (29.1)	11 (20.0)	10 (18.2)	12 (21.8)
Transfers	10 (18.2)	15 (27.3)	8 (14.5)	17 (30.9)	5 (9.1)
Standing with eyes closed	9 (16.1)	15 (27.3)	12 (21.8)	7 (12.7)	12 (21.8)
Standing with feet together	9 (16.4)	6 (10.9)	14 (25.5)	10 (18.2)	16 (29.1)
Reaching forward with outstretched arms	13 (23.6)	9 (16.4)	10 (18.2)	14 (25.5)	9 (16.4)
Retrieving object from ground	13 (23.6)	8 (14.5)	13 (23.6)	13 (23.6)	8 (14.5)
Turning to look behind	8 (14.4)	2 (3.6)	17 (30.9)	15 (27.3)	13 (23.6)
Turning 360 degrees	12 (21.8)	8 (14.5)	14 (25.5)	9 (16.4)	12 (21.8)
Placing alternate foot on stool	12 (21.8)	8 (14.5)	13 (23.6)	13 (23.6)	9 (16.4)
Standing with one foot in front	10 (18.2)	8 (14.5)	15 (27.3)	10 (18.2)	12 (21.8)

Standing on one foot	11 (20.0)	13 (23.6)	11 (20.0)	11 (20.0)	9 (16.4)

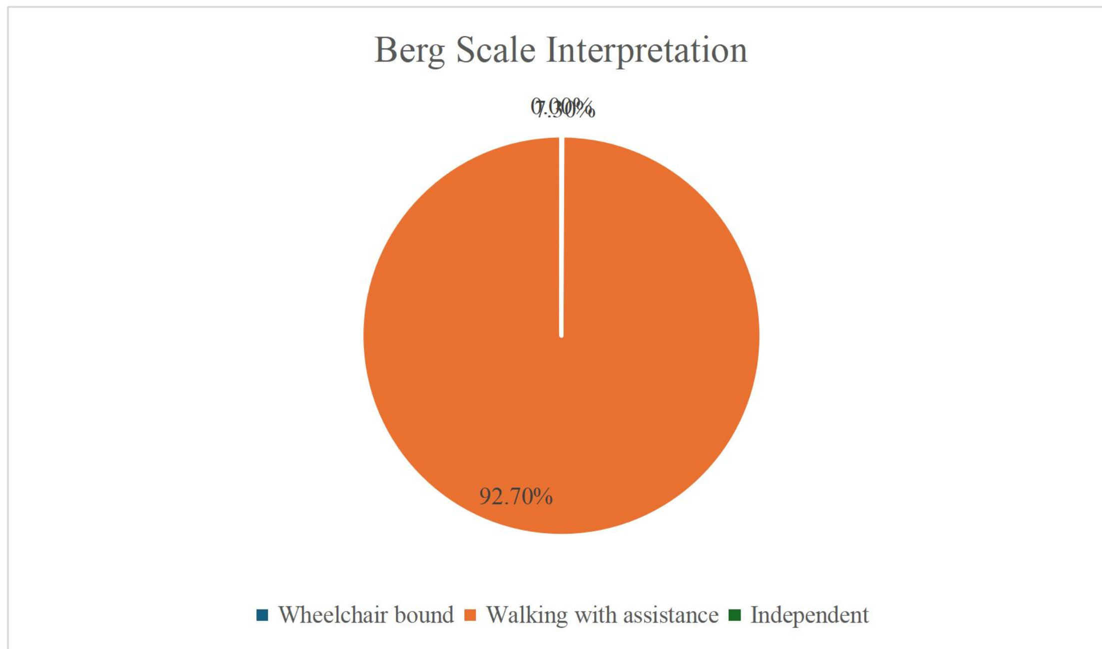


Fig.3: Pie chart showing the Berg scale interpretation

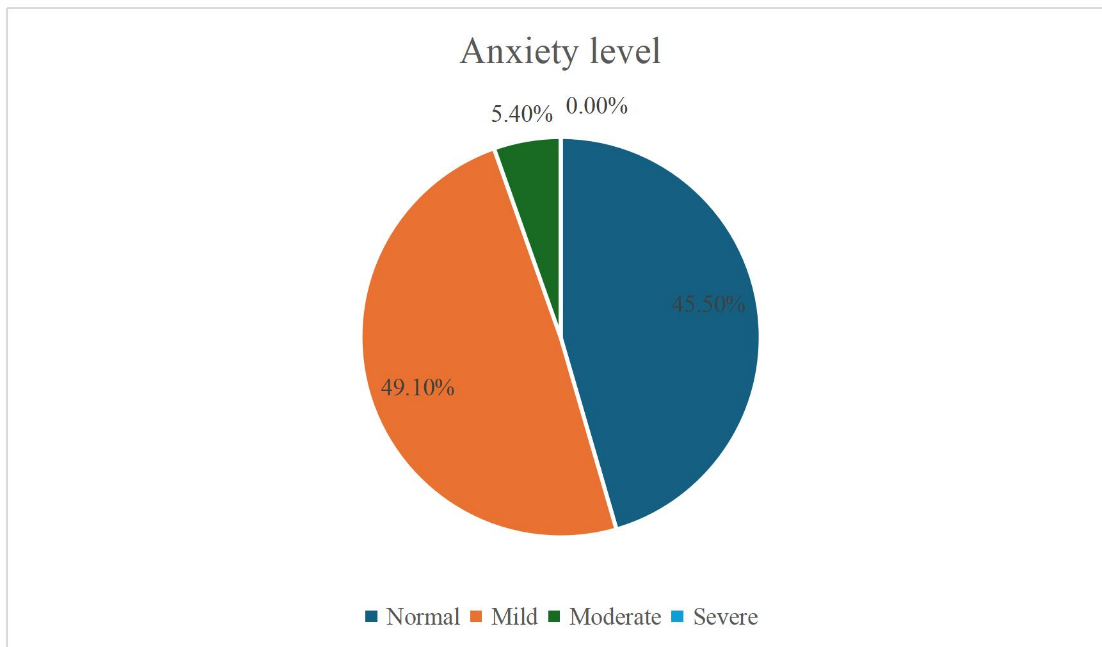


Fig.3; Pie chart showing the anxiety level of participants (n=55)

4.1.7 Anxiety Assessment using HAD - Anxiety Subscale

Across the anxiety items the dominant response pattern was one of intermittent rather than persistent anxiety. The largest proportion of participants reported feeling tense or “wound up” occasionally (74.5%). A similar majority described a frightened feeling like “butterflies” in the stomach occasionally (78.2%). Worrying thoughts were most commonly experienced from time to time but not too often (81.8%). Most participants reported that they could not sit at ease not often (81.8%), and the modal response to the item about feeling that something awful is about to happen was a little, but it does not worry me (78.2%). Restlessness was most often endorsed as not very much (89.1%), and sudden feelings of panic were again most commonly reported as not very often (80.0%), as shown in table 7.

When scores were summarized, the modal anxiety category was mild anxiety (49.1%), with the remainder predominantly in the normal range. In short, the anxiety profile for the sample reflects largely low to mild symptoms, with intermittent worry and tension more common than sustained or severe anxiety, as illustrated in fig.4.

Table 7: The Hospital Anxiety Scale (n = 55)

Variable	N (%)	N (%)	n (%)	N (%)
I feel tense or 'wound up'	Not at all 2 (3.6)	Occasionally 41 (74.5)	A lot of the time 6 (10.9)	Most of the time 6 (10.9)
I get a sort of frightened feeling like 'butterflies' in the stomach	Not at all 3 (5.5)	Occasionally 43 (78.2)	Quite often 9 (16.4)	Very often 0 (0.0)
Worrying thoughts go through my mind	Only occasionally 6 (10.9)	From time to time, but not too often 45 (81.8)	A lot of the time 4 (7.3)	A great deal of the time 0 (0.0)
I can sit at ease and feel relaxed	Not at all 2 (3.6)	Not often 45 (81.8)	Usually 4 (7.3)	Definitely 0 (0.0)
I get a sort of frightened feeling as if something awful is about to happen	Not at all 3 (5.5)	A little, but it doesn't worry me 43 (78.2)	Yes, but not too badly 9 (16.4)	Very definitely, and quite badly 0 (0.0)
I feel restless as I have to be on the move	Not at all 2 (3.6)	Not very much 49 (89.1)	Quite a lot 4 (7.3)	Very much indeed 0 (0.0)
I get sudden	Not at all 7	Not very often 44	Quite often 4	Very often indeed 0

feelings of panic	(12.7)	(80.0)	(7.3)	(0.0)

Table 4.1.8 Depression Assessment using HAD Depression Subscale items

Across the depression items the dominant pattern was one of mild affective disturbance rather than severe depressive illness. The modal responses were as follows: for enjoyment of previously pleasurable activities the commonest response was not quite so much (80.0%); for the ability to laugh and see the funny side the modal response was not quite so much now (75.5%); for feeling cheerful the modal response was sometimes (76.4%); for feeling slowed down the modal response was sometimes (81.8%); for interest in personal appearance the modal response was I do not take as much care as I should (83.6%); for looking forward with enjoyment the modal response was rather less than I used to (74.5%); and for enjoying a book, radio or TV the modal response was sometimes (76.4%). When item responses were summarized, the most common overall depression category was normal (50.9%), followed by mild (43.6%), with few participants in the moderate range (5.5%) and none in the severe category, as shown in table 8.

