CAREGIVERS' BURDEN AND ITS ASSOCIATION WITH QUALITY OF LIFE AND DEPRESSION AMONG CAREGIVERS OF STROKE SURVIVORS IN BENIN CITY

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

BY

OYEWOLE AMINAT IFEOLUWA

(BMS2101750)

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, Bold, Font color: Auto

Formatted[aminatifeoluwa09@gmail.com]: Heading 2, Centered, Line spacing: single

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, Bold

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

A PROJECT SUBMITTED TO THE DEPARTMENT OF PHYSIOTHERAPY, SCHOOL OF BASIC MEDICAL SCIENCES, COLLEGE OF MEDICAL SCIENCES, UNIVERSITY OF BENIN

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF PHYSIOTHERAPY (B.PT) DEGREE

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

OCTOBER, 2025

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

CERTIFICATION

This dissertation by OYEWOLE AMINAT IFEOLUWA is accepted in its presented 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.

Formatted[aminatifeoluwa09@gmail.com]: Heading 2, Centered, Line spacing: single

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, Bold

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, 12 pt, Not Bold

DR MRS OLUWASEUN S. KUBEYINJE

……

SUPERVISOR

EXTERNAL EXAMINER

……

SIGNATURE AND DATE

APPROVED

……..

DR MRS C.O OBASEKI

HEAD

DEPARTMENT OF PHYSIOTHERAPY

COLLEGE OF MEDICAL SCIENCES

UNIVERSITY OF BENIN

DEDICATION

This dissertation is dedicated to Almighty God, my beloved parents, Mr and Mrs Oyewole and my brother Musa Ayinde.

ABSTRACT

Background: Stroke is a leading cause of long-term disability worldwide, and caring for stroke survivors often places a significant burden on family members or informal caregivers. This burden may adversely affect their physical health, psychological well-being, and overall quality of life.

Aim: To assess the level of caregiving burden among caregivers of stroke survivors and to examine its association with their quality of life and depression level.

Method: A purposive sampling technique was used. Data were collected from caregivers of stroke survivors in the wards and out-patient departments in University of Benin Teaching Hospital (UBTH) using standardized questionnaires such as the Zarit Burden Interview (ZBI) for caregiver burden, Adult Carer Quality of Life Questionnaire (AC-QoL) to measure quality of life and Beck Depression Inventory (BDI) for depression.

Results: Females constituted 57.6% of the informal caregivers, whereas males accounted for 42.4%. 75.2% of the caregivers had significant level of burden, and 59.5% had depression, with demonstrable association between the two conditions ($\chi 2 = 99.3$, $p < 0.001$). There was a positive correlation between the scores for caregivers' burden and depression ($r = 0.75$, $p < 0.001$). The severity of caregiver burden correlated positively with the severity of depression ($r = 0.68$, $p < 0.001$).

Conclusion: The caregiver burden among caregivers of stroke survivors in Benin City is moderate. They also have moderate overall quality of life and experienced mild to moderate depressive symptoms.

Keywords: Caregivers' burden, quality of life, depression, stroke survivors.

ACKNOWLEDGMENT

I am deeply grateful to Almighty God for granting me the wisdom, knowledge, and perseverance required to complete this research successfully.

My profound gratitude goes to my supervisor Dr Mrs Oluwaseun S. Kubeyinje for her expert guidance, insightful supervision and continuous encouragement throughout the course of this study.

My sincere appreciation goes to the Head of Department Dr Mrs C.O Obaseki and to all the lecturers of the Department of Physiotherapy, University of Benin, Dr Adebisi Hammed, thank you for the fatherly love sir, Mr R.E Okhuahesuyi, Dr S.N Oghumu, Prof. Kayode Oke, Reverend Sister (Dr) Henrietta Fawole, Prof J.O Umunnah, Dr. O.A Ezeukwu, Dr. Nelson, Dr Mrs Aiyegbusi, Miss Osayi Obarisiagbon. I also want to extend my gratitude to the non academic staff of Department of Physiotherapy. I would like to appreciate the Head of Physiotherapy Department University of Benin Teaching Hospital, Dr Taiwo Oyewunmi, the Directors, Physiotherapists, Corpers and Interns for the knowledge and clinical training they impacted.

I extend my heartfelt appreciation to my loving parents, Mr and Mrs Oyewole, my siblings Halimah, Aishah, and Abdurrahman Oyewole whose love, sacrifices and prayers have been my constant support throughout my academic journey.

A special appreciation goes to my brother Musa Ayinde for his constant encouragement and help throughout my stay as a student. I also wish to acknowledge the contributions of Mr Iliyasu Abdullahi, May Allah continue to be with you all. I am deeply grateful to Imaan Ayoka, thank you for your understanding and for bringing joy into my life.

And to my relatives who have contributed in one way or the other: Prof and Mrs Ayinde, Alhaja Akintayo, Mrs Lasisi, Alhaji S. A Adebisi, Mr Ismail Adebisi, The entire Oyewole family, all staff of Al Falah Schools,Ikorodu,Lagos and many others that can’t be mentioned.

I would also like to acknowledge my best friend, Winnie, whose steadfast support and understanding stood by me in ways I did not expect. Your kindness and encouragement made a meaningful difference during the most challenging moments of this journey, my friends, coursemates and seniors that were part of my academic journey. Special thanks to Frances Osama, Esther, Tobechukwu, Habeeb Afolabi, Teslim Adegbegha, Sadiq Ozimede, PT Kayode Aje.

I also acknowledge the contributions of my participants. Thank you and God bless.

TABLE OF CONTENTSSS

Formatted[aminatifeoluwa09@gmail.com]: Font: （Default）Times New Roman, （Asian）等线 Light, 16 pt, Not Bold

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Stroke is a neurological disorder that significantly affects patient's lives (Mahran et al., 2015). It occurs when blood flow to the brain is suddenly interrupted, either by a blockage or a ruptured blood vessel leading to brain cell damage (Lindley, 2017). Stevens et al., (2017) defined it as a medical condition that begins suddenly and can lead to short-term and long-term effects for both individuals and society as a whole. It is a common cardiovascular disease and ranks as the second leading cause of death globally (Katan and Luft, 2018). Stroke is a widespread chronic illness associated with high rates of morbidity, mortality, and disability, presenting a serious threat to human health (Han et al., 2017).

The Global Burden of Diseases (GBD) in 2019 showed that stroke is the second leading cause of death and the third leading cause of death and disability combined (Feigin et al., 2022). Of the estimated 15million people who suffer from stroke each year globally (Shen et al., 2017), about 6million people die of stroke annually and another 5million have permanent disabilities resulting from the stroke while approximately 4million survived without permanent disabilities (Peyravian et al., 2019). Research highlighted that low-and-middle income countries account for approximately 75% of global stroke death and 81% of stroke related disabilities (Tiwari et al., 2021).

Stroke survivors are individuals who have lived through a stroke. After the event, they may face various physical, cognitive, and emotional difficulties, often needing rehabilitation and ongoing support to aid in their recovery journey. Stroke has a huge negative impact on survivors, often resulting in permanent functional impairments that lead to dependence in daily activities, depressed mood, and social isolation (De Wit et al., 2017). As a result, most stroke survivors who return to the community

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, Bold, Font color: Auto

Formatted[aminatifeoluwa09@gmail.com]: Heading 2, Centered, Line spacing: single, Right-to-left

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, Bold

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, Bold, Font color: Auto

Formatted[aminatifeoluwa09@gmail.com]: Heading 2, Centered, Line spacing: single

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, Bold

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, 14 pt, Bold, Font color: Auto

Formatted[aminatifeoluwa09@gmail.com]: Heading 2, Line spacing: single

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, 14 pt, Bold

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

will experience some level of disability or difficulty, often requiring support from others to manage their daily needs (Tziaka et al., 2024).

Roth et al., (2015) stated that as the number of stroke survivors increases, the demand for support rises as well. Eventually, they become dependent on those around them. While stroke survivors suffer the impact of their condition, they also face long term challenges which necessitate the introduction of caregivers in their recovery and daily lives. Tiwari et al., (2021) defined a caregiver as someone who lives with the patient and takes primary responsibility for their care and well-being. Caregivers assist stroke survivors in managing various challenges, including physical limitations such as walking, cleaning, feeding, and toileting, and others. With the aging of societies, the need for caregivers has increased all over the world (Karakurt et al., 2018). As a result, caregivers are likely to undergo physical, psychological, social, and economic changes in their lives, which can negatively impact their overall well-being. These four key areas of influence and their associated life effects are examined and described as the "burdens of caregivers" (Suksatan et al., 2022).

The burden experienced by family caregivers of stroke survivors is significantly correlated with a diminished quality of life and an elevated risk of developing depression. Elevated caregiver burden is also associated with suboptimal outcomes for the patient, such as delayed recovery, reduced quality of life, and heightened caregiver psychological distress. In turn, depression further compromises the caregiver's well-being.

Following hospital discharge, in contexts lacking structured post-discharge care and formal support services, the responsibility of caregiving often shifts to family members, who assume the informal role of providing ongoing care to the stroke survivor at home (Bragstad et al., 2014). Life after a stroke presents considerable challenges for informal caregivers, as the abrupt onset of functional impairments

and the unpredictable, long-term nature of stroke recovery impose substantial demands on those providing care.

Providing care within the home setting is widely recognized as a highly stressful experience, one that adversely affects caregivers' physical and psychological health, diminishes their quality of life, and disrupts their financial stability as well as social connections (Lutz et al., 2010). Moreover, when informal caregivers assume this unfamiliar and demanding role, they are often confronted with a wide range of responsibilities that can be overwhelming. Empirical evidence indicates that many caregivers experience heightened levels of psychological distress, including symptoms of anxiety, depression, emotional strain, and chronic stress (Perry & Middleton, 2011; Greenwood et al., 2012; Haley et al., 2015). A meta-analysis of 34 studies revealed that approximately 40% of individuals providing care for stroke survivors report experiencing depressive symptoms at different stages of the caregiving process (Log et al., 2017). Furthermore, research focusing on the initial phase of caregiving has found that between 20% and 40% of informal caregivers exhibit depressive symptoms within the first three months of assuming caregiving responsibilities (McLennon et al., 2014; Malhotra et al., 2016; Byun et al., 2019).

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

In addition to the psychological challenges faced by caregivers, physical health problems may also arise, further impairing their ability to support stroke survivors and diminishing their overall quality of life. Quality of life (QoL) is defined as an individual's perception of their position in life within the cultural and value systems they inhabit, and in relation to their goals, expectations, standards, and concerns (Kim, 2014).

Literature highlighted that caregivers play a vital role in supporting and caring for stroke survivors who have undergone significant and life-changing health challenges. For instance, they are responsible for overseeing and assisting patients with their daily activities, managing treatment and rehabilitation,

coordinating follow-up appointments with doctors, monitoring, and administration of medication. (Pucciarelli et al., 2018)

Patient's care is usually provided by caregivers, but with great burden and negative impact on their quality of life (Caro et al., 2016). Caregivers assume their role as soon as the patient returns home from the hospital and often continue in this capacity for months or even years. Throughout this journey, they navigate through different stages, each presenting its own set of unique difficulties and challenges (Jaracz et al., 2024). Caregiving burden is a broad concept that includes the various negative impacts caregiving can have on an individual's psychological, physical, social, and financial well-being (Byun and Evans, 2015)

1.2 Statement of the Problem

Stroke affects not only the lives of the sufferers but also their caregivers. The impact of the caregivers has a lasting effect on their physical, psychological, social and economic well-being. This in turn leads to a decline in their overall quality of life.

Evidence indicates that the burden of stroke extends beyond the patient to encompass the caregiver as well. The interrelationship between caregiver burden and quality of life among those providing care to stroke survivors is a well-documented area of research. This relationship has also been explored within African contexts, including Nigeria.

For example, a study by Akosile et al. (2013) found that a significant proportion (83.5%) of caregivers reported experiencing high levels of burden. The most severely affected domains of QoL were role limitations due to emotional problems and general health, although the overall QoL scores were moderate. Importantly, caregivers with higher levels of burden had significantly lower QoL scores overall as well as within the Mental and Physical Component Summary domains.

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, 14 pt, Bold, Font color: Auto

Formatted[aminatifeoluwa09@gmail.com]: Heading 2, Justified, Line spacing: single

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, 14 pt, Bold

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

Similarly, a systematic review by Badaru et al. (2017) identified eight studies from Africa that met inclusion criteria. The findings showed that a greater proportion of caregivers were female (55.6%).

Key determinants of caregiver QoL included the duration and intensity of caregiving, the caregiver's age, and the functional status of the stroke survivor. Additionally, the degree of caregiving burden was influenced by the stroke survivor's level of functioning and the nature of the caregiver-patient relationship, particularly when the relationship was close or intimate. Despite the considerable body of work investigating caregiver burden and QoL among stroke caregivers, there remains a paucity of research examining the specific interplay between caregiver burden, quality of life, and depression in the context of caregivers residing in Benin City.

Accordingly, this study seeks to address the following research questions

1.3 Research Questions

i. What is the overall quality of life of caregivers of stroke survivors in Benin City?
ii. What is the level of caregivers' burden of caregivers of stroke survivors in Benin City?
iii. What are the factors contributing to caregiving burden among caregivers of stroke survivors in Benin City?
iv. What is the relationship between the caregiving burden and overall quality of life of stroke survivors?
v. What is the relationship between caregiving burden and depression among caregivers of stroke survivors in Benin City?

1.4 Aim of the Study

To investigate the extent of caregiver burden among caregivers of stroke survivors and its association with their quality of life and the prevalence of depression.

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, 14 pt, Bold, Font color: Auto

Formatted[aminatifeoluwa09@gmail.com]: Heading 2, Justified, Line spacing: single

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, 14 pt, Bold

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, 14 pt, Bold, Font color: Auto

Formatted[aminatifeoluwa09@gmail.com]: Heading 2, Justified, Line spacing: single

Formatted[aminatifeoluwa09@gmail.com]: Font: (Default) Times New Roman, 14 pt, Bold

1.5 Specific Objectives

i. To determine the level of caregivers' burden of caregivers of stroke survivors in Benin City.

ii. To determine the level of quality of life and depression in caregivers of stroke survivors.

iii. To identify the key factors contributing to caregiving burden.

iv. To determine the association of caregiving burden with the quality of life of caregivers of stroke survivors.

v. To determine the association of caregivers' burden with depression in caregivers of stroke survivors.

1.6 Hypotheses

i. There would be no significant relationship between the burden of caregiving and the quality of life of caregivers of stroke survivors.

ii. There would be no significant relationship between the burden of caregiving and depression in caregivers of stroke survivors.

