



KPONG, EASTERN REGION, GHANA

**DETERMINANTS OF NON-ADHERENCE TO ANTIHYPERTENSIVE MEDICATIONS
AMONG HYPERTENSIVE PATIENTS AT THE KADE GOVERNMENT HOSPITAL IN
THE EASTERN REGION OF GHANA; A FACILITY BASED STUDY**

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MAY, 2026



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DEPARTMENT OF COMMUNITY HEALTH

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BY

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**A THESIS SUBMITTED TO THE DEPARTMENT OF COMMUNITY HEALTH,
FACULTY OF PUBLIC HEALTH, ENSIGN GLOBAL UNIVERSITY IN PARTIAL
FULFILMENT OF THE REQUIREMENTS FOR THE MASTER OF PUBLIC HEALTH
DEGREE**

MAY, 2026

DECLARATION AND CERTIFICATION

I hereby declare that this thesis is an original work done by myself under the supervision of my supervisor. All materials and resources used have been duly referenced and acknowledged, and this work has not been presented in whole or part for the award of any degree elsewhere.

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Date

DEDICATION

I dedicate this dissertation to my family and loved ones, especially my mother, Juliana Mensah, for their unwavering support. They have indeed given me every reason to come this far, and I am deeply grateful to them all.

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I would like to express my sincere and heartfelt gratitude to all those who contributed in diverse ways to the successful completion of this thesis.

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LIST OF ABBREVIATIONS

Abbreviation	Full Meaning
ABQ	Adherence Barrier Questionnaire
aOR	Adjusted Odds Ratio
BP	Blood Pressure
CHPS	Community-based Health Planning and Services
CI	Confidence Interval
CKD	Chronic Kidney Disease
cOR	Crude Odds Ratio
DASH	Dietary Approaches to Stop Hypertension
ENT	Ear, Nose and Throat
ESC	European Society of Cardiology
ESH	European Society of Hypertension
FDC	Fixed-Dose Combination
GBD	Global Burden of Disease
GDHS	Ghana Demographic and Health Survey
GSS	Ghana Statistical Service
GSTG	Ghana Standard Treatment Guidelines
HTN	Hypertension
JHS	Junior High School
KGH	Kade Government Hospital
LMIC	Low- and Middle-Income Country
MMAS-8	8-item Morisky Medication Adherence Scale
MOH	Ministry of Health
NHIS	National Health Insurance Scheme
OR	Odds Ratio
SD	Standard Deviation
SHS	Senior High School

Abbreviation	Full Meaning
SMS	Short Message Service
SSA	Sub-Saharan Africa
STATA	Statistics and Data (Software)
WHO	World Health Organization

ABSTRACT

Background: Non-adherence to antihypertensive medications is a leading driver of uncontrolled hypertension and its associated cardiovascular complications, particularly in sub-Saharan Africa. In Ghana, facility-level data on non-adherence and its determinants remain scarce, especially from district hospitals in the Eastern Region. This study was conducted to address this evidence gap at Kade Government Hospital in the Kwaebibirem Municipality.

Objectives: This study aimed to determine the prevalence of non-adherence to antihypertensive medications and to identify the sociodemographic and patient-related determinants of non-adherence among hypertensive patients attending Kade Government Hospital in the Eastern Region of Ghana.

Methods: A facility-based cross-sectional study was conducted among 220 hypertensive patients attending the hypertension and diabetes clinic at Kade Government Hospital over a five-week period. Participants were selected using systematic random sampling. Data were collected through structured interviewer-administered questionnaires via Kobo Collect and analyzed using STATA version 18. Non-adherence to antihypertensive medication was measured using the validated 8-item Morisky Medication Adherence Scale (MMAS-8), with scores below 7 classified as non-adherent. Descriptive statistics and both univariate and multivariable logistic regression analyses were performed to identify determinants of non-adherence.

Results: The prevalence of non-adherence to antihypertensive medications was 93.6%, with only 6.4% (95% CI: 3.1%–9.6%) of respondents classified as adherent. The majority of respondents were male (81.8%) and aged 46–65 years (69.1%). In the crude logistic regression analysis, respondents with tertiary education had significantly higher odds of non-adherence compared with

those with JHS/Middle School education (cOR = 15.14; 95% CI: 1.56–147.21; $p = 0.019$). Additionally, farmers (cOR = 0.12; 95% CI: 0.02–0.62; $p = 0.012$), artisans (cOR = 0.11; 95% CI: 0.02–0.53; $p = 0.006$), and business owners/traders (cOR = 0.12; 95% CI: 0.02–0.64; $p = 0.013$) had significantly lower odds of non-adherence compared with retired respondents. However, none of these associations remained statistically significant in the multivariable adjusted analysis.

Conclusion: Non-adherence to antihypertensive medications is extremely prevalent at Kade Government Hospital, affecting nearly all (93.6%) patients in the study. Although no independent determinants were confirmed in the multivariable adjusted analysis, crude findings suggest that tertiary educational level was associated with higher odds of non-adherence, while informal occupational groups showed lower odds relative to retired respondents. Urgent, multifaceted interventions targeting health literacy, occupational barriers, community engagement, and improved medication access are needed to reduce the burden of non-adherence and improve hypertension control outcomes in the Kwaebibirem Municipality.

Keywords: Non-adherence, antihypertensive medications, hypertension, MMAS-8, Kade Government Hospital, Ghana, Eastern Region

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Hypertension, commonly referred to as high blood pressure, remains one of the most significant and growing public health challenges worldwide. It is defined as a persistent elevation of systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg on repeated measurements (World Health Organization [WHO], 2023). Globally, an estimated 1.28 billion adults aged 30–79 years live with hypertension, with nearly two-thirds of all cases occurring in low- and middle-income countries (LMICs) (WHO, 2023). Hypertension is a leading risk factor for cardiovascular diseases, stroke, chronic kidney disease, and premature death, accounting for approximately 10.8 million preventable deaths annually (GBD 2019 Risk Factors Collaborators, 2020). Despite significant advances in pharmacological management, optimal blood pressure control remains elusive in the majority of patients, particularly in sub-Saharan Africa (SSA).

In Africa, hypertension carries a disproportionately high burden. The pooled prevalence of hypertension across Africa has risen from 19.7% in the 1990s to over 30.8 percent by 2010, with more recent estimates suggesting a prevalence of up to 57% in older adults (Bosu et al., 2021; Adeloye & Basquill, 2014). A major driver of the poor outcomes associated with hypertension in SSA is non-adherence to antihypertensive medications. A comprehensive systematic review and meta-analysis drawing on 95 studies and 34,102 patients across 27 countries in SSA, with data up to December 2023, reported an overall prevalence of non-adherence to blood pressure-lowering medication of 43.5 percent (95% CI: 39.4%–47.6%), with no meaningful reduction in non-

adherence rates over time (Iwuala et al., 2024). This finding underscores the persistent and unresolved nature of medication non-adherence in the region. In Ghana, the burden of hypertension is substantial and rising. A systematic review and meta-analysis of population-based studies found a pooled prevalence of hypertension of 30.3% (95% CI: 26.1%–34.8%), with the Eastern, Volta, Bono, and Western regions reporting prevalence levels comparable to or exceeding the national estimate (Atibila et al., 2021). The Ghana Demographic and Health Survey (GDHS) of 2014 estimated hypertension prevalence at 13.1 percent among adults aged 15–49 years, of whom only 40.5% were receiving treatment and just 23.8% had their blood pressure controlled (Sanuade et al., 2018). These figures reflect a severe treatment gap, compounded further by poor adherence to prescribed antihypertensive regimens. Non-adherence to antihypertensive medications is recognized as one of the primary causes of uncontrolled hypertension and its associated complications, including stroke, heart failure, myocardial infarction, and renal failure (Lee et al., 2022). Globally, medication non-adherence among hypertensive patients ranges from 30 to 50 percent, with markedly higher rates in LMICs (Lee et al., 2022; Tomasino & Tomasino, 2025). In Ghana, studies have consistently documented high rates of non-adherence, a multicenter study at Korle-Bu Teaching Hospital reported a non-adherence rate of 66.7%, significantly associated with depression, concerns about medications, educational level, and use of herbal preparations (Boima et al., 2015). A facility-based study in the Brong Ahafo Region similarly found a non-adherence prevalence of 63.7 percent, with lower educational attainment being a predictor (Atibila et al., 2022). Studies in the Volta Region using the Morisky Medication Adherence Scale (MMAS-8) found that knowledge of hypertension, perceived severity, and alcohol consumption were the main independent predictors of Non-Adherence (Sarkodie et al., 2020). The determinants of non-adherence to antihypertensive therapy are complex and multifactorial. They encompass patient-

related factors such as forgetfulness, perceived inefficacy of medications, fear of side-effects, and reliance on Herbal or spiritual alternatives; health system factors including drug stock-outs, long waiting times, inadequate NHIS drug coverage, and a poor patient-provider communication; and sociodemographic factors such as low educational level, informal occupation, and low income (Shin & Konlan, 2023; Boima et al., 2015; Sarkodie et al., 2020). Cultural factors particular to Ghana, including the use of Prayer Camps, Herbalists, and Traditional Medicine as alternatives or supplements to biomedical treatment, have also been documented as contributors to non-adherence (Atibila et al., 2022).

Despite this growing body of evidence at the national level, facility-specific studies from district hospitals in the Eastern Region of Ghana particularly Kade Government Hospital remain entirely absent from the published literature. Without context-specific data, local health authorities are unable to design a targeted, evidence-based interventions. Patients in this facility regularly attend clinic visits and collect their medications, yet continue to present with poorly controlled blood pressure and its complications, suggesting a significant gap between medication access and actual adherence. This study therefore aims to determine the prevalence of non-adherence to antihypertensive medications and to identify its determinants among hypertensive patients attending Kade Government Hospital in the Kwaebibirem Municipality of the Eastern Region, Ghana.

1.2 Problem Statement

Hypertension remains a leading global cause of cardiovascular morbidity and mortality. Despite the availability of effective antihypertensive medications, non-adherence to prescribed treatment regimens continues to undermine hypertension control worldwide. A landmark meta-analysis

involving over 27 million patients from 2010 to 2020 estimated a global prevalence of antihypertensive medication non-adherence of approximately 45%, with substantially higher rates observed in LMICs compared to high-income countries (Lee et al., 2022). This non-adherence is independently associated with poor blood pressure control, increased cardiovascular events, avoidable hospital admissions, and premature death. In Ghana, the problem is acute. Hypertension-related deaths account for a significant proportion of total cardiovascular mortality, and poor adherence to antihypertensive medications remains a major barrier to disease control (Boima et al., 2015; Atibila et al., 2022). The consequences are severe, uncontrolled hypertension leads to stroke, heart failure, renal disease, prolonged hospital stays, and significant socioeconomic burden on patients and their families. Factors driving non-adherence in Ghana include medication side effects, perceived drug ineffectiveness, drug unaffordability, dependence on herbal preparations, inadequate knowledge of the chronic nature of hypertension, and systemic weaknesses such as shortages of medications under the National Health Insurance Scheme (NHIS) (Boima et al., 2015; Sarkodie et al., 2020; Atibila et al., 2022).

Records from the hypertension clinic at Kade Government Hospital show that a large proportion of patients on antihypertensive treatment do not attend regularly for medication refills and review. Of the 543 patients on record in 2023, only 125 attended consistently, leaving 418 (77.0%) with irregular medication collection; comparable patterns were seen in 2024 (758 of 1,414; 53.6%) and 2025 (513 of 880; 58.3%). This pattern strongly suggests a gap between medication access and actual medication-taking behaviour. Despite this observed clinical problem, no published facility-level study has examined the prevalence and determinants of non-adherence to antihypertensive medications specifically among patients at this hospital. This evidence gap makes it impossible for facility managers and district health authorities to design targeted interventions. This study

therefore seeks to address this gap by determining the prevalence of, and identifying the determinants of, non-adherence to antihypertensive medications among hypertensive patients attending Kade Government Hospital in the Eastern Region of Ghana.

1.3 Rationale of the Study

Cardiovascular diseases remain the leading cause of morbidity and mortality globally, with uncontrolled hypertension being one of the most important and preventable contributing factors. Effective hypertension management depends critically on sustained adherence to prescribed antihypertensive medications. However, poor adherence compromises treatment outcomes and quality of life, and leads to severe complications including stroke, heart failure, myocardial infarction, visual impairment, and cognitive decline. Although several studies have examined antihypertensive medication non-adherence across different regions of Ghana, there remains a critical gap in evidence from the Kwaebibirem Municipality, particularly at Kade Government Hospital. In this setting, many hypertensive patients attend clinic visits and collect medications, yet continue to present with complications associated with poorly controlled blood pressure, a pattern indicative of non-adherence rather than treatment unavailability.

Several factors are hypothesized to be driving this non-adherence, including medication side effects such as erectile dysfunction in male patients, perceived drug inefficacy, cultural reliance on herbal remedies or spiritual interventions, misconceptions about the chronic nature of hypertension, and fear of stigma from healthcare providers. Socioeconomic factors such as occupation type and income level are also likely to compound the problem, given the predominantly informal-sector economic character of the Kwaebibirem Municipality, where irregular income and demanding work schedules may make consistent medication-taking

structurally difficult to sustain. Understanding the specific determinants of non-adherence in this population is essential for generating local evidence that can inform targeted, cost-effective, and culturally sensitive interventions. The findings from this study will provide evidence to guide facility managers, district health authorities, and national policymakers in designing strategies to improve antihypertensive medication adherence and ultimately reduce hypertension-related complications in the Kwaebibirem Municipality and the broader Eastern Region of Ghana.

1.4 Conceptual Framework

Hypertension remains a major public health concern in Ghana, affecting both urban and rural populations. It predominantly affects adults and is more prevalent among individuals of African descent. Despite the availability of effective treatment, non-adherence to antihypertensive medications continues to be a significant challenge, contributing to poor blood pressure control and an increased risk of complications. This study is guided by a conceptual framework adapted from the Andersen and Newman behavioural model of health service utilization (2005), which explains how multiple factors influence health behaviours, including medication adherence. In line with the study objectives, the framework supports the assessment of the prevalence of non-adherence, evaluation of patients' knowledge of hypertension, and identification of factors influencing non-adherence to antihypertensive therapy. In this framework, non-adherence to antihypertensive medications (the outcome variable) is influenced by three broad categories of factors: patient-related factors, provider-related factors, and health system factors. Patient-related factors include socio-demographic characteristics such as age and sex, level of knowledge or awareness of hypertension, health insurance status, accessibility to healthcare services, and previous experiences such as medication side effects. These factors may directly affect a patient's motivation and ability to follow prescribed treatment. Provider-related factors also play an

important role and include healthcare providers' communication style, perceived competence, and the availability of supportive services such as counselling. Additionally, aspects such as waiting time at the outpatient department and patient-provider relationships may influence patients' willingness to continue treatment. Health system factors further shape adherence behaviour. These include the organization of healthcare services, availability of medications, accessibility, and overall quality of care. Weaknesses within the health system may discourage consistent medication use and increase the likelihood of non-adherence. This framework recognizes that non-adherence to antihypertensive medications is a multifactorial issue influenced by interrelated patient, provider, and health system factors. Understanding these factors is essential for designing targeted interventions to improve adherence and reduce hypertension-related complications among patients.

