ASSESSMENT OF AGE-RELATED FACTORS IN DEVELOPMENT OF HYPERTENSION AMONG ELDERLY PATIENTS ATTENDING THE CONSULTANT OUT-PATIENT DEPARTMENT (COPD) IN UNIVERSITY OF BENIN TEACHING HOSPITAL

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IN PARTIAL FULFILMENT FOR THE AWARD OF A DEGREE IN BACHELOR OF NURSING SCIENCE,
FACULTY OF NURSING SCIENCES,
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OCTOBER, 2025

DECLARATION

This is to declare that this research project **ASSESSMENT OF AGE-RELATED FACTORS IN DEVELOPMENT OF HYPERTENSION AMONG ELDERLY PATIENTS ATTENDING THE CONSULTANT OUT-PATIENT DEPARTMENT (COPD) IN UNIVERSITY OF BENIN TEACHING HOSPITAL** was carried out by **NYEBUCHI NWABUZO VICTOR,** and is solely the result of my work, except where acknowledged as being derived from other person(s) or resources.

MATRICULATION NUMBER: BMS2005073

FACULTY/COLLEGE: NURSING SCIENCE, COLLEGE OF MEDICAL SCIENCES, UNIVERSITY OF BENIN, BENIN CITY.

SIGNATURE_____

DATE_____

CERTIFICATION

This is to certify that this project was carried out by **NYEBUCHI NWABUZO VICTOR** with matriculation number: **BMS2005073**, Faculty of Nursing Science, under the supervision of **DR. (MRS) C. ENUKU.**

Signature_____ _____
DR. (MRS) C. ENUKU. Date
Project Supervisor.

Signature_____ _____
PROF. (MRS) C.E. OMOROGBE. Date
Head of Department of Medical Surgical nursing.

_____ _____
External Examiner Date

DEDICATION

This research project is dedicated to Almighty God who extended his loving kindness towards me, His guidance and protection throughout my course of study.

I also dedicate this project to my family for their endless love and support throughout my course of study.

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To all those I could not mention, you all mean a lot to me. God bless you all.

ABSTRACT

Hypertension remains a leading cardiovascular risk factor among elderly populations worldwide, with age-related physiological changes, lifestyle behaviors, and socio-demographic characteristics serving as critical determinants. This study assessed age-related factors in the development of hypertension among elderly patients attending the Consultant Out-Patient Department at the University of Benin Teaching Hospital, Edo State, Nigeria. A descriptive cross-sectional design was employed involving 191 elderly patients diagnosed with hypertension. Data were collected using structured questionnaires and analyzed using descriptive statistics with mean scores to determine the level of influence of various factors. The study revealed high influence across all three dimensions examined. Lifestyle risk factors demonstrated a grand mean of 3.25, with high-salt diet consumption showing the strongest impact. Socio-demographic factors yielded a grand mean of 3.18, with low-income levels and limited healthcare access being most influential. Age-related factors showed a grand mean of 3.27, with vascular changes due to advancing age scoring highest at 3.38. The majority of respondents were females aged 65-69 years, predominantly married, with primary or secondary education, having lived with hypertension for one to five years. Multiple interacting factors contribute significantly to hypertension development among elderly patients, with age-related physiological changes, lifestyle behaviors, and socioeconomic status all playing crucial roles. Comprehensive, age-appropriate interventions addressing these multifaceted determinants are essential for effective hypertension prevention and management in elderly populations.

Keywords: Hypertension, elderly patients, age-related factors, lifestyle risk factors, socio-demographic factors, cardiovascular disease, UBTH

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CHAPTER ONE

INTRODUCTION

1.0 Background of Study

Hypertension is a major global public health concern. It is one of the most prevalent chronic medical conditions characterized by a sustained elevation in arterial blood pressure (BP) (>140/90mmHg), which is linked to the development of stroke, myocardial infarction, heart failure, and end-stage renal damage (Moiz et al,. 2024). The World Health Organization (WHO) has estimated that 1.28 billion adults aged 30–79 years worldwide have hypertension, most (two-thirds) living in low- and middle-income countries (World Health Organization [WHO], 2021). The prevalence has been projected to increase by 2025. Also, an estimated 46% of adults with hypertension are unaware that they have hypertension. The prevalence of hypertension differ from region to region, with the WHO African region having the highest prevalence of 27%, compared to the WHO region of Americas with the lowest prevalence of 18%.

Many risk factors are associated with hypertension, and they can be grouped into modifiable and non-modifiable risk factors. The modifiable risk factors include obesity, diabetes melitus, smoking, physical activity, salt intake, diet, and stress (Damayanti & Isnaini, 2024). The non-modifiable risk factors include age, gender, and family history. Age is a strong, independent, and non-modifiable risk factor for the development of hypertension. The risk of hypertension is higher with increasing age (Osunkwo et al,. 2020). With a rapidly aging global population, particularly in low- and middle-income countries, the burden of age-related hypertension is rising markedly, posing significant challenges to both public health systems and clinical nursing practice (World Health Organization [WHO], 2023).

The physiological processes that underlie aging are closely connected with mechanisms that promote elevated blood pressure. Structural and functional changes in the vascular endothelium, increased arterial stiffness, and declining baroreceptor sensitivity are known to contribute to increased vascular resistance and impaired regulatory responses to changes in blood volume and pressure. Aging also causes a progressive sympathetic overactivity, alongside reduced responsiveness to vasodilators such as nitric oxide (Pourbagher-Shahri et al., 2021). There are also age-related behavioural, social, and lifestyle changes such as physical inactivity, increased salt intake, weight gain. Changes in dietary habits such as the inability to chew or swallow certain foods, and reduced production of digestive enzymes have also been observed in older individuals, and this has been implicated in gut dysbiosis (imbalanced gut flora). Age-related gut dysbiosis has been shown to have a correlation with arterial dysfunction, leading to hypertension (Longtine et al., 2024). Nigeria has a rapidly aging population, and the proportion of Nigerians aged 60 and above is estimated to double by 2050 (National Population Commission [NPC], 2022). Due to shift in demography, there will be a rising prevalence of hypertension among older adults, and studies suggest that up to 60% of individuals aged 65 and older may be hypertensive (Ogunmola et al., 2020).

Despite the growing concerning of increased prevalence of hypertension in the elderly, age-related factors in hypertension remain under-investigated, particularly in the context of nursing practice and primary health care in Sub-Saharan Africa. The elderly population are often burdened by multimorbidity and polypharmacy, and therefore present a unique diagnostic, therapeutic, and ethical challenges that require focused clinical approaches. Nurses are at the frontier of health services in community and primary care settings, and must be equipped with vast understanding of the mechanisms and implications of age-related hypertension.

It is important to note that the clinical presentation and management of hypertension differ markedly between younger and older adults.

Older adults suffer more from isolated systolic hypertension (ISH), a subtype characterized by elevated systolic but normal diastolic pressure, due to increased arterial stiffness. They also exhibit increased sensitivity to sodium, reduced renal sodium excretion, and altered circadian blood pressure patterns such as non-dipping or reversed dipping, factors that complicate diagnosis and therapeutic monitoring (Soliman & Pollock, 2021). Aging may also lead to diminished autonomy, loneliness, and depression. These factors may alter health-seeking behaviour and compliance to antihypertensive treatment and engagement with preventive measures, coupled with the constraints of limited access to geriatric care. Ageism and communication barriers between healthcare providers and elderly patients can prevent effective nursing assessment, delay in diagnosis, and intervention (Stojanović et al., 2024).

The relevance of age-specific considerations in hypertension management is increasingly emphasized across international clinical guidelines. For example, the 2023 guidelines developed by the American College of Cardiology and American Heart Association advocate for the individualization of blood pressure targets among older patients, with particular attention to frailty, functional capacity, and anticipated life expectancy. Likewise, the International Society of Hypertension (ISH) underlines the importance of prioritizing non-pharmacologic approaches, such as lifestyle modification in older adults, particularly those susceptible to orthostatic hypotension or falls (Williams et al., 2022). These evolving clinical frameworks necessitate that nurses go beyond technical competence in blood pressure monitoring and pharmacological management, developing a broader gerontological perspective that integrates functional, cognitive, and psychosocial dimensions of aging into care delivery. From the standpoint of nursing education and applied research, there is an urgent imperative to build capacity for assessing the complex vulnerabilities of hypertensive

older adults. Student nurses and early-career practitioners must be systematically trained in evidence-based models of geriatric care, encompassing routine screening for comorbidities, functional limitations, and psychosocial stressors. In healthcare systems such as Nigeria's where services are often reactive and constrained by workforce shortages nurses are uniquely positioned to assume leadership roles in prevention and early intervention. Their responsibilities include community-based health education, blood pressure monitoring, lifestyle counseling, and coordinated care planning, all of which are particularly critical for aging populations at risk of poor outcomes.

Given these realities, the present study aims to systematically examine the age-associated determinants of hypertension within a defined population. By analyzing how physiological aging intersects with lifestyle, behavioral, and systemic factors, this study seeks to inform age-sensitive nursing practices capable of enhancing hypertension prevention and control. Key areas of focus include the characterization of blood pressure patterns in older adults, identification of behavioral risk profiles, and recognition of systemic barriers to effective care. The study also considers how nurses can adapt assessment, education, and monitoring strategies to better meet the needs of elderly patients, both within clinical settings and at the community level.

1.1 Statement of Problem

Despite the high prevalence of hypertension among older adults, there remains a notable research gap regarding age-specific predictors, risk trajectories, and effective nursing interventions. Karayiannis (2022) said that older people are at increased risk of cardiovascular events, but age alone does not sufficiently reflect individual risk profiles. Other factors such as frailty, the presence of comorbidities, and functional reserve are predictors of adverse outcomes like hypotension and falls in older hypertensive patients

(Pajewski & Cohen, 2024; Oliveros et al., 2020). Current clinical practices often rely on generalized hypertension guidelines that do not fully consider how age modifies pharmacologic response, functional reserve, and adherence behavior. Also many clinical trials do not include older adults who have significant comorbidities, leading to inadequate evidence in this population (Pajewski & Cohen, 2024). Dhiman and Chourasia (2024) examined the difficulties in diagnosing hypertension, such as variability in blood pressure readings, white coat syndrome, and masked hypertension, stating the need for accurate monitoring through home and ambulatory methods. As a result of the aforementioned disparities, older patients are often under-assessed, mismanaged, or exposed to iatrogenic risks such as hypotension and falls. The available hypertensive guidelines are also conflicting, which the more complicates management strategies. It is important to individualize management strategies, with the best clinical judgment that incorporates patients differences (Benenson et al., 2020). For a holistic care, non-pharmacological interventions such lifestyle modifications should be incorporated alongside pharmacological interventions in the management of hypertension in the elderly (Oliveros et al., 2020). This study addresses this gap by investigating the constellation of age-related factors that contribute to hypertension, with the goal of informing more nuanced, evidence-based nursing practices. By examining physiological, behavioral, and system-level determinants of hypertension in older adults, the research aims to support the development of nursing interventions tailored to the unique characteristics of the aging population.

1.2 Aim and Objectives of the Study

Aim of Study:

Assessment Of Age-Related Factors in Development of Hypertension among Elderly Patients attending Consultant Out-patient Department (COPD) Clinic in University of Benin Teaching Hospital.

Objectives of Study:

1. To identify lifestyle risk factors that contribute to the development of hypertension among elderly patients attending COPD clinic in University of Benin Teaching Hospital (UBTH).

2. To identify the socio-demographic factors that interact with age to influence hypertension risk among elderly patients attending Consultant Out-patient Department (COPD) clinic in University of Benin Teaching Hospital (UBTH).

3. To identify the key age-related risk factors that contribute to the development of hypertension among elderly patients attending COPD clinic in University of Benin Teaching Hospital (UBTH).

1.3 Research Questions

This study aims to investigate the following research questions:

1. Which lifestyle factors are associated with hypertension among elderly COPD clinic attendees at UBTH?

2. Which socio-demographic factors are associated with hypertension among elderly patients attending the COPD clinic at UBTH?

3. Which age-related risk factors are significantly associated with the development of hypertension among elderly patients attending the COPD clinic in UBTH?