Table 8: The Hospital Depression Scale (n = 55)

Variable	N (%)	N (%)	n (%)	N (%)
I still enjoy the things I used to enjoy	Hardly at all 0 (0.0)	Only a little 4 (7.3)	Not quite so much 44 (80.0)	Definitely as much 7 (12.7)
I can laugh and see the funny side of things	Not at all 6 (10.9)	Definitely not so much now 6(10.9)	Not quite so much now 41 (75.5)	As much as I always could 2(3.6)
I feel cheerful	Not at all 0 (0.0)	Not often 10 (18.2)	Sometimes 42(76.4)	Most of the time 3 (5.5)
I feel as if I am slowed down	Not at all 6(10.9)	Sometimes 45(81.8)	Very often 4(7.3)	Nearly all the time 0(0.0)
I have lost interest in my appearance	I just take as much care as ever 3(5.5)	I may not take quite as much care 4(7.3)	I don't take as much care as I should 46(83.6)	Definitely 2(3.6)
I look forward with enjoyment to things	Hardly at all 6(10.9)	Definitely less than I used to 6(10.9)	Rather less than I used to 41(74.5)	As much as I ever did 4(7.3)

I can enjoy a good book, radio, or TV program	Very seldom 0(0.0)	Not often 9(16.4)	Sometimes 42 (76.4)	Often 4(7.3)

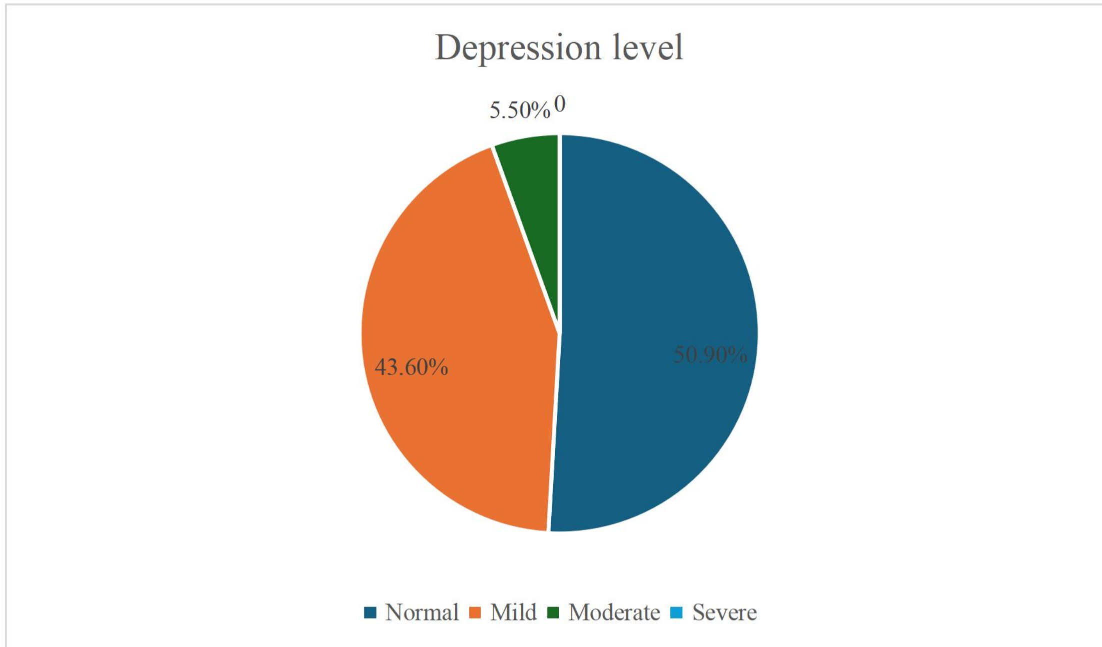


Fig.5: Pie Chart showing the depression level of participants (n=55)

4.1.9 Perceived Social Support items

Across social support items the modal response indicated that most participants perceived at least one close person available in times of need and reported overall favourable family and friend support, with neutral to agree responses predominating for items about emotional and practical help. Notably, the modal social support level was high (72.7%), as seen in Fig.6

Table 9: Perceived social support (n = 55)

Items	Very strongly disagree	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Very strongly agree
There is a special person who is around when I am in need.	0 (0.0)	0 (0.0)	0 (0.0)	23 (41.8)	22 (40.0)	10 (18.2)	0 (0.0)
There is a special person with whom I can share joys and sorrows	0 (0.0)	0 (0.0)	17 (30.9)	10 (18.2)	12 (21.8)	16 (29.1)	0 (0.0)
My family really tries to help me	0 (0.0)	0 (0.0)	13 (23.6)	18 (32.7)	9 (16.4)	15 (27.3)	0 (0.0)
I get emotional help and support I need from my family	0 (0.0)	0 (0.0)	14 (25.5)	11 (20.0)	14 (25.0)	16 (29.1)	0 (0.0)
I have a special person who is a real source of comfort to me	0 (0.0)	0 (0.0)	15 (27.3)	9 (16.4)	15 (27.3)	16 (29.1)	0 (0.0)
My friends really try to help me	0 (0.0)	0 (0.0)	14 (25.5)	15 (27.3)	17 (30.9)	9 (16.4)	0 (0.0)
I can count on my friends when things go wrong	0 (0.0)	0 (0.0)	8 (14.5)	14 (25.5)	13 (23.6)	20 (36.4)	0 (0.0)
I can talk about my problems with my family	0 (0.0)	0 (0.0)	15 (27.3)	13 (23.6)	14 (25.5)	13 (23.6)	0 (0.0)
I have friends with whom I can share my joys and	0 (0.0)	0 (0.0)	15 (27.3)	12 (21.8)	14 (25.5)	14 (25.5)	0 (0.0)

sorrows

There is a special person in my life who cares about my feelings	0 (0.0)	0 (0.0)	19 (34.5)	14 (25.5)	9 (16.4)	13 (23.6)	0 (0.0)
My family is willing to help me make decisions	0 (0.0)	0 (0.0)	12 (21.8)	19 (34.5)	12 (21.8)	12 (21.8)	0 (0.0)
I can talk about my problems with my friends	0 (0.0)	0 (0.0)	16 (29.1)	10 (18.2)	14 (25.5)	15 (27.3)	0 (0.0)

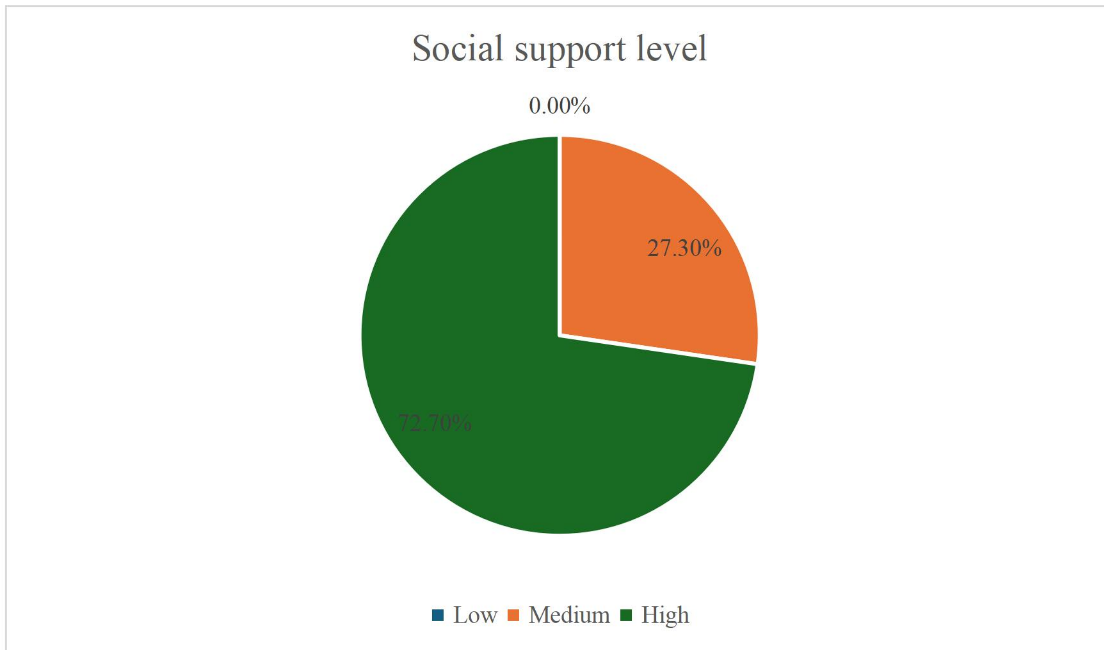


Fig.6: Pie Chart showing the social support level of participants (n=55)

4.1.10 Associations between biopsychosocial determinants and health-seeking behaviour.

Across the chi-square cross-tabulations seen in tables 15, the patterns were consistent: no biopsychosocial determinant produced a statistically significant association with health-seeking behaviour at $\alpha = 0.05$. Examples of the modal outcomes in those cross-tabulations are: stroke severity showed a modal pattern of moderate stroke but no significant association with health-seeking behaviour ($p = 0.65$), comorbidity counts showed a modal single comorbidity pattern with no significant association ($p = 0.77$), motor function and balance summaries were dominated by moderate impairment/walking-with-assistance classifications but neither was significantly associated with health-seeking behaviour ($p > 0.60$), and economic and social variables such as employment status, monthly income and social support level were likewise unimodally distributed but not significantly associated with health-seeking behaviour (all $p > 0.05$), as shown in table 10 & 11.