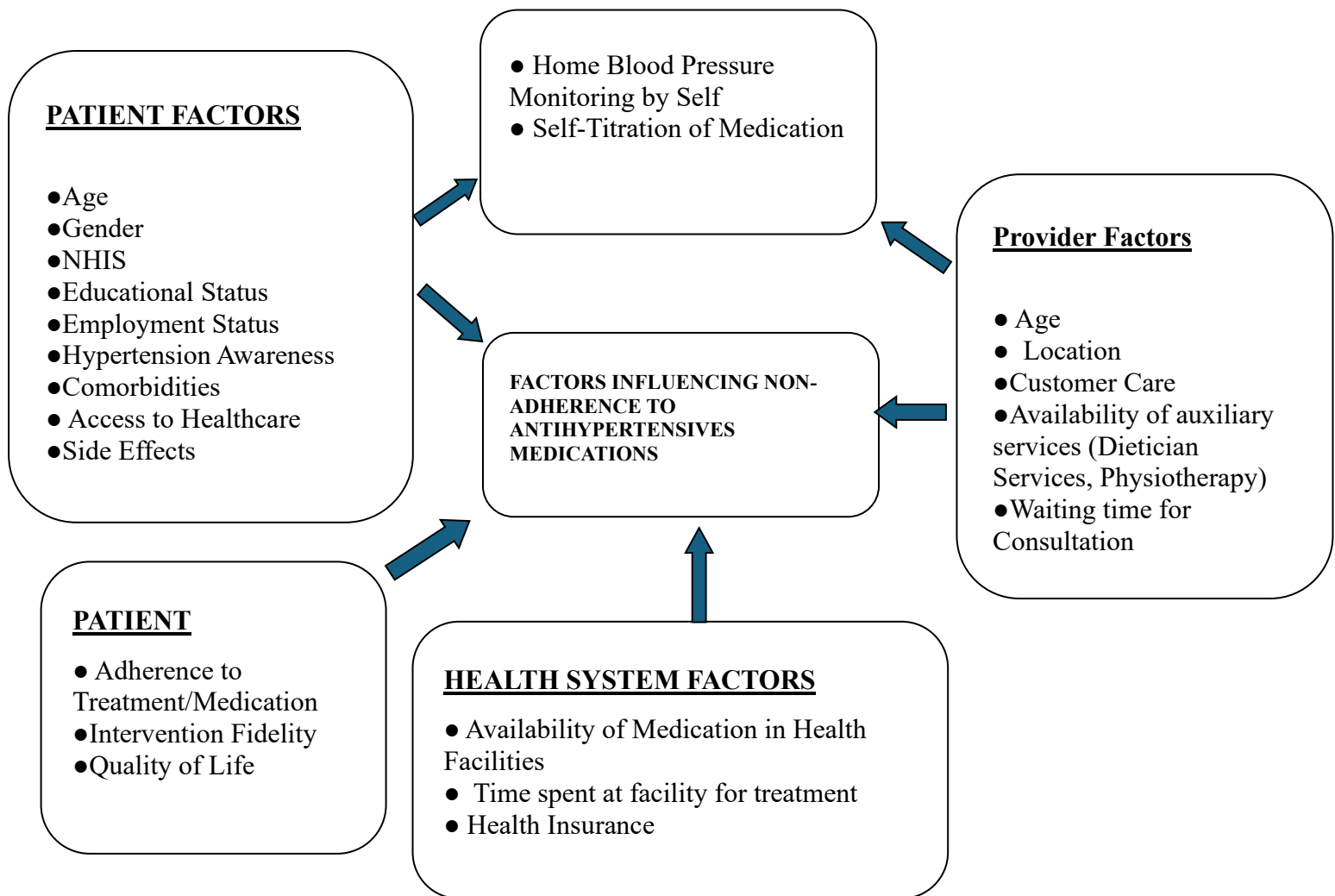


Figure 1.1 Conceptual framework adapted from Andersen and Newman (2005), illustrating factors influencing non-adherence to antihypertensive medications.

1.5 Research questions

1. What is the prevalence of non-adherence to antihypertensive medications among hypertensive patients?
2. What is the knowledge of hypertension among patients with hypertension?
3. What factors influence non-adherence to antihypertensive medications among patients with hypertension?

1.6 General Objective

The general objective of this study was to identify the determinants of non-adherence to antihypertensive medications among hypertensive patients in the Kwaebibirem Municipality in the Eastern Region of Ghana.

1.7 Specific Objectives

1. To determine the prevalence of non-adherence to antihypertensive medications among hypertensive patients.
2. To assess the knowledge of hypertension among patients with hypertension.
3. To identify factors influencing non-adherence to antihypertensive medications among patients with hypertension.

1.8 Scope of Study

This study evaluated the factors influencing non-adherence to antihypertensive treatment among patients aged 18 years and above in the Kwaebibirem Municipality of the Eastern Region, Ghana.

The study focused on patients' knowledge of hypertension, as well as the availability, accessibility, and utilization of healthcare services within the municipality. It also examined how these factors contribute to non-adherence to prescribed antihypertensive treatment following a diagnosis of hypertension.

1.9 Organization of the Thesis

This study is presented in six (6) chapters, each addressing specific components of the research.

Chapter One provides an introduction to the study, including the background to the problem, statement of the problem, rationale, conceptual framework, research questions, aims and objectives, profile of the study area, and scope of the study. Chapter Two presents a review of relevant literature, focusing on factors associated with non-adherence to antihypertensive treatment, awareness and prevalence of hypertension among Ghanaians, as well as the epidemiology, signs and symptoms, and complications of hypertension. Chapter Three describes the study methodology, including the research design, data collection procedures, data analysis, and limitations encountered during the study. Chapter Four presents the results of the study based on the key variables. Chapter Five discusses the findings in relation to the research questions, study objectives, and existing literature. Chapter Six presents the conclusions and provides recommendations to key stakeholders on strategies to reduce non-adherence to antihypertensive treatment at the health facility and within the Kwaebibirem Municipality, with the aim of reducing hypertension-related complications.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

The purpose of this study is to determine the factors influencing non-adherence to antihypertensive medications among hypertensive patients attending Kade Government Hospital in the Kwaebibirem Municipality of the Eastern Region, Ghana. This chapter presents a review of relevant literature related to the study objectives, drawing on peer-reviewed journal articles, theses, policy documents, conference proceedings, and government health reports. The review covers the epidemiology of hypertension, its risk factors, symptoms, classification, and management, as well as the prevalence and determinants of non-adherence to antihypertensive medications at the global, African, and Ghanaian levels. The chapter also examines the role of patient knowledge, sociodemographic characteristics, medication-related factors, patient-related factors, and health system factors in influencing non-adherence to antihypertensive treatment.

2.2 Epidemiology of hypertension

Hypertension, defined as a persistent elevation of systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg, is the leading modifiable risk factor for cardiovascular disease and premature death worldwide. The global burden of hypertension has grown substantially over recent decades, rising from an estimated 650 million affected adults in 1990 to approximately 1.4 billion adults aged 30–79 years in 2024 representing about 33% of the global adult population in that age group (WHO, 2024). Two-thirds of all adults with hypertension reside in low- and middle-income countries (LMICs), where detection and treatment rates remain critically low (WHO,

2024). Despite this enormous burden, fewer than one in five individuals with hypertension worldwide have their blood pressure adequately controlled, and an estimated 600 million adults are entirely unaware of their diagnosis (WHO, 2024). High blood pressure is responsible for approximately 10.8 million preventable deaths annually, making its management one of the most important priorities in global public health (GBD 2019 Risk Factors Collaborators, 2020). The hypertension burden is not uniformly distributed across regions. The WHO Eastern Mediterranean Region carries the highest prevalence of hypertension at approximately 38%, while the Western Pacific Region reports the lowest at 29% (WHO, 2024). Importantly, high-income countries have generally seen stable or declining prevalence rates due to improved detection, treatment, and control, whereas LMICs continue to experience a sharp rise, driven primarily by population ageing, rapid urbanization, and shifts in dietary and lifestyle behaviours (Mills et al., 2020). By 2025, the number of adults with hypertension globally is projected to reach 1.5 billion (WHO, 2024).

In sub-Saharan Africa (SSA), hypertension is a growing public health crisis. The pooled prevalence of hypertension in Africa has increased steadily from 19.7% in the 1990s to over 30% by 2010, and more recent estimates suggest a prevalence of up to 54% among adults and as high as 57% in older adults (Nyarko et al., 2022; Parati et al., 2022). In 2019, high blood pressure accounted for over one million cardiovascular deaths in SSA alone (Parati et al., 2022). Despite this rising burden, only about 27% of those with hypertension in SSA are aware of their condition, only 18% are on treatment, and a mere 7% have their blood pressure effectively controlled figures that highlight a severe and persistent treatment gap (Parati et al., 2022). The narratives of rapid urbanization, unhealthy diets, physical inactivity, alcohol use, and limited access to healthcare that characterize much of SSA continue to drive this burden upward. A recent narrative review

summarizing hypertension data from 2017 to 2023 across SSA confirmed consistently high and increasing prevalence, with poor detection, treatment, and control rates across the region (Gafane-Matemané et al., 2025).

In Ghana, hypertension is a leading cause of hospital admissions and deaths, accounting for approximately 5.2% of total national mortality (Ryabinina et al., 2025). A comprehensive systematic review and meta-analysis of 85 population-based studies involving 82,045 Ghanaian subjects found a pooled hypertension prevalence of 27.0% (95% CI: 24.0%–30.0%), with individual study estimates ranging from 2.8% to 67.5% (Bosu et al., 2021). A separate systematic review and meta-analysis found a slightly higher pooled prevalence of 30.3% (95% CI: 26.1%–34.8%), with males (34.0%) having a marginally higher prevalence than females (30.1%) (Atibila et al., 2021). Both reviews confirmed that prevalence was higher in the coastal and middle geographical belts of Ghana than in the north, and that urban populations had significantly higher rates than rural populations. The Eastern Region where this study is situated has been identified as having hypertension prevalence comparable to or exceeding the national average (Bosu et al., 2021). Despite the high prevalence, only 35% of hypertensive Ghanaians are aware of their status, only 22% are on treatment, and a mere 6% have their blood pressure controlled (Bosu et al., 2021). These figures underscore the critical importance of addressing not only hypertension awareness but also non-adherence to antihypertensive treatment, which remains the primary driver of poor blood pressure control in Ghana.

2.3 Risk Factors Associated with Hypertension

The risk factors for hypertension are broadly classified into two categories: non-modifiable and modifiable. Non-modifiable risk factors include advancing age, sex, family history of

hypertension, race or ethnicity, and genetic predisposition. Modifiable risk factors that can be changed through behavioural and clinical intervention include obesity, excessive dietary salt intake, physical inactivity, harmful use of alcohol, tobacco smoking, low potassium intake, psychological stress, and comorbid conditions such as diabetes mellitus (Mills et al., 2020; Gafane-Mateman et al., 2025). Uncontrolled hypertension resulting from these risk factors significantly increases the likelihood of serious end-organ damage and cardiovascular events, including myocardial infarction, haemorrhagic and ischaemic stroke, chronic kidney disease, heart failure, and lifelong disability (GBD 2019 Risk Factors Collaborators, 2020).

Globally, advancing age is among the strongest non-modifiable predictors of hypertension, with prevalence rising sharply from midlife onwards. Population ageing, combined with rapid urbanization and the adoption of unhealthy lifestyles, is largely responsible for the rising global burden of hypertension, particularly in LMICs (Mills et al., 2020). Dietary factors play a particularly important role: excessive sodium consumption raises blood pressure by promoting fluid retention and increasing vascular resistance, while low potassium intake impairs the body's ability to regulate sodium excretion. The WHO recommends a daily salt intake of less than 5 grams, yet the average daily intake in many LMICs exceeds this threshold considerably (WHO, 2024). Physical inactivity is also a major contributor, as regular aerobic exercise reduces systemic vascular resistance and supports healthy body weight, both of which are protective against hypertension (Mills et al., 2020). Obesity and overweight further compound hypertension risk through mechanisms involving insulin resistance, sympathetic nervous system activation, and the production of pro-inflammatory adipokines from visceral fat deposits (Acheampong et al., 2023).

In sub-Saharan Africa, the risk factor profile for hypertension is shaped by a combination of urbanization, westernization of diets, increasing sedentary behaviour, rising alcohol consumption, and a high genetic predisposition to salt sensitivity (Gafane-Matemané et al., 2025). A systematic review and meta-analysis of hypertension in East Africa found that general obesity was associated with a threefold increased risk of hypertension (OR = 3.045), while overweight, abdominal obesity, and alcohol consumption were also independently and significantly associated (Minja et al., 2025). Diabetes mellitus is a particularly important co-morbidity in the region, as the concurrent presence of hyperglycaemia and hypertension accelerates end-organ damage and cardiovascular events (Gafane-Matemané et al., 2025).

In Ghana, the risk factor profile for hypertension mirrors broader SSA trends but is influenced by local dietary customs, rapid urbanization, and demographic changes. An integrated review of studies conducted in Ghana from 2016 to 2021 identified age, marital status, sex, and place of residence as non-modifiable risk factors, while modifiable risk factors included consumption of additional table salt and salted meats, alcohol use, canned meat consumption, smoking, psychological stress, and overweight or obesity (Konlan et al., 2023). A community-based screening study in the Ashanti Region found that increasing age, history of alcohol intake, overweight, and obesity were the four significant independent predictors of high blood pressure among participants, with obesity associated with a 32% increased risk of hypertension (Nyarko et al., 2022). A community-based cross-sectional study among adults in the Ablekuma North Municipality of Ghana confirmed that central obesity and advancing age were the most significant predictors of unrecognized hypertension, with female participants of menopausal age being particularly at risk (Acheampong et al., 2023). A study of older adults in Ghana similarly found that overweight and obesity nearly doubled the risk of hypertension (OR = 1.94 and OR = 2.28

respectively), with urban residence also associated with higher prevalence compared to rural areas (Dai et al., 2022). These findings collectively emphasize that a combination of lifestyle changes targeting diet, physical activity, weight management, and alcohol reduction is essential for reducing the growing burden of hypertension in Ghana.