1.3.1 Hypothesis

Hypothesis 1:

- **H_{01} (Null):** There is no significant relationship between age-related physiological factors (e.g., frailty, obesity, renal decline, diabetes) and the development of hypertension in elderly patient in the COPD clinic in University of Benin Teaching Hospital (UBTH).
- **H_{11} (Alternative):** There is a significant relationship between age-related physiological factors (e.g., frailty, obesity, renal decline, diabetes) and the development of hypertension in elderly patient in the COPD clinic in University of Benin Teaching Hospital (UBTH).

1.4 Significance of the Study

The prevalence of hypertension in the elderly is on the increase. This study will therefore contribute to our knowledge of the age-related variables that contribute to the development of hypertension. The findings will be useful for the development of effective prevention and treatment strategies for age-related hypertension. This will lead to an increase in community awareness about hypertension, thereby reducing the burden of this disease on individuals and society.

1. Contribution to the Patients

This study provides valuable insights that can enhance patients' understanding of how aging contributes to the development of hypertension. By identifying physiological changes such as arterial stiffening and reduced vascular compliance that occur with advancing age, the research promotes earlier recognition and management of elevated blood pressure. This awareness can encourage patients, particularly older adults, to engage more actively in

preventive health behaviors such as routine blood pressure monitoring, adherence to medication regimens, and lifestyle modifications.

The findings support the development of age-specific health education initiatives that clarify why older individuals may develop hypertension even in the absence of symptoms. These interventions may lead to better self-management, reduced incidence of complications such as cardiovascular disease, and overall improvement in health outcomes and quality of life for aging individuals.

2. Contribution to the Society

At a broader level, this study contributes to public health by informing community-based screening and prevention strategies targeted at the elderly population. The identification of age-related risk factors provides policymakers and public health practitioners with evidence to prioritize hypertension surveillance and resource allocation, especially in resource-constrained settings.

Reducing the burden of hypertension-related complications through early detection and prevention could also translate to lower healthcare expenditures associated with hospitalizations, long-term care, and disability support. Additionally, by promoting healthy aging, the study aligns with global health initiatives such as the World Health Organization's goals for aging populations. It also sheds light on potential health inequities by identifying how age interacts with other determinants of health, thus contributing to efforts aimed at achieving more equitable healthcare delivery.

3. Contribution to the Nursing Profession

From a professional standpoint, this research enhances the nursing community's understanding of how age-specific physiological changes contribute to hypertension, thereby

improving assessment, intervention, and patient education practices. The study emphasizes the importance of incorporating age-related considerations into routine nursing care, especially in primary health settings where nurses are often the first point of contact for elderly patients.

The findings also support the integration of evidence-based strategies into nursing protocols, such as individualized care plans and community outreach focused on early detection and lifestyle counseling. Additionally, by encouraging nursing students and practitioners to engage with recent literature (2020–2025), the study promotes a culture of evidence-informed practice and reinforces the vital role of nurses in chronic disease prevention and health promotion across the lifespan.

1.5 Scope of the Study

This study will focus on Assessment of Age-Related Factors in the Development of Hypertension among Elderly Patients attending the Consultant Out-patient Department (COPD) Clinic in University of Benin Teaching Hospital (UBTH). The study will be limited to patients in the COPD ward in University of Benin Teaching Hospital (UBTH), Benin City. Analysis of data from existing studies or datasets may also be required in the course of this study.

1.6 Operational Definition of Terms

Hypertension:

In line with the World Health Organization (WHO) 2021 clinical guideline for the pharmacological treatment of hypertension in adults, this study defines hypertension as a sustained systolic blood pressure of 130 mm Hg or higher, or a diastolic pressure of 80 mm Hg or higher, confirmed by two or more readings taken on separate clinical visits.

Assessment:

Assessment in the context of this study refers to the structured process of investigating the association between aging and the onset or progression of hypertension. This entails gathering, reviewing, analyzing, and interpreting data from both primary and secondary sources—such as clinical records, published literature, or observational findings—to identify and analyze age-related factors that contribute to increased blood pressure levels.

Age-related factors:

Age-related factors are the physiological, biological, behavioral, and environmental changes that are associated with the aging process and may contribute to the risk or progression of hypertension. In this study, these factors include arterial stiffness, hormonal alterations, endothelial dysfunction, decreased physical activity, and decline in renal function.

Development:

Development in this study refers to the gradual onset and progression of hypertension over time. Within the context of this study, it encompasses the initial elevation of blood pressure and its progression to clinically diagnosable hypertension, driven by age-related physiological and pathological changes. Development will be assessed using cross-sectional blood pressure data obtained from patient records, clinical assessments, or prior documented measurements.

Elderly Patients:

In this study, elderly refers to individuals aged 60 years and above who attend the Consultant Out-patient Department (COPD) clinic in University of Benin Teaching Hospital.

CHAPTER TWO

LITERATURE REVIEW

As the global population continues to age at an unprecedented rate, it becomes imperative to understand the complex relationship between aging and hypertension, and this knowledge is important in modern nursing practice. This chapter reviews current literatures in English language spanning the last five years (2020-2025) on Age-related factors in Hypertension. Older literatures were excluded, except they contained foundational knowledge. The literatures were sourced from primary and secondary sources such as peer-reviewed articles, scholarly reviews, textbooks and other relevant materials found on online databases and libraries. This literature review will be discussed under the following headings: conceptual, theoretical, and empirical review.

2.1 Conceptual Review

2.1.1 Hypertension and its Global burden.

Hypertension, also known as High Blood Pressure, is one of the most prevalent chronic medical conditions marked by a sustained increase in arterial blood pressure BP (Moiz et al., 2024). Although traditionally hypertension has been defined as a persistent systolic blood pressure of 140mmHg or higher and/or a diastolic blood pressure of 90mmHg or higher, and warrants therapeutic management to a target of 130/80mmHg or less; the current guideline by the American Heart Association and the American College of Cardiology AHA/ACC defines hypertension as systolic blood pressure values of 130 mm Hg or more and/or diastolic blood pressure of more than 80 mm Hg. Complications from hypertension leads to 9.4 million death globally every year, of which 45% of deaths are due to heart diseases, and 51% of deaths are due to stroke (Berek et al., 2021). More sufferers of hypertension are found in developing countries than in developed countries (Derek et al., 2021).

2.1.2 Types of Hypertension

Hypertension can be categorized as:

1. Primary or essential hypertension.

2. Secondary hypertension

Primary Hypertension: it is the most common type of high blood pressure and it is of unknown etiology, accounting for 95% of cases of hypertension. A number of factors such as obesity, insulin resistance, high sodium intake and low potassium intake, low calcium intake, excessive alcohol consumption, and sedentary lifestyle are known to influence the development of hypertension.

Secondary Hypertension: is defined as high blood pressure secondary to other diseases such as chronic kidney disease, diabetes, and renal artery disease. This accounts for the remaining 5% of hypertensive cases.

Other types of hypertension include:

Resistant Hypertension (RH): according to the present American College of Cardiology/American Heart Association guidelines, Resistant Hypertension is considered as office BP >130/80 mm Hg in patients taking ≥3 antihypertensive agents, commonly including an angiotensin-converting enzyme inhibitor or angiotensin-2 receptor blocker, a calcium-channel blocker, and a diuretic at maximum (or maximally tolerated doses) and at the appropriate dosing frequency (Valenzuela et al., 2020). The prevalence of RH is estimated to be 12% to 15% of patients undergoing treatment for hypertension, and patients with RH are at high risk of cardiovascular complications and mortality with few treatment options.

Malignant Hypertension: there is a consensus that malignant hypertension is severe blood pressure elevation (typically >200/120 mm Hg) associated with advanced bilateral retinopathy (hemorrhages, cotton wool spots, papilledema); however, whether this diagnosis

is mandatory in the presence of heart, kidney, brain damage, and/or thrombotic microangiopathy alone is debated, as there is need for bilateral retinal involvement or presence of papilledema (Boulestreau et al., 2024).

Isolated Systolic Hypertension (ISH): this is characterized by an increase in systolic blood pressure but a normal or reduced diastolic blood pressure. It is thought to result from stiffening of the large arteries due to aging. Majority of older hypertensive people have ISH.

White-coat Hypertension (WCH): a common condition in which office blood pressure measurement is elevated while out-of-office blood pressure (ambulatory blood pressure or home blood pressure) is normal. It was previously thought that white-coat hypertension carried no greater risk of cardiovascular effects compared to normotension; however with recent studies, it is now widely accepted that "WCH is associated with an unfavorable metabolic risk factor profile, a more frequent asymptomatic organ damage, and a greater risk of future progression to high cardiovascular risk conditions and cardiovascular morbid and fatal events" (Mancia et al., 2021, p. 1).

2.13 Risk Factors

Hypertension is associated with various risk factors, which can be categorized as modifiable and non-modifiable. Modifiable factors include obesity, diabetes, smoking, physical inactivity, high salt consumption, diet, and stress; while non-modifiable factors encompass age, gender, and family history.

2.1.4 Pathophysiology

Blood pressure is define as the product of cardiac output and peripheral resistance. Cardiac output is the product of the heart rate and the stroke volume. During each heart contraction, pressure is transferred from the contraction of the heart muscle to the blood and then pressure is exerted by the blood as it flows through the blood vessels.

Hypertension can result from increases in cardiac output, increases in peripheral resistance (due to constriction of the blood vessels), or both. Increases in cardiac output are often related to an expansion in blood volume. Although no specific cause can be identified for most cases of hypertension, studies have found that hypertension has multiple causes.

Any factor which causes a change in either cardiac output or peripheral resistance or in the body's regulatory mechanisms will lead to hypertension.

Researchers have suggested many causes of hypertension, and these include:

1. Increased renal reabsorption of sodium, chloride, and water related to a genetic variation in the sodium absorption pathways of the kidneys.

2. Increased sympathetic nervous system activity related to derangement of the autonomic nervous system.

3. Increased activity of the renin–angiotensin–aldosterone system (RAAS), resulting in expansion of extracellular fluid volume and increased systemic vascular resistance.

4. Resistance to insulin action, which may be a common factor linking hypertension, type 2 diabetes, hypertriglyceridemia, obesity, and glucose intolerance.

5. Activation of the innate and adaptive components of the immune response that may contribute to renal inflammation and dysfunction.

6. Decreased vasodilation of the arterioles related to dysfunction of the vascular endothelium.

2.1.5 Signs and Symptoms

Hypertension may be asymptomatic most time on physical examinations, besides elevated blood pressure. Sometimes, there will be changes in the retinal vasculature such as hemorrhages, exudates (fluid accumulation), arteriolar narrowing, and cotton-wool spots (small infarctions). Pathologic changes in the kidneys (indicated by increased blood urea

nitrogen [BUN] and serum creatinine levels) may manifest as nocturia. Cerebrovascular involvement may lead to a transient ischemic attack (TIA) or stroke, manifested by alterations in vision or speech, dizziness, weakness, a sudden fall, or transient or permanent paralysis on one side (hemiplegia).

2.1.6 Assessment

A detailed health history and physical assessment are important to diagnose hypertension. Ophthalmoscopy is performed to examine involvement of the retinal blood vessels, also routine laboratory tests including urinalysis, blood chemistry (i.e., analysis of sodium, potassium, creatinine, fasting glucose, and total and HDL cholesterol levels).

2.1.7 Stages of Hypertension

Table 2.1.7 shows blood pressure ranges for healthy and unhealthy individuals of all ages (American Heart Association, 2024).

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)	and/or	DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (Emergency)	HIGHER THAN 180	and/or	HIGHER THAN 120

Table 2.1.7 Blood Pressure Ranges for Healthy and Unhealthy Individuals of all Ages

Note. Adapted from Understanding blood pressure readings by American Heart Association, 2024 (https://www.heart.org/en/health-topics/high-blood-pressure/understanding-blood-pressure-readings)

2.1.8 Management

The goal of management in hypertension is to prevent organ damages and death. Experts advocate aggressive management of blood pressure, especially in people with kidney diseases. Lowering the pressure below 140/90 mmHg is the recommendation.

Management of hypertension involves the use of pharmacological and non-pharmacological approaches.

Pharmacologic Management

Many classes of antihypertensive medications are used to treat hypertension. The most recommended first-line medications are:

1. Thiazide-type diuretics: this class of antihypertensive work by eliminating excess sodium and water. They are either used alone or in combination, and can be used to treat hypertension in all age groups and races, except there is an evidence of chronic kidney disease where angiotensin-converting enzyme inhibitor (ACE) or angiotensin II receptor blockers (ARBs) is used. Studies have shown that Chlorthalidone is the best diuretic in blood pressure treatment. It is the first drug of choice in monotherapy for older patients with osteoporosis, being associated with lower incidence of pelvic fracture compared to amlodipine and lisinopril.