Table 10. Association between Biopsychosocial determinants and Health seeking behaviors among stroke survivors (n=55)

Variables	Health seeking behaviour			
	Good	**Poor**	X^2	**P-value**
Stroke severity				
Minor stroke	5	5		
Moderate stroke	19	24		
Severe stroke	0	2		
			1.41	**0.65**
Comorbidities				
0	6	10		
1	10	15		
2	6	5		
3	1	1		
4	1	0		
			2.45	**0.77**
Motor function				
Normal/mild impairment	3	2		
Moderate impairment	21	29		
Severe impairment	0	0		
			0.60	**0.64**
Balance				
Independent	0	0		
Walking with assistance	23	28		
Wheelchair bound	1	3		
			0.61	**0.62**
Anxiety				
Normal	13	12		

Mild	11	16		
Moderate	0	3		
Severe	0	0		
			2.73	**0.30**
Depression				
Normal	10	18		
Mild	12	12		
Moderate	2	1		
Severe			**1.83**	**0.49**

Table 11: Association between Economic and social variables (Biopsychosocial determinants) against health seeking behaviors among stroke survivors

	Health seeking behaviour			
	Good	**Poor**	**X^2**	**P-value**
Social support level				
Low	0	0		
Medium	18	22		
High	6	9		
			0.11	**0.77**
Employment Status				
Employed	13	18		
Unemployed	3	5		
Retired	8	8		
			0.49	**0.87**
Monthly Income				
Less than ₦30,000	3	2		
₦30,000 - ₦50,000	1	4		
₦51,000 - ₦100,000	9	9		
Above ₦100,000	11	16		
			2.02	**0.54**
Place of Residence				
Urban	20	28		
Rural	4	3		
			0.60	**0.36**

4.2 Hypothesis testing

4.2.1 Main hypothesis

Statement: There is no significant association between biopsychosocial determinants and health-seeking behaviour among stroke survivors in Edo State.

Test statistics: Cross-tabulation and chi-square tests were performed for the biopsychosocial variables (Tables 4.15 and 4.16). Examples of the observed statistics include stroke severity $\chi^2 = 1.41$, $p = 0.65$; comorbidities $\chi^2 = 2.45$, $p = 0.77$; motor function $\chi^2 = 0.60$, $p = 0.64$; balance $\chi^2 = 0.61$, $p = 0.62$; anxiety $\chi^2 = 2.73$, $p = 0.30$; depression $\chi^2 = 1.83$, $p = 0.49$; social support level $\chi^2 = 0.11$, $p = 0.77$; employment status $\chi^2 = 0.49$, $p = 0.87$; monthly income $\chi^2 = 2.02$, $p = 0.54$; and place of residence $\chi^2 = 0.60$, $p = 0.36$. The significance threshold (α) was set at 0.05.

Judgment: All reported p-values are greater than α (0.05); therefore the null hypothesis is not rejected. The tested biopsychosocial determinants do not show statistically significant associations with health-seeking behaviour in this sample.

4.2.2 Sub-hypothesis 1

Statement: There is no significant association between stroke severity and health-seeking behaviour among stroke survivors in Edo State.

Test statistics: Cross-tabulation and chi-square test (Table 4.15). $\chi^2 = 1.41$, $p = 0.65$, $\alpha = 0.05$.
Judgment: The p-value (0.65) is greater than α (0.05); therefore the null hypothesis is not rejected. There is no statistically significant association between stroke severity and health-seeking behaviour.

4.2.3 Sub-hypothesis 2

Statement: There is no significant association between number of comorbidities and health-seeking behaviour among stroke survivors in Edo State.

Test statistics: Cross-tabulation and chi-square test (Table 4.15). $\chi^2 = 2.45$, $p = 0.77$, $\alpha = 0.05$.

Judgment: The p-value (0.77) is greater than α (0.05); therefore the null hypothesis is not rejected. There is no statistically significant association between comorbidity count and health-seeking behaviour.

4.2.4 Sub-hypothesis 3

Statement: There is no significant association between motor function and health-seeking

behaviour among stroke survivors in Edo State.

Test statistics: Cross-tabulation and chi-square test (Table 4.15). $\chi^2 = 0.60$, $p = 0.64$, $\alpha = 0.05$.

Judgment: The p-value (0.64) is greater than α (0.05); therefore the null hypothesis is not rejected. There is no statistically significant association between motor function classification and health-seeking behaviour.

4.2.5 Sub-hypothesis 4

Statement: There is no significant association between balance and health-seeking behaviour among stroke survivors in Edo State.

Test statistics: Cross-tabulation and chi-square test (Table 4.15). $\chi^2 = 0.61$, $p = 0.62$, $\alpha = 0.05$.

Judgment: The p-value (0.62) is greater than α (0.05); therefore the null hypothesis is not rejected. There is no statistically significant association between balance classification and health-seeking behaviour.

4.2.6 Sub-hypothesis 5

Statement: There is no significant association between depression level and health-seeking behaviour among stroke survivors in Edo State.

Test statistics: Cross-tabulation and chi-square test (Table 4.15). $\chi^2 = 1.83$, $p = 0.49$, $\alpha = 0.05$.

Judgment: The p-value (0.49) is greater than α (0.05); therefore the null hypothesis is not rejected. There is no statistically significant association between depression level and health-seeking behaviour.

4.2.7 Sub-hypothesis 6

Statement: There is no significant association between anxiety level and health-seeking behaviour among stroke survivors in Edo State.

Test statistics: Cross-tabulation and chi-square test (Table 4.15). $\chi^2 = 2.73$, $p = 0.30$, $\alpha = 0.05$.

Judgment: The p-value (0.30) is greater than α (0.05); therefore the null hypothesis is not rejected. There is no statistically significant association between anxiety level and health-seeking behaviour.

4.2.8 Sub-hypothesis 7

Statement: There is no significant association between perceived social support level and health-seeking behaviour among stroke survivors in Edo State.

Test statistics: Cross-tabulation and chi-square test (Table 4.16). $\chi^2 = 0.11$, $p = 0.77$, $\alpha = 0.05$.

Judgment: The p-value (0.77) is greater than α (0.05); therefore the null hypothesis is not rejected. There is no statistically significant association between social support level and health-seeking behaviour.

4.2.9 Sub-hypothesis 8

Statement: There is no significant association between employment status and health-seeking behaviour among stroke survivors in Edo State.

Test statistics: Cross-tabulation and chi-square test (Table 4.16). $\chi^2 = 0.49$, $p = 0.87$, $\alpha = 0.05$.

Judgment: The p-value (0.87) is greater than α (0.05); therefore the null hypothesis is not rejected. There is no statistically significant association between employment status and health-seeking behaviour.

4.2.10 Sub-hypothesis 9

Statement: There is no significant association between monthly income and health-seeking behaviour among stroke survivors in Edo State.

Test statistics: Cross-tabulation and chi-square test (Table 4.16). $\chi^2 = 2.02$, $p = 0.54$, $\alpha = 0.05$.

Judgment: The p-value (0.54) is greater than α (0.05); therefore the null hypothesis is not rejected. There is no statistically significant association between monthly income category and health-seeking behaviour.

4.2.11 Sub-hypothesis 10

Statement: There is no significant association between place of residence and health-seeking behaviour among stroke survivors in Edo State.

Test statistics: Cross-tabulation and chi-square test (Table 4.16). $\chi^2 = 0.60$, $p = 0.36$, $\alpha = 0.05$.

Judgment: The p-value (0.36) is greater than α (0.05); therefore the null hypothesis is not rejected. There is no statistically significant association between urban versus rural residence and health-seeking behaviour.

4.3 Thematic Analysis

4.3.1 Analytic approach

An inductive thematic analysis, adapted from Braun and Clarke, was applied to the interview dataset of stroke survivors. Transcripts were read repeatedly to ensure immersion; line-by-line open coding captured semantic units and provisional in-vivo codes. Codes were compared across cases using constant comparison, then clustered into candidate categories and iteratively reviewed until coherent, distinct themes emerged.

4.3.2 Summary of themes

Five interrelated themes emerged as central determinants of health-seeking behaviour: (1) clinical features and perceived cause, (2) emotional reactions and motivation, (3) family, community and spiritual influences, (4) health-system barriers and service experience, and (5) coping strategies and expressed needs.

Theme 1: Clinical features and perceived cause

Stroke onset and the nature of symptoms strongly influenced the decision to seek care. Participants who experienced sudden, severe loss of function such as hemiplegia, severe imbalance or aphasia, described immediate escalation to formal healthcare. When symptoms were milder or fluctuating, help-seeking was often delayed or routed through non-hospital pathways.