2.4 Symptoms of High Blood Pressure

Hypertension is widely referred to as a "silent killer" because the majority of affected individuals do not experience any noticeable symptoms, even when blood pressure is dangerously elevated (WHO, 2023). The absence of symptoms is a major reason why hypertension often goes undetected and untreated for extended periods. When symptoms do occur, they tend to manifest only in severe or advanced cases and may include persistent headaches, dizziness, chest pain, visual disturbances, palpitations, difficulty breathing, and nosebleeds. However, these symptoms are non-specific and can be associated with many other conditions, making hypertension difficult to diagnose on the basis of symptoms alone. The only reliable way to detect hypertension is through regular blood pressure measurement, which is why routine screening remains a critical public health strategy for early identification and management (WHO, 2023; Mills et al., 2020).

2.5 Classification of Clinical Blood Pressure Levels in Adults

Blood pressure is classified using standardized categories to guide clinical decision-making regarding diagnosis, treatment initiation, and target blood pressure levels. The classification used in this study follows the European Society of Hypertension (ESH) 2023 guidelines, which maintain the diagnostic threshold of $\geq 140/90$ mmHg for hypertension and subdivide elevated blood pressure into three grades based on severity, as shown in Table 2.1 below.

Table 2.1 Classification of Blood Pressure Levels in Adults

Diagnostic category	Systolic(mmHg)		Diastolic (mmHg)
Optimal	100-120	and	60-80
Normal	120-129	and/or	80-84
High-normal	130-139	and/or	85-89
Grade 1(mild) hypertension	140-159	and/or	90-99
Grade 2 (moderate) hypertension	160-179	and/or	100-109
Grade 3 (severe) hypertension	≥180	and	≥110

Source: *Mancia et al. (2023). 2023 ESH Guidelines for the management of arterial hypertension. Journal of Hypertension.*

Blood pressure is measured using validated electronic Oscillo metric devices, mercury sphygmomanometers, or aneroid devices. Current international guidelines recommend the use of validated, cuffed Oscillo metric devices for routine clinical practice, as these are both accurate and accessible. Both the ESH (2023) and ESC (2024) guidelines recommend that multiple office blood pressure measurements be taken, supplemented where possible by home or ambulatory blood pressure monitoring, before confirming a diagnosis of hypertension (Mancia et al., 2023; McEvoy et al., 2024).

2.6 Management of Hypertension

Once hypertension has been identified and confirmed, management involves either pharmacological therapy, lifestyle modification, or a combination of both, depending on the grade of hypertension and the individual's overall cardiovascular risk profile. The primary goals of

treatment are to lower blood pressure to target levels, reduce the risk of cardiovascular events, and prevent or delay hypertension-related end-organ damage.

Lifestyle modification is recommended for all hypertensive patients, regardless of whether pharmacological therapy is initiated. Key lifestyle interventions include reducing dietary salt intake to less than 5 grams per day, increasing physical activity, achieving and maintaining a healthy body weight, limiting alcohol consumption, cessation of tobacco use, adopting a diet rich in fruits, vegetables, and potassium, and managing psychological stress (Mancia et al., 2023; WHO, 2023). Accurate blood pressure measurement is fundamental to both diagnosis and monitoring. Blood pressure monitors are susceptible to measurement errors arising from incorrect positioning, terminal digit preference, and inadequate rest time before measurement; therefore, standardized measurement protocols using validated devices are strongly recommended (Mancia et al., 2023).

Regarding pharmacological treatment thresholds, the ESH (2023) guidelines recommend that drug therapy be initiated promptly in patients with Grade 1 hypertension (140–159/90–99 mmHg) when confirmed on repeated measurements, particularly in those with established cardiovascular disease, diabetes, chronic kidney disease, or an elevated estimated cardiovascular risk. In patients with Grade 2 or Grade 3 hypertension, pharmacological therapy should be commenced promptly alongside lifestyle modifications. For patients below 80 years of age, the target blood pressure for treatment is below 130/80 mmHg where tolerated, while for those aged 80 years and above, a more conservative target of below 140/90 mmHg is recommended to avoid adverse effects of excessive blood pressure reduction (Mancia et al., 2023). All patients receiving antihypertensive treatment

should receive counselling on adherence to their prescribed regimen, as non-adherence remains the primary cause of treatment failure and uncontrolled blood pressure (WHO, 2023).

2.7 Hypertension and Lifestyle Changes

Lifestyle modification is a cornerstone of hypertension management and can effectively reduce blood pressure both as a standalone intervention in mild cases and as an adjunct to pharmacological therapy in moderate to severe cases. The most evidence-based lifestyle intervention for hypertension management is the Dietary Approaches to Stop Hypertension (DASH) diet, an eating plan characterized by high intake of fruits, vegetables, whole grains, and low-fat dairy products, with reduced saturated fat and sodium content. Clinical trials have demonstrated that adherence to the DASH diet reduces systolic blood pressure by approximately 2 to 8 mmHg (Champagne, 2016). In addition to dietary changes, regular aerobic physical activity such as brisk walking, cycling, or swimming for at least 150 minutes per week has been shown to lower systolic blood pressure by 4 to 9 mmHg (Mancia et al., 2023). Sodium reduction is among the most impactful single lifestyle interventions for blood pressure control. The WHO recommends a daily intake of less than 5 grams of salt; reductions from high baseline intake have been associated with systolic blood pressure reductions of 4 to 8 mmHg (WHO, 2023). Increased dietary potassium through consumption of fruits and vegetables further augments the blood pressure-lowering effect of sodium reduction. With regard to alcohol, moderate consumption of 2.5 to 4.9 grams per day has been associated with a 14 to 25% lower cardiovascular risk compared with abstinence; however, heavy alcohol use is independently associated with elevated blood pressure and increased cardiovascular disease risk, and should therefore be minimized or avoided (Ronksley et al., 2011). Tobacco cessation is also strongly recommended, as smoking causes acute rises in blood pressure and long-term vascular damage. Together, these lifestyle modifications reduce blood pressure,

improve cardiovascular risk profiles, and enhance the effectiveness of antihypertensive medications when used in combination (Mancia et al., 2023).

2.8 Adherence to Medication and the Problem of Non-Adherence

Medication adherence refers to the extent to which patients take their medications as prescribed by their healthcare provider, including the correct dose, at the correct time, and for the duration recommended (Lee et al., 2022). In the context of hypertension, where treatment is lifelong and largely asymptomatic, sustaining adherence over time poses a major challenge for both patients and health systems. Non-adherence to antihypertensive medication is widely recognized as one of the primary causes of uncontrolled blood pressure and its associated complications. Up to 50% of patients discontinue their prescribed antihypertensive medications within one year of initiation, and optimal blood pressure control is achieved in less than one-third of hypertensive patients in high-income countries and fewer than one in ten in low- and middle-income countries (Lee et al., 2022). The consequences extend beyond individual health non-adherence contributes to increased cardiovascular events, avoidable hospitalizations, higher healthcare costs, and preventable deaths (Hill et al., 2010; Lee et al., 2022). From the patient's perspective, non-adherence to antihypertensive medications is broadly classified into two types: intentional and unintentional (Lowry et al., 2005; Nikolic et al., 2023). Unintentional non-adherence is a passive process whereby patients may be forgetful or inattentive about taking their medications, while intentional non-adherence is an active process whereby patients deliberately choose not to follow their prescribed regimen (Lowry et al., 2005). Research has shown that approximately 31% of hypertensive patients report unintentional non-adherence and 9% report intentional non-adherence, with both types associated with perceived adverse effects of antihypertensive medications (Lowry et al., 2005). Unintentional non-adherence commonly arises from

forgetfulness, difficulty remembering dosing instructions, complex treatment regimens, and financial barriers that prevent consistent access to medications (Lowry et al., 2005). Intentional non-adherence, on the other hand, often stems from patients' doubts about the necessity of treatment, fear of long-term side effects, perceived drug inefficacy, or a preference for herbal or spiritual alternatives (Nikolic et al., 2023). Non-adherence is a complex and multidimensional behaviour with three quantifiable phases: initiation, implementation, and discontinuation, collectively referred to as persistence (Vrijens et al., 2012). Failure at any of these stages can undermine blood pressure control. Understanding which phase of non-adherence predominates in a given population is therefore essential for designing appropriate and targeted interventions. In Ghana, effective management of hypertension is guided by the Ghana Standard Treatment Guidelines (GSTG) and aligned with international frameworks such as the Joint National Committee guidelines (JNC8) (MOH, 2014). These guidelines emphasize sustained medication adherence as a cornerstone of blood pressure control. Despite this, adherence in practice remains suboptimal, and the specific determinants of non-adherence at facility level including at Kade Government Hospital remain poorly understood and understudied, justifying the present investigation.

2.9 Hypertension and Its Management; Psychosocial and Social Aspects

The individual's health and wellbeing were influenced by the social and psychosocial factors. Pay, edification, accommodation, and other social health factors, for instance, have a negative impact on behavioral risk issues and may make someone more likely to develop high blood pressure. For instance, being unemployed or having little income can increase stress levels, which can then lead to hypertension, according to University of Ghana (WHO, 2011). The social and psychosocial facets of our welfare have a role in achieving excellent health. Kretchy and colleagues conducted

a study to evaluate psychosocial factors that influence patients' perceptions of pharmaceutical side effects, familiarity with these symptoms, and how these factors are managed in relation to their behavior in terms of drug adherence. The findings of their study showed that they experience reaction such as shivers, recurrent urination, persistent bouts of hunger, erectile dysfunction, and faintness, easily fatigued. The results again showed that there was a significant association between depression, anxiety, stress and side effects were observed. Drug adverse reaction significantly rises the chance of individuals to be non-compliance with social influences, media impacts and attitudes of principal caregivers (Kretchy et al, 2015). Adverse social circumstances are frequently linked to a poor lifestyle, such as an unhealthy diet, inactivity, and smoking, which leads to an increased prevalence of abdominal obesity and the so-called metabolic syndrome. Invulnerable individuals are more likely to acquire hypertension as a result. Numerous fields of research have looked into the impact of psychological stress on the management of hypertension. According to a Swedish study, men are more likely than women to experience high levels of work-related stress, which can raise blood pressure (Nilsson, 2009). Exercise can be a way to link social involvement and high blood pressure. Increasing social participation activity, especially involving horizontal organizations, is important (Yazawa et al., 2016).

2.10 Prevalence of Non-Adherence to Antihypertensive Medication among Hypertensive Patients

Non-adherence to antihypertensive medication is a major global public health concern and a leading obstacle to effective blood pressure control. Evidence from a meta-analysis involving over 27 million patients from 2010 to 2020 reported a global prevalence of antihypertensive medication non-adherence of approximately 45%, with substantially higher rates observed in low- and middle-

income countries compared to high-income settings (Lee et al., 2022). These figures underscore the scale of the problem and the urgent need for context-specific investigations.

At the individual country level, studies from various regions demonstrate wide variation in the prevalence of non-adherence. In the United Arab Emirates, non-adherence to antihypertensive medications was found in 55% of patients, with medication-related factors, forgetfulness, and limited knowledge of hypertension identified as key drivers (Bader et al., 2015). In Northern Ethiopia, a prospective cross-sectional study conducted at Ayder Referral Hospital and Mekelle General Hospital found that only 26.4% of patients were compliant with their antihypertensive medications, indicating a non-adherence rate of approximately 73.6% (Ali et al., 2014). A separate cross-sectional study in Ethiopia reported that 37% of hypertensive patients were non-adherent to their prescribed regimens, with forgetfulness and perceived drug inefficacy cited as the most common reasons (Demisew et al., 2018). A further facility-based study in southwest Ethiopia found that 38.2% of patients did not take their antihypertensive medications as prescribed (Asgedom et al., 2018). Beyond Africa, comparable trends have been documented globally. A cross-sectional study in a rural area of Vietnam found that 50.2% of hypertensive patients attending community health clinics were non-adherent to their antihypertensive therapy (Nguyen et al., 2017). In Palestine, a descriptive study reported a non-adherence prevalence of 54.2% among hypertensive patients, with fear of side effects and forgetfulness among the primary barriers (Al-Ramahi, 2015). In Aligarh, India, 76.3% of hypertensive patients were found to be non-adherent to their prescribed antihypertensive medications (Khwaja et al., 2017).

In Sub-Saharan Africa, the burden is particularly pronounced. A comprehensive systematic review and meta-analysis including 95 studies and data from 34,102 patients across 27 countries, with

evidence up to December 2023, found an overall prevalence of non-adherence to blood pressure-lowering medications of 43.9% (95% CI: 39.2–48.6), with no improvement in non-adherence rates observed over time (Aminde et al., 2025). In Cameroon, a community-based cross-sectional study found that 67.7% of hypertensive patients did not take their medications as prescribed, with financial barriers and medication side effects identified as significant predictors of non-adherence (Adidja et al., 2018).

In Ghana, non-adherence to antihypertensive medications has been consistently documented at high levels. A multi-centre study at Korle-Bu Teaching Hospital reported a non-adherence rate of 66.7%, associated with depression, concerns about medications, and use of herbal preparations (Boima et al., 2015). A facility-based study in the Brong Ahafo Region found a non-adherence prevalence of 63.7%, with lower educational attainment as a key predictor (Atibila et al., 2022). Additionally, a study in the Volta Region using the MMAS-8 reported that knowledge of hypertension, alcohol consumption, and perceived severity of illness were the main independent determinants of non-adherence (Sarkodie et al., 2020). These findings collectively highlight a persistent and serious gap in antihypertensive medication adherence across Ghana, including in the Eastern Region, where facility-level data remain scarce.

2.11 Knowledge of Patients on Hypertension and Its Influence on Non-Adherence

Patients' knowledge on hypertension including its causes, complications, chronicity, and treatment requirements is widely recognized as a critical determinant of medication adherence. Insufficient knowledge of hypertension is consistently associated with higher rates of non-adherence, particularly in low- and middle-income countries where health literacy and access to patient education are limited (Shin & Konlan, 2023; Aminde et al., 2025).

Globally, evidence points to substantial knowledge gaps among hypertensive patients. A cross-sectional study in Sri Lanka found that while patients were aware that poorly treated hypertension could lead to kidney damage, only 26% identified heart disease as a complication. Only 45% understood that increased fruit and vegetable intake could improve blood pressure control, and only 64% believed that lifestyle changes alongside medication were an effective treatment approach. The researchers concluded that patients had insufficient knowledge of hypertension and its management, a gap that directly contributes to poor treatment adherence (Kisokanth et al., 2016). A more recent cross-sectional study conducted in Sudan during 2024 found a significant positive association between patients' knowledge of hypertension and their adherence to antihypertensive therapy patients with higher hypertension knowledge scores were significantly more likely to adhere to their prescribed medications (Altayib, 2025). These findings reinforce the well-established view that what patients know about their condition directly shapes how consistently they take their medications.