2. Calcium Channel blockers: these class of antihypertensive act by preventing calcium entry into vascular endothelial cells, thus making the blood vessels relax and dilate. They are used as a first-line treatment alone or in combination with other antihypertensive in all

patients with HTN regardless of age and race, except for patients with chronic kidney disease where ACE inhibitors or ARBs are the recommended first-line treatment. Long-acting nifedipine has greater antihypertensive action compared to amlodipine.

3. ACE Inhibitors and ARBs: these interfere with the conversion of angiotensin I to angiotensin II the potent vasoconstrictor by ACE and/or prevent the binding of angiotensin II to its receptors, thereby leading to vasodilation. They are the antihypertensives of choice for patients suffering from heart failure and chronic kidney disease. They are indicated as first-line treatment for patients with chronic kidney disease with evidence of proteinuria. Studies have shown that they also have cardio-protective benefits beside their antihypertensive effects. Examples are lisinopril and enalapril; lorsatan and valsartan.

4. Beta-blockers: they work by blocking the effects of epinephrine on the blood vessels, causing them to relax. Beta-blockers are only indicated as primary treatment for hypertension when there is a specific indication of heart failure and myocardial infarction.

They are more effective in younger patients in reducing cardiovascular morbidity and mortality than in patients older than 65 and were noted to be associated with an increased risk of strokes. Examples include atenolol and metoprolol.

It should be noted that when monotherapy fails, the patient should be treated with combinations of the primary therapies. This approach has been proven to be more effective in those instances.

Non-pharmacologic Management

Lifestyle changes are increasingly recognized as important in the non-pharmacological management of hypertension. These include dietary adjustments such as reducing sodium and saturated fat intake while increasing consumption of calcium, magnesium, and potassium.

Emerging approaches like time-restricted eating aligned with circadian rhythms are also gaining attention. In addition, regular physical activity, weight reduction, moderation in alcohol intake, and stress-reducing practices such as yoga, acupuncture, tai chi, mindfulness-based programs, and Transcendental Meditation, have all been shown to be beneficial in lowering blood pressure. The influence of lifestyle modification on hypertension is exemplified in Table 2.1.7 (Verma et al., 2021).

Table 2.1.8 A table summarizing the degree of BP reduction according to each non-pharmacological treatment

	NON-PHARMACOLOGIC TREATMENT	DEGREE OF BLOOD PRESSURE REDUCTION
1.	Dietary Approaches to Stop Hypertension diet DASH Diet	SBP = 5.5 mm Hg DBP = 3 mm Hg
2.	Mediterranean Diet	SBP = 3.1 mmHg DBP = 1.9 mmHg
3.	Decreased Sodium Intake (sodium-restricted diet of 2,400 mg per day) (sodium-restricted diet of 1,500 mg per day)	Decrease = 2/1 mm Hg Decrease = 7/3 mm Hg
4.	Decreased Potassium Intake	SBP = 6.8 mmHg DBP = 4.6 mmHg
5.	Increased Magnesium Intake (magnesium supplementation (368 mg/day) for three months)	SBP = 2.0 mmHg DBP = 1.78 mmHg

	NON-PHARMACOLOGIC TREATMENT	DEGREE OF BLOOD PRESSURE REDUCTION
6.	Weight Loss (approximately 10 kg)	Overall decrease of 5 to 20 mm Hg
7.	Cocoa	2 to 3 mm Hg
8.	Substitution of alcohol consumption with low alcohol substitutes (during the first month of treatment)	SBP = 5 mm Hg DBP = 3 mm Hg
9.	Mindfulness-based stress-reduction program (MBSRP)	From a mean of 154.7 ± 7.5 to 138.1 mm Hg in the Intervention Group Diastolic blood pressure values from 90.6 ± 5.3 to 86.1 mm Hg
10.	Transcendental Meditation	In men, systolic blood pressure decreased by 12.7 mm Hg. Diastolic blood pressure decreased by 8.1 mm Hg. In women, systolic blood pressure decreased by 10.4 mm Hg Diastolic blood pressure decreased by 5.9 mm Hg.
11.	Home monitoring of blood pressure	Mean reduction in systolic blood pressure of 3.9 mm Hg at six months Additional support resulted in a reduction in systolic blood pressure of 2.1 to 8.3 mm Hg
12.	Use of personal air cleaners	Over a median 13.5-day duration was associated with a ≈4 mmHg reduction in systolic blood pressure and with no evidence of an effect on diastolic blood pressure values.

Note. From “Non-pharmacological management of hypertension,” by N. Verma, S. Rastogi, Y.-C. Chia, S. Siddique, Y. Turana, H.-M. Cheng, G. P. Sogunuru, J. C. Tay, B. W. Teo, T.-D. Wang, K. K. F. Tsoi, & K. Kari, 2021, *Journal of Clinical Hypertension, 23*(7), 1275–1283. https://doi.org/10.1111/jch.14236. CC BY-NC-ND 4.0

2.2 Biological Aging and Hypertension

Understanding the biological perspective of aging is crucial to the understanding of how hypertension develops in older adults. Although hypertension is often perceived as a lifestyle disease, in later life, it becomes clearer that it is strongly linked to structural and functional changes that occur in the cardiovascular, renal, and neurohormonal systems. Aging causes cumulative cellular, molecular, tissue and organ-level dysfunction which gradually leads to disruption of vascular balance, therefore contributing to the initiation and progression of increased blood pressure.

2.2.1 Arterial Stiffness

Age-related structural changes due to fragmentation of elastin fibers and increased deposition of collagen that occur in the large arteries, particularly the aorta leads to arterial stiffening. This causes a loss of arterial elasticity and diminished compliance to the pressure of ejected blood. There is increased systolic blood pressure and pulse pressure as a result. This is referred to as Isolated Systolic Hypertension, and is most prevalent in the older population.

2.2.2 Endothelial Dysfunction

Vascular endothelial cells regulate blood flow by regulating vascular tone through the release of nitrous oxide (NO), which is a very potent vasodilator. With advancing age, the endothelium becomes less responsive due to oxidative stress, chronic low-grade

inflammation, and reduced NO bioavailability. This is known as endothelial dysfunction (ED), and leads to increased vascular resistance due to abnormal vasoconstriction and relaxation; and this contributes to the loss of adaptive blood flow control (Pourbagher-Shahri et al., 2021)

2.2.3 Decline in Renal Function

The kidneys are involved in regulating blood pressure by regulating sodium levels, controlling fluid volume, and mediating hormonal responses through the renin-angiotensin-aldosterone system (RAAS). As individuals age, physiological changes such as reduced glomerular filtration rate (GFR), decreased renal perfusion, and diminished sodium elimination occur. These changes lead to sodium accumulation and fluid retention, which in turn elevate baseline blood pressure and increase sensitivity to dietary sodium. Older adults may therefore exhibit blood pressure patterns like elevated morning readings or nocturnal hypertension, both commonly linked with declining renal function.

2.2.4 Hormonal Changes

Aging is associated with hormonal changes, and this affects blood pressure regulation. An instance is the decrease in estrogen levels after menopause. Estrogen dilates blood vessels, and a decrease in its level may partly account for the higher rates of hypertension seen in older women. Increased activity in the renin-angiotensin-aldosterone system (RAAS) and fluctuations in cortisol, which occur with aging can contribute to rising blood pressure. Nurses should thus recognize the effect of hormonal profile, for instance adrenal function, on the course of hypertension and treatments in older patients.

2.2.5 Autonomous System Dysregulation

The autonomous nervous system which regulates involuntary functions like heart rate and blood pressure becomes less responsive with aging. The baroreceptor mechanism which

detects and regulates blood pressure becomes less sensitive, making it more difficult for the body to make fine adjustments to blood pressure. At the same time, sympathetic activity predominates over parasympathetic activities leading to increased blood pressure. This makes older adults more vulnerable to issues like orthostatic hypotension or sudden blood pressure spikes triggered by stress, pain, or standing up. Nurses should there meticulously monitor blood pressure changes with postural changes and adjustments to treatment plans.

2.2.6 Oxidative Stress and Inflammation

Aging exposes the body to a chronic low-grade inflammation known as inflammaging and oxidative stress, which produces reactive oxygen species. Reactive oxygen species (ROS) generated during this process contribute to endothelial damage, arterial stiffening, and hypertension development. Also immunosenescence amplifies oxidative stress, fostering an environment conducive to atherosclerotic plaque formation. In both inflammaging and immunosenescence, inflammatory markers, such as the high-sensitivity C-reactive protein, interleukin-6, interleukin-1β, interleukin-18, and tumor necrosis factor-alpha are present as key players in the pathways that intensify these processes (Müller & Benedetto, 2024). Although nurses do not measure these oxidative stress markers directly in clinical settings, their presence can be inferred through clinical signs such as elevated C-reactive protein (CRP), fatigue, or poor wound healing. Nurses therefore have a role in educating older hypertensive patients on antioxidant-rich diets and anti-inflammatory behaviors as non-pharmacological intervention against hypertension.

2.2.7 Gut-Vascular Axis

Recent studies suggest that the gut microbiome plays an important role in maintaining vascular health by influencing immune function, controlling inflammation, and producing beneficial compounds like short-chain fatty acids. Aging causes a disruption in the gut

microbiome, a condition known as gut dysbiosis, which has been linked to stiffer arteries and higher blood pressure (Longtine et al., 2024). Although this area of research is still emerging, it highlights the need for nurses to consider diet and gut health when assessing older adults. Encouraging fiber-rich foods, probiotics, and fermented products may eventually become part of managing hypertension in the older population.

2.3 Behavioural and Lifestyle Factors in Age-related Hypertension

Although aging increases the physiological risk for hypertension, behavioral changes that often accompany aging such as reduced physical activity, poor dietary habits, and inconsistent medication adherence can significantly accelerate disease progression. These lifestyle shifts are often influence by factors like chronic pain, cognitive decline, limited mobility, or lack of social support. Therefore nurses must assess not just biological indicators but also daily routines, nutritional intake, physical limitations, and treatment compliance. Tailoring interventions to address these modifiable behaviors is essential for effective hypertension management in older adults.

2.3.1 Reduced Physical Activity

One of the most noticeable behavioral changes associated with aging is a decline in physical movement. As older adults face challenges such as joint stiffness, muscle loss, balance issues, and chronic illness, they often become less active. This decrease in activity strongly linked to elevated systolic blood pressure and weakened cardiovascular performance, as observed in elderly Nigerians by Oseni et al., (2021). Physical inactivity also contributes to weight gain and insulin resistance. In clinical care, nurses should evaluate more than just whether older adults are engaging in formal exercise. Even everyday movements like walking, climbing stairs, or doing housework can be meaningful. Tools such as the Physical Activity Scale for the Elderly (PASE) or basic step counters can help set achievable goals and encourage

consistency. It's also essential to address fears related to falling, a major barrier to activity, by promoting balance training, making home adjustments, and offering reassurance.

2.3.2 Nutrition and Diet-Related Challenges

Diet remains a key factor in managing blood pressure, but older adults face unique challenges that can negatively impact eating habits. Changes in taste, dental issues, swallowing difficulties, and slower digestion may limit their food choices. In Nigeria, many elderly individuals also face financial barriers, often relying on inexpensive, carbohydrate-heavy meals while limiting intake of fruits, vegetables, and protein due to cost or availability (Oluwole et al., 2022).

With age, people become more sensitive to salt because of reduced kidney function and increased arterial stiffness. Common foods like instant noodles, bread, and bouillon cubes may contain high levels of hidden sodium, further raising blood pressure. Nurses should tailor dietary advice not only to clinical guidelines but also to the patient's physical capabilities, cultural preferences, and available resources. While the DASH diet remains a good model, it must be adapted to meet the specific needs and limitations of older adults, especially those who struggle with chewing or swallowing.

2.3.3 Medication Use and Treatment Compliance

Adherence to blood pressure medications is a recurring challenge among older adults. Factors like memory loss, complex treatment schedules, medication side effects, high costs, and limited understanding of prescriptions all contribute to poor compliance. The issue becomes more complicated when multiple medications are involved a common scenario in geriatric care. Olaniran et al. (2023) examined 293 elderly hypertensive patients in Lagos, Nigeria. They found that 17.1% reported poor medication adherence, with 73.7% citing forgetfulness as the primary barrier; while most had strong family support, adherence remained low.