P1 (M): *"I first experienced stroke in 2019… it affected the right side of my body… I wasn't able to speak but over time I have been able to articulate myself better."*

P3(F): *"Three months ago… my speech… for balance, I cannot stand on my own for now… we did traditional care for two months but no result; that was when I went to the hospital."*

Many participants related the event to pre-existing conditions. Hypertension and diabetes were frequently cited and shaped how urgently survivors sought biomedical care. The attribution of cause therefore functions as both an explanatory model and a practical cue for action.

P4 (F): *"I get high blood pressure… I get diabetes… I think it was because of the hypertension."*

Theme 2: Emotional reactions and motivation

Emotional responses immediately after stroke ranged from alarm and acute anxiety to denial and withdrawal. These reactions influenced early behaviour: for some, fear prompted rapid presentation to hospital; for others, denial or disbelief delayed engagement with formal services.

P1 (M): *"I felt fear. I felt anxious. I was sad. I was in denial."*

Alongside acute distress, many survivors described a hard-won motivation to recover. Hope, confidence in rehabilitation and a desire to regain independence sustained repeated visits for therapy even when costs and travel were burdensome.

P2 (F): *"I feel confident I will recover."*

Theme 3: Family, community and spiritual influences

Social networks operated as the single most decisive social determinant. Family members coordinated transport, provided funds for tests and appointments, and often made initial care decisions on behalf of the survivor.

P1 (M): "*Family. Family is everything… they are my strength."*

At the community level, spiritual beliefs and traditional medicine were prominent. Multiple participants described consulting faith-based practitioners or traditional healers before (or alongside) biomedical care. This pattern frequently produced delay, but it also reflected culturally embedded strategies for coping and meaning-making.

P3 (F): "*We sought tradition first for two months; no result, then hospital.*"

Importantly, the choice to consult a traditional healer was rarely framed by participants as irrational; rather, it was positioned as an accessible, trusted option when biomedical services were perceived as costly, distant or slow to help.

Theme 4: Health-system barriers and service experience

Participants identified several structural obstacles that reduced access and continuity: direct costs, distance to specialized services, inconsistent rehabilitation follow-up and poor patient–provider communication. These barriers interacted with social constraints for example, families with limited resources often delayed or discontinued therapy.

P6 (F): *"Accessibility is very far from where I stay… sometimes I have to stay with a friend to reach hospital."*

P1 (M): "*A lot of healthcare workers don't know how to communicate… patient-doctor relationships are poor.*"

A recurrent observation was the thin availability of rehabilitation slots and specialist follow-up. When physiotherapy was available only intermittently or when survivors could not afford repeated sessions, recovery slowed and motivation waned.

P1 (M): *"I used to have a physiotherapist come to massage me… if I had money I would have had more."*

Theme 5: Coping strategies and expressed needs

Survivors described varied coping strategies such as religious practice, music, emotional release, and social support that helped to manage daily distress. They also articulated pragmatic needs: subsidized care, counselling and clearer referral pathways.

P3 (F): "*I listen to music. I enjoy music from Burna Boy and Juice World. It calms me a lot.*"

P1 (M): *"Maybe if we had subsidized care or NHIS coverage for stroke survivors it would help."*

These expressed needs point directly to policy-relevant interventions that could reduce delay and strengthen rehabilitation uptake.

CHAPTER 5

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

This study examined the biopsychosocial determinants of health-seeking behaviour among stroke survivors in Edo State, Nigeria, using a mixed-methods approach. The quantitative component explored associations between biological, psychological, and social variables with health-seeking behaviour, while the qualitative findings provided deeper insight into contextual and cultural factors shaping those behaviours.

The findings of this study revealed that the majority of stroke survivors sought care at the hospital as their first point of contact, while a smaller proportion initially consulted pharmacies, traditional healers, or engaged in self-medication. Most respondents sought care immediately or within 24 hours of symptom onset, reflecting a relatively positive orientation toward formal healthcare. However, a notable proportion still delayed care or explored alternative pathways, often influenced by cultural or financial reasons. These results indicate a gradual shift toward improved awareness and utilization of hospital services compared with earlier Nigerian studies. For instance, Okoro et al. (2021) found that a significant percentage of stroke survivors in southeastern Nigeria preferred herbal centres or spiritual healing before hospital visits, largely due to cost and mistrust of medical institutions. Similarly, Nnanna (2020) reported that sociocultural beliefs and perceptions of stroke as a spiritual or ancestral affliction discouraged timely medical consultation. The present findings, showing majority hospital use, may reflect increased health literacy and accessibility of physiotherapy services in urban Edo State.

Nonetheless, qualitative interviews revealed that even those who eventually sought hospital care often did so after exhausting non-orthodox options. Participants described turning first to traditional healers or religious prayer houses, particularly when symptoms were mild or initially misinterpreted. These behaviours are consistent with Towns et al. (2014) description of pluralistic health-seeking pathways common in many African settings, where individuals navigate between biomedical, traditional, and spiritual systems depending on symptom interpretation and social advice. Cost, proximity, and cultural influence emerged as major determinants of first care choice. Proximity was the most frequently cited reason for choosing a care facility, reflecting Abubakar et al. (2014) qualitative study which revealed that physical accessibility remains a central determinant of health-seeking behaviour. The prominence of cost as a barrier aligns with Owolabi et al. (2008), who identified economic constraints as a key obstacle to rehabilitation continuity in Nigeria.

Furthermore, the findings of this study revealed no significant association between biological factors (stroke severity, comorbidities, motor function, and balance) and health-seeking behaviour. Although most participants had moderate stroke severity and mild to moderate motor impairment, these did not translate into differential health-seeking patterns. This contrasts with studies by Akinyemi et al. (2021) and Hertz et al. (2019), which reported that individuals with greater physical disability or higher stroke severity were more likely to access medical care promptly due to increased dependency and visibility of symptoms. The lack of significant association in the present study may be due to the relatively homogeneous sample as most participants were already engaged in follow-up rehabilitation at tertiary hospitals thus reducing variability in healthcare access patterns.

Similarly, the absence of significant effects of comorbidities contrasts with findings by Kodom (2023) and Silvanus et al. (2022), who found that comorbid conditions such as hypertension and diabetes were major drivers of health-seeking behaviour, often determining the frequency of medical visits. This discrepancy may reflect differences in study population and design; while those studies examined acute-care stroke survivors, the present study involved chronic stroke survivors who had already overcome initial barriers to seeking care.

Furthermore, the psychological variables (anxiety and depression) were not significantly associated with health-seeking behaviour. Most participants exhibited mild or normal levels of anxiety and depression, suggesting overall emotional stability and positive adaptation. These findings contrast with Park and Kang (2016) and Tan et al. (2023), who reported that depression and low rehabilitation motivation significantly hindered treatment adherence among stroke survivors. However, the current result aligns with Desrosiers et al. (2006), who found that psychosocial resilience and optimism often mitigate depressive symptoms and enhance participation in rehabilitation.

The qualitative phase of this study revealed five interrelated themes (clinical features and perceived cause, emotional reactions and motivation, family, community and spiritual influences, health-system barriers and service experience, and coping strategies and expressed needs) which together highlight the multidimensional nature of health-seeking behaviour among stroke survivors in Edo State. Participants' recognition of stroke symptoms and beliefs about their cause largely determined how quickly and where they sought help. Those perceiving biomedical causes such as hypertension were more likely to seek hospital care promptly, while those attributing the condition to spiritual or mystical forces often first sought traditional or religious healing. This pattern aligns with findings by Okoro et al. (2021) and Nnanna (2020), who reported that cultural interpretation of stroke strongly influences

care-seeking choices among Nigerians. Emotional reactions also played an important role, ranging from fear and denial to hope and determination with the latter proving crucial for sustained rehabilitation attendance, consistent with Zhang et al. (2022) who found that motivation and resilience enhance therapy adherence and long-term participation after stroke.

Additionally, family and social networks were decisive in both care decisions and continuity of therapy, providing financial, emotional, and physical support. This agrees with Butsing et al. (2019) and Lahdji et al. (2025), who observed that strong family and community support improves rehabilitation outcomes and psychological well-being among stroke survivors. Despite this, participants still faced health-system barriers such as high treatment cost, distance to facilities, and poor communication, these challenges were similarly documented by Arabambi et al. (2022) in Nigeria. Survivors adopted various coping mechanisms, including spirituality, music, and social engagement, reflecting adaptive strategies reported by Kaudmann et al. (2018) and Särkämö et al. (2018). Collectively, these findings confirm that health-seeking behaviour is shaped by an interplay of biological, psychological, social, and systemic factors, supporting Engel's (1977) biopsychosocial model. They underscore the need for culturally sensitive, family-inclusive, and affordable rehabilitation programs to promote timely and sustained stroke care in low-resource settings.