In Africa, knowledge gaps about hypertension are widespread and well-documented as a driver of non-adherence. A systematic review and meta-analysis of studies across Africa identified hypertension knowledge as one of the key determinants of medication adherence, with patients who had adequate knowledge significantly more likely to adhere to their antihypertensive regimens (Shin & Konlan, 2023). Similarly, a comprehensive SSA-focused meta-analysis found that accurate perceptions and knowledge of hypertension and its treatment predicted good medication adherence, whereas misconceptions and low health literacy were associated with poor adherence outcomes (Aminde et al., 2025). A multi-centre study in Ghana and Nigeria found a significant positive correlation between knowledge of hypertension and medication adherence (r

= 0.14, $p = 0.006$), demonstrating that patients with greater understanding of their condition were more likely to take their medications as prescribed (Boima et al., 2015).

In Ghana specifically, knowledge deficits about hypertension remain a persistent concern. A cross-sectional study in Cape Coast found that hypertensive patients demonstrated insufficient understanding of the causes, symptoms, risk factors, prevention, and management of hypertension, all of which contributed to poor treatment engagement (Anowie & Darkwa, 2015). A more recent facility-based study in the Brong Ahafo Region similarly found that lower perceived susceptibility and incomplete knowledge about hypertension were significant predictors of non-adherence, with patients who underestimated the severity of their condition being more likely to skip medications (Atibila et al., 2022). Cultural beliefs, including attribution of hypertension to spiritual causes, also contributed to knowledge gaps and were associated with patients seeking alternative care rather than adhering to prescribed treatment (Boima et al., 2015; Atibila et al., 2022). These findings collectively highlight the critical role of health education in improving antihypertensive medication adherence. Given that the majority of respondents in the present study demonstrated only moderate levels of knowledge about hypertension, targeted educational interventions addressing misconceptions, the chronic nature of the condition, and the lifelong need for treatment are essential strategies for reducing non-adherence in the Kwaebibirem Municipality.

2.12 Factors Influencing Non-Adherence to Anti-Hypertensive Medication

Non-adherence to antihypertensive medication is a multifactorial problem driven by the interplay of sociodemographic, medication-related, patient-related, and healthcare system factors. Understanding these determinants is essential for designing targeted interventions to improve blood pressure control, particularly in resource-limited settings such as Ghana.

2.12.1 Sociodemographic Factors

Sociodemographic characteristics are among the most consistently documented determinants of non-adherence to antihypertensive medications. Sex, age, educational level, occupation, income, and place of residence have all been linked to medication-taking behaviour across various study settings. Globally, younger age has been identified as a predictor of non-adherence. A multi-centre study conducted in Ghana and Nigeria found that non-adherent patients were significantly younger than adherent patients, suggesting that younger adults may underestimate the severity of hypertension and the necessity of lifelong treatment (Boima et al., 2015). This pattern is consistent with findings from a study in Palestine, where patients younger than 45 years, those living in rural areas, and those who rated their own health as less than excellent showed significantly lower medication adherence (Al-Ramahi, 2015). In Northwest Ethiopia, a hospital-based survey similarly found that patients aged 60 years and above were significantly more likely to be non-adherent, indicating that both younger and older age groups carry distinct adherence risks depending on context (Teshome et al., 2017). Educational level and occupation are also important sociodemographic predictors. A cross-sectional study in Aligarh, India, found that non-adherence was strongly associated with lower educational attainment, lower social status, and female sex (Khwaja et al., 2017). In Ghana, a study at Cape Coast Teaching Hospital found that forgetfulness and lower education were among the leading predictors of non-adherence, with patients in informal or self-employed occupations demonstrating lower rates of medication-taking compared to those in formal employment (Ryabinina et al., 2025). A prospective study at Ayder Referral Hospital in Northern Ethiopia found a significant association between rural residency and non-compliance with antihypertensive treatment, highlighting the role of geographic access in shaping adherence behaviour (Ali et al., 2014).

2.12.2 Medication-Related Factors

Factors related to the prescribed medications themselves represent a well-documented category of non-adherence determinants. These include the cost of medications, polypharmacy, medication side effects, and patients' beliefs about drug efficacy. Drug cost is a particularly powerful barrier in low- and middle-income countries. A study in the United Arab Emirates identified the amount and cost of drugs as significant therapy-related factors associated with non-adherence (Bader et al., 2015). In Ghana and Nigeria, cost-related barriers are compounded by limitations in National Health Insurance Scheme coverage; patients who lacked health insurance had higher non-adherence rates, and those required to purchase medications out-of-pocket often skipped doses or discontinued treatment due to financial constraints (Boima et al., 2015; Oseni et al., 2023). A community-based study in Cameroon found that financial barriers to medication access were an independent predictor of non-adherence to antihypertensive therapy (Adidja et al., 2018). Polypharmacy and complex dosing regimens are additional medication-related contributors. A hospital-based study in southwest Ethiopia found that receiving free medication and being prescribed multiple antihypertensive agents were both negatively correlated with adherence, with patients on combination therapy more likely to miss doses (Asgedom et al., 2018). Multiple daily doses and adverse drug reactions were similarly identified as drivers of non-adherence in a community-based Cameroonian study (Adidja et al., 2018). In Ghana, some patients have been reported to avoid their prescribed medications due to the misconception that drugs dispensed at public health facilities are counterfeit or of poor quality, reflecting the role of drug-related beliefs in driving non-adherence (Boima et al., 2015).

2.12.3 Patient-Related Factors

Patient-related factors including forgetfulness, lifestyle behaviours, beliefs about illness, and use of alternative medicine are among the most frequently cited drivers of non-adherence in hypertensive populations. Forgetfulness is consistently reported as the most common reason for unintentional non-adherence across all settings. A cross-sectional study in the United Arab Emirates identified forgetfulness and a lack of knowledge about hypertension risks as key patient-related barriers to adherence (Bader et al., 2015). These findings are echoed in studies from Ethiopia (Demisew et al., 2018; Asgedom et al., 2018), Cameroon (Adidja et al., 2018), and Palestine (Al-Ramahi, 2015), where forgetfulness was the most frequently self-reported cause of missed doses. A recent study at Cape Coast Teaching Hospital in Ghana similarly identified forgetfulness as the leading reason for non-adherence, followed by financial constraints and the complexity of drug regimens (Ryabinina et al., 2025).

Patients' perceptions of the severity of their illness also strongly influence non-adherence. A cross-sectional study in Vietnam found that patients who were unaware of the complications of uncontrolled hypertension were significantly more likely to be non-adherent, while awareness of complications motivated treatment continuation (Nguyen et al., 2017). In Ghana, a study applying the Health Belief Model found that patients who underestimated their susceptibility to hypertension-related complications were significantly more likely to skip their medications (Atibila et al., 2022). Lifestyle factors including alcohol consumption and physical inactivity are also associated with non-adherence. A study in southwest Ethiopia found that alcohol consumption was negatively associated with antihypertensive medication-taking (Asgedom et al., 2018). Cultural practices such as the use of herbal remedies and attendance at prayer camps or spiritual

healers as alternatives to biomedical treatment have been identified as particularly significant contributors to non-adherence in Ghana (Boima et al., 2015; Atibila et al., 2022).

2.12.4 Health System-Related Factors

Health system factors including the quality of patient-provider interactions, waiting times, availability of medications, and financial access to care play a critical role in shaping antihypertensive medication adherence. Long waiting times at outpatient facilities are a well-documented barrier to clinic attendance and medication continuation. When patients are required to wait several hours for consultations or drug refills, they may reduce clinic visits and consequently run out of medication, leading to non-adherence. A study in Cameroon found that system-level barriers including drug stock-outs and poor provider-patient communication were independent predictors of non-adherence (Adidja et al., 2018). In Ghana, weaknesses in the NHIS drug supply chain including inconsistent availability of antihypertensive medications at health facilities have been identified as contributing factors to non-adherence, compelling patients to either purchase medications out-of-pocket or discontinue treatment (Boima et al., 2015; Adomako et al., 2021). Inadequate health education and counselling at the point of care is another important system factor. In a study in the United Arab Emirates, patients who received regular health education, counselling, and clear explanations of their treatment plan were significantly more likely to adhere to their antihypertensive regimens (Bader et al., 2015). A study in Northern Ethiopia found that insufficient social support and the presence of hypertensive heart disease as a comorbidity were associated with poorer adherence, suggesting that clinical complexity combined with inadequate system support creates compounding barriers (Ali et al., 2014). In Ghana, a study at two Kumasi hospitals identified inadequate supply of antihypertensives and limited health

insurance coverage as key systemic drivers of non-adherence, with implications for blood pressure control at the population level (Adomako et al., 2021).

2.13 Chapter Summary

This chapter reviewed the existing literature on the epidemiology and burden of hypertension globally, in Africa, and in Ghana, as well as the prevalence and determinants of non-adherence to antihypertensive medications. Evidence from multiple studies and systematic reviews demonstrates that non-adherence is highly prevalent among hypertensive patients across all settings, with particularly high rates documented in sub-Saharan Africa and Ghana. The literature consistently identifies non-adherence as the primary driver of uncontrolled blood pressure and its associated cardiovascular complications. The key determinants of non-adherence operate across four broad domains: sociodemographic factors such as age, education, and occupation; medication-related factors including drug cost, polypharmacy, and side effects; patient-related factors such as forgetfulness, illness perceptions, lifestyle behaviours, and cultural health-seeking practices; and health system factors including medication availability, waiting times, NHIS coverage gaps, and quality of patient-provider communication. Despite this growing body of national evidence, facility-level data from the Eastern Region of Ghana and specifically from Kade Government Hospital remain absent from the literature. This study therefore seeks to fill that gap by determining the prevalence of non-adherence to antihypertensive medications and identifying its determinants among hypertensive patients attending Kade Government Hospital in the Kwaebibirem Municipality.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Design and Type

This study employed a health facility-based cross-sectional design to determine the prevalence of, and factors associated with non-adherence to antihypertensive medications among hypertensive patients aged 18 years and above attending Kade Government Hospital in the Kwaebibirem Municipality of the Eastern Region, Ghana. A cross-sectional design was considered appropriate for this study as it allows for the simultaneous collection of data on the outcome variable non-adherence to antihypertensive medications and relevant explanatory variables at a single point in time (Hennekens & Buring, 1987). This design is widely used in facility-based epidemiological studies to estimate the prevalence of health-related conditions, assess knowledge levels, and examine factors associated with health behaviours (Carlson & Morrison, 2009). Its practicality, cost-effectiveness, and suitability for generating data to inform public health planning interventions make it particularly appropriate for studies conducted in resource-limited settings such as district hospitals in Ghana. The study adopted a quantitative approach, with data collected using a structured interviewer-administered questionnaire. Data collection was carried out over a period of five weeks at the hypertension and diabetes clinic of Kade Government Hospital, during which approximately 40–50 questionnaires were administered per week.

3.2 Profile of Study Area

The study was conducted at Kade Government Hospital (KGH) in Kwaebibirem Municipality, located in the Eastern Region of Ghana. It is among the top public health facilities offering services

to the people in Eastern Region. Kwaebibirem is located 25 kilometers east of the capital city, Koforidua in the Eastern Region. Kwaebibirem metropolis is one of the 26 districts in Eastern Region and a vibrant commercial and industrial town. The metropolitan shares boundaries with New Abirem municipality and Denkyembour municipality. The population of Kwaebibirem was estimated at 121,698 projection from 2021 population census (GSS PHC., 2021). Kade Government Hospital is located in Kade and started operating in the year 1985 as a Health Center and responds to the health needs of the people. With time, the health Center was expanded to a hospital as the population grows. Average daily outpatient attendance ranges from 100-150 patients. Apparently, the hospital is equipped with seven trained medical doctors, five trained physician Assistants, about 100 nurses and midwives, two dentists and a visiting gynaecologist. The main services provided by the hospital include outpatient services, ultrasound, Electrocardiogram, laboratory services, in-patient services, dental clinic, ENT clinic, Eye clinic and management of some non-communicable illnesses of which hypertension is included.

3.3 Study Population

The study population comprised adult hypertensive patients aged 18 years and above who were receiving care at the Out-Patient Department of Kade Government Hospital in the Kwaebibirem Municipality of the Eastern Region of Ghana. These were patients who had been clinically diagnosed with hypertension and placed on antihypertensive medication for the management of their condition, and who had been on treatment for at least six months prior to data collection. The hospital serves as a referral point for several communities within the municipality and its surrounding areas, which made it a suitable setting for assessing medication non-adherence among hypertensive patients drawn from diverse backgrounds.

3.3.1 Inclusion Criteria

The study included patients who met the following criteria:

- Aged 18 years and above
- Clinically diagnosed with hypertension and attending the hypertension clinic at Kade Government Hospital
- Prescribed and taking antihypertensive medication for a minimum of six months prior to data collection
- Patients with co-existing chronic conditions such as diabetes mellitus, dyslipidaemia, or chronic kidney disease who were concurrently receiving antihypertensive treatment
- Mentally sound and willing to give written informed consent

3.3.2 Exclusion Criteria

The study excluded patients who met any of the following criteria:

- Declined to provide written informed consent
- Pregnant women and individuals diagnosed with pregnancy-induced hypertension
- On antihypertensive medication for less than six months
- Critically ill, cognitively impaired, or otherwise unable to respond meaningfully to the questionnaire at the time of data collection

3.4 Sampling

Hypertension and diabetes clinics were held at least twice a week at Kade Government Hospital, with an average patient turnout of approximately 100 patients per clinic day. Data for the study were collected over a period of five weeks. Study participants were selected using a systematic random sampling method. Systematic random sampling was chosen because it provides an equal probability of selection for all eligible patients, reduces selection bias, and is practical for use in clinic-based settings with a predictable patient flow (Cochran, 1977).

The sample size was estimated using the Cochran (1977) formula for sample size determination for proportions:

$$n = (Z)^2 p(1 - p) / e^2$$

Where:

n = desired sample size

Z = 1.96 (standard normal deviate at 95% confidence level)

p = 0.13 (estimated prevalence of hypertension in Ghana based on the Ghana Demographic and Health Survey)

e = 0.05 (margin of error)

Substituting the values:

$$n = (1.96)^2 \times 0.13(1 - 0.13) / (0.05)^2 = 174$$

This yielded a minimum sample size of 174 participants. To account for possible non-response, the sample was adjusted upward by 10% using the formula $n_1 = n (1 + 0.10)$, giving a minimum required sample size of 191 respondents. However, to increase the analytical power of the study and improve the precision of the estimates, the final sample size was set at 220 hypertensive patients attending the clinic during the study period.

To draw this sample from the patient flow, the sampling interval (k) was determined by dividing the estimated eligible hypertensive population attending the clinic over the study period by the required sample size. Over the five-week period, an estimated 660 eligible hypertensive patients were expected to attend the clinic. The sampling interval was therefore calculated as:

$$k = N / n = 660 / 220 = 3$$

A random starting point was selected between the first and third patient using a simple lottery method at the beginning of data collection. From that starting point, every third (k th) eligible patient attending the clinic was selected and invited to participate, until the required sample size of 220 was reached. Where a selected patient declined or did not meet the inclusion criteria, the next eligible patient was approached in order to maintain the sampling interval.