Nurses should perform regular medication reviews to confirm what patients are taking and how. It's also important to assess whether patients understand why they're taking each drug and whether they can consistently afford them. Tools like the Morisky Medication Adherence Scale (MMAS-8) can help identify individuals at risk of non-adherence. Strategies to support better adherence include simplifying treatment regimens, involving family members in medication routines, and providing instructions in local languages with clear visuals.

2.3.4 Substance Use: Alcohol and Tobacco

Although less frequently discussed, alcohol and tobacco use remain significant concerns among older adults. Some may turn to alcohol as a way to cope with grief, loneliness, or depression. Alcohol can raise blood pressure by stimulating the nervous system and increasing oxidative stress. While smoking rates are generally lower in older adults, those who continue to smoke face additional vascular damage and an even higher risk of hypertension (Williams et al., 2022).

Nurses should screen for alcohol and tobacco use in a non-judgmental way, especially in outpatient and community settings. These conversations can open the door to behavior change and risk reduction, ideally involving caregivers or family members when appropriate.

2.3.5 Psychological Stress, Isolation, and Poor Sleep

Chronic psychological stress plays a bigger role in hypertension than is often recognized, especially among older adults. Retirement, loss of loved ones, financial hardship, and social withdrawal can lead to ongoing emotional strain. This kind of stress triggers hormonal changes, including increased cortisol that elevate blood pressure. Sleep issues like insomnia and sleep apnea are also common and have been independently linked to hypertension (Soliman & Pollock, 2021).

Loneliness has clear physical effects too. It raises systemic inflammation and activates the sympathetic nervous system, both of which contribute to vascular dysfunction. Nurses should make it routine to ask older patients about their emotional well-being, support networks, and sleep patterns. Simple screening tools or open-ended questions can help identify those at risk. Depending on what's uncovered, interventions might include mental health referrals, support group participation, or helping patients reconnect with community and religious organizations.

2.3.6 Delayed Care and Limited Health Literacy

Many older adults delay or avoid seeking medical care, often due to fear of hospitalization, cultural beliefs, or the assumption that high blood pressure is a normal part of aging. These attitudes are compounded by low health literacy. Many elderly individuals struggle to interpret health information, including medication instructions, blood pressure readings, or dietary recommendations.

Nurses have a key role to play in improving health literacy and reducing these barriers. Education should be clear, visual, and delivered through conversation rather than written materials alone. Techniques like teach-back, blood pressure journals, and picture-based guides can help make complex information easier to understand. Nurses should also push for more age-friendly systems such as shorter wait times, simpler referral processes, and mobile outreach clinics to ensure older adults are not left behind.

2.4 Psychosocial and Environmental Factors in Age-Related Hypertension

While physical changes play a major role in hypertension, a person's social and environmental surroundings often matter just as much, especially in older adults. These factors are frequently overlooked in routine assessments, yet they influence everything from the onset of high blood pressure to how well it's managed. As people age, they're more likely

to encounter emotional stress, social isolation, economic hardship, and obstacles in accessing care. These challenges can combine with physiological vulnerabilities to worsen health outcomes. In low-resource settings like Nigeria, where older adults often receive limited specialized support, these influences can be even more damaging. For nurses, understanding these non-medical factors is essential to providing care that truly meets the needs of elderly patients.

2.4.1 Loneliness and Social Disconnection

As people grow older, they often lose close social ties due to retirement, the death of loved ones, or health issues that limit mobility. When support systems shrink, older adults may feel isolated or chronically lonely—feelings that can have real physical consequences. Loneliness has been linked to increased stress hormone levels, nervous system overactivity, and inflammation, all of which can worsen or trigger hypertension.

Thuy et al., (2021) revealed social support improved the outcome of uncontrolled hypertension. Loneliness can reduce a person's motivation to maintain a healthy lifestyle or attend medical appointments. For nurses, asking questions about social connections should be part of every routine assessment. Simple screening like asking if the patient talks to anyone regularly can uncover risks that aren't visible in lab results. Nurses can also encourage participation in community events, church groups, or peer networks to improve social engagement.

2.4.2 Financial Challenges and Access to Care

Many older Nigerians live on limited incomes or rely entirely on their children or community for financial support. This makes it difficult to afford medications, attend follow-up appointments, or even get to a clinic. Some may skip medications to stretch out their supply or choose traditional remedies because they're more affordable or locally available.

Jobe et al., (2025) revealed that cost and lack of insurance is a major reason why many older adults in sub-Saharan Africa don't have adequate access their antihypertensive drugs regularly. Those living in rural areas may also face long travel distances and unreliable transportation. Nurses working in communities are often the first to notice when patients are struggling financially. They can connect individuals with low-cost services, medication aid programs, or even community transport networks. Nurses also play a crucial role in advocating for fairer health policies that support older adults, especially those without pensions or insurance.

2.4.3 Barriers within the Health System

Navigating the health system can be frustrating for older adults. Clinics are often crowded, signage is unclear, and staff may not have the time or training to communicate effectively with elderly patients. These frustrations are made worse by subtle forms of ageism, where older adults are ignored, rushed, or dismissed simply because they are old.

This leads to missed diagnoses, poor communication, and a breakdown in trust. Nurses are key to changing this. By speaking slowly, using clear language, and listening actively, they can make patients feel heard and respected. Training in geriatric sensitivity and the development of elder-friendly clinic spaces, like dedicated queues or caregiver-inclusive consultations can also improve access and outcomes.

2.4.4 Cultural Beliefs and Misunderstandings about Hypertension

Cultural perspectives strongly shape how older adults view illness. In many Nigerian communities, hypertension may not be seen as a disease, but as a result of "overthinking," curses, or spiritual forces. Some people believe high blood pressure is simply part of growing old and doesn't need treatment. Others may rely entirely on herbal remedies or traditional healers.

While not all cultural beliefs are harmful, some can delay care or interfere with prescribed medications. Nurses working within their own communities are in a unique position to respond respectfully to these beliefs. Rather than dismissing them, they can educate patients using familiar stories, metaphors, or through trusted local figures. Culturally aware communication helps build trust, which improves adherence and follow-up.

2.4.5 Environmental Risks

The physical environment where someone lives can either support or harm their health. Poor lighting, slippery floors, or steep staircases may prevent older adults from moving around safely, leading to a more sedentary lifestyle. In cities and towns, air pollution and noise can increase stress levels, while poor housing conditions like inadequate ventilation or erratic electricity can affect sleep, medication storage, and general well-being.

In Nigeria, these issues are common, especially in lower-income areas. Nurses conducting home visits or community screenings should assess the living space as part of routine care. Simple recommendations, like adding handrails or improving airflow, can go a long way in supporting blood pressure control. Nurses also have a role in advocating for safer, age-friendly community design.

2.4.6 Health Literacy and Communication Challenges

Understanding medical instructions can be difficult for many older adults, particularly those with limited schooling, hearing loss, vision problems, or memory decline. Too often, healthcare providers use technical language, speak too quickly, or don’t check whether patients truly understand what they’ve been told.

The teach-back method of asking patients to explain instructions in their own words can help confirm understanding. Nurses can also expand education beyond the clinic through radio programs, community talks, and caregiver involvement.

2.5 Theoretical Framework

The theoretical framework adopted in this study is the Biopsychosocial Model first proposed by Engel (1977).

2.5.1 Biopsychosocial Model

The study will be guided by the biopsychosocial model which emphasizes that health and disease are products of interactions among biological, psychological, and social factors.

The biological dimension encompasses factors such as arterial stiffness, impaired endothelial function, declining renal capacity, and increased oxidative stress, all of which contribute to the physiological development of hypertension with age.

The psychological domain includes chronic emotional stress, depressive symptoms, cognitive impairment, and individual health beliefs, which can influence both disease perception and self-management behaviors.

The social component involves key contextual influences such as social isolation, availability of caregiver support, accessibility of healthcare services, and financial limitations, each of which can significantly affect both the progression and management of hypertension in older adults.

2.5.2 Application of the Biopsychosocial Model to the Assessment of Age-related Factors in the Development of Hypertension

1. Considers age-related factors: The model takes into account the biological changes that occur with aging, such as increased systolic blood pressure, decreased physical activity, and changes in body composition.

2. Examines lifestyle factors: The model considers the impact of lifestyle factors, such as diet, physical activity, and smoking status on hypertension.

3. Includes demographic variables: The model takes into account demographic variables, such as age, sex, and ethnicity that can influence the risk of developing hypertension.

4. Looks at health-related variables: The model considers health-related variables, such as body mass index (BMI), waist circumference, and blood lipids that can contribute to hypertension.

2.5.3 Application of the Biopsychosocial Model to Nursing Practice

The biopsychosocial Model provides comprehensive understanding of how aging contributes to hypertension. It is needed for effective nursing practice, particularly in geriatric care. This framework helps nurses recognize that hypertension in older adults isn't just about elevated numbers on a blood pressure monitor, but also a condition shaped by a web of biological changes, behavioral habits, psychosocial stressors, and environmental challenges. By integrating this broader perspective, nurses are better positioned to deliver holistic, context-sensitive care that goes beyond symptom management.

Assessment

Nurses must move past the routine act of recording blood pressure readings and begin to assess the full spectrum of age-related risk factors. This includes recognizing signs of vascular aging (e.g., widened pulse pressure or postural hypotension), evaluating physical activity levels, identifying medication adherence challenges, and exploring emotional and social support systems. Incorporating tools like functional assessments, dietary screens, and psychosocial checklists can offer a more accurate picture of each patient's risk profile.

Health Education

Effective education for older adults must consider more than just clinical guidelines. Nurses should adapt their teaching to accommodate varying levels of health literacy, cultural perceptions about aging and illness, and the patient's cognitive or sensory abilities. Using visual aids, local languages, and interactive strategies like the teach-back method ensures that information is not only delivered but truly understood. Involving family members or caregivers in the educational process can also reinforce key messages and support adherence.

Care Planning

Interventions should be tailored to each patient's unique situation, taking into account their physical limitations, social context, beliefs about illness, and available resources. A one-size-fits-all approach is inadequate in geriatric hypertension care. Instead, nurses must craft individualized care plans that address the underlying causes of hypertension, whether those are rooted in diet, stress, loneliness, or polypharmacy, and coordinate care across disciplines when possible.

Advocacy

In many low- and middle-income countries, including Nigeria, nurses are often the primary point of contact for elderly patients navigating the health system. This places them in a powerful position to advocate for systemic changes. These might include pushing for reduced drug costs, age-friendly clinic designs, expanded outreach services, or policy reforms that include older adults in national health insurance schemes. Nurses can also advocate for caregiver support programs and better integration of traditional and formal care systems.

2.6 Empirical Review

Mahara et al. (2023) carried out a quantitative cross-sectional descriptive study involving 247 respondents using simple random sampling and proportionate sampling method in the Bajhang district of Nepal. Respondents were aged 60 and above. Descriptive and inferential statistical analysis revealed Prevalence of hypertension was 36%, which was significantly higher in age group more than 80 years (50%) and males (48.6%) than female. Hypertension was significantly associated with smoking and insufficient fruit and vegetable consumption habit.

In a cross-sectional study conducted by Ayadi et al. (2023) in Akure South Local Government Area, Ondo State, they explored the factors contributing to hypertension among 420 adults, with a particular focus on older individuals. Using the WHO STEPS framework, they reported a hypertension prevalence rate of 27.9%. Age emerged as a significant determinant, with older adults found to be nearly four times more likely to develop hypertension compared to younger respondents (AOR ≈ 3.8). Other key risk factors identified included a history of diabetes (AOR ≈ 9.6), high cholesterol levels (AOR ≈ 5.5), and lack of physical activity ($p = 0.032$). The study reinforces the idea that aging intensifies the impact of existing health conditions and lifestyle habits. It highlights the importance of incorporating comprehensive, age-appropriate risk assessments into hypertension care.

Yan et al. (2024) conducted a cross-sectional study among 1,327 Chinese adults aged 60–79 years to examine associations between daily physical activity and hypertension. Physical activity was measured using questionnaires, and blood pressure was assessed with standardized devices. Data were analyzed using multivariable logistic regression to estimate odds ratios of hypertension across physical activity categories. The study found that lower levels of daily physical activity were significantly associated with a higher prevalence of hypertension, depressive symptoms, and poor sleep, while higher activity correlated with lower systolic blood pressure. This study shows that physical inactivity is an independent

correlate of hypertension among older adults, supporting the need to assess physical activity in elderly populations.

