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REDUCING CARDIOVASCULAR DISEASE RISKS AMONG RETIRED OLDER ADULTS IN OSUN STATE NIGERIA: AN INTERVENTION STUDY

Grace Oluwatoyin Faronbi



A thesis submitted to the Faculty of Health Sciences, University of the Witwatersrand,

in fulfilment of the requirements of the degree

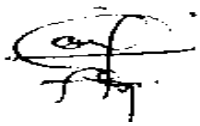
of

Doctor of Philosophy

Johannesburg, 2025

DECLARATION

I, Grace Oluwatoyin Faronbi, declare that this thesis, which is being submitted for the degree of Doctor of Philosophy at the University of the Witwatersrand, Johannesburg, is my own work. It has not previously been submitted for any degree or examination at any other university.

Signature: 

This 17th day of June**,** 2025 at Johannesburg, South Africa

HREC Protocol Number: M220534

DEDICATION

This dissertation is dedicated to my beloved father, the Late Pastor David Olugbenga Adebayo, and my Mother-in-law, the Late Mrs Mary Modupeola Faronbi. From their personal experience, I understood what it was to care for older adults with CVD, hence the pursuit to create awareness on this topic among older adults.

PUBLICATIONS AND PRESENTATIONS

1. Faronbi G.O, Schmollgruber S. & Tshabalala A.M (2024) Nurse-led interventions to reduce cardiovascular risk among older adults in Africa: A systematic review and narrative synthesis (*Under review*).

2. Faronbi G.O, Tshabalala A.M & Schmollgruber S. (2024) Facilitators and Barriers to the uptake of educational intervention programmes among retired older adults in Osun state, Nigeria. (*Under review*).

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ABSTRACT

Purpose: This study aimed to develop, refine, and test an educational intervention programme to improve cardiovascular disease risk reduction among retired older adults in Osun state, Nigeria.

Method: The study utilised an exploratory sequential multimethod approach through convergent triangulation of quantitative and qualitative research methods to develop the intervention program. The research setting included three local governments in Osun State, Nigeria. The study was conducted in three phases: In phase one, systematic review was conducted on existing educational interventions for preventing CVD among older adults in Africa. Followed by a qualitative study to explore the barriers and facilitators of educational intervention programmes.

Findings from phase one were triangulated in phase two to develop the intervention programme and verified by a Delphi survey. Finally, the developed programme was pilot-tested among 40 participants as a one-group quasi-experimental study. A baseline biophysical profile and questionnaire were obtained at the programme's inception, and the same was repeated six weeks after the programme.

Results: The outcome of the systematic review revealed the need for more comprehensive intervention programmes to reduce CVD risk for older adults. Multi-factorial themes identified from the qualitative study further reinforced this need. Results of the Delphi study yielded a content validation index of 0.99, which suggests that the developed programme's content was relevant, comprehensive, and of good quality.

The results of the intervention programme were analysed using descriptive and inferential statistics utilising the STATA version 15 statistical package. The primary outcome measured was the level of knowledge of participants on the risk factors of CVD and the assessment of their pre- and post-intervention biophysical profiles. The secondary outcome was the participants' attitude to changes needed to reduce CVD risk. The participants' mean scores improved in their knowledge base of CVD risk from 5.5±1.8 to 6.6±2.0 with a P-value of P=< 0.014. Perception and intention to change also increased from 20.9±4.9 to 21.3±7.4 with a mean difference of 0.3±8.0.

Conclusion: The developed intervention programme was assessed as effective in creating the needed awareness and behavioural changes to reduce CVD risk among older adults.

Keywords: Cardiovascular Disease Risk, Educational Intervention Programme, Older adults, Reduction, Retirement

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LIST OF ABBREVIATIONS

ABCD risk	Attitudes and Beliefs towards Cardiovascular Disease
ADL	Activities of Daily Living
BMI	Body Mass Index
BP	Blood Pressure
CVD	Cardiovascular Disease
FGD	Focus Group Discussion
HBM	Health Belief Model
HDL	High-Density Lipoprotein
HIC	High-income Countries
JBI	Joanna Briggs Institute
LDL	Low-Density Lipoprotein
LMIC	Low-medium-income countries
SDG	Sustainable Development Goals
SSA	Sub-Saharan Africa
UN	United Nations
WHF	World Heart Federation
WHO	World Health Organization