3.5 Data Collection Methods and Instruments

Data was collected through face-to-face interviews using a structured interviewer-administered questionnaire, administered electronically via Kobo Collect a mobile data collection platform that supports offline data entry, in-built validation checks, and secure data storage. The use of Kobo Collect minimized data entry errors during fieldwork, ensured completeness of responses through automatic required-field validation, and facilitated efficient data export for analysis. The

questionnaire was organized into four sections. The first section captured the socio-demographic characteristics of participants, including age, sex, religion, marital status, educational level, occupation, income level, and health insurance status. The second section assessed participants' knowledge of hypertension, including knowledge of its causes, complications, and treatment. The third section assessed health-seeking behaviour and choice of health facility, including factors such as waiting times, access to prescribed medications, and use of alcohol and tobacco. The fourth section assessed non-adherence to antihypertensive medications and factors influencing medication-taking behaviour. Non-adherence to antihypertensive medication was measured using the 8-item Morisky Medication Adherence Scale (MMAS-8), a validated self-report tool widely used in hypertension research (Morisky et al., 2008). The MMAS-8 consists of eight items assessing medication-taking behaviours across different situations, with total scores ranging from 0 to 8. For the purpose of this study, participants with a total MMAS-8 score of 7 or above were classified as adherent, while those with a score below 7 (i.e., less than 7) were classified as non-adherent. This dichotomous classification is consistent with established MMAS-8 scoring criteria used in similar studies (Morisky et al., 2008; Boima et al., 2015). The questionnaire was originally developed in English. Prior to data collection, it was translated into Twi the predominant local language spoken in the Kwaebibirem Municipality to facilitate effective communication with participants who were more comfortable in the local language. Back-translation was performed to verify the accuracy and consistency of the translated version before use in the field.

3.6 Pretesting and Quality Control

To ensure data quality and reliability, the data collection tool was pretested prior to the main study. The pretest was conducted among 20 hypertensive patients at Asamankese Government Hospital and selected health centers within the West Akim Municipality, which share similar demographic

and healthcare characteristics with the study area. This process helped identify unclear or ambiguous questions, which were subsequently revised to improve clarity and reduce the risk of misinterpretation. Research assistants were recruited and trained for one week prior to the commencement of data collection. The training covered the study objectives, standardized interview techniques, ethical considerations regarding participant privacy and voluntary participation, the proper administration of the MMAS-8 scale, and the correct use of the Kobo Collect electronic data collection platform. To maintain data quality throughout the fieldwork period, completed questionnaires were reviewed daily by field supervisors to ensure completeness and internal consistency. Any identified errors or omissions were promptly addressed and corrected. Interviews were conducted in English or in Twi, the predominant local language of the study area, depending on the preference and language proficiency of each participant.

3.7 Data Processing and Analysis

Data collected via Kobo Collect were exported directly to STATA version 18 (Stata Corp, College Station, TX) for cleaning and analysis. Prior to analysis, the dataset was thoroughly cleaned to identify and correct inconsistencies, missing values, and data entry errors. Descriptive statistics were performed to summarize all study variables. Frequencies and percentages were used to describe categorical variables, while means and standard deviations were computed for continuous variables. Results were presented in tables and charts to describe the socio-demographic characteristics of respondents, their health-seeking behaviours, their knowledge of hypertension, and the prevalence of non-adherence to antihypertensive medications. To identify independent factors associated with non-adherence, both univariate and multivariable logistic regression analyses were performed, with non-adherence to antihypertensive medication as the binary dependent variable. The strength and direction of associations were reported using crude odds

ratios (cOR) and adjusted odds ratios (aOR) with corresponding 95% confidence intervals. A p-value of less than 0.05 was considered statistically significant throughout the analysis.

3.8 Study Variables

Two main categories of variables were considered in this study: the dependent variable and the independent variables.

3.8.1 Dependent Variable

The dependent variable in this study was non-adherence to antihypertensive medication, measured using the 8-item Morisky Medication Adherence Scale (MMAS-8) as described in Section 3.2. Participants with a total MMAS-8 score of 7 or above were classified as adherent, while those with a score below 7 (scores 0–6) were classified as non-adherent. This dichotomous approach was chosen to allow for straightforward logistic regression analysis and direct comparability with published studies in similar settings that applied the same scoring threshold.

3.8.2 Independent Variables

The independent variables examined in this study fell into two broad categories. The first comprised socio-demographic characteristics, including age, sex, educational level, religion, occupation, income level, housing type, living arrangements, and National Health Insurance Scheme (NHIS) status. The second comprised patient-related and health system factors, including beliefs about hypertension and its treatment, waiting time for blood pressure consultation, waiting time for drug refill at the pharmacy, ability to purchase medications when prescribed outside the facility, smoking behaviour, alcohol consumption, presence of comorbid conditions, and duration of hypertension diagnosis.

3.9 Ethical Consideration

Ethical clearance for this study was obtained from the ENSIGN Global University Review Ethics Committee (REC) prior to the commencement of data collection. Institutional permission was also obtained from the Medical Superintendent of Kade Government Hospital before any participant recruitment was undertaken. Written informed consent was obtained from all eligible participants before data collection commenced. Each participant was provided with a clear explanation of the purpose of the study, the procedures involved, the potential benefits, and any foreseeable risks. Participants were informed that their participation was entirely voluntary and that they were free to withdraw from the study at any time without any negative consequences to the care they received at the facility. All information collected was treated with strict confidentiality throughout the study. No personal identifiers were included in the dataset, and all data were securely stored and used solely for the purposes of this research. Data collected via Kobo Collect were password-protected and accessible only to the principal investigator and the supervising team. The study was conducted in full accordance with the ethical principles outlined in the Declaration of Helsinki.

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic Characteristics

A total of 220 hypertensive patients participated in the study. Regarding age, the majority of respondents were 46–65 years 152 (69.1%), followed by those aged 25–45 years 64 (29.1%), while only a small proportion were 65 years and above 4 (1.8%). In terms of sex distribution, most respondents were male 180 (81.8%), whereas 40 (18.2%) were female. With respect to marital status, the majority of respondents were married 166 (75.5%), followed by widowed 23 (10.5%) and divorced 17 (7.7%). A smaller proportion were never married 8 (3.6%) and cohabiting 6, (2.7%). Regarding educational attainment, most respondents had SHS/Technical education 72 (32.7%), followed by primary education 70 (31.8%) and JHS/Middle School education 54 (24.6%). Only 18 (8.2%) had attained tertiary education, while 6 (2.7%) had no formal education. In terms of occupation, artisans constituted the largest group 77 (35.0%), followed by farmers 55 (25.0%) and business owners/traders 53 (24.1%). Additionally, 20 (9.0%) were unemployed, 12 (5.5%) were civil servants, and 3 (1.4%) were retired. With regard to income levels, the majority of respondents reported earning ≥ 2000 158 (71.8%), while 47 (21.4%) earned 1000–2000, and 15 (6.8%) earned ≤ 1000 . Regarding housing type, 85 (38.6%) lived in family houses, 68 (30.9%) lived in their personal property, and 67 (30.5%) were renting. Most respondents lived with their spouse and children 136 (61.8%), while 46 (20.9%) lived with relatives, 27 (12.3%) lived alone, and 11 (5.0%) reported other living arrangements. In terms of health insurance status, the majority of respondents were insured under the National Health Insurance Scheme 183 (83.2%), while 37 (16.8%) were not insured.

Table 4.1 Demographic Characteristics of Respondents

Characteristics	Frequency	Percentage
	[N=220]	(%)
Age (In Years)		
25 – 45 (Youth)	64	29.1
46 – 65 (Middle Age)	152	69.1
65 > (Elderly)	4	1.8
Sex		
Female	40	18.2
Male	180	81.8
Marital Status		
Never Married	8	3.6
Married	166	75.5
Co-habiting	6	2.7
Divorced	17	7.7
Widow/Widower	23	10.5
Educational Level		
No Formal Education	6	2.7
Primary	70	31.8
JHS/Middle School	54	24.6
SHS/Technical School	72	32.7
Tertiary	18	8.2
Occupation		
Retired	3	1.4
Farmer	55	25.0
Artisan	77	35.0
Business Owner/Trader	53	24.1
Civil Servant	12	5.5
Unemployed	20	9.0
Level of Income		

≤1000	15	6.8
1000 – 2000	47	21.4
≥2000	158	71.8
Housing		
Family House	85	38.6
Personal Property	68	30.9
Renting	67	30.5
Living With		
All by Myself	27	12.3
With my spouse and Children	136	61.8
With my Relatives	46	20.9
Others	11	5.0
NHIS Status		
Not Insured	37	16.8
Insured	183	83.2

4.2 Health-Seeking Behaviour and Choice of Health Facility of Respondents

Table 4.2 presents the health-seeking behaviour and choice of health facility among respondents. When respondents were asked where they first go when they are ill, the majority reported visiting a hospital 92 (41.8%). This was followed by pharmacies/licensed chemical or drug shops 45 (20.5%) and health Centres/CHPS compounds 35 (15.9%). A smaller proportion sought care from prayer camps 23 (10.5%), shrines/herbalists 16 (7.2%), while others accounted for 9 (4.1%). Regarding the factors influencing respondents' choice of health facility, proximity to residence was the most commonly reported factor 66 (30.0%), followed by affordability 61 (27.7%) and availability of medicines 48 (21.8%). Additionally, severity of illness influenced the choice of facility among 36 (16.4%) of respondents, while other factors were reported by 9 (4.1%). With respect to access to prescribed medications at the clinic or hospital, the majority of respondents

reported that they received all prescribed medications 169 (76.8%), whereas 51 (23.2%) indicated that they did not. Similarly, 150 (68.2%) of respondents reported that they were able to buy medications from outside pharmacies when given a prescription, while 70 (31.8%) indicated that they were not able to do so. In relation to smoking behaviour, most respondents reported that they did not smoke 202 (91.8%), while 10 (4.6%) reported smoking occasionally, and 8 (3.6%) reported smoking all the time. Regarding alcohol consumption, the majority of respondents reported that they did not drink alcohol 152 (69.1%), while 57 (25.9%) indicated drinking occasionally, and 11 (5.0%) reported drinking all the time. Concerning waiting time at the hospital for blood pressure consultation, the majority of respondents reported waiting 30 minutes to 1 hour 108 (49.1%), followed by 1–2 hours 78 (35.4%). Additionally, 29 (13.2%) reported waiting less than 30 minutes, while 5 (2.3%) reported waiting more than 2 hours. Similarly, regarding waiting time at the pharmacy for blood pressure drug refill, 109 (49.6%) of respondents reported waiting 30 minutes to 1 hour, 64 (29.1%) waited 1–2 hours, 41 (18.6%) waited less than 30 minutes, and 6 (2.7%) reported waiting more than 2 hours.

Table 4.2 Health-Seeking Behaviour and Choice of Health Facility of Respondents

Characteristics	Frequency [N=220]	Percentage (%)
Where do you go first when you are ill		
Health Center/CHPS	35	15.9
Hospital	92	41.8
Pharmacy/Licensed Chemical/Drug Shop	45	20.5
Prayer Camp	23	10.5
Shrine/Herbalist	16	7.2
Others	9	4.1
What main factor influences your choice above		
Affordability	61	27.7
Availability of medicines	48	21.8
Proximity to residence	66	30.0
Severity of illness	36	16.4
Others	9	4.1
Do you get all medications prescribed at the clinic/hospital		

	No	51	23.2
	Yes	169	76.8
Are you able to buy medications from outside when given prescription			
	No	70	31.8
	Yes	150	68.2
Do you Smoke			
	All the time	8	3.6
	Not at All	202	91.8
	Occasionally	10	4.6
Do you Drink Alcohol			
	All the times	11	5.0
	Not at All	152	69.1
	Occasionally	57	25.9
How much time do you spend waiting at the hospital for BP consultation			
	< 30 Minutes	29	13.2
	30 – 1 Hour	108	49.1
	1 – 2 Hours	78	35.4
	>2 Hours	5	2.3
How much time do you spend waiting at the pharmacy for BP drug refill			
	< 30 Minutes	41	18.6
	30 – 1 Hour	109	49.6
	1 – 2 Hours	64	29.1
	>2 Hours	6	2.7

4.3 Prevalence of Non Adherence with Anti-Hypertensive Medications among Hypertensive Patients

Figure 4.1 presents the prevalence of non-adherence to antihypertensive medications among respondents. The prevalence of non-adherence was 93.6%, indicating that the vast majority of respondents did not adhere to their prescribed antihypertensive medications. In contrast, only a small proportion of respondents were adherent (6.4%; 95% CI: 3.1%–9.6%) to their antihypertensive medications.

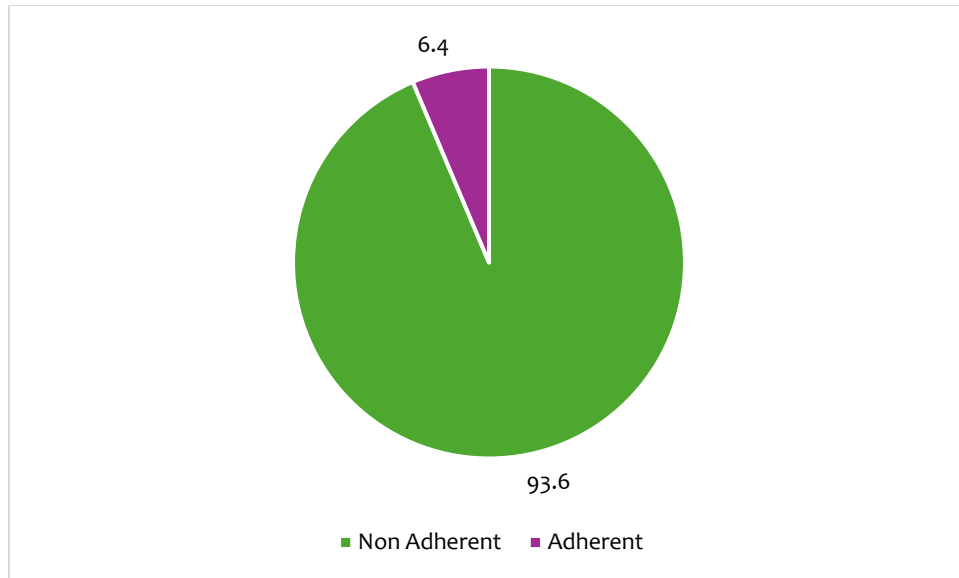


Figure 4.1 Prevalence of Non Adherence with Anti-Hypertensive Medications among Hypertensive Patients

4.4 Duration of Hypertension and Comorbidities among Patients with Hypertension

Table 4.3 presents the duration of hypertension and comorbid conditions among respondents. The majority of respondents had been diagnosed with hypertension for 1 year, 100 (45.5%). This was followed by those who had lived with hypertension for 2 years, 59 (26.8%), while 48 (21.8%) had been diagnosed for less than one year. A smaller proportion of respondents reported having hypertension for 3 years, 13 (5.9%). With respect to comorbid conditions, 70 (31.8%) of respondents reported having no comorbid condition. Among those with comorbidities, diabetes was the most common 55 (25.0%), followed by high cholesterol 40 (18.2%), osteoarthritis 24 (10.9%), and chronic kidney disease (CKD) 16 (7.3%). Additionally, 15 (6.8%) of respondents reported having other comorbid conditions.