5.2 Conclusion

This study investigated the biopsychosocial determinants of health-seeking behaviour among stroke survivors in Edo State, Nigeria, using a mixed-methods approach. The quantitative results showed no statistically significant associations between biological, psychological, and social variables and health-seeking behaviour, while the qualitative findings provided deeper insights into contextual and experiential factors influencing care decisions. Stroke survivors largely demonstrated positive health-seeking patterns, with most seeking hospital care

promptly after onset; however, cultural beliefs, financial barriers, and systemic challenges still influenced care pathways.

5.3 Recommendations

i. Expand Stroke Services: Government and healthcare institutions should establish and equip more stroke units and community-based rehabilitation centres across Edo State and other regions.
ii. Enhance Health Worker Training: Build capacity of healthcare providers in patient communication, cultural competence, and psychosocial support for stroke survivors and families.
iii. Strengthen Family and Community Engagement: Design family-inclusive rehabilitation models that leverage caregivers' involvement in therapy and home-based care.
iv. Intensify Awareness Campaigns: Implement community education programs highlighting stroke warning signs, risk factors, and the benefits of early hospital care.

5.4 Implication for further studies

The findings of this research highlight several important directions for future investigation.

i. First, since the current study was limited to a relatively small, hospital-based sample in Edo State, future studies should include larger, multi-centre samples that encompass both community-dwelling and rural stroke survivors to enhance generalisability.

ii. Second, longitudinal research is needed to track how health-seeking behaviour evolves over time and how biopsychosocial factors interact at different recovery stages.

iii. Third, there is a need for interventional studies testing the effectiveness of culturally tailored psychosocial and educational programs aimed at improving rehabilitation adherence and early hospital presentation.

REFERENCES

Abubakar, A., Van Baar, A., Fischer, R., Bomu, G., Gona, J. K., & Newton, C. R. (2013). Socio-cultural determinants of health-seeking behaviour on the Kenyan coast: a qualitative study. *PloS one*, *8*(11), e71998.

Adeloye, D., Ezejimofor, M., Auta, A., Mpazanje, R.G., Ezeigwe, N., Ngige, E.N., Harhay, M.O., Alemu, W. and Adewole, I.F. (2019) 'Estimating morbidity due to stroke in Nigeria: a systematic review and meta-analysis', Journal of the Neurological Sciences, 402, pp. 136-144.

Adeyemi, T., Ikpeba, A.E. and Oyewole, O.O., 2024. Quality of sleep and its determinants among Nigerian stroke survivors. Sleep Science and Practice, 8, Article 21.

Aho, K., Harmsen, P., Hatano, S., Marquardsen, J., Smirnov, V.E. and Strasser, T. (1980) 'Cerebrovascular disease in the community: results of a WHO collaborative study', Bulletin of the World Health Organization, 58, pp. 113-130.

Akinyemi, R.O., Ovbiagele, B., Adeniji, O.A., Sarfo, F.S., Abd-Allah, F., Adoukonou, T., Ogah, O.S., Naidoo, P., Damasceno, A., Walker, R.W., Ogunniyi, A., Kalaria, R.N. and Owolabi, M.O. (2021) 'Stroke in Africa: profile, progress, priorities', Nature Reviews Neurology, 17(10), pp. 634-656. https://doi.org/10.1038/s41582-021-00542-4

Arabambi, B., Oshinaike, O., Ogun, S. A., Eze, C., Bello, A. H., Igetei, S., Yusuf, Y., Olanigan, R. A., & Ashiru, S. Y. (2022). Stroke units in Nigeria: a report from a nationwide organizational cross-sectional survey. *The Pan African medical journal*, *42*, 140. https://doi.org/10.11604/pamj.2022.42.140.35086 .

Babawale Arabambi, O., Oshinaike, S.A., Ogun, C., Eze, A.H., Bello, S., Igetei, Yakub Yusuf, Rashidat Amoke Olanigan, and Sikirat Yetunde Ashiru (2022) 'Stroke units in Nigeria: a report from a nationwide organizational cross-sectional survey', Research, Volume 42, Article 140.

Bae, J.H., Lee, T.Y. and Kang, D.H. (2012) 'Effects of pain catastrophizing and rehabilitation motivation on the activities of daily living in stroke patients', Journal of the Korean Society of Occupational Therapy, 20, pp. 57-68.

Benam, N., Miller, W.C., Tao, G., Mortenson, W.B. and Schmidt, J. (2023) 'Anxiety and support are associated with loneliness among adults with disabilities and older adults with no self-reported disabilities 10 months post COVID-19 restrictions', Disabilities, 3(1), pp. 1-11.

Borghi, A.M., Osińska, A., Roepstorff, A. and Raczaszek-Leonardi, J. (2023) 'Editorial: Concepts in interaction: social engagement and inner experiences', Philosophical Transactions of the Royal Society B, 378(1870), p. 20210351.

Butsing, N., Tipayamongkholgul, M., Ratanakorn, D., Suwannapong, N., & Bundhamcharoen, K. (2019). Social support, functional outcome and quality of life among stroke survivors in an urban area. *Journal of Pacific Rim Psychology*, *13*, e4.

Centers for Disease Control and Prevention (2022) Treat and Recover from Stroke. Available at: https://www.cdc.gov.htm (Accessed: 18 January 2023).

Centers for Disease Control and Prevention. (2023). Stroke facts. https://www.cdc.gov/stroke/facts.htm

Centers for Disease Control and Prevention. (2023). Genomics and precision health. https://www.cdc.gov/genomics/resources/diseases/mental.htm

Chamorro, Á., Dirnagl, U., Urra, X., et al. (2016) 'Neuroprotection in acute stroke: targeting excitotoxicity, oxidative and nitrosative stress, and inflammation', The Lancet Neurology, 15, pp. 869-881.

Champion, V.L. and Skinner, C.S. (2008) 'The Health Belief Model', in Glanz, K., Rimer, B.K. and Viswanath, K. (eds.) Health Behavior and Health Education: Theory, Research, and Practice, 4th edn. San Francisco: Jossey-Bass, pp. 45-65.

Chauhan, P., Rathawa, A., Jethwa, K. and Mehra, S. (2021) 'The Anatomy of the Cerebral Cortex', in Pluta, R. (ed.) Cerebral Ischemia. Exon Publications.

Desrosiers, J., Rochette, A., Noreau, L., et al. (2006) 'Long-term changes in participation after stroke', Topics in Stroke Rehabilitation, 13(4), pp. 86-96.

Donkor, E.S. (2018) 'Stroke in the 21st century: a snapshot of the burden, epidemiology, and quality of life', Stroke Research and Treatment, 2018, Article ID 3238165.

Doyle, K.P., Simon, R.P. and Stenzel-Poore, M.P. (2008) 'Mechanisms of ischemic brain damage', Neuropharmacology, 55, pp. 310-318.

Enato, E.F., Yovwin, E.O. & Ogunrin, O.A. (2020). Assessment of health-related quality of life in stroke survivors attending two healthcare facilities in Benin City, Edo State. Journal of Pharmacy & Bioresources, 17(2), 1-8.

Enato, E.F., Yovwin, E.O. & Ogunrin, O.A. (2025). Eating difficulties among Nigerian community-dwelling stroke survivors: prevalence, correlates, and association with quality of life. BMC Public Health, 25:519.

Engel, G.L. (1977) 'The need for a new medical model: a challenge for biomedicine', Science, 196(4286), pp. 129-136.

Ezekiel, L., Collett, J., Dawes, H., et al. (2019) 'Factors associated with participation in life situations for adults with stroke: a systematic review', Archives of Physical Medicine and Rehabilitation, 100(5), pp. 945-955.

Feigin, V.L., Norrving, B., George, M.G., Foltz, J.L., Roth, G.A. and Mensah, G.A. (2016) 'prevention of stroke: a strategic global imperative', Nature Reviews Neurology, 12, pp. 501-512.

Feigin, V.L., Roth, G.A., Naghavi, M., et al. (2016) 'Global burden of stroke and risk factors in 188 countries, during 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013', The Lancet Neurology, 15(9), pp. 913-924.

Fernández-Gil, M.A., Palacios-Bote, R., Leo-Barahona, M. and Mora-Encinas, J.P. (2010) 'Anatomy of the brainstem: a gaze into the stem of life', Seminars in Ultrasound, CT and MRI, 31(3), pp. 196-219.

Gao, J., Hu, H. and Yao, L. (2020) 'The role of social engagement in the association of self-reported hearing loss and health-related quality of life', BMC Geriatrics, 20, pp. 1-9.

Gimigliano, F. and Negrini, S. (2017) 'The World Health Organization "Rehabilitation 2030: a call for action"', European Journal of Physical and Rehabilitation Medicine, 53, pp. 155-168.

Hasin, D. S., Sarvet, A. L., Meyers, J. L., Saha, T. D., Ruan, W. J., Stohl, M., & Grant, B. F. (2018, April 1). Epidemiology of adult DSM-5 major depressive disorder and its specifiers in the United States. JAMA Psychiatry, 75(4), 336–346. 10.1001/jamapsychiatry.2017.4602 [DOI] [PMC free article] [PubMed] [Google Scholar]

Hayden, J.A. (2013) Introduction to Health Behavior Theory. Burlington: Jones & Bartlett Publishers.

Heijmans, N., van Lieshout, J. and Wensing, M. (2017) 'Social network composition of vascular patients and its associations with health behavior and clinical risk factors', PLoS One, 12, e0185341.