1.7 Significance of the Study

i. The findings of this study may provide a better understanding of the well-being of caregivers, helping them understand their physical, emotional and psychological challenges and the need for self-care to guide them towards support and coping strategies.

ii. Knowledge of how care burden affects quality of life of caregivers may enable healthcare professionals see that caregiver stress can affect patient's recovery. With this understanding, they can create better care plans that include teaching and supporting caregivers, as well as checking in regularly on their health thereby improving their well-being.

iii. The insights gained from this study may provide clear evidence that can support the creation of services to help caregivers, offer financial help, and make changes to policies. This could lead to better outcome for both the patient and the caregiver.

iv. The outcome of this study may contribute to the literature on caregiving and quality of life, offering a foundation for future research in areas such as intervention development, caregiver training, and effects of caregiving.

1.8 Scope of the Study

This study focuses on examining the burden experienced by caregivers of individuals recovering from stroke and how it relates to their quality of life and level of depression. It will be conducted at the University of Benin Teaching Hospital (UBTH) and will involve primary caregivers who provide direct and sustained care to stroke survivors.

The study aims to assess the extent of caregiver burden, explore the impact of caregiving responsibilities on their physical, emotional and psychological well-being, and identify any significant relationship between caregiver burden, quality of life, and depression. Ethical guidelines will be strictly followed to ensure participants' confidentiality and welfare throughout the study.

1.9 Definition of Terms

i. **Caregiving Burden**: The extent to which caregivers feel that caregiving has had an adverse effect on their emotions, social life, finances, physical health and spiritual well-being (Adelman et al., 2014).

ii. **Quality of Life**: WHO defines it as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns (WHO, 2019).

iii. **Depression**: A disorder characterized by sadness, loss of interest in activities, and decreased energy (Ifeanyi et al., 2018).

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Stroke is a disease characterized by a sudden onset and can have serious short and long-term consequences for both individual patients and societies (Stevens et al., 2017). The current World Health Organization definition of stroke (introduced in 1970 and still used) is “rapidly developing clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin. There are two main causes of stroke; an ischemic stroke caused by a blocked artery in the brain, a hemorrhagic stroke caused by leaking or bursting of a blood vessel in the brain. Some people may have only a temporary disruption of blood flow to the brain, known as a transient ischemic attack (TIA) (Rochmah et al., 2021).

Among non-communicable disorders (NCDs), Stroke remains the second-leading cause of death and the third-leading cause of death and disability combined (as expressed by disability-adjusted life-years lost – DALYs) in the world (Brainin et al., 2025). Disability caused by stroke has a major effect on the patient, causing not only physical challenges but also greatly limiting their social life. Post-stroke depression impacts not just the survivors, but also deeply affects their family and friends (Mandowara et al., 2020).

Most people who survive a stroke often have lasting problems like poor balance, incontinence, difficulty swallowing, vision problems, and psychological and cognitive impairment (Jokinen et al., 2015). However, when they return home, they still face some unavoidable challenges. Recovery is often long and slow, as they work to regain physical strength, speech, thinking skills, and other abilities (Chen et al., 2019). Larén et al., (2018) stated that falling is a common complication after a stroke. It can happen often because stroke survivors may have physical issues like weakness, paralysis, balance

problems, or numbness, as well as mental challenges like tiredness, depression, or trouble thinking clearly.

Globally, stroke ranks as the second leading cause of death and the third leading cause of disability. Over the past three decades, stroke incidence has surged by 70%, with low-income countries bearing the brunt—accounting for 85% of global stroke-related fatalities. In Nigeria, stroke prevalence is estimated at 1.14 per 1000 individuals, with a 30-day mortality rate of 40%.

Stroke is a major and growing global health concern, ranking as the leading cause of acquired physical disability among adults and the second leading cause of death in middle- and high-income countries. Over the past three decades, stroke incidence has risen in these regions, ranging from 85 to 94 cases per 100,000 people, with significantly higher rates (1151–1216 per 100,000) observed in individuals over 75 years old. Additionally, with low-income countries bearing the brunt—accounting for 85% of global stroke-related fatalities and 87% of stroke-related disability-adjusted life years (DALYs).

In Nigeria, the most populous black nation, the prevalence of stroke and other cardiovascular diseases continues to increase due to ongoing epidemiological transitions. This rise adds to the existing healthcare challenges posed by communicable diseases such as HIV/AIDS, multidrug-resistant malaria, and tuberculosis, further straining the country's already limited healthcare resources. Currently, stroke prevalence in Nigeria is estimated at 1.14 per 1000 individuals, with a 30-day case fatality rate reaching up to 40%. Stroke management remains largely conservative, with limited funding allocated for high-quality research to address this growing public health issue.

Caregivers play an important role in supporting stroke survivors who have gone through major, life-changing health issues. For example, they help with daily activities, manage treatments and rehabilitation, attend doctor visits, and handle medications—making sure they're given correctly and

on time (Pucciarelli et al., 2018). In addition, caregivers often need to research, obtain, and learn how to use and take care of different equipment that is important for the patient's recovery and daily needs (Magwood et al., 2019). All of these "duties" are required to meet the stroke patients' needs, including their physical, mental, emotional, social and spiritual well-being (Alquwez et al., 2021). Caregivers of stroke patients should receive physical and emotional support and training, as they can face a heavy burden depending on their own situation and the patient's condition. This burden can harm their health, social life, and overall well-being.

2.2 Relevant Anatomy

2.2.1 The Brain

The brain is responsible for regulating and coordinating nearly all bodily functions. It is the organ that distinguishes humans from other animals. Despite being a delicate structure, it is safeguarded by a strong skull. However, it remains vulnerable to damage from severe injuries, tumor-induced compression, or oxygen deprivation caused by a rupture or blockage in a cerebral artery (Moore et al., 2017).

2.2.2 Parts of the Brain

The brain is composed of three major regions: the cerebrum, cerebellum, and brainstem.

i. Cerebrum (Cerebral Hemisphere): The cerebrum consists of three poles, three surfaces, and four lobes.

ii. Brainstem: The brainstem is an elongated structure located between the forebrain (comprising the cerebral hemispheres and diencephalon) and the spinal cord. It is divided into three sections: the midbrain, the pons, and the medulla oblongata (Bruni, 2009).

The midbrain is the shortest and most rostral part of the brainstem, measuring approximately 2 cm in length. It is positioned between the diencephalon above and the pons below, extending

through the tentorial incisure. The midbrain also houses the nuclei of origin for cranial nerves III and IV (Bruni, 2009; Bhuiyan et al., 2014).

iii. Cerebellum: The cerebellum is a key brain structure responsible for regulating and coordinating voluntary motor activities. It fine-tunes muscle tone, helps maintain balance, and ensures that muscular actions are smooth, coordinated, and precise (Bruni, 2009). It consists of a central region called the vermis and two lateral hemispheres. The cerebellum has two surfaces: superior and inferior. The superior surface shows no clear separation between the vermis and the hemispheres, whereas the inferior surface has a deep depression, known as the vallecula, which divides the two hemispheres (Bhuiyan et al., 2014).

2.2.3 Arterial Blood Supply of the Brain

Although the human brain constitutes only about 2.5% of total body weight, it receives nearly one-sixth of the cardiac output and utilizes one-fifth of the body's oxygen consumption at rest (Moore et al., 2017). The brain's blood supply is entirely dependent on two sets of arteries originating from the dorsal aorta: the vertebral arteries and the internal carotid arteries, the latter being a branch of the common carotid artery (Purves et al., 2001).

i. Internal Carotid Arteries: The internal carotid arteries emerge as the terminal branches of the common carotid artery at the level of the C4 vertebra in the neck. Each artery ascends within the carotid sheath and enters the cranial cavity via the carotid canal and the upper portion of the foramen lacerum (Bhuiyan et al., 2014). The internal carotid artery follows a path divided into four segments: cervical, petrous, cavernous, and cerebral. The cerebral portion gives rise to several branches, including the ophthalmic artery, anterior choroidal artery, posterior communicating artery, anterior cerebral artery, and middle cerebral artery (Bhuiyan et al., 2014).

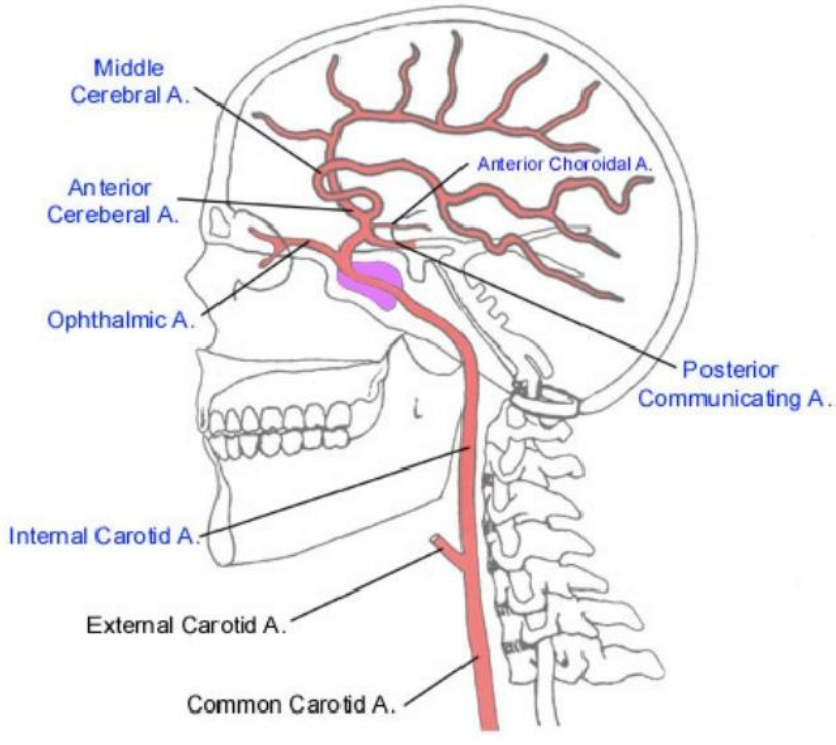

Figure 2. Internal carotid artery with its divisions and course

https://www.meddean.luc.edu/lumen/meded/neuro/neurovasc/navigation/ica.htm

ii. Vertebrobasilar Arteries: The vertebral arteries originate from the subclavian arteries at the root of the neck, specifically from their first branches (Moore et al., 2017). These arteries are often asymmetrical in size, with the left typically being larger than the right. Their course is divided into four segments: cervical, vertebral, suboccipital, and cerebral. The cerebral segment gives

rise to several branches, including the anterior and posterior spinal arteries, the posterior inferior cerebellar artery, medullary branches, and meningeal branches.

The two vertebral arteries ascend and merge at the pontomedullary junction, forming the basilar artery. The basilar artery courses through the basilar sulcus of the pons and bifurcates at the pontomesencephalic junction into two posterior cerebral arteries. The branches of the internal carotid and vertebrobasilar arteries interconnect at the base of the brain, forming the arterial circle of Willis.

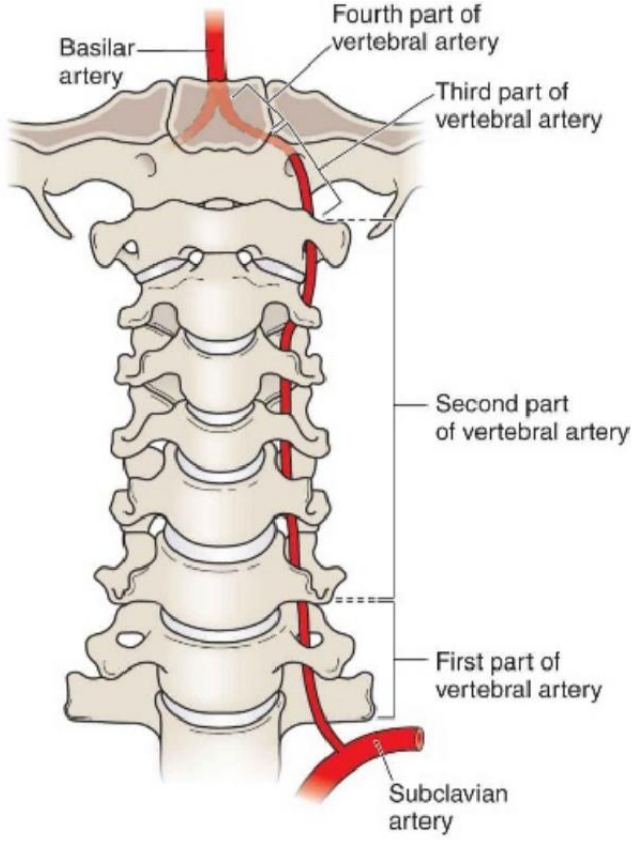

Figure 3. Vertebral artery parts and its course

https://musculoskeletalkey.com/vertebral-artery.

The two vertebral arteries ascend up and unite at the pontomedullary junction to form the basilar artery. The basilar artery runs in the basilar sulcus of the pons and at the pontomesencephalic junction divides into two posterior cerebral arteries. The branches of internal carotid artery and the branches of vertebrobasilar artery anastomose in the base of the brain to form the arterial circle of Willis

2.2.4 Circle of Willis

Four hundred years ago, Thomas Willis gave the detailed anatomic description of the arterial anastomosis at the base of the brain that is surrounded by cerebrospinal fluid, he called it the circle of Willis (CW) (Vrselja et al., 2014). It is closely related to the optic chiasma, tuber cinereum, mammillary bodies and posterior perforated substance (Bhuiyan et al., 2014). In the work done by Thomas Willis, he states that Circle of Willis functions as a compensatory mechanism in the case of occlusion or stenosis of internal carotid artery or vertebral artery. (Vrselja et al., 2014; Rosner et al., 2023).

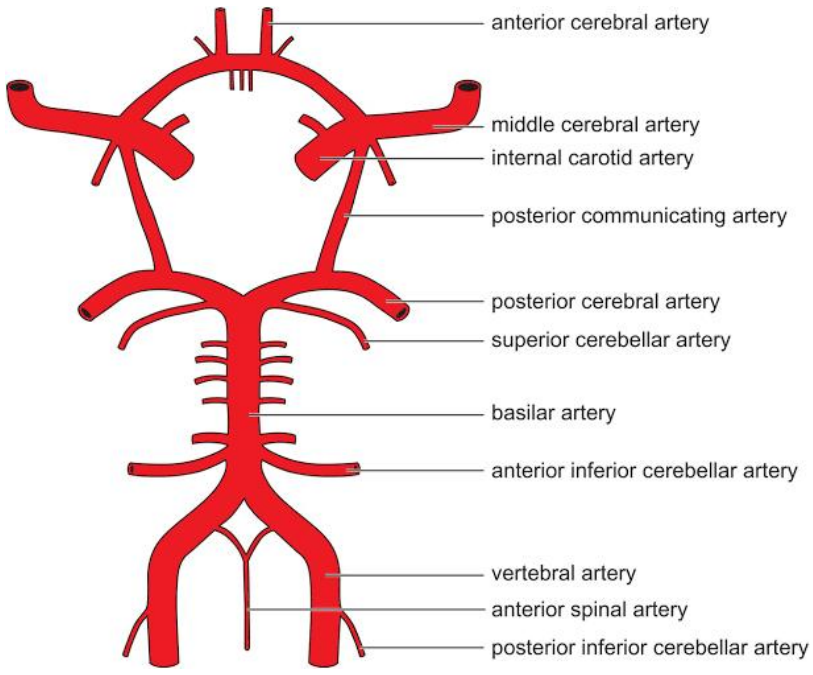

Figure 4. The Circle of Willis

Bhuiyan, 2017

In summary, the circle of Willis is formed by;

i. The anterior communicating artery, which connects the right and left anterior cerebral arteries, forms anterior part of the circle of Willis.
ii. The anterior cerebral artery forms the anterolateral part on each side.
iii. The lateral part is formed by the termination of internal carotid artery on each side.
iv. The circle is completed posteriorly by the bifurcation of basilar artery into the right and left posterior cerebral arteries.
v. Posterolaterally, the posterior communicating artery is the connecting link between the internal carotid and the posterior cerebral artery (Bhuiyan et al., 2014).