Table 4.3 Duration of Hypertension and Comorbidities among Patients with Hypertension

Characteristics	Frequency	Percentage
	[N=220]	(%)
Duration of HTN		
< 1 year	48	21.8
1 year	100	45.5
2 Years	59	26.8
3 Years	13	5.9
Comorbidities		
CKD	16	7.3
Diabetes	55	25.0
High Cholesterol	40	18.2
None	70	31.8
Osteoarthritis	24	10.9
Others	15	6.8

4.5 Knowledge of Causes of Hypertension among Patients with Hypertension

Figure 4.3 presents respondents' knowledge regarding the causes of hypertension. As this was a multiple-response question, respondents could identify more than one cause, and the percentages therefore sum to more than 100%. The most commonly identified cause was lack of exercise, reported by 65.0% of respondents. This was followed by unhealthy diet, mentioned by 61.4%, and aging, reported by 55.9% of the participants. In addition, 49.1% of respondents indicated that hypertension could occur through inheritance, while 23.6% attributed it to spiritual causes. Furthermore, 15.9% of respondents indicated that they did not know the causes of hypertension, and none of the respondents (0%) selected other causes.

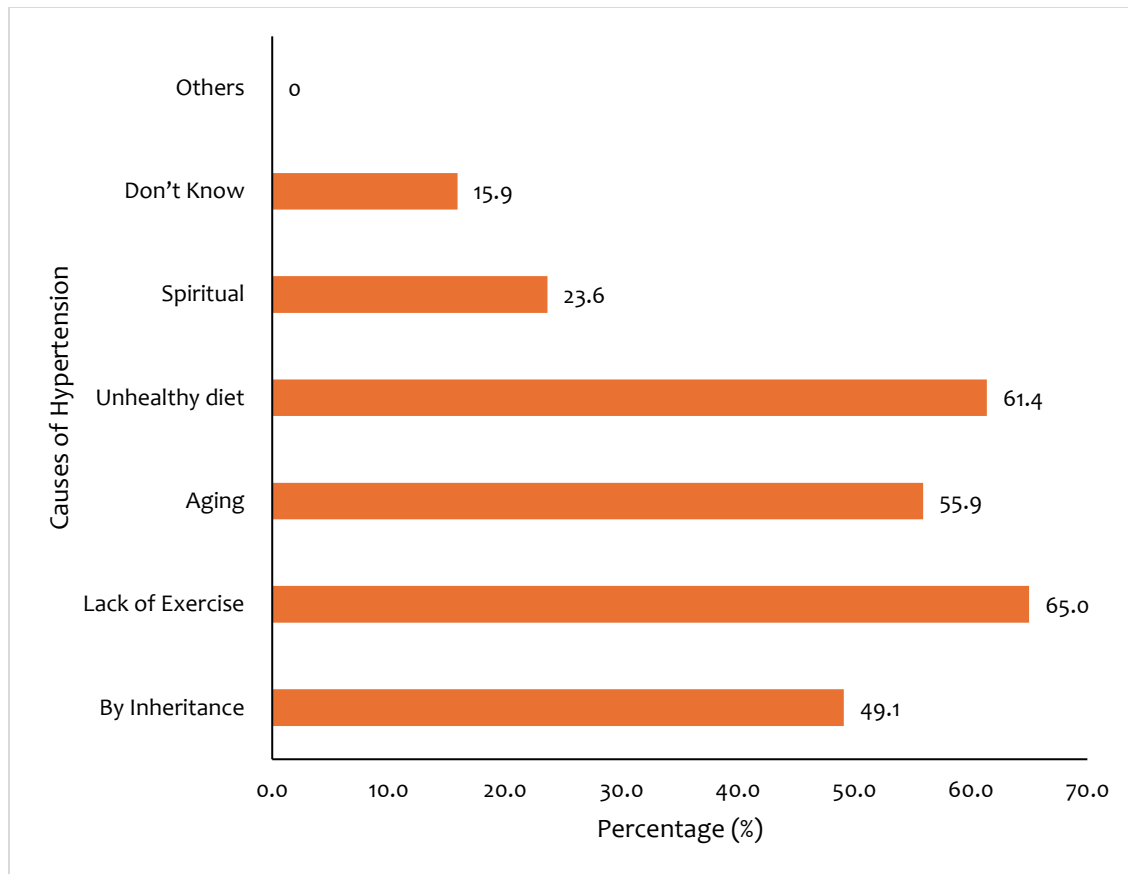


Figure 4.2. Knowledge of Causes of Hypertension among Patients with Hypertension

4.6 Knowledge of Complications of Hypertension among Patients with Hypertension

Figure 4.4 presents respondents' knowledge of the complications associated with hypertension. As this was a multiple-response question, respondents could identify more than one complication, and the percentages therefore sum to more than 100%. The majority of respondents identified stroke as a complication of hypertension, reported by 166 (75.5%) of the participants. This was followed by heart attack, indicated by 161 (73.2%) of respondents, and heart failure, recognised by 145 (65.9%). A smaller proportion, 78 (35.5%), identified renal failure as a complication, while none of the respondents (0%) mentioned other complications of hypertension.

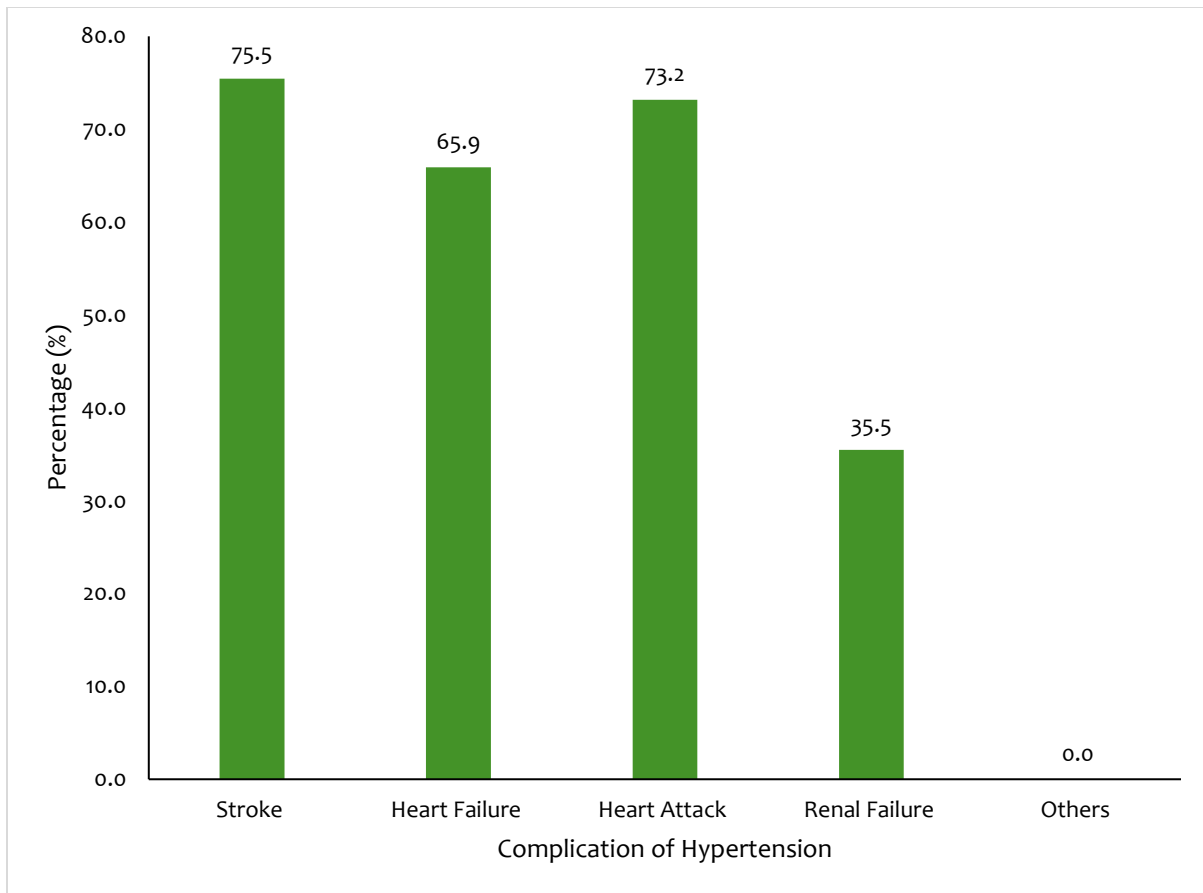


Figure 4.3. Knowledge of Complications of Hypertension among Patients with Hypertension

4.7 Adherence Barrier Questionnaire (ABQ Analysis)

A set of 12-item questionnaire was adopted to evaluate what participants perceived to be barriers to their medication adherence. Each ABQ item was scored on a scale of 1 to 4, with a score of 1 indicating "Stronger Agreement" of the specific adherence barrier and a score of 4 depicting "Strong Disagreement." Table 4.4 displays the distribution characteristics of the participants' responses to the 12 ABQ items. All items recorded a median score of 3.00 with mean scores ranging from 2.605 to 3.095, indicating that respondents generally disagreed that the listed factors were barriers to their adherence. Most items showed a positively skewed distribution, further

confirming this trend. However, Items 2, 7, and 12 recorded negative skewness values, suggesting that recalling medication names, taking medications at a fixed time, and fear of side effects were slight exceptions where some participants acknowledged these as adherence barriers.

A Cronbach's alpha (α) scale reliability coefficient on the 12-ABQ items was 0.8383, which demonstrates a good reliability in the responses provided. Item-total correlation ranged from 0.3947 to 0.7645, where Items 3 and 4 ("I trust my doctor and agree to my therapy plan" and "My medications help me only if I take regularly as prescribed") had the highest correlation of 0.7645, while Item 7 ("I take my medications automatically every day at a fixed time") recorded the lowest correlation of 0.3947. All item-total correlations were positive, indicating that all items contributed consistently to the overall scale.

Table 4.4 Findings from ABQ Analysis

Item	Adherence Barrier Questionnaire	Mean	Median	SD	Skewness
1	I fully understand what my doctor, nurse or pharmacy attendants have explained to me so far	2.814	3	0.751	0.188
2	I can mention the names of my medications and scope without hesitation	3.095	3	0.705	-0.370
3	I trust my doctor and agree to my therapy plan together with him	2.868	3	0.863	0.043
4	My medications help me only if I take regularly as prescribed	2.868	3	0.863	0.043
5	Medicines are all poisonous. You should avoid taking them if possible	2.605	3	0.650	0.407
6	I feel healthy so I'm sometimes unsure if I really need to take my medications daily	2.695	3	0.664	0.335
7	I take my medications automatically every day at a fixed time	2.645	3	0.598	-0.061
8	I frequently forget things on an everyday basis	2.632	3	0.673	0.413
9	Generally, I often feel bad and sometimes I feel depressed or discouraged to take my medications	2.655	3	0.611	0.116
10	I frequently have problems taking my medications	2.632	3	0.609	0.398
11	I really will need help every day with my, medications but I don't get any help	2.709	3	0.667	0.315
12	I am really frightened of side effects of my medications	2.795	3	0.596	-0.160

Source: Field Data , 2026

4.8 Factors Influencing Non-Adherence to Anti-Hypertensive Medications among Patients with Hypertension

Table 4.5 presents the crude and adjusted odds ratios for factors influencing non-adherence to antihypertensive medications among patients with hypertension. It is worth noting that adjusted odds ratios could not be computed for some subgroups including respondents aged 65 years and above, those with tertiary education, those who had never married, widowed/widowers, farmers, artisans, civil servants, the unemployed, and those on monthly follow-up, as all individuals within these subgroups were non-adherent, resulting in complete separation which precluded stable estimation in the multivariable model. With respect to educational level, using JHS/Middle School as the reference category, all other educational groups demonstrated higher odds of non-adherence. Respondents with primary education had higher crude odds of non-adherence (cOR = 4.08; 95% CI: 0.46–36.16; $p = 0.207$), as did those with SHS/Technical education (cOR = 3.11; 95% CI: 0.33–28.87; $p = 0.317$), though neither association was statistically significant. Respondents with no formal education could not be included in either the crude or adjusted analysis as all individuals in this subgroup were non-adherent, resulting in a zero cell count that precluded odds ratio estimation. Respondents with tertiary education recorded the highest odds of non-adherence across all educational subgroups in the crude analysis (cOR = 15.14; 95% CI: 1.56–147.21; $p = 0.019$), and this was the only statistically significant educational association. However, upon adjustment, an odds ratio could not be computed for tertiary-educated respondents as all individuals within this subgroup were non-adherent, resulting in complete separation in the multivariable model. In the adjusted model, primary (aOR = 4.60; 95% CI: 0.51–41.80; $p = 0.172$) and SHS/Technical respondents (aOR = 2.99; 95% CI: 0.26–34.92; $p = 0.382$) continued to show elevated odds of non-adherence relative to the JHS reference group, though neither attained statistical significance.

Regarding occupation, with retired respondents serving as the reference group, farmers (cOR = 0.12; 95% CI: 0.02–0.62; $p = 0.012$), artisans (cOR = 0.11; 95% CI: 0.02–0.53; $p = 0.006$), and business owners/traders (cOR = 0.12; 95% CI: 0.02–0.64; $p = 0.013$) all had significantly lower odds of non-adherence in the crude analysis, indicating that retired respondents were considerably more non-adherent relative to these working groups. However, upon adjustment, odds ratios could not be computed for farmers, artisans, civil servants, and the unemployed as all individuals within these subgroups were non-adherent, resulting in complete separation which precluded stable estimation in the multivariable model. The association for business owners/traders also did not retain statistical significance after adjustment. Concerning marital status, both divorced (cOR = 0.67; 95% CI: 0.05–9.08; $p = 0.761$) and married respondents (cOR = 0.35; 95% CI: 0.04–3.33; $p = 0.364$) had lower crude odds of non-adherence compared with co-habiting respondents, though neither association was statistically significant. These patterns persisted in the adjusted model, where divorced (aOR = 0.15; 95% CI: 0.01–2.21; $p = 0.168$) and married respondents (aOR = 0.18; 95% CI: 0.01–2.16; $p = 0.175$) continued to show lower odds of non-adherence, though statistical significance was still not attained. Adjusted odds ratios could not be computed for those who had never married or were widowed/widowers as all individuals within these subgroups were non-adherent, resulting in complete separation in the multivariable model.