Hertz, J. T., Madut, D. B., William, G., Maro, V. P., Crump, J. A., & Rubach, M. P. (2019). Perceptions of stroke and associated health-care-seeking behavior in Northern Tanzania: a community-based study. *Neuroepidemiology*, *53*(1-2), 41-47.

Johnston, S.C., Easton, J.D., Farrant, M., et al. (2018) 'Clinical presentation of acute ischemic stroke', Continuum, 24(6), pp. 1599-1622.

Kalkonde, Y.V., Alladi, S., Kaul, S. and Hachinski, V. (2018) 'Stroke prevention strategies in the developing world', Stroke, 49(12), pp. 3092-3097.

Karenberg, A. (2020) 'Historic review: select chapters of a history of stroke', Neurological Research and Practice, 2(1).

Kaufmann, C. N., Montross-Thomas, L. P., & Griser, S. (2018). Increased engagement with life: Differences in the cognitive, physical, social, and spiritual activities of older adult music listeners. *The Gerontologist*, *58*(2), 270-277.

Kodom, M. A. (2023). Health-seeking behavior of Diabetic and Hypertensive patients in Rural communities of Ghana. *Pan-African Journal of Health and Environmental Science*, *1*(2), 1-16.

Krishnamurthi, R., Hale, L., Barker-Collo, S., et al. (2019) 'Mobile technology for primary stroke prevention: a proof-of-concept pilot randomized controlled trial', Stroke, 50, pp. 196-198.

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression severity measure. Journal of General Internal Medicine, 16(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x.

Lahdji, A., Anggraini, M. T., & Fuadah, S. (2025). Factors Associated with Psychological Well-Being in Non-Hemorrhagic Post-Stroke Patients. *Althea Medical Journal*, *12*(2), 78-84.

Larsson, S.C., Åkesson, A. and Wolk, A. (2015) 'Primary prevention of stroke by a healthy lifestyle in a high-risk group', Neurology, 84, pp. 2224-2228.

Lian, L., Zhang, Y., Liu, L., et al. (2021) 'Neuroinflammation in ischemic stroke: focus on microRNA-mediated polarization of microglia', Frontiers in Molecular Neuroscience, 13.

Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P. Y. (2008). Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. Medical Care, 46(3), 266–274. https://doi.org/10.1097/MLR.0b013e318160d093

Martin, A., Rief, W., Klaiberg, A., & Braehler, E. (2006). Validity of the Brief Patient Health Questionnaire Mood Scale (PHQ-9) in the general population. General Hospital Psychiatry, 28(1), 71–77. https://doi.org/10.1016/j.genhosppsych.2005.07.003

Martin, T.S. and Kessler, M. (2015) Neurological Interventions for Physical Therapy, 3rd edn. Indiana: University of Evansville.

Menkin, J.A., McCreath, H.E., Song, S.Y., et al. (2019) '"Worth the Walk": culturally tailored stroke risk factor reduction intervention in community senior centers', Journal of the American Heart Association, 8, e011088.

Michie, S., van Stralen, M.M. and West, R. (2011) 'The behaviour change wheel: a new method for characterising and designing behaviour change interventions', Implementation Science, 6, p. 42.

Moeyersons, M., De Vliegher, K., Huyghe, B., et al. (2022) 'Living in a shrinking world: the experience of loneliness among community-dwelling older people with reduced mobility: a qualitative grounded theory approach', BMC Geriatrics, 22(1), p. 285.

National Institute of Mental Health. (2021). Statistics, major depression. https://www.nimh.nih.gov/health/statistics/major-depression

Netter, F.H. (2022) Atlas of Human Anatomy, 8th edn. Philadelphia: Elsevier.

Nnanna, P. (2020). Influence of sociocultural factors on medication use among stroke patients in rural Cross River State, Nigeria. *The Nigerian Journal of Sociology and*

Anthropology, 18(2). Available from: http://nasajournal.com.ng/volume-18-issue-2-2020/1289-2/.

Oberoi, S., et al. (2016) 'Understanding health-seeking behaviour', Journal of Family Medicine and Primary Care, 5(2), pp. 463-464.

Oh, S.Y. and Hwang, S.Y. (2017) 'Relationship between depression and rehabilitation motivation in middle-aged stroke patients: a focus on the mediating effects of resilience', Journal of the Korea Academia-Industrial Cooperation Society, 18, pp. 58-66.

Okoro, F. O., Nwoha, C. O., & Ogoko, N. C. (2021). Stroke survivors' preference of herbal centre to hospital. *International Journal of Complementary Medicine*, 1(1), 29–41.

Olajide, S.O., Afolayan, J.O., & Musa, S.A. (2023). Sleep disturbances and associated factors amongst stroke survivors. Nigerian Postgraduate Medical Journal, 110:19–27.

Ong, A.D., Uchino, B.N. and Wethington, E. (2016) 'Loneliness and health in older adults: a mini-review and synthesis', Gerontology, 62(4), pp. 443-449.

Owolabi M. O. (2008). Determinants of health-related quality of life in Nigerian stroke survivors. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, *102*(12), 1219–1225. https://doi.org/10.1016/j.trstmh.2008.05.003

Owolabi, M.O., Thrift, A.G., Martins, S., et al. (2021) 'The state of stroke services across the globe: report of World Stroke Organization-World Health Organization surveys', International Journal of Stroke, 16, pp. 889-901.

Park, A. S., Ko, E., & KANG, H. S. (2016). Comparison of motivation for rehabilitation, family support and adherence to rehabilitation between depressive and non-depressive stroke patients. *Korean Journal of Rehabilitation Nursing*, 138-147.

Purves, D., Augustine, G.J., Fitzpatrick, D., et al. (2001) Neuroscience, 2nd edn. Sunderland: Sinauer Associates.

Robinson, R. G., & Jorge, R. E. (2016). Post-stroke depression: Areview. The American Journal of Psychiatry, 173(3), 221231.10.1176/appi.ajp.2015.15030363

Rosenstock, I.M., Strecher, V.J. and Becker, M.H. (1988) 'Social learning theory and the Health Belief Model', Health Education & Behavior, 15, pp. 175-183.

Sacco, R.L., Kasner, S.E., Broderick, J.P., et al. (2013) 'An updated definition of stroke for the 21st century: a statement for healthcare professionals from the American Heart Association/American Stroke Association', Stroke, 44(7), pp. 2064-2089.

Särkämö, T. (2018). Music for the ageing brain: Cognitive, emotional, social, and neural benefits of musical leisure activities in stroke and dementia. *Dementia*, *17*(6), 670-685.

Sanchetee, P. (2021) 'Current trends in stroke rehabilitation', in Sanchetee, P. (ed.) Ischemic Stroke. London: IntechOpen.

Shahid, J., Kashif, A. and Shahid, M.K. (2023) 'A comprehensive review of physical therapy interventions for stroke rehabilitation: impairment-based approaches and functional goals', Brain Sciences, 13(5), p. 717.

Silvanus, V., Maharjan, S., & Jha, A. (2022). Factors influencing health seeking behaviour among persons with diabetes attending urban health care settings.

Singh, D.K. (2023) 'Stroke management: an overview', International Journal of Neuroscience, 8(4), pp. 1-18.

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. Archives of Internal Medicine, 166(10), 1092–1097. https://doi.org/10.1001/archinte.166.10.1092

Stiles, J. and Jernigan, T.L. (2010) 'The basics of brain development', Neuropsychology Review, 20(4), pp. 327-348.

Tan, M., Li, H., & Wang, X. (2023). Analysis of the current status of rehabilitation motivation and its influencing factors in older adults with stroke: a cross-sectional study. *Frontiers in Aging Neuroscience*, *15*, 1186681.

Tibebu, A., Mengistu, D. and Negesa, L. (2017) 'Adherence to recommended lifestyle modifications and factors associated for hypertensive patients attending chronic follow-up units of selected public hospitals in Addis Ababa, Ethiopia', Patient Preference and Adherence, 11, pp. 323-330.

Towns, A. M., Mengue Eyi, S., & van Andel, T. (2014). Traditional medicine and childcare in Western Africa: mothers' knowledge, folk illnesses, and patterns of healthcare-seeking behavior. *PloS one*, *9*(8), e105972.

Unnithan, A.K.A., Das, J.M. and Mehta, P. (2023) 'Hemorrhagic stroke', StatPearls. Available at: https://www.ncbi.nlm.nih.gov/books/NBK559173/ (Accessed: 10 June 2024).

World Health Organization (2017) Rehabilitation 2030: The Need to Scale Up Rehabilitation. Geneva: World Health Organization.

World Health Organization. (2023, March 31). Depressive disorder. https://www.who.int/news-room/fact-sheets/detail/depression

Zhang, Y. (2018) 'Family functioning in the context of an adult family member with illness: a concept analysis', Journal of Clinical Nursing, 27, pp. 3205-3224.