It should be noted that the middle cerebral artery does not take part in the formation of the circle of Willis (Bhuiyan et al., 2014).

2.3 Types of Stroke

There are two main types of stroke which are the ischemic and hemorrhagic stroke. Ischemic stroke happens to be the most common type of stroke with over 80% of stroke occurrence. While hemorrhagic stroke occupies less than 20% of stroke incidence (Grysiewicz et al., 2008). There is high mortality rate among patients with hemorrhagic stroke than ischemic stroke (Andersen et al., 2009). Henriksson et al. (2012) reported that, patients with hemorrhagic stroke had a higher risk of dying within the first 30 days after stroke compared to patients with ischemic stroke. Also, in term of severity, stroke is more severe in patients with hemorrhagic stroke than ischemic stroke (Andersen et al., 2009).

2.3.1 Ischemic Stroke

Ischemic stroke, which is also known as cerebral infarction is most common type of stroke. It is characterized by hypoxia or reduced oxygenation to the brain tissues as a result of poor blood supply

(Martin and Kessler, 2015). There are two types of ischemic stroke, they are, thrombolism and embolism ischemic stroke.

i. Thrombolism: A thrombolic stroke is a type of ischemic stroke that results from the formation of thrombus in the cerebral arteries. Atherosclerosis is the main cause of them. As plaque is accumulated within the arterial walls, it causes the lumen of artery to become narrow. As a result, there is a decreased blood flow through the vessel, which restricts the amount of oxygen that can reach the cerebral areas. The tissue supplied by the artery will die or suffer a cerebral infarction if the plaque fully blocks the vessel (Martin and Kessler, 2015).
ii. Embolism: Embolic stroke occurs as a result of formation of thrombus at a distant or extracerebral arteries which are transported to the lumen of the cerebral arteries. The embolus may get stuck in a blood vessel in the brain, obstruct it, and then injure the brain tissue as a result. They are usually associated with cardiovascular diseases, specifically atrial fibrillation (Martin and Kessler, 2015).

2.3.2 Hemorrhagic Stroke

Hemorrhagic stroke (HS) also known as cerebral hemorrhage is characterized by abnormal bleeding on the brain tissues as a result of rupturing or bursting of cerebral arteries walls (Martin and Kessler, 2015). It comprises of approximately 20% of stroke incidence (Montaño et al., 2021). It is subdivided into two main types, this includes, intracerebral hemorrhage (ICH) and subarachnoid hemorrhage (SAH).

i. Intracerebral hemorrhage (ICH): This happens to be the most common type of hemorrhagic stroke, accounts for over 10% of HS (Grysiewicz et al., 2008; Montaño et al., 2021). Incidence of intracerebral hemorrhage is low in those under age of 45 and rises beyond the age of 65. Arteriovenous malformation (AVM), alterations in the integrity of the blood vessels brought on by the effect of hypertension and aging, and ICH are frequently linked. (Martin and Kessler,

2015). A capillary bed is not present as arteries and veins join together directly in AVMs. Within the brain, blood vessels enlarge and group together to form masses. Due to this development, blood vessel walls become more vulnerable to rupture and result in hemorrhagic strokes. (Martin and Kessler, 2015).

ii. Subarachnoid hemorrhage (SAH): It accounts for less than 10% of HS (Grysiewicz et al., 2008). It occurs as a result of bleeding into the subarachnoid space. Subarachnoid space is a space between the subarachnoid matter and pie matter of the brain meninges. The most common cause of SAH is aneurysm which account for approximately 90% of the SAH. Aneurysms means the ballooning or outpouching of cerebral vascular walls, this tends to weaken the cerebral vessel walls and can lead to rupture, causing bleeding on the brain tissues. A vessel malformation can also lead to SAH (Martin and Kessler, 2015).

2.4 Etiology of Stroke

Stroke is a multifactorial disease. Just like most neurological diseases, it is not attributed to a particular cause. There are various factors that contribute or increase the risk of stroke in individuals. These factors are divided into modifiable and non-modifiable risk factors. There are numbers of modifiable risk factors, but for the sake of this current study, some of them are; hypertension, alcohol consumption, diabetes, heart failure, obesity, cigarette smoking, and physical inactivity (O'Donnell et al., 2016, Guo et al., 2016, Hackshaw et al., 2018, Willey et al., 2017, Andersen and Olsen, 2015, Kim and Kim, 2018). The non-modifiable risk factors are, age, gender, race and family history of stroke (Choudhury et al., 2015). It has been reported that pregnancy, oral contraception, hormone replacement therapy and reduction in estrogen after menopause are risk factors to stroke unique to women (Mirzaei, 2017).

2.5 Clinical Presentations of Stroke

Clinical presentations of stroke refer to the signs and symptoms that occur due to an interruption in blood flow to the brain. The clinical presentations of stroke can vary depending on the type of stroke and the area of the brain affected (Johnston et al., 2018). Some of them include, weakness or numbness in the face, arm, or leg, difficulty speaking or understanding speech, vision problems, dizziness, loss of balance and coordination, severe headache, nausea, vomiting, weakness, seizures, loss of consciousness, dysarthria, dysphagia, sensory deficit, cognitive impairment, hemineglect, thalamic pain syndrome, and pusher syndrome (Martin and Kessler, 2015; Johnston et al., 2018). It is important to recognize the clinical presentations of stroke as early intervention can help reduce the risk of permanent brain damage and disability.

The American Stroke Association recommends using the “FAST” acronym as a tool to help recognize the signs of stroke: F for Face drooping, A for Arm weakness, S for Speech difficulty, and T for Time to call emergency services. If any of these symptoms are present, it is important to seek immediate medical attention (American Stroke Association, 2022).

2.6 Diagnosis of Stroke

The diagnosis of stroke involves multidisciplinary approach which comprises of three major assessment procedures. They include, physical examination, neuroimaging examination and laboratory investigations. It is important to note that physical examination or laboratory testing alone is not sufficient for diagnosing stroke, therefore imaging studies are typically required to confirm the diagnosis. (National Institute of Neurological Disorder and Stroke.

2.6.1 Physical Examination

The physical examination is done to determine the history of the stroke and also to evaluate motor, sensory, speech, and reflex function. It begins with subjective assessment under which questions like What, Where, When and How is asked from the patient or a family member. The second part of the physical examination is the objective assessment, where the physiotherapist makes use of specific neurological assessment tools and tests to reproduce or confirmed the information provided to him by the patient or his/her family member in the previous phase of the examination (subjective phase). Some of the neurological assessment tools or tests include, Modified Ashworth scale, Oxford muscle grading scale, reflex hammer, Mini mental status scale, Romberg test, hand to nose test, sensation examinations, functional independence measure etc. (Martin and Kessler, 2015).

2.6.2 Neuroimaging Examination

Neuroimaging is majorly carried out either with a computed tomography scan (CT) or a magnetic resonance imaging (MRI) scan to determine whether the stroke is the result of ischemic or hemorrhagic injury and the information from the result guides medical treatment. However, it has been reported that MRI is a much preferable scan to be done at the acute stage of stroke as it diagnoses an ischemic event within 2 to 6 hours after the initial onset (Martin and Kessler, 2015).

2.6.3 Laboratory Investigation

Laboratory tests can also help to confirm the diagnosis of stroke, rule out other possible causes, and guide treatment decisions. One of the most commonly used laboratory tests for stroke diagnosis is a complete blood count (CBC), which can help to identify anemia, thrombocytopenia, and other blood disorders that may contribute to stroke. (Mehta, 1984). Another important test is a coagulation profile, which can help to identify abnormalities in blood clotting that may increase the risk of stroke or affect the patient’s response to anticoagulant therapy (Watson et al., 2009). Blood glucose levels may also be

checked, as hypoglycemia can cause symptoms that mimic stroke (Johnston et al., 2019). In addition, a lipid test may be performed to assess the patient's cholesterol levels, which can play a role in the development of atherosclerosis and stroke. (Naci et al., 2013).

2.7 Stroke Management

Management of stroke patients involves a multidisciplinary approach, and it comprises of two primary phases. This includes, the acute management phase and post stroke rehabilitation phase. The acute management phase is aimed to stabilize the patients after stroke onset so as to prevent further brain damage. While the post stoke rehabilitation phase is aimed to improve the lost functions of the patients after he/she has suffered stroke. In the acute phase, treatment is more effective when it is provided within 3hours of stroke onset. While for post rehabilitation phase, treatments yield a good outcome when it is provided within the first 3 – 6 months of stroke (Martin and Kessler, 2015).

Generally, stroke management is divided into two. These are, conservative management and surgical management. Conservative management are non-invasive treatments approach given to a stroke patient and they include, medical management, physiotherapy management, occupational therapy, speech therapy, psychological therapy. Surgical management involves the use of invasive procedures to treat stroke patients. Examples include, hemicraniectomy, decompressive craniectomy, vascular clipping, carotid endarterectomy (Martin and Kessler, 2015).

2.7.1 Surgical Management

I. Ischemic stroke: Some of the surgical procedures for ischemic stroke patients include; decompressive hemicraniectomy, carotid endarterectomy (Doberstein et al., 2017).

II. Hemorrhagic stroke: Some of the surgical procedures for hemorrhagic stroke include; open craniotomy, stereotaxic aspiration (Zuccarello et al., 1999).

2.7.2 Conservative Management of Stroke

I. Medical Management: Stroke treatment at the acute stage typically involves pharmacological interventions. For ischemic stroke, medications such as tissue plasminogen activator (tPA), heparin, warfarin, and aspirin are commonly administered (Goldstein, 2014). In cases of hemorrhagic stroke, drug therapy aims to alleviate excessive intracranial pressure caused by bleeding and to manage elevated blood pressure within the cerebral vessels. Medications used for this purpose include diuretics, beta-blockers, and angiotensin-converting enzyme inhibitors (Martin & Kessler, 2015).

II. Physiotherapy Management: The primary objective of rehabilitative physiotherapy in stroke patients is to minimize impairments and disabilities, thereby enhancing their ability to perform daily self-care activities independently (Dobkin & Dorsch, 2013). Several physiotherapy approaches exist for stroke rehabilitation, with the Bobath concept being one of the most widely employed methods (Paci, 2003). This approach is based on the principle that the central nervous system possesses neuroplasticity, allowing it to reorganize and compensate for lost cognitive and motor functions (Dobkin & Dorsch, 2013). However, studies indicate that the Bobath approach is not significantly superior to other rehabilitation techniques (Paci, 2003; Van Vliet et al., 2005). Common physiotherapy interventions for stroke management include:

i. Strengthening Exercises: Stroke often leads to muscle weakness and impaired motor control. Strength training is implemented to enhance mobility, strength, and overall functional ability, typically involving repetitive and progressive resistance exercises targeting affected muscle groups (Dobkin & Dorsch, 2013).
ii. Proprioceptive Neuromuscular Facilitation (PNF): This method is employed to enhance motor coordination, range of motion, and functional performance by incorporating diagonal movement patterns, resistance, and stretching techniques (Dobkin & Dorsch, 2013).

iii. Functional Electrical Stimulation (FES): Electrical stimulation is used to activate muscles, assist in movement, improve walking patterns, and enhance upper limb function in stroke patients (Dobkin & Dorsch, 2013).

iv. Balance and Coordination Training: Since stroke often affects balance and postural control, training programs focus on exercises that address these deficits, including weight shifting, standing balance, and dynamic stability (Dobkin & Dorsch, 2013).

v. Constraint-Induced Movement Therapy (CIMT): This approach encourages functional use of the affected limb by restricting movement of the unaffected limb, thereby promoting neural adaptation and motor recovery (Dobkin & Dorsch, 2013).

vi. Sustained Passive Stretching (SPS): Spasticity and contractures following stroke limit joint mobility. SPS involves prolonged stretching to improve muscle length, joint range of motion, and functional outcomes (Dobkin & Dorsch, 2013).

vii. Mirror Therapy: This technique utilizes a mirror to create the illusion of movement in the affected limb, stimulating mirror neurons and facilitating neuroplasticity (Dobkin & Dorsch, 2013).

viii. Body Weight-Supported Treadmill Training (BWSTT): This method assists stroke patients with walking difficulties by supporting a portion of their body weight while they practice gait on a treadmill, allowing safe and controlled movement training (Werner et al., 2022).

ix. Transcranial Direct Current Stimulation (tDCS): Low-intensity electrical currents are applied to the scalp to modulate brain activity, enhance neuroplasticity, and facilitate motor recovery (Hummel et al., 2005).

x. Virtual Reality (VR): VR-based rehabilitation utilizes interactive computer-generated environments to promote motor learning, sensory feedback, and cognitive engagement in stroke patients (Dobkin & Dorsch, 2013).

2.8 Brunnstrom Stage of Motor Recovery

Motor recovery typically follows a pattern described by the Brunnstrom Stages of Recovery.

Stage 1: Complete flaccidity (absence of movement).

Stage 2: Emergence of spasticity.

Stage 3: Peak spasticity, with voluntary movement limited to synergistic patterns.

Stage 4: Reduction of spasticity, enabling movement outside of synergy patterns.

Stage 5: Further decline in spasticity, with greater voluntary control.

Stage 6: Disappearance of spasticity, allowing isolated and combined movements.

Stage 7: Full restoration of normal motor function (Martin & Kessler, 2015).

Although all patients typically progress through these stages, the speed of recovery varies. Some may advance rapidly, while others plateau at a certain stage, preventing full recovery (Martin & Kessler, 2015).

2.9 Outcome Measures of Stroke Rehabilitation

Outcome measures are essential for assessing treatment efficacy, tracking patient progress, and guiding rehabilitation. Two commonly used measures are:

I. Functional Independence Measure (FIM): This tool evaluates a stroke patient's ability to perform activities of daily living (ADLs). It consists of 18 items divided into motor (13

items) and cognitive (5 items) domains, scored on a scale of 1 (completely dependent) to 7 (fully independent), with a maximum total score of 126. Scores below 60 indicate dependence, while scores above 76 signify full independence (Dodds, 1993; Hoyer et al., 2013).