Camara et al. (2024) conducted a cross-sectional community-based survey of 1698 individuals in Guinea to assess the prevalence, risk factors, and control of hypertension among older adults. The study population consisted of individuals aged 60 years and above, surveyed in 2021 using multistage sampling. Blood pressure was measured using standardized procedures, while socio-demographic and lifestyle variables were collected through structured questionnaires. Logistic regression analysis was employed to determine factors associated with hypertension. The study reported a high prevalence of hypertension among Guinean older adults, with rates increasing significantly with advancing age. Obesity, physical inactivity, alcohol consumption, and low educational status were identified as key risk factors. Control of hypertension was found to be poor, with a large proportion of known hypertensive individuals remaining uncontrolled despite treatment.

Egwim et al. (2024) carried out a hospital-based cross-sectional study of 257 adults to determine the prevalence, awareness, and risk factors of hypertension among adults attending a tertiary hospital in South-East Nigeria. The study population comprised adult patients recruited through systematic sampling. Blood pressure was measured following WHO guidelines, and socio-demographic and lifestyle information was collected using structured questionnaires. Data were analysed using descriptive statistics and logistic regression to identify predictors of hypertension. Findings showed a high prevalence of hypertension among the study participants, with increasing age strongly associated with elevated risk. Other significant predictors included obesity, alcohol consumption, smoking, and family history of hypertension.

Adeke et al. (2024) conducted a cross-sectional survey involving 3782 adults. Blood pressure was measured using standardized protocols, while socio-demographic variables (age, sex, education, marital status, residence) and lifestyle factors (smoking, alcohol use, physical activity, body mass index) were assessed through structured questionnaires. Data were analysed using multivariable logistic regression to identify independent predictors of hypertension. The study found a significant rise in hypertension prevalence with increasing age, confirming ageing as a major risk factor. Male sex, urban residence, and lower education were associated with higher odds of hypertension. Lifestyle behaviours such as obesity,

physical inactivity, alcohol intake, and smoking were also significantly linked with elevated blood pressure.

Leszczak et al. (2024) performed an observational, cross-sectional study involving 109 older adults (aged 60–85 years; 80 women and 29 men) from south-eastern Poland. Participants were recruited from a local University of the Third Age program. Body composition (BMI, body fat percentage) was measured via bioelectrical impedance, while blood pressure was taken using an automated oscillometric device. Physical activity and sedentary time were objectively tracked with tri-axial accelerometers, and socio-demographic and lifestyle data were self-reported. Logistic regression (stepwise) was used to identify factors associated with hypertension. Results revealed that hypertension prevalence escalated from 16% among those with normal weight to 85% in individuals with obesity. Higher BMI and body fat percentage were significantly correlated with both systolic and diastolic blood pressure. Logistic regression identified higher BMI, elevated body fat percentage, and failure to meet moderate-to-vigorous physical activity (MVPA) recommendations as the strongest predictors of hypertension. Of all socio-economic variables, only education level showed a significant association with hypertension.

Camara et al. (2024) conducted a cross-sectional community-based survey of 1698 individuals in Guinea to assess the prevalence, risk factors, and control of hypertension among older adults. The study population consisted of individuals aged 60 years and above, surveyed in 2021 using multistage sampling. Blood pressure was measured using standardized procedures, while socio-demographic and lifestyle variables were collected through structured questionnaires. Logistic regression analysis was employed to determine factors associated with hypertension. The study reported a high prevalence of hypertension among Guinean older adults, with rates increasing significantly with advancing age. Obesity, physical inactivity, alcohol consumption, and low educational status were identified as key risk factors. Control of hypertension was found to be poor, with a large proportion of known hypertensive individuals remaining uncontrolled despite treatment.

Teng et al. (2023) assessed frailty and hypertension in a hospital-based cross-sectional study involving 612 older adults aged ≥65 years. Frailty was measured using the Fried Frailty Phenotype, while blood pressure was assessed with standard protocols. Logistic regression analysis was applied to test associations between frailty, hypertension, and fall risk. The study found that frailty often coexisted with hypertension, and frail patients displayed

different blood pressure patterns and higher fall risk. Limitations included a single-site design and cross-sectional approach. This work emphasizes that frailty modifies hypertension risk and outcomes in the elderly, making geriatric assessment essential.

Ibrahim et al. (2023) carried out a cross-sectional survey of 361 adults (including elderly) in Jigawa State, Nigeria. Data on BP, BMI, diabetes, and CKD status were obtained using WHO STEPS methodology. Logistic regression analysis was employed to test predictors. Age, overweight/obesity, and CKD markers were independently associated with hypertension. This study provides Nigerian-specific evidence linking obesity and CKD to hypertension in older adults.

Camara et al. (2024) carried out a national cross-sectional survey of 1698 older Guinean adults (≥60 years). Hypertension was diagnosed using standardized BP protocols, and lifestyle factors were collected via structured questionnaire. Data analysis was done with logistic regression models to identify predictors of hypertension. Results showed high prevalence with obesity, diabetes, and physical inactivity being significant factors. This study underscores the role of lifestyle-related and metabolic factors in elderly hypertension.

Osude et al. (2021) analyzed longitudinal data from 6,814 participants in the Multi-Ethnic Study of Atherosclerosis (MESA) to assess how age and sex influence hypertension control over a 12-year period. Hypertension was classified as blood pressure ≥140/90 mmHg or the use of antihypertensive medication, while control was evaluated at both <140/90 and <130/80 mmHg using mixed-effects logistic regression. Results showed that among adults aged 45–64, men were less likely than women to achieve control (OR = 0.89 at <140/90; OR = 0.60 at <130/80), but in older adults, particularly those 75 years and above, men had higher odds of control (OR = 2.08 at <140/90; OR = 1.71 at <130/80). These findings indicate that sex differences in hypertension control shift with age, highlighting the importance of interventions tailored to both age and sex.

Nguyen et al. (2024) conducted a cross-sectional study among outpatients aged 60 years and older in Vietnamese cardiology clinics, employing frailty assessments, standardized blood

pressure measurements, and logistic regression to explore factors associated with hypertension control. The study revealed that frailty was more prevalent in women than in men and was significantly associated with uncontrolled hypertension in women ($p < 0.01$), but not in men. These findings suggest that geriatric conditions like frailty may contribute to sex-related differences in blood pressure control among older adults.

2.7 Summary of Literature Review

Despite extensive research on hypertension in Nigeria and across Africa, critical gaps remain. Previous Nigerian studies (Ayadi et al., 2023; Egwim et al., 2024; Ibrahim et al., 2023; Adeke et al., 2024) have identified major risk factors such as age, obesity, smoking, and alcohol use, but none have specifically focused on elderly patients attending Consultant Out-patient departments (COPD clinics).

Most African and Nigerian studies emphasize prevalence, with little exploration of control rates or treatment outcomes. Global research (Osude et al., 2021; Nguyen et al., 2024) shows that hypertension control varies significantly by age and sex, yet these differences are rarely examined in Nigerian elderly populations.

Furthermore, frailty and multimorbidity, which are that factors shown internationally to influence hypertension risk and outcomes (Teng et al., 2023; Nguyen et al., 2024), remain underexplored in African contexts. Similarly, while studies from Nepal (Mahara et al., 2023) and the U.S. (Osude et al., 2021) report clear sex-related variations in prevalence and control, Nigerian evidence tends to treat older adults as a homogeneous group.

Finally, the predominance of cross-sectional studies (Mahara, Camara, Adeke, Leszczak, Egwim) limits causal interpretation. While the present study also adopts a cross-sectional approach, it addresses these gaps by focusing on elderly COPD outpatients, an under-researched yet clinically significant population, thereby generating context-specific baseline evidence to guide future longitudinal research and tailored interventions in Nigeria.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter describes the research methodology that will be used in conducting this study. The section contains various components of research methodology , discussed under their respective headings which include; research design, research settings, target population, sampling technique, validity of the instrument, reliability test, data collection method, data analysis and ethical consideration.

3.1 Research Design

This study will adopt a descriptive cross-sectional survey design. The design is appropriate because it allows for the collection of data at a single point in time to assess the relationship between age-related factors and the development of hypertension in elderly individuals. It enables the identification of both biological and behavioral risk factors, as well as their interactions, without manipulating the study environment.

3.2 Study Area

The study was conducted at the Outpatient (COPD) clinic of the University of Benin Teaching Hospital (UBTH), Benin City, Edo State, Nigeria.

The University of Benin Teaching Hospital (UBTH) is a tertiary healthcare institution that serves as a major referral center for Edo State and its neighboring regions. Established in 1973 under the Nigerian National Health Act and affiliated with the University of Benin, UBTH was originally created to provide advanced medical care to the former Mid-Western Region, now comprising Edo and Delta States. The hospital also operates community health

centers in Ogbonna (Etsako Central) and Udo (Ovia South-West), extending primary care services to rural communities.

As of February 2025, UBTH has 36 wards and employs 721 nurses. It was taken over by the Federal Government in 1975, becoming the fifth teaching hospital in the country. With over 900 bed spaces and a wide range of clinical departments, it stands as a leading center for healthcare delivery and training in Nigeria and beyond. UBTH provides internship and residency training for various health professionals, including doctors, nurses, pharmacists, radiographers, and dietitians. It also plays a key role in medical education and research, supporting academic investigations into public health and disease trends.

The hospital is equipped with modern facilities such as a dialysis center, CT scan services, an accident and emergency center, and an oxygen production plant. It runs general and specialist outpatient clinics throughout the week, with consultation hours typically between 8:00 a.m. and 2:00 p.m., except on Wednesdays when clinics operate from 12 noon to 5:00 p.m. Hypertensive patients, along with those managing other cardiovascular conditions, are scheduled to attend clinics on Mondays for specialist reviews. UBTH's dedicated geriatrics unit and large population of elderly hypertensive patients make it an appropriate setting for research on age-related hypertension.

3.3 Target Population

The target population for this study includes older patients aged 60 years and above at the COPD clinic of UBTH. These individuals are assumed to have already been diagnosed with hypertension or are at risk due to age-related factors and comorbid conditions. These individuals are scheduled to visit the clinic on Mondays for checkups.

Table 3.3 Number of patients who visited the consultant outpatient department from the period of January 2025 to February 2025

January 2025							
Cardiology Unit	**Old**		**New**		**NHIS**		
	M	**F**	**M**	**F**	**M**	**F**	**Total**
	20	44	7	3	19	35	128
	19	50	6	4	9	18	93
	17	24	2	2	7	8	60
	20	26	4	6	3	4	57
Total							335
February 2025							
Cardiology Unit	**Old**		**New**		**NHIS**		
	M	**F**	**M**	**F**	**M**	**F**	**Total**
	22	57	3	3	14	12	111
	11	25	1	1	5	15	58
	16	25	2	2	5	7	57
	21	32	5	10	1	8	77
Total							303

The average number of patients seen for the period of January 2025 to February 2025 was 319.

3.4 Sample Size Determination

The sample size for this study is the subset of the population from which data for the study will be obtained. It is calculated using Taro Yamane's formula:

$$n = \frac{N}{1 + N\,(e)^2}$$

Where:

n = sample size

N = population size

e = margin of error (commonly 0.05 for 95% confidence)

Given that:

N = 319

e = 0.05

$$n = \frac{319}{1+319(0.05)^2} = \frac{319}{1+319\,(0.0025)} = \frac{319}{1+0.80} = \frac{319}{1.80} = 177$$

To allow for a 10% attrition rate: 10% of 177 = 17.7

Therefore, n= the attrition rate (17.7) + the sample size (n) 177= 194.7

The sample size approximately will be 195.

3.5 Sampling Technique

A stratified random sampling technique was used in this study to ensure fair representation of participants across relevant subgroups within the target population. The population was first stratified by age groups (e.g. 60-69 years, 70-79 years, and 80 year and above) to reflect the

natural distribution of elderly patients seen in the clinic. If necessary, gender may also be used as a secondary stratification factor to control for sex-based differences in hypertension risk. From each stratum, a proportionate number of participants was selected using simple random sampling, ensuring that each subgroup was adequately represented in the final sample.