CHAPTER ONE

OVERVIEW OF THE STUDY

1.0 INTRODUCTION

Globally, older adults have a heightened probability of developing non-communicable diseases, with cardiovascular disease (CVD) being one of the suggested prevalent (Rodgers et al., 2019). In this thesis, the term 'CVD' will refer to cardiovascular disease. While various definitions of CVD exist, this study adopts the World Health Organization (WHO) definition. The WHO defined CVD as a collection of conditions affecting the heart and blood vessels (World Health Organization, 2021). These conditions include disorders of blood vessels supplying the heart, brain, arms and legs and damage to the heart muscles and valves or blood clots in leg veins that may dislodge and travel to the heart and lungs (World Health Organization, 2021). The researcher's personal experience caring for two family members – my father and mother-in-law, both of blessed memories – inspired this research. This study addresses the health needs of retired older adults, who have devoted much of their lives to supporting the economy and communities. Like everyone, they deserve a healthy ageing experience. Raising awareness on CVD risk is a critical step to achieving this goal. This chapter provides an overview of the study, encompassing the background, problem statement, objectives, significance, theoretical framework and research methodology, and an outline.

1.1 BACKGROUND

Worldwide, the proportion of deaths from cardiovascular diseases outweighs that of any other non-communicable disease (Roth et al., 2020). CVD has become a significant concern for global health, with a projection of more than 23 million deaths from cardiovascular disease alone by 2030 (Amini, Zayeri & Salehi, 2021). The burden is significant in low-income and middle-income countries, with an exponential increase in Africa (Okube, Kimani & Mirie, 2023). The statistics are alarming and need attention from all angles. Analysis of about 195 countries over the last two to three decades showed a rising global trend in the prevalence of cardiovascular diseases; the same goes for the mortality and disability ratio (Mensah, Roth & Fuster, 2019). The impact

is enormous and a significant economic burden, contributing to the massive cost of medical and healthcare systems worldwide (Amini et al., 2021).

From the human development index unit of the United Nations Development Program, the database revealed that the global burden of disease has varying statistical tools and health markers used by scholars across regions of the world with submission that posits that some significant health indexes are markedly affected by CVD. Examples of such health markers are Years of life lost, Years lived in disability, Disability-adjusted life, Quality of life, and Activity of daily living (Amini et al., 2021, Mensah et al., 2019).

The record has it that there was a fair decline at some point in the incidence of CVD in the developed regions of the world, with a matching statistic of about 14.4% over two decades compared with a meagre decrease of 2.7% in developing nations (Amini et al., 2021). Another study conducted by Kollia et al. (2018) recorded a higher figure of a 43% decrease in the incidence of CVD witnessed between 1990 and 2013 in developed nations. In contrast, developing nations recorded only about 13% decline. The report shows that global efforts to control CVD yield successful outcomes; however, there is still a growing epidemic in developing nations (Owolabi et al., 2016).

However, the incidence and mortality rates vary from one region to another. In the past, CVD had more incidence in developed countries (Kganakga et al., 2022). While developed countries are working relentlessly to curb this menace through advanced technology, improved medical and clinical facilities, enhanced level of awareness on the risk factors of CVD, and adopting a healthy lifestyle (Schorr et al., 2021), It is still of great concern in most Low- and Medium-Income countries (LMIC) in which Nigeria is listed with higher incidence and mortality rate (Owolabi et al., 2016). Many factors are related to this, including poor awareness of the disease conditions, unhealthy choices and lifestyle, and limited preventive healthcare services (Amini et al., 2021).

Previous systematic reviews revealed many studies conducted in developed and high-income countries compared to Africa (Ndejjo et al., 2021, Okube et al., 2023). However, the risk of exponential increase appears indisputably progressive in Low- and Medium-Income countries

(Nyirenda, 2021). The spotlight has been on black African countries in the last decade, especially for many reasons. In their study, Chillo et al. (2022) argued that CVD occurs more among people of African origin, as compared with Caucasians and with fast progression to end-stage organ damage. The reason for this increase is believed to be due to poor awareness on basic preventive strategies. CVD, therefore, accounts for about 80% of the global mortality in low-income and middle-income countries and could further create heavy social and economic burdens (Hamid, Groot & Pavlova, 2019).