Zhang, S., Xu, M., Liu, Z.-J., Feng, J., & Ma, Y. (2020, June 19). Neuropsychiatric issues after stroke: Clinical significance and therapeutic implications. World Journal of Psychiatry, 10(6), 125–138. 10.5498/wjp.v10.i6.125

Zhang L, Shu Y, Han C, Liu J. Correlation Between Family Functioning and Health Beliefs in Patients with Stroke in Beijing, China. J Multidiscip Healthc [Internet]. 2023 Apr 18 [cited 2025 Jan 3];Volume 16:1067–74. Available

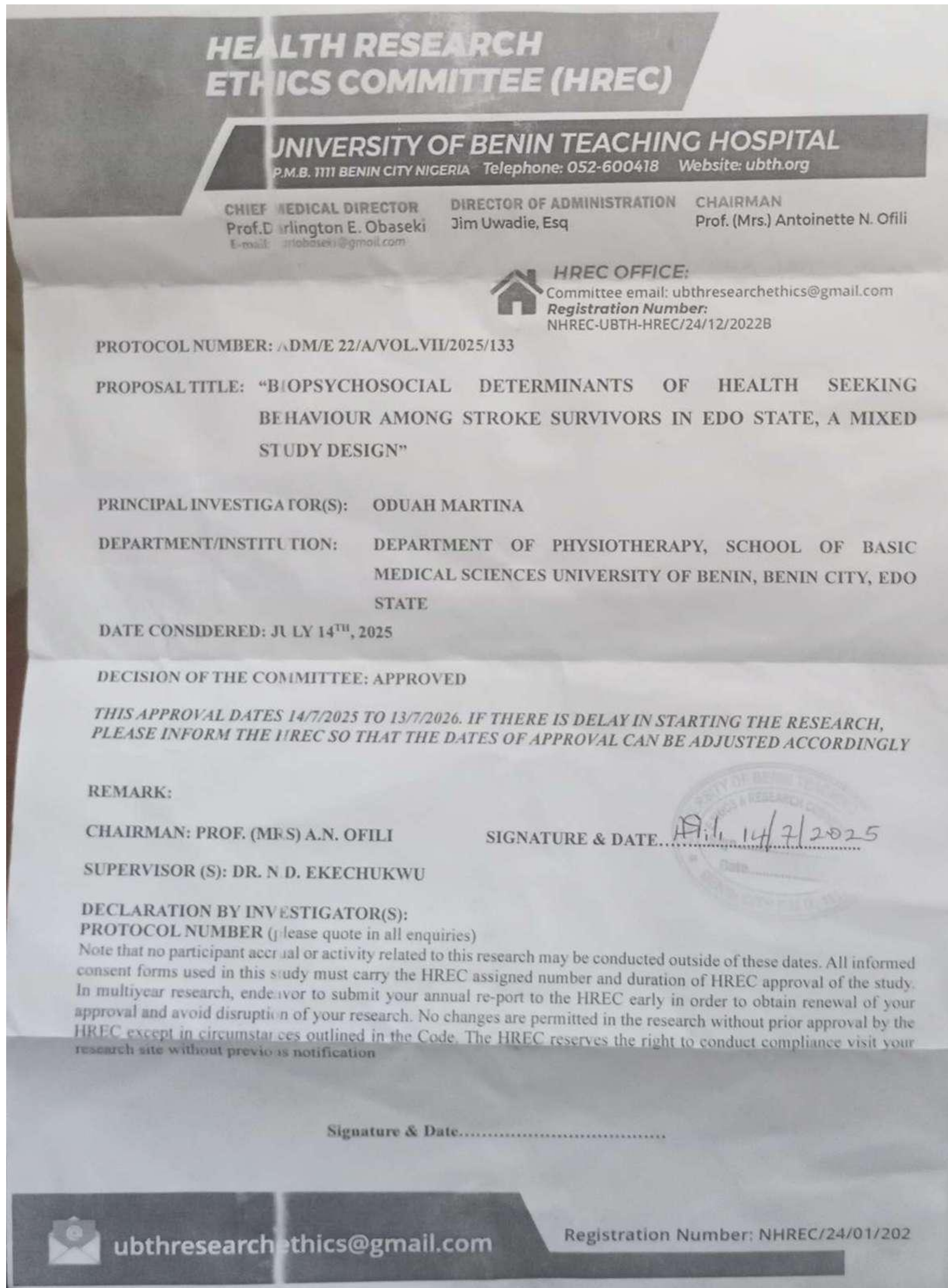
from: https://www.dovepress.com/correlation-between-family-functioning-and-health-beliefs-in-patients--peer-reviewed-fulltext-article-JMDH.

Zhang, T., Wan, Z. H., & Wu, J. (2022). Effect of time-sensitive motivational care combined with cognitive-behavioural intervention on psychological resilience and Barthel Index in post-operative cerebral haemorrhage patients. *Archives of Clinical Psychiatry*, *49*(5).

Zheng, H. (2015) 'Losing confidence in medicine in an era of medical expansion?', Social Science Research, 52, pp. 701-715.

Zou, H., Chen, Y., Fang, W., Zhang, Y. and Fan, X. (2017) 'Identification of factors associated with self-care behaviors using the COM-B model in patients with chronic heart failure', European Journal of Cardiovascular Nursing, 16, pp. 530-538.

APPENDIX I



HEALTH RESEARCH ETHICS COMMITTEE (HREC)

UNIVERSITY OF BENIN TEACHING HOSPITAL

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Registration Number:
NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/2025/133

PROPOSAL TITLE: "BIOPSYCHOSOCIAL DETERMINANTS OF HEALTH SEEKING BEHAVIOUR AMONG STROKE SURVIVORS IN EDO STATE, A MIXED STUDY DESIGN"

PRINCIPAL INVESTIGATOR(S): ODUAH MARTINA

DEPARTMENT/INSTITUTION: DEPARTMENT OF PHYSIOTHERAPY, SCHOOL OF BASIC MEDICAL SCIENCES UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

DATE CONSIDERED: JULY 14TH, 2025

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 14/7/2025 TO 13/7/2026. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI SIGNATURE & DATE 14/7/2025

SUPERVISOR (S): DR. N D. EKECHUKWU

DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification

Signature & Date....................................

ubthresearchethics@gmail.com Registration Number: NHREC/24/01/202

APPENDIX II

INFORMED CONSENT FORM

Title of study: Biopsychosocial Determinants of Health Seeking Behaviour among Stroke Survivors in Edo State.

Investigator: Oduah Martina

Supervisors: Dr. Nelson Ekechukwu

Financial Sponsorship: This research project is self-sponsored

Purpose of the research: To investigate the biopsychosocial determinant of health seeking behaviour among stroke survivors in Edo state, using a mixed-method approach.

Procedures and protocol involved in the study

You are politely approached to respond to an interviewer-administered questionnaire and interview.

This would be only used for research purpose and will determine the biopsychosocial determinants of health seeking behaviour among stroke survivors in Edo state.

Compensation

There will be no financial compensation for participating in this study.

Voluntary Participation

Please note that your participation in this research is entirely voluntary. No form of discrimination will be meted to you, should you decide not to participate in this study; You are entirely free to change your mind and stop participating even if you agreed earlier.

Side Effects

There is no anticipated adverse effect associated with participating in this study.

Benefits

The purpose of the research is to investigate the biopsychosocial determinants of health seeking behaviour among stroke survivors in Edo state.

Confidentiality

All information and data obtained in the course of this study will be treated confidentially. The names of the participants will not be written on the questionnaire, and all information collected will be encoded in a file in my personal computer and passworded.

Thereafter the questionnaires will be shelved and locked in my personal document cabinet.

CONTACT INFORMATION

ODUAH MARTINA

PROJECT STUDENT

Email: oduahtina@gmail.com

Ethics and Research Committee

University of Benin Teaching Hospital

Benin City.

Phone Number: 07063331337

CERTIFICATE OF CONSENT

have read the above information (or it has been read to me). I had the opportunity to ask questions about it and the questions were answered to my satisfaction.

I consent voluntarily to take part as a participant in this study

I do not consent to participate in this study.