This method was chosen to minimize selection bias and allow for meaningful subgroup analysis, particularly as age and sex are well-documented modifiers of hypertension development and progression. Stratification enhances the external validity of the study by ensuring that the sample closely mirrors the population structure of elderly hypertensive patients seen in UBTH.

If logistical constraints arise or if a complete patient list is not readily accessible, systematic random sampling may be used as a fallback. In that case, a sampling interval (e.g., every 2nd or 3rd eligible patient) will be determined from the appointment list, and the first participant will be selected randomly within the first interval.

3.6 Inclusion and Exclusion Criteria

3.6.1 Inclusion Criteria

Participants must meet all of the following criteria to be eligible for this study:

1. **Age 60 years and above** at the time of data collection.
2. **Clinically diagnosed with hypertension**, as documented in their medical records.
3. **Currently attending the Consultant out-patient clinic** at University of Benin Teaching Hospital (UBTH) for follow-up care.
4. **Able to give informed consent** or have a legal guardian provide consent on their behalf.

5. Have attended **at least one clinic visit** in the last three months (up to the time of data collection).

3.6.2 Exclusion Criteria

Participants were excluded from the study if they meet any of the following conditions:

1. **Under 60 years of age**, even if diagnosed with hypertension.
2. Have a documented **secondary cause of hypertension** (e.g., renal artery stenosis, endocrine disorders).
3. Diagnosed with **severe cognitive impairment** or dementia that would interfere with reliable communication or informed consent.
4. Are **critically ill** or admitted for acute conditions during the data collection period.
5. Have **incomplete or missing medical records** relating to hypertension or age-related assessments.

3.7 Instrument for Data Collection

The instrument for data collection in this study was a structured questionnaire. A structured questionnaire is a data collection instrument designed by researchers to gather information directly from respondents without the need for an interviewer. It consists of a series of standardized questions that are formulated in advance, allowing respondents to provide their answers independently. This type of questionnaire can include various question formats, such as closed-ended questions (which offer predefined response options) and open-ended questions (which allow for free-form responses). This will be developed based on the objectives of the study. The questionnaire will be made up of four sections. Questions which will be carefully drafted, sequenced and constructed in a bid to get in-depth information that is useful and relevant to the study will be used.

Section A: Consist of questions on the demographic data of the participants including their age at last birthday, gender, marital status, educational level, occupation, religion, ethnic group, residence, etc.

Section B: Questions on Lifestyle Risk Factors Contributing to Hypertension with responses, on a 4-point Likert Scale, where 4 = Strongly Agree, 3 = Agree, 2 = Disagree, 1 = Strongly Disagree

Section C: Questions on Socio-Demographic Factors Influencing Hypertension Risk, on a 4-point Likert Scale, where 4 = Strongly Agree, 3 = Agree, 2 = Disagree, 1 = Strongly Disagree

Section D: Questions on Age-Related Risk Factors Contributing to Hypertension, on a 4-point Likert Scale, where 4 = Strongly Agree, 3 = Agree, 2 = Disagree, 1 = Strongly Disagree

3.8 Validity of the Instrument

Validity refers to the degree to which a research instrument measures what it is intended to measure. The instrument was validated through face and content validity. The questionnaire was structured in relation with the research topic. The project supervisor, an experienced statistician, and other lecturers in the faculty of nursing, University of Benin, were consulted to scrutinize the questionnaire to ensure it reflects the content of the study. Appropriate corrections based on their recommendations were made before it was administered.

3.9 Reliability of the Instrument

It essentially gauges how consistently the instrument produced similar results across multiple trials. A reliable instrument is one that could produce the same results if the behavior was measured again by the same scale. A test-retest method was conducted to test the instrument

by distributing 18 questionnaires, which constituted 10% of the total sample size of 177, to patients with hypertension cell attending the COPD clinic in University of Benin Teaching Hospital, Benin City Edo State. The data was collected and analyzed using Cronbach's alpha technique, a correlation coefficient of 0.71 was obtained, indicating a high level of internal consistency making it a reliable instrument.

3.10 Method of Data Collection

The researcher went to the Consultant out-patient department of University of Benin Teaching Hospital (UBTH) on a clinic day, which is usually Mondays. The patients were be approached in the clinic on each clinic day, following prior permission from the head of the clinic. The purpose of the study was explained to them, and the instrument for data collection was administered to the patient by the researcher until the required sample size of is achieved. The data collection took place during their clinic days, and on-the-spot retrieval of the administered copies of the questionnaire was ensure that all copies were collected on the same day. Data collection lasted for about seven weeks.

3.11 Method of Data Analysis

Data was analyzed using SPSS version 26. Descriptive statistics (frequencies, means, and standard deviations) was used to summarize the data. Inferential statistics included chi-square tests, binary logistic regression, and Pearson correlation, with significance set at $p < 0.05$.

3.12 Ethical Considerations

Ethical approval was obtained from the Ethics and Research Committee of the University of Benin Teaching Hospital. Informed consent was obtained from each participant.

Confidentiality was maintained, and participation was voluntary, with the right to withdraw at any time.

Ethical consideration

The study took ethical and moral principles into consideration when it comes to data collection from participants, confidentiality which is one of the most important human right concepts was put into consideration. Prior to data collection, permission was obtained from the University of Benin Ethical Clearance Committee. The following are the main ethical guidelines that were followed throughout this study:

Confidentiality: Respondents' information was treated confidentially, with no request for names or addresses in the questionnaire. Participants were made to understand that their responses are confidential and solely used for research purposes. No personal identifiers were used in any document or questionnaire to maintain anonymity.

Voluntary Participation: Participants were informed of their right to voluntary participation without facing penalties or bias. They could choose to withdraw or decline to provide information at any point if they feel uncomfortable or unsure.

Avoidance of Plagiarism: Proper citation of all authors used in the study was ensured, both within the content and in the reference page.

Informed Consent: Participants were required to provide informed consent before taking part in the study. They were fully informed about the research objectives, procedures, potential risks, and benefits. Consent was voluntary, and participants had the right to ask questions or seek clarification before agreeing to participate.

Beneficence and Non-Maleficence: The research was conducted with the intent to maximize benefits and minimize harm. The well-being of participants was a priority, and any risks were

mitigated as much as possible. Participants were not exposed to any physical or psychological harm during the research.

Justice: The selection of participants was fair and equitable, ensuring that no group was disproportionately burdened or excluded from the potential benefits of the research. The study reflected the diversity of the population relevant to the study

Respect for Autonomy: Participants' autonomy was respected throughout the study. They were free to make their own decisions regarding participation without any form of coercion or undue influence.

Right to Withdraw: Participants were informed that they have the right to withdraw from the study at any time without any negative consequences. This reinforced their freedom of choice and control over their involvement in the research.

Minimizing Harm: Every effort was made to minimize discomfort or risk to participants during data collection. All sensitive issues raised, appropriate referrals or support services were provided.

CHAPTER FOUR

RESULTS

This chapter presents the analysis and interpretation of data collected on the *influence of socio-economic factors on hypertension among elderly patients attending the COPD clinic at the University of Benin Teaching Hospital (UBTH),* Edo State. A total of **195 structured questionnaires** were distributed to elderly patients diagnosed with hypertension who attended the clinic during the study period. Out of these, **191 questionnaires** were correctly completed and returned, representing a **valid response rate of 97.9%.**

Table 4.1: Socio-demographic characteristics of respondents

Variable	Categories	Frequency (n)	Percentage (%)
Age (years)	60–64	58	30.4
	65–69	64	33.5
	70–74	43	22.5
	75 years and above	26	13.6
Gender	Male	83	43.5
	Female	108	56.5
Marital Status	Single	12	6.3
	Married	102	53.4
	Widowed	65	34.0
	Divorced/Separated	12	6.3
Highest Educational nLevel Attained	No formal education	41	21.5
	Primary	65	34.0
	Secondary	54	28.3
	Tertiary	31	16.2
Occupation (Before or After Retirement)	Unemployed	9	4.7
	Trader	43	22.5
	Artisan	26	13.6
	Civil Servant	38	19.9
	Farmer	29	15.2
	Retired	37	19.4
	Other	9	4.7
Duration of Hypertension Diagnosis	Less than 1 year	24	12.6
	1–5 years	79	41.4
	6–10 years	58	30.4

Above 10 years	30	15.7

Table 4.1 presents the socio-demographic characteristics of the 191 elderly respondents who participated in the study on the *influence of socio-economic factors on hypertension among elderly patients attending the COPD clinic at the University of Benin Teaching Hospital (UBTH)*. With respect to **age distribution,** the majority of respondents were within the age group of 65–69 years (33.5%), followed by those aged 60–64 years (30.4%), while 22.5% were within 70–74 years, and 13.6% were 75 years and above. In terms of **gender,** more than half of the respondents were females (56.5%), while males constituted 43.5%. Regarding **marital status**, over half of the respondents were married (53.4%), 34.0% were widowed, while 6.3% were single and another 6.3% divorced or separated. In terms of **educational attainment**, 34.0% had primary education, 28.3% attained secondary education, 21.5% had no formal education, while 16.2% had tertiary education. Concerning **occupation (before or after retirement)**, 22.5% were traders, 19.9% civil servants, 19.4% retired, 15.2% farmers, 13.6% artisans, while 4.7% each were unemployed or engaged in other forms of occupation. With respect to **duration of hypertension diagnosis,** the highest proportion (41.4%) had been diagnosed for 1–5 years, followed by 30.4% who had hypertension for 6–10 years, 15.7% for above 10 years, and 12.6% for less than 1 year.

Overall, the distribution indicates that most respondents were elderly females aged 65–69 years, predominantly married, with primary or secondary education, and engaged mostly in trading or civil service before retirement. Most had lived with hypertension for between one to five years.

Table 4.2: Lifestyle Risk Factors influencing Hypertension among Elderly Patients

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	SD	Decision
Regular consumption of high-salt foods increases the risk of developing hypertension among elderly patients.	102 (53.4%)	64 (33.5%)	18 (9.4%)	7 (3.7%)	3.37	0.76	High Influence
Lack of regular physical exercise contributes significantly to high blood pressure among elderly individuals.	96 (50.3%)	70 (36.6%)	17 (8.9%)	8 (4.2%)	3.33	0.78	High Influence
Excessive alcohol consumption is a major lifestyle factor that elevates blood pressure in older adults.	88 (46.1%)	66 (34.6%)	25 (13.1%)	12 (6.3%)	3.20	0.87	High Influence
Smoking or use of tobacco products increases the likelihood of hypertension among the elderly.	80 (41.9%)	74 (38.7%)	25 (13.1%)	12 (6.3%)	3.16	0.86	High Influence
Stressful lifestyle and inadequate relaxation increase the tendency of developing hypertension.	85 (44.5%)	70 (36.6%)	26 (13.6%)	10 (5.2%)	3.21	0.84	High Influence
Frequent consumption of fatty and processed foods contributes to hypertension in elderly patients.	90 (47.1%)	68 (35.6%)	23 (12.0%)	10 (5.2%)	3.25	0.82	High Influence

Grand Mean = 3.25

Decision Rule: Mean ≥ 2.77 = **High Influence** 2.50–2.76 = **Moderate Influence** < 2.50 = **Low Influence**

Table 4.2 presents data on the lifestyle risk factors contributing to hypertension among 191 elderly patients attending the COPD clinic at the University of Benin Teaching Hospital (UBTH). The results show that the majority of respondents **strongly agreed (53.4%)** and **agreed (33.5%)** that regular consumption of high-salt foods increases the risk of developing hypertension, with a mean score of **3.37 ± 0.76**, indicating a *high influence*. Similarly, **50.3%**

strongly agreed and **36.6% agreed** that lack of regular physical exercise contributes significantly to high blood pressure among the elderly, yielding a mean of **3.33 ± 0.78**, also denoting a *high influence*.

Furthermore, **46.1% strongly agreed** and **34.6% agreed** that excessive alcohol consumption elevates blood pressure in older adults, with a mean of **3.20 ± 0.87**. Likewise, **41.9% strongly agreed** and **38.7% agreed** that smoking or the use of tobacco products increases the likelihood of hypertension among elderly patients, with a mean of **3.16 ± 0.86**, both showing *high influence*. Additionally, **44.5% strongly agreed** and **36.6% agreed** that a stressful lifestyle and inadequate relaxation raise the risk of developing hypertension, with a mean of **3.21 ± 0.84**. Finally, **47.1% strongly agreed** and **35.6% agreed** that frequent consumption of fatty and processed foods contributes to hypertension in elderly patients, with a mean of **3.25 ± 0.82**, also reflecting a *high influence*.