In Sub-Saharan African countries, records have shown a rapid epidemiological transition -with a noteworthy shift from managing infectious to chronic diseases (Musinguzi et al., 2019). CVD has been on the frontline (Hamid et al., 2019). Most of these changes are associated with lifestyle changes from the traditional African way of life (Kganakga et al., 2022). Older persons are usually more at risk of developing CVD due to some physiological dysfunctionality common to this age group and at varying degrees (Rodgers et al., 2019). The submission does not inevitably translate that all older persons must be stricken with CVD as the risk of developing cardiovascular diseases is multi-factorial (Alikor & Emem-Chioma, 2018). Scholars have identified various risk factors for cardiovascular diseases. However, this information is limited among older adults in Nigeria (Owolabi et al., 2016, Ozoemena et al., 2019).

In Nigeria, retirees are at higher risk of cardiovascular diseases due to a combination of socioeconomic, physiological, and psychological challenges they experience (Ojo & Mohammed, 2013, Ozoemena et al., 2019). Mbam, Halvorsen and Okoye (2022) affirmed records of high level of negligence and non-existence of welfare policy that caters for older adults in Nigeria. The experience and challenges faced by older adults in turn influence their health and quality of life(Mbam et al., 2022). Likewise, this susceptible group needs access to essential Information, knowledge, and technology (Yakubu, 2019), especially on health matters (Mares et al., 2022). Some others are challenged with the double burden of “old” and “new” lifestyle and the psychosocial risk associated to CVD (Chillo et al., 2022). Ozoemena et al. (2019) submission on Nigerian retired older persons revealed that the transition to retirement significantly impacts their well-being. If well managed, this phase of life also allows the older adult to pay more attention to their welfare and optimally enjoy healthy ageing.

Many studies have been conducted around cardiovascular disease risk concerning prevalence, knowledge, perception, and measurement of cardiovascular disease risk levels among various age groups using different research designs and tools in developed and developing nations (Adzandeh, Awope & Oviasu, 2016, Alikor & Emem-Chioma, 2018, Gaziano et al., 2015). Regardless of the recorded increase in morbidity and mortality, most studies conducted on cardiovascular disease risk in Nigeria were cross-sectional, with few educational intervention programmes on cardiovascular disease risk (Adedoyin et al., 2018, Oluyombo et al., 2015, Ozoemena et al., 2019).

Some of these studies were hospital-based and a form of follow-up management of already diagnosed individuals (Alikor & Emem-Chioma, 2018, Wahab, Kayode & Musa, 2015). Lately, the global health system has been focusing on health promotion, with the view of equipping people with adequate information and empowering them to improve their health (Aerts et al., 2022). In the same vein, nursing activities are critical and pivotal to providing health-promoting information to individuals and groups, thus helping them make informed choices that could help them prevent illness and diseases. Therefore, nurses are suitable to actively lead and coordinate CVD prevention initiatives (Aerts et al., 2022). Consequently, there is a need for the implementation of cost-effective interventions and public health programmes (Mensah, 2020).

Intensified effort is needed to meet sustainable development goal 3 by promoting healthy ageing, reducing disabilities, and preventing deaths from cardiovascular diseases (Mensah, 2020). Primary and secondary preventive measures are of great importance in reducing CVD (Rodgers et al., 2019), and the role of nursing in health promotion and disease prevention must be balanced. Nurses, as the primary care providers in the health sector, shoulder the responsibility of leading, coordinating, managing, delivering, and facilitating health care services and people-centred care (Aerts et al., 2022).

Recent evidence suggests that the knowledge and awareness targets in preventive or health promotion guidelines might only be effective or executed adequately if the context or conceptual framework is correct (Aerts et al., 2022, Okop et al., 2023). Therefore, the need to analyse factors that enhance or prevent programme implementation as well as the existing

gaps before designing an intervention programme to reduce CVD risk among older adults in Nigeria is evident.