II. Barthel Index (BI): This scale measures independence in ADLs, assessing ten functional activities, such as mobility, toileting, and stair climbing. Scores range from 0 (total dependency) to 100 (complete independence) (Mahony & Barthel, 1965).

2.10 Prognosis of Stroke

Stroke prognosis refers to the likelihood of recovery, which is influenced by several factors, including:

i. Age: Older stroke survivors often experience greater disability (Alawieh et al., 2018).

ii. Gender: Women are more likely than men to remain functionally impaired post-stroke (Weimar et al., 2002; Alawieh et al., 2018).

iii. Diabetes: Elevated blood sugar levels are associated with poorer outcomes (Ogunrin & Ogundare, 2017).

iv. Stroke Type: Although hemorrhagic strokes cause greater initial impairment, they often show faster recovery than ischemic strokes (Alawieh et al., 2018).

v. Severity of Injury: The extent of brain damage determines the potential for functional recovery (Alawieh et al., 2018).

vi. Previous Stroke: Recurrent strokes generally result in worse outcomes (Weimar et al., 2002).

vii. Post-Stroke Depression: Depression negatively affects recovery (Carson et al., 2000).

viii. Comorbidities: Additional health conditions can impede rehabilitation progress (Alawieh et al., 2018).

2.11 Stroke Prevention

Preventive strategies include lifestyle modifications, antiplatelet and anticoagulant therapy, lipid management, and carotid interventions (Martínez-González et al., 2010; Rerkasem et al., 2020).

2.12 Complications of Stroke

Common complications include contractures, hemiplegic shoulder pain, post-stroke seizures, falls, deep vein thrombosis, fatigue, and depression. Preventive measures and rehabilitative strategies help mitigate these risks (Chohan et al., 2019; Batchelor et al., 2010; Sico et al., 2016).

2.13 CONCEPTUAL FRAMEWORK

2.13.1 Caregiving

The etymology of caregiving defined by the Oxford English Dictionary (2010) is as follows: Caregiving; characterized by attention to the needs of others, especially those unable to look after themselves adequately; professionally involved in the provision of health or social care; Attention to the needs of a child, elderly person. The Merriam Webster dictionary (2010) defines caregiver as “a person who provides direct care, as for children, elderly people, or the chronically ill”. Drentea (2007) refers to caregiving as “the act of providing unpaid assistance and support to family members or acquaintances who have physical, psychological or developmental needs”

Caregiving is a special kind of stress that, while challenging, can also bring psychological benefits. It has been linked to greater resilience, helping some caregivers better cope with depression and stress, and even lowering the risk of early death (Roth et al., 2018)

Caregivers can be Formal or Informal; Formal caregivers are those who are paid to give care, whereas informal caregivers are not paid to provide care. For example, a nurse is a formal caregiver, and a family member is an informal caregiver (Lai et al., 2017)

2.13.2 Quality of Life

The social, physical and psychological consequences of stroke are devastating. These consequences are described by studies that elaborate Quality of Life (QOL) (Denno et al., 2013) Quality of life (QOL) refers to how a person views their place in life, considering their culture, values, goals, expectations, and concerns. Health-related quality of life (HRQOL) focuses on the parts of overall quality of life that are influenced by a person's physical and mental health (Hydzik et al. 2023). The concept of quality of life (QOL) includes several areas: a person's physical and emotional health, mental and social well-being, ability to reach personal goals, financial stability, and the ability to carry out daily activities as usual (Caqueo-Urízar et al., 2009).

Only a few studies have looked into how patient traits, caregiver qualities, and support systems work together to affect the caregiver's level of stress and their quality of life (McCullagh et al., 2005). This information matters because strategies to support caregivers are more likely to work if they focus on changeable factors that increase caregiver stress and meet the specific needs of each caregiver (Kalra et al., 2004).

2.13.3 Depression in Caregivers

While caregivers play a vital role in the recovery of stroke, their long-term support can affect their mental well-being (Alemayehu et al., 2024). As caregiver burden increases, caregivers are more likely to have anxiety and depression (Denno et al., 2013). Depression is a disorder characterized by sadness, loss of interest in activities, and decreased energy (Ifeanyi et al., 2018). Caregiver depression can be linked to certain factors related to the patient. Multiple studies have recognized that burden caused by caring for a stroke survivor is a detriment to the mental health of the caregiver. Literature highlighted that when caregivers are not doing well, the stroke survivor's recovery can be affected. This may lead

to slower progress in physical healing, communication, and getting back to meaningful activities, which can put the success of home care at risk (Cameron et al., 2011).

2.14 Caregivers' Burden

The Carers of stroke patients provide informal care ranging from physical help to psychosocial support. As a result, these carers may experience high levels of burden, associated with characteristics of the patients and of the carers themselves. This burden can result in a deterioration of the carers' health status, social life and well-being (Feigin at al., 2022). The increasing number of stroke patients requires caregivers to bear a high burden of responsibilities and heavy distress (Panzeri et al., 2019). Caregivers are required to bear many responsibilities, sometimes changing their roles, which can be extremely difficult (Camak, 2015).

Caregivers often experience loneliness, depression, and anxiety, which can lead to poor physical health (Persson et al., 2015). When caregivers are overwhelmed, they may struggle to give stroke patients proper care (Em et al., 2017), which can also lead to higher healthcare costs (Jennum et al., 2015). However, what happens in a more distant period, when caregivers age, some patients experience a recurrent stroke or late stroke-related and health-related changes and their functional status deteriorates (Gil-Salcedo et al., 2022). Literature highlighted that completing caregiving tasks entails a reduction in free time and social contacts, leading to progressive isolation (Ratti et al., 2017; Woodford et al., 2018).

2.14.1 Measurement Tools for Caregiving Burden

Caregiver burden was first defined in 1980 by Professor Steven Zarit from Pennsylvania State University. He created the Zarit Burden Interview (ZBI), a tool that is now widely used around the world (Gratão et al., 2019). There are many other tools available for measuring caregiver burden that healthcare providers can use. These tools are often designed to match the specific illness or condition of the person receiving care (Pop et al., 2022). There are many examples of studies that have explored

how different illnesses impact caregiver burden. These include caring for someone with a long-term physical illness (Ghazali et al., 2015), caring for the elderly (Schulz et al., 2020), supporting cancer patients needing palliative care (Yuen and Wilson, 2021), caring for people with dementia (Jeste, Mausbach, and Lee, 2021), and supporting individuals with psychiatric disorders (Chadda, 2014). Caregiver burden tools have been used in many countries, and several of them have been translated into different languages to make them more accessible (Liu, Heffernan, and Tan, 2020).

2.14.1.1 Commonly used Scales

Caregivers' stress and feelings of burden can be measured using standard questionnaires and interviews. While these feelings aren't official medical diagnoses, they are important signs of the psychological distress that many caregivers face (American Psychological Association, 2020).

These tools include:

Zarit Burden Interview (ZBI): The Zarit Burden Interview is a widely used self-report questionnaire designed for caregivers, especially in aging-related care (Gratão et al., 2019). The original version had 29 items (Zarit et al., 1980), but a more commonly used revised version includes 22 items. Caregivers respond to each statement using a 5-point scale, ranging from 0 (Never) to 4 (Nearly Always). There is also a shorter version available for quicker use, ranging from 1-18 items. A study by Yu, Yap, and Liew (2019) found that the 6-item version of the Zarit Burden Interview was the most effective short form, as it offered similar diagnostic accuracy to the original 22-item version while using the fewest questions.

The Caregiver Strain Index (CSI): The CSI is a screening tool used to measure the level of stress or strain felt by people who are caring for others, especially elderly or chronically ill family members.

Caregiver Reaction Scale (CRS): The Caregiver Reaction Scale, developed by Qualls and Kenny (2008), is a tool adapted for clinical use from a research model of caregiver burden and competence

originally created by Pearlin, Mullan, Semple, and Skaff (1990). It includes several subscales that measure different aspects of the caregiving experience, such as role captivity, overload, loss in relationships, competence, personal growth, coping, family beliefs and conflicts, job issues, and financial strain. This scale is practical for clinical settings because of its simple 1–4 Likert-type response format (ranging from "not at all" to "completely") and its wide coverage of both emotional and social effects of caregiving, including feelings of self-efficacy and family stress.

Caregiver Self-Assessment Questionnaire: This 18-item self-report tool was developed by the American Medical Association to help doctors assess the stress levels of family caregivers who accompany older adults with chronic illnesses to medical appointments. Caregivers answer "Yes" or "No" to statements like "During the past week or so, I have felt completely overwhelmed" and "During the past week or so, I have felt strained between work and family responsibilities" (American Psychological Association, 2020).

Picot Caregiver Rewards Scale (PCRS): The PCRS is a 25-item scale that focuses on the positive outcomes of caregiving. It measures how much caregivers feel they benefit or grow from the experience. Caregivers rate each item on a 5-point Likert scale, from "Not At All" to "A Great Deal" (Hsueh et al., 2014; American Psychological Association, 2020).

2.15 Prevalence of Depression

The literature has shown that stroke caregivers have consistently higher rates of depression (34%-52%) than non-caregiver control groups. Increased rates of depression may be due to factors such as the physical disability of the patient, decreased social activity of the caregiver, and level of dependency of the patient, among others (Denno et al., 2013). Depression is more common among caregivers of stroke patients than in the stroke survivors themselves, with studies showing that 30% to 52% of caregivers experience depression (Gonzalez et al., 2013). Pooled global prevalence of depressive symptoms

among caregivers of stroke survivors is estimated to be 40.2% in 2016 (Loh et al., 2017). In a Finnish study conducted by Berg and colleagues, the prevalence of depression among caregivers of stroke survivors was reported to be between 30% - 33%. Also, 33.57% to 42.16% of all caregivers were depressed as reported in an Iranian population (Ifeanyi et al., 2018). In a survey in a Chinese population, 71% of stroke caregivers was reported to have experienced depressive symptoms (Guo et al., 2015).

2.15.1 Measurement Tools for Depression

Commonly Used Depression Scales Includes:

Beck Depression Inventory (BDI): The BDI is a widely used tool for identifying and measuring the severity of depression. Suitable for individuals aged 13 to 80, it includes 21 self-report items, each with multiple-choice responses. The questionnaire takes about 10 minutes to complete. Its validity and reliability have been confirmed across different population worldwide (Beck et al., 1961; American Psychological Association, 2023).

Center for Epidemiologic Studies Depression Scale (CES-D): The CES-D is a 20-item self-report questionnaire originally developed for use in the general population and is now commonly used to screen for depression in primary care settings. It asks individuals to rate how often they experienced symptoms of depression during the past week using a 4-point scale. Suitable for people aged 6 and older, the CES-D has been tested across different genders and cultures, showing strong validity and reliability. It takes about 20 minutes to complete and score (Saracino et al., 2020).

Hamilton Depression Rating Scale (HAM-D or HDRS): The HAM-D is a clinician-administered tool used to assess the severity of depression before, during, and after treatment. It includes 21 items, but only the first 17 are used for scoring. These items are rated on either a 3-point or 5-point scale. The

assessment typically takes 15 to 20 minutes to complete and score (Hamilton, 1960; Trajkovic et al., 2011).

Children's Depression Inventory (CDI): The CDI is a version of the Beck Depression Inventory adapted for children and teens aged 7 to 17. Now in its second edition, it measures the severity of depression through two main areas: emotional and functional problems. It includes three different forms—for parents (17 items), teachers (12 items), and the child (self-report, 28 items). The questionnaire takes about 5 to 15 minutes to complete (Sun and Wang, 2015).

2.16 Association between Caregivers' Burden, Quality of Life and Depression

The connection between caregiver burden, quality of life, and depression in those caring for stroke survivors is well documented. Caregiver burden—which includes physical, emotional, and financial stress—is a major factor that influences both their quality of life and mental health (Liu, Heffernan, and Tan, 2020). Studies show that a higher caregiving burden is closely linked to a lower quality of life. This is largely because caregivers often spend so much time and energy on their responsibilities that they neglect their own health and emotional needs. Research by Vitaliano et al. (2003) found that caregivers tend to experience more stress, which can lead to physical health issues and limit their ability to take part in social or leisure activities, ultimately reducing their overall well-being (Vitaliano, Zhang, and Scanlan, 2003). The connection between caregiving burden and depression is also well-established. Schulz and Sherwood (2008) found that caregivers of older adults are more likely to experience depression than those who are not caregivers. The ongoing demands of caregiving, along with the emotional strain of seeing a loved one's health decline, can cause serious psychological stress. This stress often worsens when caregivers lack proper support or resources, leading to feelings of isolation and hopelessness (Schulz and Sherwood, 2008). In this context, quality of life and depression

are closely linked. Caregivers with a lower quality of life are more likely to experience symptoms of depression, which then further worsens their quality of life—creating a continuous and harmful cycle.