Overall, the **grand mean of 3.25** indicates that lifestyle-related factors such as poor diet, lack of exercise, alcohol consumption, smoking, stress, and consumption of fatty foods have a **high influence** on the development of hypertension among elderly patients in the study population.

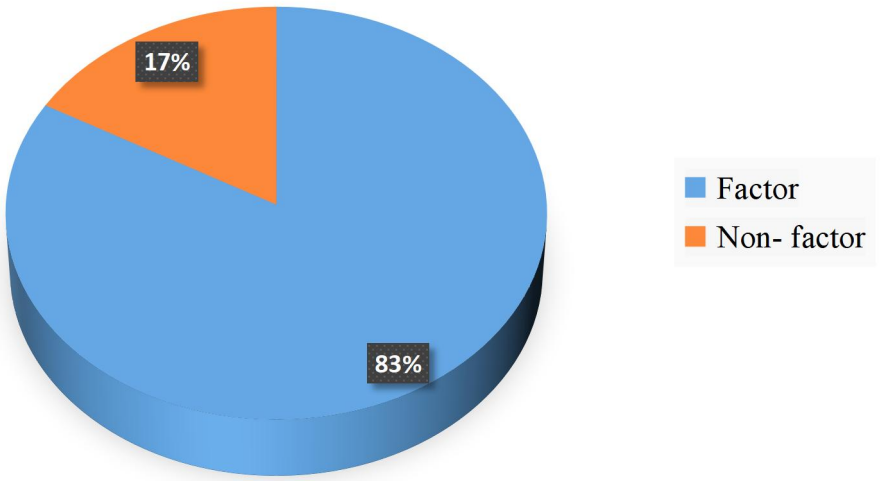

Figure 4.1: Lifestyle Risk Factors Influencing Hypertension among Elderly Patients

The chart shows that 159 respondents (83%) identified lifestyle factors as influencing hypertension among elderly patients, while 32 respondents (17%) indicated otherwise. This implies that the majority of respondents recognized lifestyle-related habits as major contributors to hypertension among the elderly

Table 4.3: Socio-Demographic Factors Influencing Hypertension Risk among Elderly Patients

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	SD	Decision
Gender differences influence the risk of developing hypertension among elderly patients.	76 (39.8%)	71 (37.2%)	29 (15.2%)	15 (7.9%)	3.09	0.89	Low Influence
Level of education affects awareness and management of hypertension in older adults.	88 (46.1%)	72 (37.7%)	20 (10.5%)	11 (5.8%)	3.24	0.82	High Influence
Low-income levels limit access to healthcare and increase hypertension risk.	101 (52.9%)	67 (35.1%)	16 (8.4%)	7 (3.7%)	3.37	0.76	High Influence
Marital status has a relationship with the	70 (36.6%)	75 (39.3%)	31 (16.2%)	15 (7.9%)	3.05	0.88	Low Influence

prevalence of hypertension among elderly individuals.							
Occupational history (e.g., sedentary or stressful jobs) contributes to hypertension risk in the elderly.	84 (44.0%)	70 (36.6%)	24 (12.6%)	13 (6.8%)	3.18	0.84	High Influence
Residence type (urban vs rural) influences exposure to hypertension risk factors among elderly patients.	78 (40.8%)	73 (38.2%)	27 (14.1%)	13 (6.8%)	3.13	0.86	High Influence

Grand Mean = 3.18 Decision **Rule:** Mean ≥ 2.77 = **High Influence** >3.1, **Low Influence** = < 3.1

Table 4.3 presents the socio-demographic factors influencing hypertension risk among 191 elderly patients attending the COPD clinic at the University of Benin Teaching Hospital (UBTH). The findings show that **39.8% strongly agreed** and **37.2% agreed** that gender differences influence the risk of developing hypertension among elderly patients, with a mean of **3.09 ± 0.89**, indicating a *low influence*. In contrast, a higher proportion, **46.1% strongly agreed** and **37.7% agreed**, that level of education affects awareness and management of hypertension, yielding a mean of **3.24 ± 0.82**, which reflects a *high influence*.

Furthermore, the majority of respondents (**52.9% strongly agreed** and **35.1% agreed**) believed that low-income levels limit access to healthcare and increase hypertension risk, with a mean score of **3.37 ± 0.76**, showing a *high influence*. Regarding marital status, **36.6% strongly agreed** and **39.3% agreed** that it has a relationship with the prevalence of hypertension, resulting in a mean of **3.05 ± 0.88**, which indicates a *low influence*. Similarly, **44.0% strongly agreed** and **36.6% agreed** that occupational history, such as sedentary or stressful jobs, contributes to hypertension risk among elderly individuals, with a mean of **3.18 ± 0.84**, representing a *high influence*. Also, **40.8% strongly agreed** and **38.2% agreed** that residence type (urban vs rural) influences exposure to hypertension risk factors, with a mean of **3.13 ± 0.86**, also indicating a *high influence*.

Overall, the **grand mean of 3.18** suggests that socio-demographic factors such as education, income, occupation, and residence type exert a **high influence** on hypertension risk among the elderly, while gender and marital status show **lower levels of influence** within the study population.

Table 4.4: Age-Related Risk Factors Contributing to Hypertension among Elderly Patients

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	SD	Decision
Advancing age naturally increases the risk of developing hypertension due to vascular changes.	102 (53.4%)	67 (35.1%)	15 (7.9%)	7 (3.7%)	3.38	0.77	High Influence
Reduced physical activity with age contributes to the rise in blood pressure among elderly persons.	89 (46.6%)	74 (38.7%)	18 (9.4%)	10 (5.2%)	3.27	0.82	High Influence
Age-related weight gain or obesity increases the risk of hypertension among older adults.	84 (44.0%)	79 (41.4%)	17 (8.9%)	11 (5.8%)	3.23	0.83	High Influence
Decreased kidney function in old age predisposes individuals to hypertension.	92 (48.2%)	73 (38.2%)	16 (8.4%)	10 (5.2%)	3.29	0.81	High Influence
Hormonal changes associated with aging influence blood pressure regulation.	78 (40.8%)	80 (41.9%)	21 (11.0%)	12 (6.3%)	3.17	0.86	High Influence
Family history combined with increasing age raises the likelihood of hypertension in elderly patients.	95 (49.7%)	70 (36.6%)	17 (8.9%)	9 (4.7%)	3.31	0.79	High Influence

Grand Mean = 3.27 Decision Rule: Mean ≥ 2.77 = **High Influence** < 2.50 = **Low Influence**

Table 4.4 presents the age-related risk factors contributing to hypertension among 191 elderly patients attending the COPD clinic at the University of Benin Teaching Hospital (UBTH). The findings reveal that a majority of respondents, **53.4% strongly agreed** and **35.1% agreed**, that advancing age naturally increases the risk of developing hypertension due to vascular changes, with a mean score of **3.38 ± 0.77**, indicating a *high influence*. Similarly, **46.6% strongly agreed** and **38.7% agreed** that reduced physical activity with age contributes to the rise in blood pressure among elderly persons, resulting in a mean of **3.27 ± 0.82**, also showing a *high influence*. Additionally, **44.0% strongly agreed** and **41.4% agreed** that age-related weight gain or obesity increases the risk of hypertension among older adults, with a mean of **3.23 ± 0.83**, signifying a *high influence*. Likewise, **48.2% strongly agreed** and **38.2% agreed** that decreased kidney function in old age predisposes individuals to hypertension, yielding a mean of **3.29 ± 0.81**, also indicating a *high influence*. Furthermore, **40.8% strongly agreed** and **41.9% agreed** that hormonal changes associated with aging influence blood pressure regulation, with a mean of **3.17 ± 0.86**, reflecting a *high influence*. In the same vein, **49.7% strongly agreed** and **36.6% agreed** that family history combined with increasing age raises the likelihood of hypertension in elderly patients, with a mean score of **3.31 ± 0.79**, also representing a *high influence*.

Overall, the **grand mean of 3.27** indicates that all the listed age-related factors such as vascular changes, reduced physical activity, obesity, declining kidney function, hormonal shifts, and hereditary predisposition have a **high influence** on the development of hypertension among elderly patients in the study population.

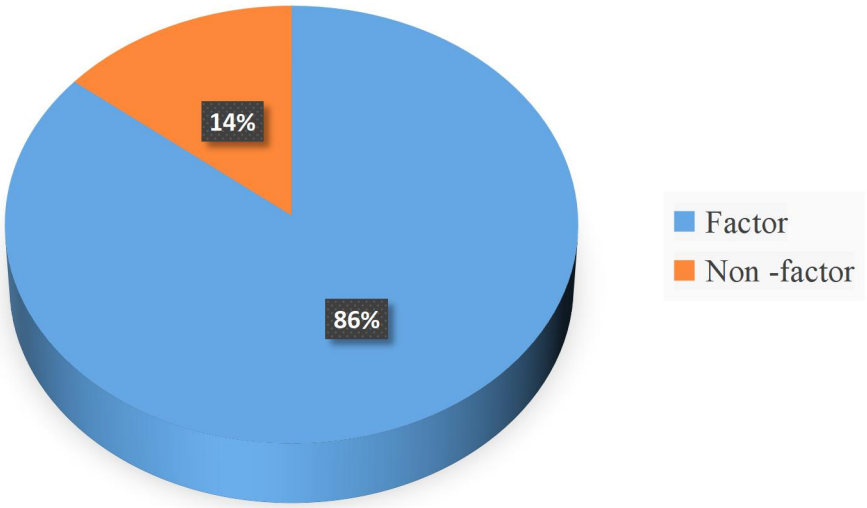

Figure 4.2: Age-Related Risk Factors Contributing to Hypertension among Elderly Patients

The chart shows that 164 respondents (86%) identified age-related factors as contributing to hypertension among elderly patients, while 27 respondents (14%) indicated otherwise. This implies that the majority of the respondents recognized age-related factors as significant contributors to hypertension among the elderly

CHAPTER FIVE

DISCUSSION OF FINDINGS

This chapter discusses the major findings of the research compared with the literature reviewed, the implication for nursing, summary, conclusion, Recommendations and Suggestions for further Studies.

5.1 Discussion of Findings

Lifestyle Risk Factors Contributing to Hypertension Development

The present study revealed that lifestyle risk factors exert a high influence on hypertension development among elderly patients at UBTH, with a grand mean of 3.25. Regular consumption of high-salt foods emerged as the strongest predictor, with 86.9% of respondents acknowledging its impact and yielding the highest mean score of 3.37. This finding aligns remarkably well with Mahara et al. (2023), who reported that insufficient fruit and vegetable consumption was significantly associated with hypertension in elderly Nepalese populations, suggesting that poor dietary habits transcend geographical boundaries. Similarly, lack of regular physical exercise was identified as a major contributor in the current study, with 86.9% agreement and a mean of 3.33. This corroborates the findings of Yan et al. (2024) among Chinese elderly adults, where lower levels of daily physical activity were significantly associated with higher hypertension prevalence. Camara et al. (2024) reinforced this pattern in Guinea, identifying physical inactivity as a key risk factor among older adults.

The current study also found that excessive alcohol consumption, smoking, stress, and consumption of fatty foods all demonstrated high influence, with mean scores ranging from 3.16 to 3.25. These findings parallel those of Egwim et al. (2024) in South-East Nigeria, who

identified alcohol consumption and smoking as significant predictors of hypertension. However, while stress was highly recognized in the present study, with 81.1% agreement, this factor received less emphasis in comparative studies, possibly reflecting cultural differences in stress perception or reporting. Overall, the convergence of evidence across multiple contexts underscores the universal importance of lifestyle modification in hypertension prevention among the elderly.

Socio-Demographic Factors Interacting with Age to Influence Hypertension Risk

The investigation of socio-demographic factors yielded a grand mean of 3.18, indicating high overall influence, though with notable variation across specific variables. Low-income levels emerged as the most influential factor, with 88% of respondents agreeing it limits healthcare access and increases hypertension risk, reflected in the highest mean of 3.37. This finding resonates strongly with the broader literature on health disparities. Adeke et al. (2024) similarly identified lower education, which often correlates with income, as associated with higher odds of hypertension. The economic barrier to healthcare access represents a critical vulnerability in elderly populations, particularly in resource-limited settings like Nigeria, where out-of-pocket health expenditure remains substantial.