With respect to NHIS status, respondents with active NHIS membership had higher odds of non-adherence compared with the uninsured in both the crude (cOR = 2.75; 95% CI: 0.35–21.82; $p = 0.338$) and adjusted (aOR = 2.80; 95% CI: 0.21–37.48; $p = 0.436$) analyses, though neither estimate reached statistical significance. Concerning housing, respondents living in personal property (cOR = 0.82; 95% CI: 0.22–3.05; $p = 0.771$; aOR = 0.60; 95% CI: 0.11–3.27; $p = 0.557$) and those renting (cOR = 0.84; 95% CI: 0.23–3.10; $p = 0.789$; aOR = 0.55; 95% CI: 0.11–2.83; $p = 0.471$)

had lower odds of non-adherence than those in family houses in both analyses, though none of these associations were statistically significant.

Patients attending follow-up every two months had marginally higher crude odds of non-adherence compared with those on default review schedules (cOR = 1.07; 95% CI: 0.36–3.24; $p = 0.901$). This estimate was attenuated after adjustment (aOR = 0.77; 95% CI: 0.24–2.47; $p = 0.666$), with neither estimate reaching statistical significance. An adjusted odds ratio could not be estimated for those on monthly follow-up as all individuals within this subgroup were non-adherent, resulting in complete separation in the multivariable model. Finally, respondents who were able to purchase their medications when given a prescription had marginally higher odds of non-adherence in both the crude (cOR = 1.18; 95% CI: 0.36–3.91; $p = 0.788$) and adjusted (aOR = 1.51; 95% CI: 0.43–5.23; $p = 0.519$) analyses compared with those who were not, though neither association was statistically significant. Overall, no variable attained statistical significance in the multivariable adjusted model.

Table 4.5 Factors Influencing Non-Adherence to Anti-Hypertensive Medications among Patients with Hypertension

	Characteristics	cOR	95% CI	p-value	aOR	95% CI	p-value
Age							
	25 – 45	Ref			Ref		
	46 – 65	1.06	[0.32 – 3.51]	0.929	2.16	[0.67 – 6.93]	0.195
	65>						
Sex							
	Female	Ref			Ref		
	Male	0.80	[0.21 – 3.03]	0.746	0.41	[0.08 – 2.17]	0.292
Educational Level							
	JHS/Middle School	Ref			Ref		
	No Formal Education						
	Primary	4.08	[0.46 – 36.16]	0.207	4.6	[0.51 – 41.80]	0.172
	SHS/Technical	3.11	[0.33 – 28.87]	0.317	2.99	[0.26 – 34.92]	0.382
	Tertiary	15.14	[1.56 – 147.21]	0.019*			
Marital Status							
	Co-habiting	Ref			Ref		
	Divorced	0.67	[0.05 – 9.08]	0.761	0.15	[0.01 – 2.21]	0.168
	Married	0.35	[0.04 – 3.33]	0.364	0.18	[0.01 – 2.16]	0.175
	Never Married						
	Widow/Widower						
Occupation							
	Retired	Ref			Ref		
	Farmer	0.12	[0.02 – 0.62]	0.012*			
	Artisan	0.11	[0.02 – 0.53]	0.006*			
	Business Owner/Trader	0.12	[0.02 – 0.64]	0.013*			
	Civil Servant						
	Unemployed						
NHIS Status							
	No	Ref			Ref		
	Yes	2.75	[0.35 – 21.82]	0.338	2.80	[0.21 – 37.48]	0.436
Housing							
	Family House	Ref			Ref		
	Personal Property	0.82	[0.22 – 3.05]	0.771	0.60	[0.11 – 3.27]	0.557
	Renting	0.84	[0.23 – 3.10]	0.789	0.55	[0.11 – 2.83]	0.471
Follow-Up							
	Default Review	Ref			Ref		
	Every 2 Months	1.07	[0.36 – 3.24]	0.901	0.77	[0.24 – 2.47]	0.666
	Monthly						
Ability to buy drugs when given prescription							
	No	Ref			Ref		
	Yes	1.18	[0.36 – 3.91]	0.788	1.51	[0.43 – 5.23]	0.519

CHAPTER FIVE

5.0 DISCUSSION

5.1 Introduction

This chapter discusses the findings of the study in relation to existing literature on non-adherence to antihypertensive medications. The discussion is organized around the three specific objectives of the study: the sociodemographic profile of respondents, the prevalence of non-adherence to antihypertensive medications, the knowledge of hypertension among patients, and the factors associated with non-adherence among hypertensive patients attending Kade Government Hospital in the Eastern Region of Ghana.

5.2 Sociodemographic Characteristics of Respondents

The demographic profile of participants in this study revealed that the majority were in the 46–65 years (middle-aged) category, with very few aged 65 years and above. This pattern mirrors the broader epidemiological literature, which consistently documents that hypertension disproportionately affects middle-aged adults in sub-Saharan Africa, driven by the cumulative effects of vascular stiffness, weight gain, and hormonal changes from midlife onwards (Mills et al., 2020; Gafane-Matemané et al., 2025). The relatively low proportion of elderly patients presenting at the clinic may reflect alternative health-seeking pathways among older individuals in the Kwaebibirem Municipality, including reliance on traditional remedies and spiritual healing, a pattern well-documented in Ghanaian facility-based studies (Atibila et al., 2022; Boima et al., 2015).

The strong male predominance observed in this study (81.8%) stands in contrast to the wider literature, which more commonly reports a higher burden of hypertension among post-menopausal women (Atibila et al., 2021; Acheampong et al., 2023). This discrepancy likely reflects gender-specific health-seeking disparities at the facility level rather than a true difference in hypertension prevalence. Women in the Kwaebibirem Municipality may face barriers to formal clinic attendance, including competing domestic responsibilities and financial dependency, which may lead them to seek care through community health workers or informal channels instead.

The low educational profile of the study population, with the majority having attained only primary or junior high school education, is a finding of considerable significance. A well-established body of literature links low educational attainment to limited health literacy, poor understanding of medication instructions, and greater vulnerability to health misconceptions (Boima et al., 2015; Atibila et al., 2022). The high proportion of artisans (35.0%) and farmers (25.0%) further reflects the predominantly informal-sector economic character of the Kwaebibirem Municipality, a context in which irregular income and demanding work schedules represent potential structural barriers to consistent medication adherence, though the crude analysis in this study suggests these groups maintained comparatively better adherence than retired respondents. The majority of respondents (83.2%) held valid NHIS coverage, yet non-adherence remained extremely high, demonstrating that insurance access alone is insufficient to guarantee medication-taking behaviour.

5.3 Prevalence of Non-Adherence to Antihypertensive Medications

The prevalence of non-adherence to antihypertensive medications recorded in this study was 93.6%, meaning that the vast majority of hypertensive patients attending Kade Government Hospital were not taking their medications as prescribed. This is considerably higher than the

pooled non-adherence estimate of 43.5% reported by Iwuala et al. (2024) in a comprehensive systematic review and meta-analysis drawing on 95 studies across 27 sub-Saharan African countries, and substantially exceeds facility-based rates documented across Ghana. Boima et al. (2015) documented a non-adherence rate of 66.7% at Korle-Bu Teaching Hospital in Accra, while Atibila et al. (2022) reported a prevalence of 63.7% in the Brong Ahafo Region, and Sarkodie et al. (2020) found a rate of 61.3% in two district hospitals using the same MMAS-8 instrument. The rate observed in this study is also higher than the 31.4% reported in the North Dayi District by an earlier Ghanaian facility-based study (Manortey et al. 2021), and the 50.2% reported in a rural Vietnamese community health clinic setting (Nguyen et al., 2017).

The extremely high non-adherence rate at Kade Government Hospital suggests that the burden of non-adherence in this facility is particularly severe, pointing to deep-rooted structural, socioeconomic, and health-system challenges that go beyond what has been documented at comparable Ghanaian facilities. The very small proportion of adherent patients (6.4%; 95% CI: 3.1%–9.6%) reflects an urgent public health problem that demands immediate, targeted, and multifaceted intervention at the facility and district levels. The non-adherence rate was highest among respondents in the 46–65 years age group, consistent with patterns reported by similar Ghanaian studies where the middle-aged group carried the greatest burden of non-adherence (Atibila et al., 2022). The predominantly male composition of non-adherent patients in this study diverges from findings that typically associate female sex with higher non-adherence, and may reflect the male-dominated patient composition of the study sample rather than a sex-specific adherence pattern.

5.4 Knowledge of Hypertension among Patients

This study found that respondents demonstrated moderate but incomplete knowledge of the causes and complications of hypertension. The most commonly identified causes of hypertension were lack of exercise (65.0%), unhealthy diet (61.4%), and aging (55.9%), while 49.1% correctly identified hereditary or genetic factors. These findings are encouraging and suggest that health education messages delivered at the clinic level have partially reached the patient population. However, a notable proportion of respondents (23.6%) attributed hypertension to spiritual causes, and 15.9% reported not knowing the causes of hypertension at all. This pattern of mixed knowledge, where biomedical understanding coexists with spiritual and traditional explanatory models, is well-recognized in Ghana and has been documented at Korle-Bu Teaching Hospital (Boima et al., 2015) and in the Brong Ahafo Region (Atibila et al., 2022). It reflects the pluralistic health belief systems that characterize much of the Ghanaian context, where biomedical and spiritual frameworks of illness are not mutually exclusive.

With respect to complications, the majority of respondents demonstrated good awareness of the major cardiovascular consequences of hypertension. Stroke was identified as a complication by 75.5% of respondents, heart attack by 73.2%, and heart failure by 65.9%. This level of awareness is broadly consistent with findings from similar Ghanaian studies, where a high proportion of patients correctly identified stroke and heart failure as sequelae of poorly controlled hypertension (Sarkodie et al., 2020). However, awareness of renal failure as a complication was notably lower, with only 35.5% of respondents identifying it, suggesting a gap in patients' understanding of the systemic and organ-specific consequences of uncontrolled blood pressure beyond the cardiovascular system. This is consistent with what was highlighted by Keen (2017), where close to eight out of every ten respondents noted stroke, heart, and kidney failure as complications of

hypertension. The more knowledgeable patients are about the benefits of hypertension treatment to their health and wellbeing, the more adherent they tend to become (Altozano, 2012).

The ABQ analysis further revealed that respondents generally disagreed that the listed factors were barriers to their adherence, with all 12 items recording a median score of 3.00 and mean scores ranging from 2.605 to 3.095. This suggests that at a self-reported level, patients did not strongly perceive the listed items as significant obstacles. However, this finding must be interpreted cautiously alongside the extremely high observed prevalence of non-adherence (93.6%). The discrepancy likely reflects social desirability bias in self-reporting, and indicates that patients may lack insight into the extent to which factors such as forgetfulness, the belief that they feel healthy without medication (Item 6, mean 2.695), and infrequent medication self-monitoring contribute to their non-adherence in practice. Respondents who admitted to being counselled on their condition by their healthcare providers were more adherent to hypertension therapy because they better understood the course of the disease, the optimal blood pressure target, and the complications they risked by not taking their medications as prescribed (Altozano, 2012). This reinforces the critical importance of structured, individualized patient education as a cornerstone of adherence support at Kade Government Hospital.

5.5 Factors Associated with Non-Adherence to Antihypertensive Medications

5.5.1 Educational Level

In the crude analysis, all educational groups demonstrated higher odds of non-adherence relative to respondents with JHS/Middle School education, who served as the reference category and represented the most adherent group in this study. Respondents with tertiary education recorded the highest odds of non-adherence of all educational subgroups (cOR = 15.14; 95% CI: 1.56–

147.21; $p = 0.019$), and this was the only statistically significant association. Although an adjusted odds ratio could not be computed for the tertiary subgroup due to complete separation in the multivariable model, the magnitude of the crude estimate is noteworthy. Respondents with primary (aOR = 4.60; $p = 0.172$) and SHS/Technical education (aOR = 2.99; $p = 0.382$) similarly showed elevated odds of non-adherence in the adjusted model, though neither association attained statistical significance.

This finding is unexpected and contrasts with the broader literature, which consistently documents higher educational attainment as a protective factor against non-adherence in Ghana and sub-Saharan Africa (Boima et al., 2015; Atibila et al., 2022; Shin & Konlan, 2023). One plausible explanation is that the extremely small number of adherent patients in this study ($n=14$) severely limited statistical power, making it difficult to detect true associations and potentially producing unstable estimates with wide confidence intervals. The very wide confidence interval for the tertiary education estimate (1.56–147.21) reflects this instability and should be interpreted with considerable caution. It is also possible that in this specific facility context, higher educational attainment is associated with greater occupational demands, busier schedules, or stronger health beliefs that lead patients to stop medications when they feel well, all of which could paradoxically increase non-adherence. Future studies with larger sample sizes and more balanced outcome distributions are needed to clarify the true relationship between educational level and antihypertensive medication adherence in this population.

5.5.2 Occupation

In the crude analysis, farmers (cOR = 0.12; 95% CI: 0.02–0.62; $p = 0.012$), artisans (cOR = 0.11; 95% CI: 0.02–0.53; $p = 0.006$), and business owners/traders (cOR = 0.12; 95% CI: 0.02–0.64; $p = 0.013$) all had significantly lower odds of non-adherence compared with retired respondents, indicating that retired patients were considerably more non-adherent than all other working occupational groups. Although these associations did not retain statistical significance in the multivariable adjusted model, the consistent pattern across all three occupational groups points to retirement status as a contextually important factor associated with poorer adherence behaviour in this population. This finding is clinically meaningful and warrants careful consideration. Retired individuals may lack the structured daily routines that active employment provides, and this loss of routine may make consistent medication-taking harder to sustain. Research has shown that daily routine and habit formation are critical enablers of medication adherence, particularly for chronic conditions requiring lifelong treatment such as hypertension (Brown et al., 2016). Without the temporal anchors of a working schedule, retired patients may find it more difficult to remember and maintain fixed medication-taking times. Additionally, retirement is often associated with reduced income, social isolation, and diminished engagement with community networks, all of which have been linked to poorer health behaviours and lower medication adherence in older adult populations (Lee et al., 2022; Shin & Konlan, 2023). In the Kwaebibirem Municipality context, where only three respondents were retired, the small size of this subgroup also means that even one or two non-adherent individuals within it would dramatically influence the odds ratio, and these findings should therefore be interpreted cautiously. Nonetheless, the data suggest that retirement, rather than active informal employment, represents the greater adherence risk in this setting, and that interventions targeting routine-building, social support, and income-related

medication access barriers among retired hypertensive patients deserve priority attention at Kade Government Hospital.