Overall, research highlights the importance of strong support systems for caregivers to reduce burden and enhance their quality of life and mental health. Addressing these connected challenges allows healthcare providers to better care for both caregivers and the older adults they support

2.17 Empirical Table

AUTHOR/YEAR	TITLE	SAMPLE SIZE	AIM OF STUDY	STUDY TYPE	CONCLUSION
Akosile et al., 2018	Informal caregiving burden and perceived social support in an acute stroke care facility	This study recruited 56 caregivers	This study was designed to evaluate the prevalence of caregiving burden and its association with patient and caregiver-related variables and also level of perceived social support in a sample of informal caregivers of stroke survivors at an acute stroke-care facility in Nigeria.	Fifty-six (21 males, 35 females) consecutively recruited informal caregivers of stroke survivors at the medical ward of a tertiary health facility in South-Southern Nigeria participated in this cross-sectional survey.	Informal care-giving burden was highly prevalent in this acute stroke caregiver sample and about one in every five of these caregivers rated social support low. This is a single centre study. Healthcare managers and professionals in acute care facilities should device strategies to minimize caregiver burden and these may include family education and involvement.
Boakye et al., 2017	Burden of Care and Quality of Life among Caregivers of Stroke Survivors: Influence of	Sixty (60) caregivers participated in this study out of which, 39(65.0%) were females. Forty-one	To determine the factors that significantly impact on the caregivers'	A cross sectional study design was used.	The level of functional limitations presented by the sampled stroke survivors in this study was the single major

	Clinical and Demographic Variables	(68.3%) of the caregivers were employed, of which 25(61.0%) were involved in blue collar jobs.	burden and their quality of life (QoL) in the process of caring for stroke survivors.		determinant of burden among the caregivers whilst sex, employment status, relationship to patient, and marital status of the caregivers also have appreciable impact on their QoL.
Caleb et al., 2015.	Stroke management: Informal caregivers' burdens and strains of caring for stroke survivors.	This study involved 157 (81 males and 76 females).	This study investigated informal caregivers' burden and strains of caring for stroke patients.	Data was analysed using Spearman's rank correlation coefficient.	Caring for stroke survivors put social, emotional, health and financial burdens and strains on the informal caregivers. Therefore, informal caregivers should be involved in the rehabilitation plan for stroke patients and their well-being should also be given adequate attention.
Imarhiagbe et al., 2017	Burden of Informal Caregivers of Stroke	64 stroke survivors were assessed for	To look at the burden of informal caregivers	A cross sectional study of 64 stroke	Reported burden of informal caregiving of about 33% is in

	Survivors: Validation of the Zarit Burden Interview in an African Population	demographics of age, gender, duration of follow-up since discharged from in-patient care, modified Rankin score at the time of discharge and at the time of evaluation for this study and the most important informal care giver at home was also assessed for whether care giving was telling on their health or life in any negative way. All the caregivers were subsequently assessed with the ZBI.	of stroke survivors using the Zarit burden interview (ZBI).	survivors Caregivers	our opinion huge. The moderate sensitivity and specificity of the ZBI means it could be safely used in the population studied.
Okeke et al., 2020	Care Burden Correlates with Depression among Informal	This study recruited 311 stroke caregivers by systematic random	This study aimed to determine the relationship between the	This cross-sectional study recruited 311 stroke caregivers by	Burden of care correlates with depression in informal caregivers of stroke survivors,

	Caregivers of Stroke Patients: A Cross Sectional Study in Lagos, Nigeria	sampling.	burden of care and depression in informal caregivers of stroke survivors.	systematic random sampling, at Lagos University Teaching Hospital in Nigeria, over six months. A structured questionnaire incorporating the Zarit Burden Interview and Patient Health Questionnaire-9 was used to obtain information on burden of care and depression, besides socio-demographics.	with the severity of each increasing with an increase in the other. Presence of burden of care in a stroke caregiver warrants a search for co-morbid depression, and vice versa. Stroke rehabilitation efforts should incorporate promotion of caregiver wellness.
Okonkwo et al., 2022	The Burden and Quality of life of Caregivers of Stroke Survivors with Cognitive Impairment in Selected Healthcare Facilities in Anambra State, Nigeria	This study involved 55 stroke survivor caregiver	The purpose of this study was to determine the burden and quality of life of caregivers of stroke survivors with cognitive impairment in selected healthcare	This was a cross-sectional survey using the World Health Organization QOL-BREF and Caregiver Strain Index (CSI) as instruments.	The quality of life of the caregivers of stroke survivors with cognitive impairment was moderate, and the caregivers' stress was high in the sample of the population studied.

			facilities in Anambra State, Nigeria.		
Rahman et al., 2018	Burden of stroke caregivers	This study involved 18 stroke caregivers	This study aimed to determine the caregivers' burden and challenges as reported by caregivers of stroke survivors.	A cross sectional study	This study highlighted the experiences by the caregivers in caring for the stroke survivors that focused on the different needs of the caregivers.
Runtian et al., 2024.	Depression mediates the association between burden and quality of life in informal caregivers of stroke survivors.	The analysis included 18 articles that reported 23 effect sizes (N = 3284)	This study used meta-analytical structural equation modelling (MASEM) to clarify the relationship between burden, depression, and quality of life in informal caregivers of stroke survivors.	Two researchers performed an independent initial searcher by using a unified search strategy.	Using the MASEM approach, it was observed that caregiver depression completely mediated the relation between burden and quality of life in informal caregivers of stroke survivors.
Saviour et al., 2020.	Caregiver burden and associated factors among	This study includes 88 informal caregivers.	The purpose of this study was to examine caregiver	A cross-sectional study of 88 informal caregiver of	Caregivers of stroke survivors with functional disabilities and caregivers

	informal caregivers of stroke survivors.		burden and associated factors among a cohort of informal caregivers of stroke survivors.	stroke survivors was completed.	experiencing depressive symptoms may have severer caregiver burden.
Yi Wang et al., 2021.	Burden of informal care in stroke survivors and its determinants: a prospective observational study in an Asian setting.	This study involves Three hundred and five patients and 263 patients examined at 3-months and 12-months.	This aimed to examine and quantify objective and subjective informal care burden after stroke; and explored the factors associated with informal care burden in Singapore.	A prospective observational study in an Asian setting.	Informal care burden remains high up to 12-months post-stroke. Factors such as functional dependency, stroke severity, informal caregiver gender and co-caring with foreign domestic workers were associated with informal care burden.

CHAPTER THREE

MATERIALS AND METHODOLOGY

3.1 Materials

3.1.1 Population

This study was conducted among caregivers of stroke survivors at University of Benin Teaching Hospital, Edo State Nigeria.

3.1.2 Selection Criteria

3.1.2.1 Inclusion Criteria

i. Primary caregivers of stroke survivors at UBTH.

ii. Caregivers aged 18 and above.

iii. Care recipient must have a clinically confirmed diagnosis of stroke.

iv. Caregiver must be mentally competent and able to provide informed consent.

3.1.2.2 Exclusion Criteria

i. Caregivers with severe illness or disability that prevents full participation.

3.1.3 Description of Instruments

Adult Carer Quality of Life Questionnaire (AC-QoL): The AC-QoL is a validated instrument designed to measure the quality of life among adult caregivers. It assesses eight distinct domains: support for caring, caring choice, caring stress, money matters, personal growth, sense of value, ability to care, and carer satisfaction (Elwick et al., 2010). The questionnaire is versatile, suitable for cross-sectional assessments or evaluating changes in quality of life following interventions. It is self-administered, making it practical for use in clinical and research settings.

Formatted[FNU]: Normal, Justified, Indent: First line: 0 mm, Line spacing: Double, No bullets or numbering

Reliability: The AC-QoL demonstrates good internal consistency, with Cronbach's alpha values ranging from 0.77 to 0.94 across its domains, indicating reliable measurement of caregiver quality of life (Elwick et al., 2010). Test-retest reliability has been reported as satisfactory, with intraclass correlation coefficients (ICCs) above 0.70 for most domains, confirming stability over time (Joseph et al., 2012).

Validity: The AC-QoL has strong construct validity, correlating well with other established quality-of-life measures, such as the WHOQOL-BREF (r = 0.65–0.80) (Elwick et al., 2010). It also exhibits discriminant validity, effectively distinguishing between caregivers with high and low burden levels. Content validity was ensured through development with input from caregivers and experts, confirming its relevance to the caregiving experience.

Scoring: The AC-QoL comprises 40 items, each rated on a 4-point Likert scale (0 = Never, 1 = Sometimes, 2 = Often, 3 = Always). Total scores range from 0 to 120, with higher scores indicating better quality of life. Subscale scores for each domain can also be calculated to provide detailed insights into specific aspects of caregiver well-being (Elwick et al., 2010). The scoring is straightforward, with summed totals interpreted relative to established cutoffs for low, moderate, and high quality of life.

Zarit Burden Interview (ZBI): The ZBI is a widely used, standardized tool for assessing caregiver burden, particularly in the context of chronic illness and disability. It evaluates the impact of caregiving on psychological well-being, financial situation, social life, and the caregiver's relationship with the care recipient (Zarit et al., 1980). The ZBI is globally recognized for its applicability across diverse populations, including African settings (Imarhiagbe et al., 2017).

Formatted[FNU]: Justified, Indent: Left: 0 mm, First line: 0 mm, No bullets or numbering

Reliability: The ZBI exhibits excellent internal consistency, with Cronbach's alpha values typically ranging from 0.85 to 0.93 across studies (Gratão et al., 2019). Test-retest reliability is

robust, with correlation coefficients ranging from 0.71 to 0.89, indicating consistent measurement over time (Hébert et al., 2000). The 22-item version, used in this study, maintains high reliability.

Validity: The ZBI has strong construct validity, showing significant correlations with measures of caregiver depression (e.g., BDI, r = 0.60–0.75) and quality of life (e.g., SF-36, r = -0.50 to -0.70) (Schulz & Sherwood, 2008). Concurrent validity is supported by its alignment with other burden scales, such as the Caregiver Strain Index (CSI). The ZBI's cross-cultural validity has been validated in African populations, including Nigeria, with moderate sensitivity and specificity (Imarhiagbe et al., 2017). Content validity was established through expert consensus and caregiver feedback during its development.

Scoring: The ZBI (22-item version) uses a 5-point Likert scale (0 = Never, 1 = Rarely, 2 = Sometimes, 3 = Quite Frequently, 4 = Nearly Always). Total scores range from 0 to 88, with higher scores indicating greater burden. Cutoff scores are commonly used: 0–20 (little or no burden), 21–40 (mild to moderate burden), 41–60 (moderate to severe burden), and 61–88 (severe burden) (Zarit et al., 1980). The scale can be summed for a total score or analyzed by subscales (e.g., personal strain, role strain) for deeper insights.

Beck Depression Inventory (BDI): The BDI is a 21-item self-report questionnaire designed to assess the severity of depressive symptoms in adolescents and adults. It is one of the most widely used tools in both research and clinical practice for evaluating depression, with established applicability in caregiver populations (Beck et al., 1961).

Formatted[FNU]: Justified, Indent: Left: 0 mm, First line: 0 mm, No bullets or numbering

Reliability: The BDI demonstrates high internal consistency, with Cronbach's alpha values ranging from 0.86 to 0.92 across diverse populations (Beck et al., 1988). Test-retest reliability is moderate to high (r = 0.60–0.90), depending on the time interval and population, indicating

stability for short-term assessments (American Psychological Association, 2023). Its reliability has been confirmed in caregiver studies, including those involving stroke caregivers.

Validity: The BDI has excellent construct validity, correlating strongly with other depression measures, such as the Hamilton Depression Rating Scale (r = 0.70–0.85) and the Center for Epidemiologic Studies Depression Scale (r = 0.65–0.80) (Saracino et al., 2020). Criterion validity is supported by its ability to differentiate between clinical and non-clinical populations. Content validity is robust, covering cognitive, affective, and somatic symptoms of depression, as defined by DSM criteria. Its validity in African populations, including Nigeria, has been established in prior studies (Ifeanyi et al., 2018).

Scoring: Each of the 21 items is rated on a 4-point scale (0 = symptom absent, 3 = severe symptom), with total scores ranging from 0 to 63. Standard cutoffs are: 0–13 (minimal depression), 14–19 (mild depression), 20–28 (moderate depression), and 29–63 (severe depression) (Beck et al., 1988). The total score is calculated by summing responses, with higher scores indicating greater depressive severity. The BDI is quick to administer (approximately 10 minutes) and easy to score.

3.2 Methods

3.2.1 Research Design

This study utilized a cross-sectional design to determine the level of caregiving burden, quality of life, and depression among caregivers of stroke survivors.

The cross-sectional design is most appropriate as it efficiently captures simultaneous data on caregiving burden quality of life and depression, enabling correlation analysis in a resource-constrained setting like Benin City. It provides baseline data for future research while accommodating diverse caregiver experiences without requiring longitudinal follow up.

3.2.2 Sampling Technique

The caregivers of stroke survivors were selected using a convenience sampling technique. Caregivers were approached in medical wards of UBTH and among outpatients and those willing to participate were included in the study.

3.2.3 Sample Size Calculation

Exact - Correlation: Bivariate normal model

Options: exact distribution

Analysis: A priori: Compute required sample size

Input: Tail(s) = Two

Correlation ρ H1 = 0.3

α err prob = 0.05

Power (1-β err prob) = 0.80

Correlation ρ H0 = 0

Output: Lower critical r = -0.2145669

Upper critical r = 0.2145669

Total sample size = 84

Actual power = 0.8003390

3.2.4 Ethical Consideration

Ethical approval was obtained from the Health Research Ethics Committee (HREC) of University of Benin Teaching Hospital. Confidentiality and anonymity of participants was ensured.

3.2.5 Procedure for Data Collection

The data for this study was obtained using a structured questionnaire which are in 3 parts alongside an introductory page which includes the participants' bio data and some demographic variables. Data were collected from caregivers of stroke survivors in the wards of UBTH and outpatient department.

After obtaining informed consent, participants were given questionnaire to fill and the questionnaires were retrieved immediately.

3.2.6 Data Analysis

Data was analysed using IBM SPSS Version 25. Descriptive statistics was used to summarize the data. Pearson correlation and regression analysis was used to determine associations between caregiver burden, quality of life, and depression. Level of significance was set at $p < 0.05$.

CHAPTER FOUR

RESULTS

4.1 Preamble

4.1.1 Sociodemographic characteristics of the respondents

Characteristics of the respondents

Out of 84 respondents, 53 (63.1%) were female. The majority were married 46 (54.8%). In terms of education, the 34 had a Bachelor's degree (40.5%). Regarding employment status, the largest group were employed (n = 32, 38.1%), closely followed by those who were self-employed (n = 30, 35.7%). By occupation, the most common was business (n = 34, 40.5%). Almost all respondents (88.1%) were Christians (n = 74). 74 (88.1%) of the respondents were currently living with a stroke survivor. The respondents' ages ranged from 18–58 years with a mean of 34.8 ± 11.4 years.

Table 4.1: Sociodemographic characteristics of the respondents N=84

	Frequency	Percentage
Gender		
Male	31	36.9
Female	53	63.1
Marital status		
Single	37	44.0
Married	46	54.8
Widowed	1	1.2
Educational status		
Primary Education	1	1.2
Secondary Education	33	39.3
Diploma	8	9.5
Bachelor's degree	34	40.5
Postgraduate degree (MSc/PhD)	8	9.5
Employment status		
Employed	32	38.1
Self employed	30	35.7
Retired	1	1.2
Unemployed	21	25.0
Occupation		
Accountant	1	1.2
Business	34	40.5
Caregiving	3	3.6
Carpentry	2	2.4
Civil Servant	4	4.8
Clergy	1	1.2
Driving	3	3.6
Electrician	1	1.2
Engineer	1	1.2
Higher Sales Executive	1	1.2
House-help	1	1.2
Lecturer/Teacher	5	6.0
Nil	12	14.3
Nursing	1	1.2
Pharmacist	2	2.4
Proprietor	1	1.2
Social worker	1	1.2
Student	10	11.9

Religion		
Christianity	74	88.1
Islam	9	10.7
Traditional African	1	1.2
Currently living with a stroke survivor		
Yes	74	88.1
No	10	11.9
	Range	**Mean ± SD**
Age (years)	18 – 58	34.75 ± 11.4

4.1.2 Information about caregiving among the respondents

Thirty respondents (35.7%) were sons or daughters of the stroke survivor, representing the largest proportion. 23 (27.4%) had provided care for 7–12 months, which was the most common caregiving duration. 45 respondents (53.6%) reported being the primary caregiver. A large majority, 73 (86.9%), reported receiving formal or informal support for caregiving duties, with the most common type of support being financial support from family members, reported by 43 respondents (51.2%).