Educational level showed high influence in the current study, with 83.8% agreement and a mean of 3.24, affecting both awareness and management of hypertension. Leszczak et al. (2024) in Poland found that among all socio-economic variables examined, only education level showed significant association with hypertension, underscoring its cross-cultural importance. Occupational history and residence type also demonstrated high influence in the present study, with means of 3.18 and 3.13 respectively. These findings align with Adeke et al. (2024), who reported that urban residence and occupational factors were associated with elevated blood pressure.

Interestingly, gender and marital status showed lower influence in the current study, with means of 3.09 and 3.05 respectively, falling just below the high influence threshold. This contrasts somewhat with Mahara et al. (2023), who found significantly higher hypertension prevalence in males compared to females in Nepal. The divergent findings may reflect contextual differences in gender roles, healthcare-seeking behavior, and social support structures across different cultural settings.

Key Age-Related Risk Factors Contributing to Hypertension Development

Age-related factors demonstrated the strongest recognition among respondents, with 86% identifying them as significant contributors and a grand mean of 3.27. Advancing age and associated vascular changes received the highest endorsement, with 88.5% agreement and a mean of 3.38, reflecting widespread understanding of biological aging processes. This finding is substantially supported by multiple studies in the empirical review. Ayadi et al. (2023) in Ondo State found that older adults were nearly four times more likely to develop hypertension compared to younger individuals. Similarly, Camara et al. (2024) reported that hypertension rates increased significantly with advancing age among Guinean older adults, while Adeke et al. (2024) confirmed aging as a major risk factor with significant prevalence rises across age groups.

Decreased kidney function emerged as another highly recognized factor in the present study, with 86.4% agreement and a mean of 3.29. This aligns with Ibrahim et al. (2023), who found chronic kidney disease markers independently associated with hypertension in Jigawa State, Nigeria. Age-related weight gain and obesity also showed high influence, with 85.4% agreement and a mean of 3.23, corroborating Leszczak et al. (2024), who found hypertension prevalence escalating from 16% in normal-weight individuals to 85% in those with obesity. Furthermore, the current study identified family history combined with increasing age as

highly influential, with 86.3% agreement and a mean of 3.31, suggesting important gene-environment interactions that intensify with aging.

Interestingly, while hormonal changes showed high influence in the present study, this factor received less explicit attention in comparative literature, possibly due to methodological differences or the complex nature of hormonal assessment in elderly populations.

5.2 Implications for Nurses

The findings of this study have several important implications for nursing practice. First, the strong influence of lifestyle factors on hypertension highlights the need for nurses to prioritize health education and counseling focused on diet modification, regular exercise, and stress management among elderly patients. Nurses should adopt community-based health promotion programs that encourage older adults to engage in moderate physical activity and adhere to dietary guidelines that limit salt and fat intake.

Second, the study underscores the critical role of nurses in early screening and continuous monitoring of blood pressure, especially for patients above 60 years. Nurses can integrate routine health checks and patient education into primary healthcare services to promote early detection and management. Third, given that low income and educational levels were found to affect awareness and treatment adherence, nurses should employ culturally sensitive communication strategies and simplify health messages for better understanding. Overall, nurses are pivotal in reducing hypertension burden through prevention, education, and patient empowerment.

5.3 Summary

This study investigated age-related and lifestyle risk factors contributing to hypertension among elderly patients in Benin City. Out of 195 questionnaires distributed, 191 were correctly completed and analyzed. The results revealed that 86% of respondents identified age-related factors as major contributors to hypertension, while 83% recognized lifestyle behaviors as significant risks. Advancing age, reduced physical activity, obesity, and hormonal changes were among the top age-related factors identified. Likewise, high salt consumption, lack of exercise, alcohol use, smoking, and stress emerged as leading lifestyle risks. Socio-demographic variables such as education, income, and occupation also influenced hypertension management and awareness. These findings confirm that hypertension in the elderly results from the interaction of biological aging and modifiable lifestyle behaviors.

5.4 Conclusion

The study concludes that both age-related and lifestyle risk factors significantly influence the prevalence of hypertension among elderly patients. While aging is inevitable, modifiable lifestyle behaviors play a crucial role in either mitigating or exacerbating the condition. Therefore, effective management requires a comprehensive approach that includes lifestyle modification, continuous health education, and regular screening. Nurses, as frontline caregivers, have a vital role in promoting healthy aging through patient-centered interventions that target both behavioral change and adherence to treatment.

5.5 Limitations of the Study

This study was limited by its cross-sectional design, which restricts causal interpretation of relationships between variables. The data were self-reported, which may have introduced

recall or social desirability bias, particularly regarding lifestyle practices such as diet and alcohol consumption. Additionally, the study focused on one health facility in Benin City, limiting the generalizability of the findings to other populations. Despite these limitations, the results provide valuable insight into the risk factors influencing hypertension among the elderly and offer a useful basis for further research.

5.6 Recommendations

Based on the findings, the following recommendations are made:

1. **Health Education:** Nurses should intensify patient education on modifiable lifestyle behaviors such as healthy eating, physical activity, and avoidance of alcohol and tobacco.
2. **Routine Screening:** Regular blood pressure screening should be incorporated into community health programs to ensure early detection among older adults.
3. **Community Outreach:** Public health nurses should collaborate with local health centers and community leaders to raise awareness about hypertension prevention.
4. **Policy Support:** Government and healthcare institutions should develop policies that support affordable access to hypertension medication and dietary supplements.
5. **Training Programs:** Continuous professional training should be provided for nurses on geriatric care and hypertension management strategies.

5.7 Suggestions for Further Study

Future studies should:

1. Examine the long-term effects of lifestyle modification programs on hypertension control among elderly patients.

2. Conduct comparative studies between urban and rural elderly populations to assess environmental and socioeconomic influences.
3. Explore psychosocial factors such as stress, family support, and depression in relation to hypertension management.
4. Utilize larger and more diverse samples to enhance generalizability of findings across different settings.
5. Investigate the effectiveness of nurse-led interventions in reducing hypertension prevalence among elderly individuals.

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APPENDIX 1

FACULTY OF NURSING SCIENCES

COLLEGE OF MEDICAL SCIENCES

UNIVERSITY OF BENIN,

BENIN CITY, EDO

Dear Respondent,

I am a 500 level student of the faculty of Nursing in the above-named institution. I am carrying out a research study on the topic: **ASSESSMENT OF AGE-RELATED FACTORS IN DEVELOPMENT OF HYPERTENSION AMONG ELDERLY PATIENTS ATTENDING THE CONSULTANT OUT-PATIENT DEPARTMENT (COPD) IN UNIVERSITY OF BENIN TEACHING HOSPITAL**. It will not take more than 15minutes to fill the questionnaire. It is not compulsory to participate, you can opt out at any time. Please kindly assist me by indicating your opinion where necessary

Yours faithfully,

Nyebuchi Nwabuzo Victor

Instruction: please do not write your name, provide and tick the appropriate answer. Your responses will be kept confidential.

Instructions: Please tick (√) where applicable.

SECTION A: Socio-Demographic and Socio-Economic Characteristics

1. **Age:** ( ) 60–64 ( ) 65–69 ( ) 70–74 ( ) 75 years and above
2. **Gender:** ( ) Male ( ) Female
3. **Marital Status:** ( ) Single ( ) Married ( ) Widowed ( ) Divorced/Separated
4. **Highest Educational Level Attained:** ( ) No formal education ( ) Primary ( ) Secondary ( ) Tertiary
5. **Occupation (Before or After Retirement):** ( ) Unemployed ( ) Trader ( ) Artisan ( ) Civil Servant ( ) Farmer ( ) Retired ( ) Other: _____

6. **Religion:** ( ) Christianity ( ) Islam ( ) African Traditional Religion ( ) Other: _____

7. **Duration of Hypertension Diagnosis:** ( ) Less than 1 year ( ) 1–5 years ( ) 6–10 years ( ) Above 10 years

SECTION B: Lifestyle Risk Factors Contributing to Hypertension

Please tick (√) the option that best represents your opinion.
4 = Strongly Agree 3 = Agree 2 = Disagree 1 = Strongly Disagree

S/N	Questions	4	3	2	1
1	Regular consumption of high-salt foods increases the risk of developing hypertension among elderly patients.				
2	Lack of regular physical exercise contributes significantly to high blood pressure among elderly individuals.				
3	Excessive alcohol consumption is a major lifestyle factor that elevates blood pressure in older adults.				
4	Smoking or use of tobacco products increases the likelihood of hypertension among the elderly.				
5	Stressful lifestyle and inadequate relaxation increase the tendency of developing hypertension.				
6	Frequent consumption of fatty and processed foods contributes to hypertension in elderly patients.				

SECTION C: Socio-Demographic Factors Influencing Hypertension Risk

Please tick (√) the option that best represents your opinion.
4 = Strongly Agree 3 = Agree 2 = Disagree 1 = Strongly Disagree

S/N	Questions	4	3	2	1
1	Gender differences influence the risk of developing hypertension among elderly patients.				
2	Level of education affects awareness and management of hypertension in older adults.				
3	Low-income levels limit access to healthcare and increase hypertension risk.				
4	Marital status has a relationship with the prevalence of hypertension among elderly individuals.				
5	Occupational history (e.g., sedentary or stressful jobs) contributes to hypertension risk in the elderly.				
6	Residence type (urban vs rural) influences exposure to hypertension risk factors among elderly patients.				

SECTION D: Age-Related Risk Factors Contributing to Hypertension

Please tick (√) the option that best represents your opinion.
4 = Strongly Agree 3 = Agree 2 = Disagree 1 = Strongly Disagree

S/N	Questions	4	3	2	1
1	Advancing age naturally increases the risk of developing hypertension due to vascular changes.				
2	Reduced physical activity with age contributes to the rise in blood pressure among elderly persons.				
3	Age-related weight gain or obesity increases the risk of hypertension among older adults.				
4	Decreased kidney function in old age predisposes individuals to hypertension.				
5	Hormonal changes associated with aging influence blood pressure regulation.				
6	Family history combined with increasing age raises the likelihood of hypertension in elderly patients.				

APPENDIX II

RELIABILITY ANALYSIS RESULTS

Age-Related Risk Factors Contributing to Hypertension among Elderly Patients

Case Processing Summary

Case Processing Summary

		N	%
Cases	Valid	191	100.0
	Excluded[a]	0	.0
	Total	191	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.801	.812	6

Lifestyle Risk Factors Contributing to Hypertension among Elderly Patients

Case Processing Summary

		N	%
Cases	Valid	191	100.0
	Excluded[a]	0	.0
	Total	191	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.764	.751	6

Socio-Demographic Factors Influencing Hypertension Risk

Case Processing Summary

		N	%
Cases	Valid	191	100.0

	Excluded[a]	0	.0
	Total	191	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.783	.776	6

APPENDIX III

HEALTH RESEARCH
ETHICS COMMITTEE (HREC)
UNIVERSITY OF BENIN TEACHING HOSPITAL
P.M.B. 1111 BENIN CITY NIGERIA Telephone: 052-600418 Website: ubth.org

CHIEF MEDICAL DIRECTOR Prof (Mrs) I.N Ize-Iyamu
DIRECTOR OF ADMINISTRATION Jim Uwadie, Esq
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Committee email: ubthresearchethics@gmail.com
Registration Number: NHREC-UBTH-HREC/24/12/20228

PROTOCOL NUMBER: ADM/E 22/A/VOL. VII/2025/22142 601972

PROPOSAL TITLE: "ASSESSMENT OF AGE-RELATED FACTORS IN DEVELOPMENT OF HYPERTENSION ELDERLY PATIENTS ATTENDING THE CONSULTANT OUT PATIENT DEPARTMENT (COPD) IN UNIVERSITY OF BENIN TEACHING HOSPITAL"

PRINCIPAL INVESTIGATOR(S): NYEBUCHI NWABUZO VICTOR

DEPARTMENT/INSTITUTION: DEPARTMENT OF NURSING SCIENCE, FACULTY OF NURSING SCIENCE, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

DATE CONSIDERED: OCTOBER 3RD, 2025

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 3/10/2025 TO 2/10/2026. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI **SIGNATURE & DATE**..... 3/10/2025

UNIVERSITY OF BENIN TEACHING HOSPITAL ETHICS & RESEARCH COMMITTEE Sign..... Date.....

SUPERVISOR (S): PROF C.A. ENUKU

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

Signature & Date.....