5.5.3 Health System and Patient-Related Factors

Although NHIS status, follow-up frequency, housing, and ability to purchase prescribed medications did not reach statistical significance in either the crude or adjusted analysis, they represent contextually important vulnerabilities that warrant attention. A considerable proportion of respondents (23.2%) reported that not all their prescribed medications were available at the facility, and nearly a third (31.8%) were unable to purchase medications when given a prescription. Drug stock-outs and out-of-pocket medication costs are among the most consistently documented health system barriers to adherence across sub-Saharan Africa (Lee et al., 2022; Iwuala et al., 2024). Their presence at Kade Government Hospital, even where statistical significance was not achieved, likely exerts a practical influence on medication-taking behaviour that the study's limited number of adherent cases may have been underpowered to detect. It is imperative to continuously create awareness on the benefits of being enrolled onto the National Health Insurance Scheme to an individual and their communities, to boost acceptance and utilization of the Health Insurance Scheme and thereby improve medication access among hypertensive patients.

The pluralistic health-seeking behaviour documented in this study is also noteworthy. A proportion of respondents first sought care from prayer camps (10.5%) or shrines and herbalist services (7.2%) before presenting to the formal health facility. These non-biomedical care pathways delay the initiation or resumption of antihypertensive treatment and may entrench health beliefs that undermine long-term adherence. Some patients may resort to divine interventions or home remedies as they are not experiencing any hypertension-related symptoms, and these alternatives

seem cheaper and more accessible than travelling long distances to access facility-based care. This pattern is well-recognized in Ghana and has been documented at comparable facilities across the country (Boima et al., 2015; Atibila et al., 2022; Kretchy et al., 2015). Addressing this challenge requires the health system to actively engage community-level influencers, including religious leaders and traditional healers, as partners in hypertension awareness and adherence promotion.

Forgetting to take medications was a common reason for non-compliance and is consistent with data showing it accounts for a substantial proportion of all non-adherence (Brown et al., 2016). Pointing out the type of forgetfulness is key to finding the appropriate solution, as an individual with cognitive impairment requires a different management approach compared with one who forgets to take medications due to a busy work schedule. Fear of side effects and pill burden are additional patient-related factors that can be improved by resorting to prescribing fixed-dose combination (FDC) poly-pills to hypertensive patients to simplify therapy and enhance compliance (Okai et al., 2020). Respondents who were always able to purchase their medications when given a prescription had marginally higher crude odds of non-adherence compared with those who were not (cOR = 1.18; 95% CI: 0.36–3.91; $p = 0.788$); upon adjustment, the odds remained marginally elevated though non-significant (aOR = 1.51; 95% CI: 0.43–5.23; $p = 0.519$). This finding suggests that the ability to purchase medications alone does not guarantee adherence, and that other behavioural, motivational, and health system factors likely play a greater role in determining whether patients actually take their medications as prescribed. Healthcare should be prioritized by all individuals, families, and the community at large, so as to establish screening, early detection, and treatment programmes for patients with hypertension, in addition to ancillary services such as physiotherapy for those with hypertension-related disability, dietary services, and support groups to enhance compliance with treatment.

5.6 Chapter Summary

This chapter has discussed the key findings of the study in the context of existing evidence. The prevalence of non-adherence to antihypertensive medications at Kade Government Hospital was extremely high at 93.6%, substantially exceeding both the sub-Saharan African regional average and rates documented at comparable facilities across Ghana. Knowledge of hypertension among patients was moderate but incomplete, with encouraging awareness of major cardiovascular complications coexisting with significant gaps, particularly with respect to renal failure and the attribution of hypertension to spiritual causes by a notable proportion of respondents.

The ABQ analysis indicated that patients did not strongly self-identify with the listed adherence barriers, a finding that contrasts sharply with the observed non-adherence prevalence and underscores the importance of social desirability bias in self-reported adherence research. Although no variable retained statistical significance in the multivariable adjusted analysis, the crude analysis identified tertiary educational level as significantly associated with higher odds of non-adherence relative to JHS/Middle School-educated respondents, while informal occupational groups including farmers, artisans, and traders showed significantly lower odds of non-adherence relative to retired respondents. The loss of significance in the adjusted model for both findings is attributable to the very small number of adherent patients limiting statistical power, and the estimates should therefore be interpreted with caution given the wide confidence intervals observed. Health system vulnerabilities, including drug unavailability, financial barriers to medication access, and pluralistic health-seeking behaviour involving prayer camps and herbalists, represent additional contextual risks that compound non-adherence in this population. Taken together, these findings call for an urgent, multilevel, and evidence-based response targeting health

literacy, routine-building support for retired patients, medication access, and community engagement at Kade Government Hospital and across the Kwaebibirem Municipality.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Non-adherence to antihypertensive medications is extremely prevalent among patients diagnosed with hypertension attending Kade Government Hospital, affecting nearly all (93.6%) patients in this study. This rate substantially exceeds the sub-Saharan African pooled estimate of 43.5% reported by Iwuala et al. (2024) and is considerably higher than non-adherence rates documented at comparable facilities across Ghana, including Korle-Bu Teaching Hospital (66.7%), the Brong Ahafo Region (63.7%), and district hospitals in the Volta Region (61.3%). Health-seeking behaviour among the predominantly male study population was of concern, as the strong male predominance observed (81.8%) contrasts with the wider literature which more commonly documents higher non-adherence among female patients, suggesting that gender-specific barriers to consistent medication-taking may be operating differently in this population.

The study population was predominantly middle-aged, with most respondents engaged in informal occupations such as artisanal work and farming. Despite the majority (83.2%) holding valid National Health Insurance Scheme coverage, non-adherence remained pervasive, demonstrating that insurance access alone is insufficient to guarantee consistent medication-taking behaviour. A considerable proportion of respondents (23.2%) reported that not all their prescribed medications were available at the facility, and nearly a third (31.8%) were unable to purchase medications when given a prescription, highlighting critical structural gaps in medication access that must be urgently addressed.

With respect to knowledge of hypertension, respondents demonstrated moderate but incomplete understanding of the condition. Awareness of major cardiovascular complications was reasonably high, though knowledge of renal failure as a complication was low (35.5%), and 23.6% attributed hypertension to spiritual causes, reflecting the pluralistic health belief systems prevalent in the Kwaebibirem Municipality context.

In the crude logistic regression analysis, tertiary educational level was significantly associated with higher odds of non-adherence relative to JHS/Middle School-educated respondents, an unexpected finding that likely reflects the instability of estimates resulting from the very small number of adherent patients in this study rather than a true protective effect of lower education. Informal occupational groups including farmers, artisans, and traders demonstrated significantly lower odds of non-adherence relative to retired respondents in the crude analysis, suggesting that retirement status rather than active employment represents the greater adherence risk in this population. None of these associations retained statistical significance in the multivariable adjusted analysis, again attributable to the limited statistical power arising from the small number of adherent cases. In conclusion, non-adherence to antihypertensive medications at Kade Government Hospital is driven by a complex interplay of occupational factors, limited medication access, incomplete knowledge of hypertension, and pluralistic cultural health-seeking behaviours. Without urgent, multilevel, and evidence-based interventions, the extremely high burden of non-adherence will continue to drive uncontrolled hypertension and its preventable cardiovascular consequences in this population.

6.2 Recommendations

1. Healthcare providers at Kade Government Hospital should strengthen patient education on hypertension and medication adherence using photo illustrations, videos, and Twi-language materials, while actively demystifying misconceptions such as the belief that antihypertensive therapy causes erectile dysfunction through community outreaches and home visits.
2. Targeted adherence support strategies should be designed for retired patients including structured medication schedules and routine-building counselling, while all occupational groups should benefit from SMS reminders, pill organizers, flexible clinic appointment scheduling, and regular community health volunteer home visits.
3. The Kwaebibirem Municipal Health Directorate should train church leaders, pastors, imams, and traditional healers as community hypertension champions to redirect patients to formal care and reinforce sustained medication adherence within their communities.
4. Shared decision-making between clinicians and patients, covering medication side effects, treatment goals, and the chronic nature of hypertension, should be integrated as a standard component of every clinic consultation at Kade Government Hospital.
5. The Ghana Health Service and hospital management should introduce a proactive medicines inventory system to prevent stock-outs and partner with community pharmacies to ensure affordable access to NHIS-covered antihypertensive medications.
6. Kade Government Hospital should adopt the MMAS-8 as a routine adherence screening tool at every hypertension clinic visit, establish a medication adherence tracking register, and introduce a defaulter tracing system using community health volunteers for patients who miss appointments.

7. Future research should employ mixed-methods and longitudinal designs, incorporate objective adherence measures such as pharmacy refill records and pill counts, and use larger sample sizes to improve statistical power in multivariable analyses.

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APPENDICES

APPENDIX I: CONSENT FORM

STUDY TITLE: **DETERMINANTS OF NON-ADHERENCE TO ANTIHYPERTENSIVE MEDICATIONS AMONG HYPERTENSIVE PATIENTS AT THE KADE GOVERNMENT HOSPITAL IN THE EASTERN REGION OF GHANA; A FACILITY BASED STUDY**

PARTICIPANTS' STATEMENT

I acknowledge that I have read or have had the purpose and contents of the study and satisfactorily explained to me in a language I understand (*.....name of language*). I fully understand the contents and any potential implications as well as my right to change my mind (i.e. withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name or Initials of Participant..... ID Code

Participants' Signature OR Thumb Print.....

Date:

STATEMENT OF WITNESS

I was present when the purpose and contents of the study was read and explained satisfactorily to the participant in the language he/she understood (*....name of language*)

I confirm that he/she was given the opportunity to ask questions/seek clarifications and same were duly answered to his/her satisfaction before voluntarily agreeing to be part of the research.

Name:.....

Signature..... OR Thumb Print

Date:.....

INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Signature.....

Name:.....

Date:.....

Consent Statement

I have read and understood the purpose and procedures of this study. I voluntarily grant permission for the researcher to review relevant documents at Kade Government Hospital for the stated research purpose.

Name of Institutional Representative:

Position/Designation:

Signature:.....

Date:

Principal Investigator:.....

Date:

Official Stamp (if applicable)

APPENDIX II: DATA COLLECTION TOOL

DETERMINANTS OF NON-ADHERENCE TO ANTIHYPERTENSIVE MEDICATIONS AMONG HYPERTENSIVE PATIENTS AT THE KADE GOVERNMENT HOSPITAL IN THE EASTERN REGION OF GHANA; A FACILITY BASED STUDY

DEMOGRAPHY

1. Age:.....
2. Gender:
 - a) Male
 - b) Female
3. Marital Status
 - a) Married
 - b) Single
 - c) Widow/widower
 - d) Divorced/Separated
4. Educational level
 - a) No Formal Education
 - b) Primary
 - c) JHS
 - d) SHS or equivalent
 - e) Tertiary
5. Occupation:
6. Ethnicity:
 - a) Krobo
 - b) Akan
 - c) Ewe
 - d) Dangme
 - e) Others:.....
7. Religion
 - a) Christianity
 - b) Islamic
 - c) Traditionalist

d) Others:

9. Who do you live with at home?

- a) All by myself
- b) With spouse and children
- c) With my relatives
- d) Others (specify).....

10. valid NHIS

- a) Yes
- b) No

SOCIOECONOMIC STATUS

11. Housing

- a) Family house
- b) Personal property
- c) Renting

12. Level of income per month

- a) GHS 100- 500
- b) GHS 500- 1000
- c) GHS >1000

PATIENT'S KNOWLEDGE ON HYPERTENSION

13. If yes, how long have you known that you are hypertensive?

- a) 1-5 years
- b) 5-10 years
- c) > 10 years

14. What do you think is the cause of hypertension?

- a) Spiritual
- b) Increasing age
- c) Lack of exercise

- d) Unhealthy diet
- e) Stress
- f) Unknown

15. What do you think are the complications of hypertension?

- a) Heart failure
- b) Cardiac arrest
- c) Kidney failure
- d) Stroke

16. What comorbidities do you have?

- a) Diabetes
- b) High cholesterol
- c) Osteoarthritis
- d) CKD
- e) Other.....

AVAILABILITY, ACCESSIBILITY, AFFORDABILITY, AND UTILIZATION OF HEALTH FACILITY

17. Do you have health facilities in your community? a) Yes b) No

18. Where do you go first when you are ill? (One option only)

- a) Shrine/ Herbalist
- b) Prayer camp
- c) Pharmacy/Licensed chemical shop/drug store
- d) Health center/CHPS Compound
- e) Hospital
- f) Others (Specify).

20. What main factor influences your choice above? (One option only)

- a) Affordability
- b) Proximity to residence
- c) Severity of illness
- d) Availability of medicines
- e) Others (Specify).

COMPLIANCE

21. How often do you visit the clinic/hospital for follow up?
- a) Monthly
 - b) Every 2 months
 - c) Default review
22. Are lab test results explained to you a) Yes b) No
23. How many different antihypertensive drugs do you take.....
24. How often do you take your antihypertensive drugs?
- a) Every day as prescribed
 - b) When I remember
 - c) When my BP is high
25. If non-compliant, what are the reasons?
- a) Forgetfulness
 - b) Financial constraint
 - c) Feel better
 - d) Side effects of medication
 - e) Share medications with other relatives who are unwell.
 - f) Too many medications
26. Does the hospital provide dietician services? a) Yes b) No
27. Will you follow dietary advice if given any? a) Yes b) No
28. Do you get all medications prescribed at the clinic/hospital?
- a) Yes b) No
- a. Yes b) No
29. Are you able to buy medications from outside when given prescription? A. Yes B. No
30. How long does it take before you see a doctor when you get to the hospital?
- a) 30 mins – 1 hour
 - b) 1 hour – 2 hours
 - c) >2hours
31. Are you educated on your condition when you are diagnosed? A. Yes B. No
32. Are you educated on the proper use of medicines? a) Yes b) No

33. How long does it take to get medication refill at the hospital pharmacy?
- a) 30 mins – 1 hour
 - b) 1 hour – 2 hours
 - c) >2hours
34. Have you ever experienced any BP drug side effect?
- b. Yes b) No
35. Please tick any side effect you may have suffered
- a) Palpitations
 - b) Erectile dysfunction
 - c) Weakness
 - d) Cough
 - e) Other.....
36. Is patient experiencing any hypertension related complication? A) Yes b) No
37. If yes to Q 36, state complications being experienced..... Check the box that reflects the most appropriate response to the following questions

Item	Adherence Barrier Questionnaire	Strongly Agree (1)	Agree (2)	Disagree (3)	Strongly Disagree (3)
1	I fully understand what my doctor, nurse or pharmacy attendants have explained to me so far				
2	I can mention the names of my medications and scopes without hesitations				
3	I trust my doctor and agree with my treatment plan				
4	My medications help me only if I take regularly as prescribed				
5	Medications are all poisonous. You should avoid taking them if possible				
6	I feel healthy so I'm sometimes unsure if I really need to take my medications daily				
7	I take my medication automatically everyday at a fixed time				
8	I frequently forget things on an everyday basis				
9	Generally, I often feel bad and sometimes I feel depressed or discouraged to take my medications				
10	I frequently have problems taking my medications				
11	I really will need help everyday with my medications but I don't get any help				
12	I am really frightened of side effects of my medication				