4.1.3 Quality of life among stroke caregivers

The Adult Carer Quality of Life (QOL) scores among the caregivers ranged from 10 to 38, with a mean score of 23.4 ± 7.4, indicating a moderate overall quality of life.

4.1.4 Burden of care among the respondents

The caregivers' burden scores ranged from 0 to 34, with a mean score of 17.7 ± 10.2, indicating a moderate level of burden on average. 19 respondents (22.6%) reported severe burden of care.

4.1.5 Depression score among the respondents

The caregivers' depression scores ranged from 0 to 23, with a mean score of 7.5 ± 5.8, indicating generally low to moderate depressive symptoms on average. The largest proportion of respondents had minimal depression (n = 38, 45.2%).

4.1.6 Relationship between burden of care, quality of life and depression

There was a significant positive relationship between burden of care and depression ($r = 0.842$, $p < 0.001$). Burden of care was negatively correlated with care giver quality of life ($r = -0.814$, $p < 0.001$)

Table 4.2: Caregiving information about the respondents N=84

	Frequency	Percentage
Relationship to stroke survivor		
Spouse/Partner	21	25.0
Son/Daughter	30	35.7
Sibling	13	15.5
Extended Family	8	9.5
Non-relative/Friend/Caregiver	12	14.3
Length of caregiving to the stroke survivor		
less than 3months	9	10.7
3 - 6 months	15	17.9
7 - 12 months	23	27.4
1 - 2 years	20	23.8
2 - 5 years	17	20.2
Primary Caregiver		
Yes	45	53.6
No	39	46.4
Receiving formal or informal support for caregiving duties		
Yes	73	86.9
No	11	13.1
Description of support received		
Financial support from family members	43	51.2
Support from family members	21	25.0

Family and support groups	1	1.2
Salary	4	4.8
Support groups	2	2.4
NGOs	1	1.2
Paid help	1	1.2
Nil	11	13.1

Table 4.3: Quality of life score among the caregivers N=84

	Range	Mean ± SD
Adult Carer QOL Score	10 – 38	23.4 ± 7.4

Table 4.4: Burden of care among the caregivers N=84

	Range	**Mean ± SD**
Burden score	0 – 34	17.7 ± 10.2
Burden of care categories	**Frequency**	**Percentage**
Little or no burden	26	31.0
Mild to moderate burden	13	15.5
Moderate to severe burden	26	31.0
Severe burden	19	22.6

Table 4.5: Depression score among the caregivers

	Range	**Mean ± SD**
Depression score	0 – 23	7.5 ± 5.8
Severity	**Frequency**	**Percentage**
Minimal depression	38	45.2
Mild depression	11	13.1
Moderate depression	20	23.8
Severe depression	15	17.9

Table 4.6: Pearson correlation between burden of care, quality of life and depression

	r	p
Burden of care * Depression	0.842	<0.001
Burden of care * QOL	-0.814	<0.001

4.2 Hypothesis Testing

Hypothesis 1: There would be no significant relationship between the burden of caregiving and the quality of life of caregivers of stroke survivors.

Alpha level: 0.05

Test statistic: Pearson's correlation

Observed: $p < 0.05$

Since the observed p value was lesser than 0.05 Alpha level. The hypothesis was therefore REJECTED

Hypothesis 2: There would be no significant relationship between the burden of caregiving and depression in caregivers of stroke survivors.

Alpha level: 0.05

Test statistic: Pearson's correlation

Observed: $p < 0.05$

Since the observed p value was lesser than 0.05 Alpha level. The hypothesis was therefore REJECTED

CHAPTER FIVE

5.1 DISCUSSION

Sociodemographic Characteristics of Caregivers

The finding that the majority of caregivers were female (63.1%) aligns with a substantial body of research indicating that caregiving for stroke survivors is a role predominantly undertaken by women. Okeke et al. (2020) in a Lagos-based study, reported that 57.6% of informal caregivers were female, a figure remarkably similar to the present study. This trend is also consistent with findings from studies in Nigeria by Akosile et al. (2018) and Gbiri et al. (2015), as well as international studies by Boakye et al. (2017) in Ghana and Rahman et al. (2018) in Malaysia. This suggests a widespread socio-cultural pattern where women are often the primary caregivers within the family structure. This may be rooted in traditional gender roles that place the responsibility of nurturing and care on women.

The mean age of caregivers in the present study was 34.8 years, which is younger than the mean age of caregivers in similar studies. Imarhiagbe et al. (2017) in a study also conducted in Benin City, found a mean caregiver age of 40.67 years, while Okeke et al. (2020) reported a mean age of 41.1 years. This discrepancy might be due to a higher proportion of children, adolescents and younger adults taking on caregiving roles in the current study's population. The finding that the largest group of caregivers were the children of the stroke survivors (35.7%) supports this interpretation. This is a common finding in the Nigerian context, as Gbiri et al. (2015) also found that children were the most frequent caregivers.

Caregiver Burden

The present study found a moderate level of burden among caregivers, with a mean score of 17.7. However, it is noteworthy that a high proportion of caregivers (22.6%) experienced severe burden. This

is a crucial finding, as it highlights the substantial strain that caregiving can place on individuals. This finding is consistent with the results of a study by Okeke et al. (2020), who found that 75.2% of caregivers experienced some level of burden. The prevalence of high caregiver burden has been consistently reported in the literature, both locally in Nigeria and internationally (Akosile et al., 2018; Boakye et al., 2017).

The level of burden experienced by caregivers is often linked to the functional dependence of the stroke survivor. Boakye et al. (2017) found a significant positive association between the strain experienced by caregivers and the functional limitation of the stroke survivors. Although the present study did not directly measure the stroke survivors' functional status, it is a well-established predictor of caregiver burden and likely contributes to the burden observed in this study. The financial strain of caregiving is another significant factor, as highlighted by Rahman et al. (2018).

Quality of Life of Caregivers

The present study found that caregivers of stroke survivors have a moderate overall quality of life, with a mean score of 23.4. This suggests that while caregiving is burdensome, caregivers are able to maintain a reasonable quality of life. However, it is important to note that this is an average, and individual experiences may vary significantly. Okonkwo et al. (2022) found that while some domains of quality of life were moderate, psychological health was low among caregivers of stroke survivors with cognitive impairment. This suggests that the psychological impact of caregiving may be particularly pronounced.

The negative correlation between caregiver burden and quality of life is well-documented in the literature. The present study's finding of a strong negative correlation ($r = -0.814$) is consistent with the findings of Ogunlana et al. (2014), who also reported a significant negative correlation between

caregiver burden and quality of life. This suggests that as the burden of caregiving increases, the caregiver's quality of life tends to decrease. This is a critical finding with important implications for the well-being of caregivers.

Depression in Caregivers

The mean depression score of 7.5 in the present study indicates that caregivers experienced low to moderate depressive symptoms. However, a notable percentage of caregivers (17.9%) were found to have severe depression. This is a serious concern and underscores the mental health risks associated with caregiving. Okeke et al. (2020) reported a higher prevalence of depression (59.5%) in their study, which may be due to differences in the outcome measures used or the specific characteristics of the study population.

The strong positive correlation between caregiver burden and depression (r = 0.842) found in the present study is consistent with the results of Okeke et al. (2020). This suggests that caregivers who experience a higher burden are also more likely to experience depressive symptoms. This relationship has been observed in a number of studies and is a central theme in the caregiving literature (Achilike et al., 2020). The emotional and physical strain of caregiving can lead to feelings of hopelessness and sadness, which are characteristic of depression.

5.2 Conclusion

The caregiver burden among caregivers of stroke survivors in Benin City is moderate. They also have moderate overall quality of life and experienced mild to moderate depressive symptoms. Care giver burden is linked with both quality of life and depressive symptoms. With increasing caregiver burden, quality of life deceases and the severity of depressive symptoms increase.

5.3 Recommendations

Based on the findings of this study, the following recommendations are proposed:

i. Integrate Caregiver Assessment: Healthcare providers should routinely assess the well-being of caregivers, including their level of burden, quality of life, and mental health. The strong correlation between these factors means that identifying a problem in one area should trigger screening in the others.

ii. Provide Education and Training: Caregivers should be educated on the nature of stroke, its potential complications, and effective management strategies. Practical training on patient handling, mobility assistance, and managing behavioral changes can reduce the physical and emotional strain of caregiving.

iii. Promote Mental Health Support: Given the high prevalence of depressive symptoms, caregivers should be screened for depression and referred to mental health services or counseling when necessary. Encouraging participation in support groups can also provide emotional relief and a sense of community.

iv. Adopt a Family-Centered Approach: Rehabilitation plans should be developed collaboratively with both the stroke survivor and the primary caregiver. This ensures that the plan is realistic and considers the caregiver's capacity and well-being.

v. Establish Formal Support Systems: Hospitals and healthcare systems should develop structured support programs for caregivers. This could include respite care services, dedicated caregiver resource centers, and telephone support lines.

vi. Improve Access to Social Support: Policies should be implemented to facilitate access to social and financial support for families affected by stroke. This is crucial as financial strain was identified as a major contributor to caregiver burden in the referenced literature.

vii. Public Awareness Campaigns: Public health initiatives should aim to raise awareness about the challenges faced by caregivers and promote a culture of community support for these individuals.

viii. Encourage Help-Seeking Behavior: Caregivers should be encouraged to recognize their own needs and seek help when they feel overwhelmed. Family members and the wider community should be educated on how to offer practical and emotional support to caregivers.

ix. Foster Peer Support: Establishing local or online support groups can connect caregivers with one another, allowing them to share experiences, advice, and coping strategies.

5.4 Implications for Further Study

i. Longitudinal Studies: Longitudinal studies are needed to track changes in caregiver burden, quality of life, and depression over time, from the acute phase of stroke through to long-term community care. This would provide a more dynamic understanding of the caregiving journey.

ii. Intervention-Based Research: Future research should focus on designing and evaluating the effectiveness of interventions aimed at reducing caregiver burden and improving mental health. This could include randomized controlled trials of educational programs, counseling services, respite care, and technology-based support systems.

iii. Exploring the Impact of Stroke Survivor Characteristics: While this study focused on the caregiver, future research should incorporate detailed assessments of the stroke survivor's functional, cognitive, and emotional status. This would allow for a more comprehensive analysis of how specific patient-related factors contribute to caregiver outcomes.

iv. Qualitative Research: Qualitative studies, such as in-depth interviews and focus groups, could provide a richer understanding of the lived experiences of caregivers in Benin City. This would help to uncover the specific cultural, social, and economic factors that shape their experience

and inform the development of culturally sensitive support services.

v. Comparative Studies: Comparative studies examining the experiences of caregivers in different regions of Nigeria (urban vs. rural) and across different healthcare settings (public vs. private) could provide valuable insights into the influence of context on caregiver well-being.

REFERENCES

Achilike, S., Beauchamp, J.E., Cron, S.G., Okpala, M., Payen, S.S., Baldridge, L., Okpala, N., Montiel, T.C., Varughese, T., Love, M. and Fagundes, C., 2020. Caregiver burden and associated factors among informal caregivers of stroke survivors. Journal of Neuroscience Nursing, 52(6), p.277.

Adelman, R.D., Tmanova, L.L., Delgado, D., Dion, S. And Lachs, M.S., 2014. Caregiver burden: a clinical review. JAMA, 311(10), pp.1052-1060.

Akosile, C. O., Banjo, T. O., Okoye, E. C., Ibikunle, P. O., & Odole, A. C. (2018). Informal caregiving burden and perceived social support in an acute stroke care facility. Health and quality of life outcomes, 16(1), 57.

Akosile, C.O., Banjo, T.O., Okoye, E.C., Ibikunle, P.O. and Odole, A.C., 2018. Informal caregiving burden and perceived social support in an acute stroke care facility. Health and quality of life outcomes, 16(1), pp.1-7.

Alawieh, A., Zhao, J. And Feng, W., 2018. Factors affecting post-stroke motor recovery: Implications on neurotherapy after brain injury. Behavioural Neurology, 2018, pp.1–13.

Alemayehu, T.T., Wassie, Y.A., Tadesse, G., Fentahun, S., Yazie, A.S., Mengistie, B.A., Worku, M.C., Mulatu, A., Bekalu, A.F., Gebremeskel, E.D. and Belete, R., 2024. Prevalence of depression and associated factors among caregivers of stroke survivors in developing countries: a systematic review and meta-analysis. Current Problems in Cardiology, p.102876.

Alquwez, N. And Alshahrani, A.M., 2021. Influence of spiritual coping and social support on the mental health and quality of life of the Saudi informal caregivers of patients with stroke. Journal of Religion and Health, 60(2), pp.787-803.

American Psychological Association, 2019. Publication manual of the American Psychological Association. 7th ed. Washington, DC: American Psychological Association.

American Stroke Association, 2022. Stroke symptoms. [online]

Andersen, K.K. and Olsen, T.S., 2015. The obesity paradox in stroke: Lower mortality and lower risk of readmission for recurrent stroke in obese stroke patients. International Journal of Stroke, 10(1), pp.99–104.

AT, O.B., 1961. Beck Depression Inventory (BDI). Archives of General Psychiatry, 4, pp.561-571.

Batchelor, F., Hill, K., Mackintosh, S. And Said, C., 2010. What works in falls prevention after stroke? A systematic review and meta-analysis. Stroke, 41(8), pp.1715–1722.

Bhuiyan, M.I., Hasan, M.M., Islam, M.S. and Haque, M.A., 2014. Neuroanatomy: Circle of Willis. In: Inderbir Singh's Textbook of Human Neuroanatomy. 9th ed. New Delhi: Jaypee Brothers Medical Publishers, pp.40–41.

Boakye, H., Nsiah, A., Bello, A. I. And Quartey, J. N. A. (2017) "Burden of Care and Quality of Life among Caregivers of Stroke Survivors: Influence of Clinical and Demographic Variables", Journal of Advances in Medicine and Medical Research, 20(6), pp. 1–10. Doi: 10.9734/BJMMR/2017/31903.

Boakye, H., Nsiah, A., Bello, A.I. and Quartey, J.N.A., 2017. Burden of care and quality of life among caregivers of stroke survivors: influence of clinical and demographic variables. British Journal of Medicine and Medical Research, 20(6), pp.1-10.

Brainin, M., Feigin, V.L., Norrving, B., Martins, S.O., Pandian, J., Lindsay, P., Grupper, M.F. and Rautalin, I., 2025. World Stroke Organization: Global Stroke Fact Sheet 2025. International Journal of Stroke, 20(2), pp.132–144.

Bruni, J.E., 2009. Human Neuroanatomy. New York: Oxford University Press.

Camak, D.J., 2015. Addressing the burden of stroke caregivers: a literature review. Journal of Clinical Nursing, 24(17-18), pp.2376–2382.