Signature of participant: ___________________________________

Date:____

APPENDIX III

Pro-forma

Section A: Socio-Demographic Information

1. Age: __________ years

2. Sex: [ ] Male [ ] Female

3. Marital Status: [ ] Single [ ] Married [ ] Widowed [ ] Divorced/Separated

4. Educational Level: [ ] No formal education [ ] Primary [ ] Secondary [ ] Tertiary

5. Employment Status: [ ] Employed [ ] Unemployed [ ] Retired

6. Monthly Income: [ ] Less than ₦30,000 [ ] ₦30,000 - ₦50,000 [ ] ₦51,000 - ₦100,000 [ ] Above ₦100,000

7. Place of Residence: [ ] Urban [ ] Rural

Section B: Clinical Information

8. Time Since Stroke Onset: __________ months

9. Stroke Type: [ ] Ischemic [ ] Hemorrhagic [ ] Not Sure

10. Stroke Severity (NIHSS Score): __________

11. Number of Comorbidities: __________

Section C: Health-Seeking Behaviour

12. Where did you first seek care after stroke onset? [ ] Hospital [ ] Pharmacy [ ] Traditional healer [ ] Self-medication [ ] Others (specify) __________

13. How long after stroke onset did you seek your first care? [ ] Immediately [ ] Within 24 hours [ ] Within 1-3 days [ ] After more than 3 days

14. What was your reason for choosing the first place of care? [ ] Cost [ ] Proximity [ ] Cultural beliefs [ ] Family influence [ ] Fear [ ] Others (specify) __________

15. Do you currently adhere to your physiotherapy or medical rehabilitation appointments? [ ] Yes [ ] No

16. If No, what are the reasons for non-adherence? [ ] Financial constraint [ ] Transportation issues [ ] Lack of family support [ ] Belief in traditional medicine [ ] Others (specify) __________

17. Have you used any form of alternative or traditional medicine for your stroke? [ ] Yes [ ] No

18. What are the barriers you face in accessing healthcare? [ ] Cost [ ] Distance [ ] Cultural beliefs [ ] Fear of hospital [ ] Lack of family support [ ] Others (specify) __________

The National Institutes of Health Stroke Scale (NIHSS)

	Scale Definition	Score
1a. Level of Consciousness	0 = **Alert;** keenly responsive. 1 = **Not alert**; but arousable by minor stimulation to obey, answer, or respond. 2 = **Not alert**; requires repeated stimulation to attend, or is obtunded and requires strong or painful stimulation to make movements (not stereotyped). 3 = Responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, and areflexic.	_____
1b. LOC Questions	0 = **Answers** both questions correctly. 1 = **Answers** one question correctly. 2 = **Answers** neither question correctly.	_____
1c. LOC Commands	0 = **Performs** both tasks correctly. 1 = **Performs** one task correctly. 2 = **Performs** neither task correctly.	_____
2. Best Gaze	0 = **Normal.** 1 = **Partial gaze palsy;** gaze is abnormal in one or both eyes, but forced deviation or total gaze paresis is not present. 2 = **Forced deviation,** or total gaze paresis not overcome by the oculocephalic maneuver.	_____

3. Visual	0 = **No visual loss.** 1 = **Partial hemianopia.** 2 = **Complete hemianopia.**	_____

	3 = **Bilateral hemianopia** (blind including cortical blindness).	
4. Facial Palsy	0 = **Normal** symmetrical movements. 1 = **Minor paralysis** (flattened nasolabial fold, asymmetry on smiling). 2 = **Partial paralysis** (total or near-total paralysis of lower face). 3 = **Complete paralysis** of one or both sides (absence of facial movement in the upper and lower face).	____
5. Motor Arm	0 = **No drift;** limb holds 90 (or 45) degrees for full 10 seconds. 1 = **Drift;** limb holds 90 (or 45) degrees, but drifts down before full 10 seconds; does not hit bed or other support. 2 = **Some effort against gravity;** limb cannot get to or maintain (if cued) 90 (or 45) degrees, drifts down to bed, but has some effort against gravity. 3 = **No effort against gravity;** limb falls. 4 = **No movement.** UN = **Amputation** or joint fusion, explain: _ **5a. Left Arm** **5b. Right Arm**	____
6. Motor Leg	0 = **No drift;** leg holds 30-degree position for full 5 seconds. 1 = **Drift;** leg falls by the end of the 5-second period but does not hit bed. 2 = **Some effort against gravity;** leg falls to bed by 5 seconds, but has some effort against gravity. 3 = **No effort against gravity;** leg falls to bed immediately. 4 = **No movement.** UN = **Amputation** or joint fusion, explain: _ **6a. Left Leg** **6b. Right Leg**	____ ____

		____

7. Limb Ataxia	0 = **Absent.** 1 = **Present in one limb.** 2 = **Present in two limbs.** UN = **Amputation** or joint fusion, explain: _	____
8. Sensory	0 = **Normal;** no sensory loss. 1 = **Mild-to-moderate sensory loss;** patient feels pinprick is less sharp or is dull on the affected side; or there is a loss of superficial pain with pinprick, but patient is aware of being touched. 2 = **Severe to total sensory loss;** patient is not aware of being touched in the face, arm, and leg.	____
9. Best Language	0 = **No aphasia;** normal. 1 = **Mild-to-moderate aphasia;** some obvious loss of fluency or facility of comprehension, without significant limitation on ideas expressed or form of expression. Reduction of speech and/or comprehension, however, makes conversation about provided materials difficult or impossible. For example, in conversation about provided materials, examiner can identify picture or naming card content from patient's response. 2 = **Severe aphasia;** all communication is through fragmentary expression; great need for inference, questioning, and guessing by the listener. Range of information that can be exchanged is limited; listener carries burden of communication. Examiner cannot identify materials provided from patient response. 3 = **Mute, global aphasia;** no usable speech or auditory comprehension.	____
10. Dysarthria	0 = **Normal.** 1 = **Mild-to-moderate dysarthria;** patient slurs at least some words and, at worst, can be understood with some difficulty. 2 = **Severe dysarthria;** patient's speech is so slurred as to be unintelligible in	

	the absence of or out of proportion to any dysphasia, or is mute/anarthric. UN = **Intubated** or other physical barrier, explain:______	_____

11. Extinction and Inattention (formerly Neglect)	0 = **No abnormality.** 1 = **Visual, tactile, auditory, spatial, or personal inattention** or extinction to bilateral simultaneous stimulation in one of the sensory modalities. 2 = **Profound hemi-inattention or extinction to more than one modality;** does not recognize own hand or orients to only one side of space.	_____

The Motor Assessment Scale (MAS)

MOVEMENT SCORING SHEET

DATE: ....

	0	1	2	3	4	5	6
1. Supine to side lying							
2. Supine to sitting over side of bed							
3. Balanced sitting							
4. Sitting to standing							
5. Walking							
6. Upper arm function							
7. Hand movements							
8. Advanced hand activities							

COMMENTS (IF APPLICABLE)

Berg Balance Scale

S.N.	Item Description	Date				
		Score [0-4]				
1	Sit to stand					
2	Standing Unsupported					
3	Sitting Unsupported					
4	Standing to sitting					
5	Transfers					
6	Standing with eyes closed					
7	Standing with feet together					
8	Reaching forward with outstretched arms					
9	Retrieving object from ground					
10	Turning to look behind					
11	Turning 360 degrees					
12	Placing alternate foot on stool					
13	Standing with one foot in front					
14	Standing on one foot					
	Total					

Interpretation

- 0–20 : Wheelchair bound
- 21–40 : Walking with assistance
- 41–56 : Independent

The Hospital Anxiety and Depression Scale (HADS)

Tick the box beside the reply that is closest to how you have been feeling in the past week.

Don't take too long over you replies: your immediate is best.

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

Multidimensional Scale of Perceived Social Support

		Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neutral	Mildly Agree	Strongly Agree	Very Strongly Agree
1.	There is a special person who is around when I am in need.	1	2	3	4	5	6	7
2.	There is a special person with whom I can share joys and sorrows.	1	2	3	4	5	6	7
3.	My family really tries to help me.	1	2	3	4	5	6	7
4.	I get the emotional help & support I need from my family.	1	2	3	4	5	6	7
5.	I have a special person who is a real source of comfort to me.	1	2	3	4	5	6	7
6.	My friends really try to help me.	1	2	3	4	5	6	7
7.	I can count on my friends when things go wrong.	1	2	3	4	5	6	7
8.	I can talk about my problems with my family.	1	2	3	4	5	6	7
9.	I have friends with whom I can share my joys and sorrows.	1	2	3	4	5	6	7
10.	There is a special person in my life who cares about my feelings.	1	2	3	4	5	6	7
11.	My family is willing to help me make decisions.	1	2	3	4	5	6	7
12.	I can talk about my problems with my friends.	1	2	3	4	5	6	7

SEMI – STRUCTURED INTERVIEW

In-depth interview questions

A. Background

1. Can you tell me a little about yourself (age, gender, occupation, marital status)?

B. Biological Factors

2. When did you first experience your stroke?

3. How would you describe your physical condition after the stroke (mobility, speech, memory, balance)?

4. Did the severity of your symptoms influence how quickly you sought medical care?

5. Do you have other health conditions (hypertension, diabetes)? If yes, how have they affected your care-seeking decisions?

C. Psychological Factors

6. How did you feel emotionally after your stroke (fear, anxiety, sadness, denial)?

7. Have these feelings ever influenced your decision to seek (or not seek) care?

8. Heat coping strategies have you used to deal with the effects of stroke (religion, social groups, personal motivation)?

9. How confident do you feel in your ability to recover or manage your health?

D. Social Factors

10. Who supports you the most in your recovery (family, friends, community, health workers)?

11. How do cultural or spiritual beliefs in your community influence the way people respond to stroke?

12. Have financial challenges ever prevented or delayed you from accessing medical treatment or rehabilitation?

13. Can you describe your experience with healthcare facilities in Edo State (availability, accessibility, affordability, quality)?

14. Have you ever used traditional or herbal medicine for your stroke? If yes, why did you choose that option?

E. Lived Experiences

15. Can you share your experience in trying to access stroke care (positive or negative)?

16. What are the biggest challenges you face in continuing rehabilitation or treatment?

17. What motivates you to keep seeking treatment despite these challenges?

18. What changes would you like to see in healthcare services to better support stroke survivors like you?