Cameron, J.I., Cheung, A.M., Streiner, D.L., Coyte, P.C. and Stewart, D.E., 2011. Stroke survivor depressive symptoms are associated with family caregiver depression during the first 2 years poststroke. Stroke, 42(2), pp.302-306.

Caqueo-Urízar, A., Gutiérrez-Maldonado, J. And Miranda-Castillo, C., 2009. Quality of life in caregivers of patients with schizophrenia: a literature review. Health and Quality of Life Outcomes, 7, pp.1-5.

Carson, A.J., MacHale, S., Allen, K., Lawrie, S.M., Dennis, M., House, A. And Sharpe, M., 2000. Depression after stroke and lesion location: A systematic review. The Lancet, 356(9224), pp.122–126.

Chadda, R.K., 2014. Caring for the family caregivers of persons with mental illness. Indian Journal of Psychiatry, 56(3), pp.221-227.

Chen, Y., Abel, K.T., Janecek, J.T., Chen, Y., Zheng, K. And Cramer, S.C., 2019. Home-based technologies for stroke rehabilitation: a systematic review. International Journal of Medical Informatics, 123, pp.11–22.

Chohan, S.A., Venkatesh, P.K. and How, C.H., 2019. Long-term complications of stroke and secondary prevention: An overview for primary care physicians. Singapore Medical Journal, 60(12), pp.616–620.

Choudhury, M.J., Dastidar, M.G., Roy, R.P., Chatterjee, A. And Basu, B., 2015. Risk factors of stroke in coastal regions of India: A prospective case-control study. Journal of Marine Medical Society, 17(2), pp.135–139.

Denno, M.S., Gillard, P.J., Graham, G.D., DiBonaventura, M.D., Goren, A., Varon, S.F. and Zorowitz, R., 2013. Anxiety and depression associated with caregiver burden in caregivers of stroke survivors with spasticity. Archives of Physical Medicine and Rehabilitation, 94(9), pp.1731-1736.

Doberstein, C., Torabi, R. And Klinge, P.M., 2017. Current concepts in the pathogenesis, diagnosis, and management of cerebral venous sinus thrombosis. Neurosurgery Clinics of North America, 28(4), pp.511–520.

Dobkin, B.H. and Dorsch, A., 2013. New evidence for therapies in stroke rehabilitation. Current Atherosclerosis Reports, 15(6), pp.1–9.

Dodds, T.A., Martin, D.P., Stolov, W.C. and Deyo, R.A., 1993. A validation of the functional independence measurement and its performance among rehabilitation inpatients. Archives of Physical Medicine and Rehabilitation, 74(5), pp.531–536.

Drentea, P., 2007. Caregiving. In: The Blackwell Encyclopedia of Sociology. Oxford: Blackwell Publishing.

Em, S., Bozkurt, M., Caglayan, M., Cevik, F.C., Kaya, C., Oktayoglu, P. And others, 2017. Psychological health of caregivers and association with functional status of stroke patients. Topics in Stroke Rehabilitation, 24(5), pp.323-329.

Fatoye, Femi & Komolafe, Morenikeji & Adewuya, Abiodun & Fatoye, G. (2006). Emotional distress and self-reported quality of life of primary caregivers of stroke survivors in Nigeria. East African medical journal. 83. 271-9. 10.4314/eamj.v83i5.9433.

Feigin, V.L., Brainin, M., Norrving, B., Martins, S., Sacco, R.L., Hacke, W., Fisher, M., Pandian, J. And Lindsay, P., 2022. World Stroke Organization (WSO): global stroke fact sheet 2022. International Journal of Stroke, 17(1), pp.18-29.

Gbiri, C.A., Olawale, O.A. and Isaac, S.O., 2015. Stroke management: Informal caregivers' burdens and strians of caring for stroke survivors. Annals of physical and rehabilitation medicine, 58(2), pp.98-103.

Ghazali, S. And others, 2015. Burden of caregivers of the elderly: associated factors in an urban setting in Malaysia. Malaysian Journal of Public Health Medicine, 15(3), pp.1-9.

Gil-Salcedo, A., Dugravot, A., Fayosse, A., Jacob, L., Bloomberg, M., Sabia, S. And others, 2022. Long-term evolution of functional limitations in stroke survivors compared with stroke-free controls: findings from 15 years of follow-up across 3 international surveys of aging. Stroke, 53(1), pp.228–237.

Goldstein, L.B., 2014. Acute ischemic stroke treatment in 2007. Circulation, 116(13), pp.1504–1514.

Gonzalez, C. And Bakas, T., 2013. Factors associated with stroke survivor behaviors as identified by family caregivers. Rehabilitation Nursing Journal, 38(4), pp.202-211.

Gratão, A.C.M., Brigola, A.G., Ottaviani, A.C., Luchesi, B.M., Souza, É.N., Rossetti, E.S., Oliveira, N.A.D., Terassi, M. And Pavarini, S.C.I., 2019. Brief version of Zarit Burden Interview (ZBI) for burden assessment in older caregivers. Dementia & Neuropsychologia, 13(1), pp.122-129.

Grysiewicz, R.A., Thomas, K. And Pandey, D.K., 2008. Epidemiology of ischemic and hemorrhagic stroke: Incidence, prevalence, mortality, and risk factors. Neurologic Clinics, 26(4), pp.871–895.

Guo, J., Liu, C., Wang, Y., Liu, Y., He, B., Zhou, M., Liu, M. And Zhang, X., 2016. Different risk factor profiles between subtypes of ischemic stroke: A nationwide hospital-based study. International Journal of Stroke, 11(8), pp.897–903.

Guo, Y.L. and Liu, Y.J., 2015. Family functioning and depression in primary caregivers of stroke patients in China. International Journal of Nursing Sciences, 2(2), pp.184-189.

Hackshaw, A., Morris, J.K., Boniface, S., Tang, J.L. and Milenković, D., 2018. Low cigarette consumption and risk of coronary heart disease and stroke: Meta-analysis of 141 cohort studies in 55 study reports. BMJ, 360, p.j5855.

Henriksson, K.M., Farahmand, B., Åsberg, S., Edvardsson, N. And Terént, A., 2012. Comparison of cardiovascular risk factors and survival in patients with ischemic or hemorrhagic stroke. International Journal of Stroke, 7(5), pp.419–425.

Hoyer, E.H., Celnik, P.A. and Dobkin, B.H., 2013. Measuring functional outcome in stroke rehabilitation: The role of the functional independence measure. Topics in Stroke Rehabilitation, 20(3), pp.189–196.

Hsueh, K.H., Bachman, J.A., Richardson, L.I., Cheng, W.Y. and Zimmerman, R.S., 2014. Mechanisms through which reciprocal filial values protect wellbeing of Chinese adult-child caregivers in the US. Research in Nursing & Health, 37(2), pp.155-166.

Hummel, F., Celnik, P., Giraux, P., Floel, A., Wu, W.H., Gerloff, C. And Cohen, L.G., 2005. Effects of non-invasive cortical stimulation on skilled motor function in chronic stroke. Brain, 128(3), pp.490–499.

Hydzik, A., Opławski, M., Trystuła, M. And Pąchalska, M., 2023. Quality of life of a patient with persistent complications after SARS-CoV-2 infection requiring urgent surgical intervention–endarterectomy with emergency angioplasty of an inflamed, bleeding right internal carotid artery (RICA) using the trans-carotid artery revascularization (TCAR). Acta Neuropsychological, 21, pp.259-278.

Ifeanyi, U.C., Sa'ad, F.S., Martin, O.C., Monday, M.S. and Onyinyechukwu, N.J., 2018. Prevalence of depression among primary caregivers of stroke survivors in Nigeria. Middle East Journal of Rehabilitation and Health, 5(2), pp.1-6.

Imarhiagbe, F.A., Asemota, A.U., Oripelaye, B.A., Akpekpe, J.E., Owolabi, A.A., Abidakun, A.O., Akemokwe, F.M., Ogundare, V.O., Azeez, A.L. and Osakue, J.O., 2017. Burden of informal caregivers of stroke survivors: Validation of the Zarit burden interview in an African population. Annals of African medicine, 16(2), p.46.

Imarhiagbe, Frank & Asemota, AU & Oripelaye, BA & Akpekpe, J. & Owolabi, AA & Abidakun, Oladotun & Akemokwe, Fatai & Ogundare, V. & Azeez, Abiodun & Osakue, J.. (2017). Burden of Informal Caregivers of Stroke Survivors: Validation of the Zarit Burden Interview in an African Population. Annals of African Medicine. 16. 46. 10.4103/aam.aam_213_16.

Jeste, D.V., Mausbach, B. And Lee, E.E., 2021. Caring for caregivers/care partners of persons with dementia. International Psychogeriatrics, 33(4), pp.307-310.

Johnston, S.C., Easton, J.D., Farrant, M., Barsan, W., Conwit, R.A., Elm, J.J., Kim, A.S., Lindblad, A.S. and Palesch, Y.Y., 2018. Clopidogrel and aspirin in acute ischemic stroke and high-risk TIA. New England Journal of Medicine, 379(3), pp.215–225.

Johnston, S.C., Gress, D.R., Browner, W.S. and Sidney, S., 2019. Short-term prognosis after emergency department diagnosis of TIA. JAMA, 284(22), pp.2901–2906.

Jokinen, H., Melkas, S., Ylikoski, R., Pohjasvaara, T., Kaste, M., Erkinjuntti, T. And Hietanen, M., 2015. Post-stroke cognitive impairment is common even after successful clinical recovery. European Journal of Neurology, 22(9), pp.1288-1294.

Kalra, L., Evans, A., Perez, I., Melbourn, A., Patel, A., Knapp, M. And Donaldson, N., 2004. Training carers of stroke patients: randomised controlled trial. BMJ, 328(7448), p.1099.

Kim, J. And Kim, Y., 2018. Association between physical activity and stroke in a Korean population: A cross-sectional study. Journal of Clinical Medicine, 7(12), p.507.

Lai, C.K., 2017. Formal caregivers, informal caregivers, and carers. [online]

Larén, A., Odqvist, A., Hansson, P.O. and Persson, C.U., 2018. Fear of falling in acute stroke: The Fall Study of Gothenburg (FallsGOT). Topics in Stroke Rehabilitation, 25(4), pp.256-260.

Liu, Z., Heffernan, C. And Tan, J., 2020. Caregiver burden: a concept analysis. International Journal of Nursing Sciences, 7(4), pp.438-445.

Loh, A.Z., Tan, J.S., Zhang, M.W. and Ho, R.C., 2017. The global prevalence of anxiety and depressive symptoms among caregivers of stroke survivors. Journal of the American Medical Directors Association, 18(2), pp.111-116.

Magwood, G.S., Ellis, C., Nichols, M., Burns, S.P., Jenkins, C., Woodbury, M. And Adams, R., 2019. Barriers and facilitators of stroke recovery: perspectives from African Americans with stroke, caregivers and healthcare professionals. Journal of Stroke and Cerebrovascular Diseases, 28(9), pp.2506-2516.

Mahony, F.I. and Barthel, D.W., 1965. Functional evaluation: The Barthel Index. Maryland State Medical Journal, 14, pp.61–65.

Mandowara, B., Patel, A.N., Amin, A.A., Phatak, A. And Desai, S., 2020. Burden faced by caregivers of stroke patients who attend rural-based medical teaching hospital in Western India. Annals of Indian Academy of Neurology, 23(1), pp.38–43.

Mandowara, B., Patel, A.N., Amin, A.A., Phatak, A. And Desai, S., 2020. Burden faced by caregivers of stroke patients who attend rural-based medical teaching hospital in Western India. Annals of Indian Academy of Neurology, 23(1), pp.38–43.

Martin, R.L. and Kessler, M., 2015. Neuroanatomy Text and Atlas. 4th ed. New York: McGraw-Hill Education.

McCullagh, E., Brigstocke, G., Donaldson, N. And Kalra, L., 2005. Determinants of caregiving burden and quality of life in caregivers of stroke patients. Stroke, 36(10), pp.2181-2186.

Mehta, S.R., 1984. Hematologic aspects of stroke. Neurologic Clinics, 2(1), pp.135–147.

Mirzaei, M., 2017. Stroke in women: Risk factors and clinical presentation. Journal of Neurology and Stroke, 7(3), pp.1–5.

Montaño, A., Hanley, D.F. and Hemphill, J.C., 2021. Hemorrhagic stroke. Handbook of Clinical Neurology, 176, pp.229–248.

Moore, K.L., Dalley, A.F. and Agur, A.M.R., 2017. Clinically Oriented Anatomy. 8th ed. Philadelphia: Wolters Kluwer.

O'Donnell, M.J., Chin, S.L., Rangarajan, S., Xavier, D., Liu, L., Zhang, H., Rao-Melacini, P., Zhang, X., Pais, P., Agapay, S. And Lopez-Jaramillo, P., 2016. Global and regional effects of potentially modifiable risk factors associated with acute stroke in 32 countries (INTERSTROKE): A case-control study. The Lancet, 388(10046), pp.761–775.

Ogunlana, M.O., Dada, O.O., Oyewo, O.S., Odole, A.C. and Ogunsan, M.O., 2014. Quality of life and burden of informal caregivers of stroke survivors. Hong Kong Physiotherapy Journal, 32(1), pp.6-12.

Ogunrin, A.O. and Ogundare, O., 2017. Impact of diabetes mellitus on stroke outcome in Nigeria. Journal of Stroke and Cerebrovascular Diseases, 26(10), pp.2278–2283.

Okeke, P.C., Oparah, S.K., Oboke, S.O. and Inem, V., 2020. Care Burden Correlates with Depression among Informal Caregivers of Stroke Patients: A Cross Sectional Study in Lagos, Nigeria. International Journal of Caring Sciences, 13(2), p.1402.

Okonkwo, U. P., Agbo, C. F., Ibeneme, S. C., Igwe, E. S., Akosile, C. O., Onwuakagba, I. U., Emmanuel, O. C., Maduagwu, S. M., Ezenwankwo, E. F., & Ekechukwu, E. N. (2022). The Burden and Quality of life of Caregivers of Stroke Survivors with Cognitive Impairment in Selected Healthcare Facilities in Anambra State, Nigeria. Gerontology & geriatric medicine, 8, 23337214221126329.

Okonkwo, U.P., Agbo, C.F., Ibeneme, S.C., Igwe, E.S., Akosile, C.O., Onwuakagba, I.U., Okoye, E.C., Maduagwu, S.M., Ezenwankwo, E.F. and Ekechukwu, E.N., 2022. The Burden and Quality of life of Caregivers of Stroke Survivors with Cognitive Impairment in Selected Healthcare Facilities in Anambra State, Nigeria. Gerontology & geriatric medicine, 8, p.23337214221126329.

Paci, M., 2003. Physiotherapy based on the Bobath concept for adults with post-stroke hemiplegia: A review of effectiveness. Journal of Rehabilitation Medicine, 35(1), pp.2–7.

Panzeri, A., Rossi Ferrario, S. And Vidotto, G., 2019. Interventions for psychological health of stroke caregivers: a systematic review. Frontiers in Psychology, 10, p.2045.

Pearlin, L.I., Mullan, J.T., Semple, S.J. and Skaff, M.M., 1990. Caregiving and the stress process: an overview of concepts and their measures. The Gerontologist, 30(5), pp.583-594.

Pop, R.S., Payne, S., Tint, D., Pop, C.P. and Mosoiu, D., 2022. Instruments to assess the burden of care for family caregivers of adult palliative care patients. International Journal of Palliative Nursing, 28(2), pp.80-99.

Pucciarelli, G., Ausili, D., Galbussera, A.A., Rebora, P., Savini, S., Simeone, S., Alvaro, R. And Vellone, E., 2018. Quality of life, anxiety, depression and burden among stroke caregivers: a

longitudinal, observational multicentre study. Journal of Advanced Nursing, 74(8), pp.1875-1887.

Purves, D., Augustine, G.J., Fitzpatrick, D., Katz, L.C., LaMantia, A.S., McNamara, J.O. and Williams, S.M., 2001. Neuroscience. 2nd ed. Sunderland: Sinauer Associates.

Qualls, S.H. and Kenny, M., 2008. Caregiver Reaction Scale. Unpublished assessment.

Rahman, M.M., Suut, N.B., Putit, Z.B., Arif, M.T., Said, A.B., Suhaili, M.R.B., Fadzillah, M., Bakon, F.A., Tambi, Z.B. and Kee, L.H., 2018. Burden of Stroke Caregivers: Evidence from a Qualitative Study in Sarawak, Malaysia. Bangladesh Journal of Medical Science, 17(4), pp.593-599.

Rerkasem, K., Tharavanij, T., Chotikanuchit, S., Wongthanee, A. And Rerkasem, A., 2020. Carotid endarterectomy for symptomatic carotid stenosis. Cochrane Database of Systematic Reviews, (9).

Rochmah, T.N., Rahmawati, I.T., Dahlui, M., Budiarto, W. And Bilqis, N., 2021. Economic burden of stroke disease: a systematic review. International Journal of Environmental Research and Public Health, 18(14), p.7552.

Rosner, J., Davis, A. And Grandhi, R., 2023. The circle of Willis: Anatomical variations and their aneurysms. Neurosurgery Clinics of North America, 34(2), pp.165–174.

Roth, D.L., Brown, S.L., Rhodes, J.D. and Haley, W.E., 2018. Reduced mortality rates among caregivers: does family caregiving provide a stress-buffering effect? Psychology and Aging, 33(4), pp.619-629.

Saracino, R.M., Aytürk, E., Cham, H., Rosenfeld, B., Feuerstahler, L.M. and Nelson, C.J., 2020. Are we accurately evaluating depression in patients with cancer? Psychological Assessment, 32(1), pp.98-107.

Schulz, R. And Sherwood, P.R., 2008. Physical and mental health effects of family caregiving. Journal of Social Work Education, 44(sup3), pp.105-113.

Schulz, R., Beach, S.R., Czaja, S.J., Martire, L.M. and Monin, J.K., 2020. Family caregiving for older adults. Annual Review of Psychology, 71, pp.635-659.

Sico, J.J., Yaggi, H.K., Ofner, S., Concato, J., Austin, C., Ferguson, J., Qin, L., Tobias, L., Taylor, S., Vaz Fragoso, C.A. and Bravata, D.M., 2016. Poststroke seizures and the risk of mortality and recurrent seizures: A systematic review and meta-analysis. Stroke, 47(12), pp.2970–2976.

Stevens, E., Emmett, E., Wang, Y., McKevitt, C. And Wolfe, C., 2017. The burden of stroke in Europe. London: Stroke Alliance for Europe.

Sun, S. And Wang, S., 2015. The Children's Depression Inventory in worldwide child development research: a reliability generalization study. Journal of Child and Family Studies, 24(8), pp.2352-2363.

Trajković, G., Starčević, V., Latas, M., Leštarević, M., Ille, T., Bukumirić, Z. And Marinković, J., 2011. Reliability of the Hamilton Rating Scale for Depression: a meta-analysis over a period of 49 years. Psychiatry Research, 189(1), pp.1-9.

Van Vliet, P., Lincoln, N.B. and Foxall, A., 2005. Comparison of Bobath based and movement science based treatment for stroke: A randomised controlled trial. Journal of Neurology, Neurosurgery & Psychiatry, 76(4), pp.503–508.

Vitaliano, P.P., Zhang, J. And Scanlan, J.M., 2003. Is caregiving hazardous to one's physical health? A meta-analysis. Psychological Bulletin, 129(6), pp.946-972.

Vrselja, Z., Brkić, H., Mrdenović, S., Radovanović, R. And Filipović, V., 2014. Function of circle of Willis. Journal of Cerebral Blood Flow & Metabolism, 34(4), pp.578–584.

Watson, H.G., Keeling, D.M. and Laffan, M.A., 2009. Laboratory investigation of suspected bleeding disorders. British Journal of Haematology, 145(2), pp.155–165.

Weimar, C., Ziegler, A., König, I.R. and Diener, H.C., 2002. Predicting functional outcome and survival after acute ischemic stroke. Journal of Neurology, 249(7), pp.888–895.

Werner, C., Gerards, M., Hesse, S. And von Frankenberg, S., 2022. Body weight-supported treadmill training for patients with neurological disorders: A review of its impact on gait and mobility. Neurorehabilitation, 50(2), pp.189–201.

Willey, J.Z., Moon, Y.P., Kahn, E., Rodriguez, C.J., Rundek, T., Cheung, K., Wright, C.B., Sacco, R.L. and Elkind, M.S., 2017. Population attributable risks of hypertension and diabetes for cardiovascular disease and stroke in the northern Manhattan study. Journal of the American Heart Association, 6(9), p.e006106.

Woodford, J., Farrand, P., Watkins, E.R. and Llewellyn, D.J., 2018. "I don't believe in leading a life of my own, I lead his life": a qualitative investigation of difficulties experienced by

informal caregivers of stroke survivors experiencing depressive and anxious symptoms. Clinical Gerontologist, 41(4), pp.293–307.

World Health Organization, 2019. Cardiovascular diseases. [online] [Accessed 2 Oct. 2021].

World Health Organization, 2019. WHOQOL: Measuring Quality of Life.

Yu, J., Yap, P. And Liew, T.M., 2019. The optimal short version of the Zarit Burden Interview for dementia caregivers: diagnostic utility and externally validated cutoffs. Aging & Mental Health, 23(6), pp.706-710.

Yuen, E.Y. and Wilson, C.J., 2021. The relationship between cancer caregiver burden and psychological outcomes: the moderating role of social connectedness. Current Oncology, 29(1), pp.14-26.

Zarit, S.H., Reever, K.E. and Bach-Peterson, J., 1980. Relatives of the impaired elderly: correlates of feelings of burden. The Gerontologist, 20(6), pp.649-655.

Zuccarello, M., Brott, T., Derex, L., Kothari, R., Sauerbeck, L., Tew, J., Van Loveren, H., Yeh, H.S., Tomsick, T. And Pancioli, A., 1999. Early surgical treatment for supratentorial intracerebral hemorrhage: A randomized feasibility study. Stroke, 30(9), pp.1833–1839.

ZARIT BURDEN INTERVIEW

ASSESSING CAREGIVER BURDEN

	Never	Rarely	Sometimes	Frequently	Nearly Always
Do you feel stressed between caring for your relative and trying to meet other responsibilities for your family or work?	0	1	2	3	4
Do you feel that your relative currently affects your relationship with other family members or friends in a negative way?	0	1	2	3	4
Do you feel that your social life has suffered because you are caring for your relative?	0	1	2	3	4
Do you wish you could just leave the care of your relative to someone else?	0	1	2	3	4
Do you feel strained when you are around your relative?	0	1	2	3	4
Do you feel that you do not have as much privacy as you would like because of your relative?	0	1	2	3	4
Do you feel your relative is dependent upon you?	0	1	2	3	4
Do you feel your health has suffered because of your involvement with your relative?	0	1	2	3	4
Do you feel that you will be unable to take care of your relative much longer?	0	1	2	3	4
Do you feel that you have lost control of your life since your relative's illness?	0	1	2	3	4

BECK'S DEPRESSION INVENTORY

1. 0 I do not feel sad.
   1 I feel sad
   2 I am sad all the time and I can't snap out of it.
   3 I am so sad and unhappy that I can't stand it.

2. 0 I get as much satisfaction out of things as I used to.
   1 I don't enjoy things the way I used to.
   2 I don't get real satisfaction out of anything anymore.
   3 I am dissatisfied or bored with everything.

3. 0 I don't feel disappointed in myself.
   1 I am disappointed in myself.
   2 I am disgusted with myself.
   3 I hate myself.

4. 0 I don't cry any more than usual.
   1 I cry more now than I used to.
   2 I cry all the time now.
   3 I used to be able to cry, but now I can't cry even though I want to.

5. 0 I have not lost interest in other people.
   1 I am less interested in other people than I used to be.
   2 I have lost most of my interest in other people.
   3 I have lost all of my interest in other people.
6. 0 I can sleep as well as usual.
   1 I don't sleep as well as I used to.
   2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
   3 I wake up several hours earlier than I used to and cannot get back to sleep.
7. 0 I don't get more tired than usual.
   1 I get tired more easily than I used to.
   2 I get tired from doing almost anything.
   3 I am too tired to do anything.

8. 0 I am no more worried about my health than usual.
   1 I am worried about physical problems like aches, pains, upset stomach, or constipation.

2 I am very worried about physical problems and it's hard to think of much else.
3 I am so worried about my physical problems that I cannot think of anything else.

9. 0 I can work about as well as before.
1 It takes an extra effort to get started at doing something.
2 I have to push myself very hard to do anything.
3 I can't do any work at all.

ADULT CARER QUALITY OF LIFE QUESTIONNAIRE (AC-QOL)

	Never	Some Of The Time	A Lot Of The Time	Always
Personal Growth				
I have experienced many positive things through caring	0	1	2	3
Because of caring, I have learnt a lot about myself	0	1	2	3
Caring Choice				
I feel that my life is on hold because of caring	0	1	2	3
My social life has suffered because of caring	0	1	2	3
Caring stops me doing what I want to do	0	1	2	3
Ability to Care				
I can take care of the needs of the person I am caring for	0	1	2	3
I feel I am able to make the life of the person I am looking after better	0	1	2	3
Carer Satisfaction				
Caring is important to me	0	1	2	3
I enjoy being a carer	0	1	2	3
I feel frustrated with the person I am caring for	0	1	2	3
Caring Stress				
I feel depressed due to caring	0	1	2	3
I am physically exhausted by caring	0	1	2	3
I feel stressed as a result of caring	0	1	2	3

INFORMED CONSENT FORM

Title of Study: Caregivers' burden and its association with quality of life and depression in caregivers of stroke survivors

Investigator: Oyewole Aminat Ifeoluwa

Supervisors: Dr Mrs Oluwaseun Kubeyinje

Financial Sponsorship: This research project is self-sponsored

Purpose of the research: To investigate the extent of caregiver burden among caregivers of stroke survivors and its association with their quality of life and the prevalence of depression.

Procedures and protocol involved in the study

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

This questionnaire would be only used for research purpose and will determine the extent of caregiver burden among caregivers of stroke survivors and its association with their quality of life and the prevalence of depression.

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 extent of caregiver burden among caregivers of stroke survivors and its association with their quality of life and the prevalence of depression.

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

OYEWOLE AMINAT IFEOLUWA

PROJECT STUDENT

EMAIL; aminatifeoluwa09@gmail.com

Ethics and Research Committee

University of Benin Teaching Hospital

Benin City.

Phone Number: 07050410395

CERTIFICATE OF CONSENT

I 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:_____

Socio-Demographic Data Questionnaire
Section A: Caregiver Demographic Information
* Age: _____
* Gender:
  * [ ] Male [ ] Female [ ] Non-binary [ ] Prefer not to say
* Marital Status:
  * [ ] Single [ ] Married [ ] Divorced [ ] Widowed
* Highest Level of Education Completed:

* [ ] No formal education [ ] Primary School [ ] Junior Secondary School [ ] Senior Secondary School [ ] Technical/Vocational Certificate [ ] National Diploma (ND) / National Certificate of Education (NCE) [ ] Bachelor's Degree [ ] Master's Degree [ ] Doctorate
* [ ] Other (Please specify): _____
* Current Employment Status:
* [ ] Employed [ ] Self-employed [ ] Unemployed [ ] Retired [ ] Student [ ] Homemaker/Caregiver (primary role)
* [ ] Other (Please specify): _____
* If currently employed, what is your occupation? _____
* Religion:
*[ ] Christianity [ ] Islam [ ] Traditional African Religion [ ] None
* [ ] Other (Please specify): _____
* Do you currently live with the stroke survivor?
* [ ] Yes
* [ ] No

Section B: Caregiver Role and Relationship to Stroke Survivor

* Relationship to the stroke survivor:
* [ ] Spouse/Partner [ ] Son/Daughter [ ] Sibling [ ] Parent [ ] Non-relative/Friend

* [ ] Other relative (Please specify): _____

* How long have you been providing care for the stroke survivor?
* [ ] Less than 3 months [ ] 3-6 months [ ] 7-12 months [ ] 1-2 years [ ] 2-5 years [ ] More than 5 years
* Approximately how many hours per day do you spend on caregiving duties? _____ hours
* Are you the primary caregiver? (i.e., the person who provides most of the care)
* [ ] Yes [ ] No
* [ ] Share caregiving responsibilities equally with someone else
* Do you receive any formal or informal support for your caregiving duties? (e.g., from family, friends, paid help, support groups)
* [ ] Yes (Please describe briefly): _____
* [ ] No

HEALTH RESEARCH ETHICS COMMITTEE (HREC)

UNIVERSITY OF BENIN TEACHING HOSPITAL

P.M.B. 1111 BENIN CITY NIGERIA Telephone: 052-600418 Website: ubth.org

CHIEF MEDICAL DIRECTOR
Prof. Darlington E. Obaseki
E-mail: darlobaseki@gmail.com

DIRECTOR OF ADMINISTRATION
Jim Uwadie, Esq

CHAIRMAN
Prof. (Mrs.) Antoinette N. Ofili

HREC OFFICE:
Committee email: ubthresearchethics@gmail.com

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

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/2025/111

PROPOSAL TITLE: "CAREGIVERS' BURDEN AND ITS ASSOCIATION WITH QUALITY OF LIFE AND DEPRESSION IN CAREGIVERS OF STROKE SURVIVORS IN BENIN CITY"

PRINCIPAL INVESTIGATOR(S): OYEWOLE AMINAT IFEOLUWA

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**..Ofili, 14/7/2025

SUPERVISOR (S): DR. (MRS) S. O. KUBEYINJE

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.....