1.2 PROBLEM STATEMENT

Older adults in Nigeria are often neglected when it comes to social services and lack sufficient access to essential health information and preventative care services. Experts recommend that interventional and preventative programmes provide relevant information to help reduce chronic illnesses and improve quality of life for older adults. Encouraging older adults to adopt and sustain health behaviours is crucial, as such behaviours can significantly reduce the long-term risk of cardiovascular disease (CVD). Despite a documented rise in CVD related morbidity and mortality, most studies on cardiovascular disease risk in Nigeria have been cross-sectional, with only a few focusing on educational intervention. Nurse-led programmes addressing CVD risk reduction among older adults, remain particularly scarce. To address this gap, the purpose of this study was to develop and validate a nurse-led, comprehensive educational intervention programme targeting one of the most vulnerable groups, retired older adults. The programme's goal is to promote preventive measures essential for reducing (CVD) risk in this population.

1.3 RESEARCH QUESTIONS

The study attempted to address the following research questions.

- What intervention programmes have been previously implemented to reduce cardiovascular disease risk in Africa?
- What are the barriers to and facilitators of educational intervention programmes on cardiovascular disease risk prevention among retired older adults?
- What are experts' opinions on the developed cardiovascular disease risk prevention intervention programme?

1.4 AIM AND OBJECTIVES

The objective of this thesis was based on the overarching problem identified from the background information and literature search, statement of problem and significance of the study.
This study therefore aimed to develop and test an educational intervention to improve cardiovascular disease risk prevention among retired older adults in Osun state, Nigeria.

This study addressed the following objectives:

- To explore documented literature on previous interventions engaged in reducing cardiovascular disease risk in Africa.
- To identify the barriers and facilitators of educational intervention programmes on cardiovascular disease risk reduction among retired older adults.
- To develop a new educational intervention programme and conduct an expert review of the developed programme.
- To test the developed educational intervention on reducing cardiovascular disease risks among retired older adults in the Osun state.

1.5 SIGNIFICANCE OF THE STUDY

Currently, there is no documented evidence of structured educational programmes for older adults in Osun state on the prevention of CVD risk. It is hoped that the findings of this study empower older adults to manage their health needs better. This study is further anticipated to add to public health importance, by creating a more viable responses to CVD risk reduction among older adults. The intervention programme has also shown that the burden on Nigeria's already strained health system can be reduced when older adults are well-empowered through health awareness.

1.6 OPERATIONAL DEFINITIONS

The explanations below indicate the way in which terms are applied in this study.

- **Retired Person**

Retirement refers to someone who has stopped working at their main job or career. Although people can retire at any age, retirement is often associated with older adults. Globally, the decision to stop working varies from nation to nation, as well as between organizations and individuals. The phase significantly impacts such an individual's life, self-image, use of time, and other life activities in general (Kim & Beehr, 2018).

In Nigeria, the duration of public service – spanning the Federal, State and Local Governments is set at 35 years of active service or 60 years of age whichever comes first (Akpan, 2017). Consequently, individuals formally engaged and discharged from their duties upon reaching the statutory service age are referred to as retirees.

- **Older adults**

The United Nations defined an older adult as someone who is 60 or 65 years of age or older (United Nations, 2020). Some ageist attitudes consider older people to be frail or dependent and a burden to society. In contrast, in public health response, older adults are increasingly recognized as valuable contributors to society, bringing experience, knowledge, and volunteerism (World Health Organization, 2024).
In the Nigerian context, these are men and women aged sixty years and above (Faronbi, Faronbi & Adegbenro, 2021). Attaining age sixty distinguishes ageing and is set as an acceptable benchmark for the older population in Nigeria.

- **Cardiovascular Diseases** (CVD)

Refer to group of disorders of the heart and blood vessels that include coronary heart disease, cerebrovascular disease, rheumatic heart disease and other conditions (World Health Organization, 2021).

- **Cardiovascular Disease Risk**

Refer to predisposing clinical features that serve as cardinal warning signs for the chances of developing cardiovascular diseases (World Heart Federation, 2023). These include non-modifiable factors (age, gender, family history of CVD) and modifiable risk factors, such as hypertension, high cholesterol levels, smoking, diabetes, obesity, physical inactivity, unhealthy diet, excessive alcohol consumption and chronic stress.

- **Expert**

This describes an individual with extensive knowledge, skill or application in a particular field or domain gained through study, training, and practical application over time. According to Bruce, Langley and Tjale (2008) experts are often recognized for their ability to analyse complex issues, provide informed insights, and make accurate judgements within their area of expertise.

- **Nurse-led intervention**

Refer to a healthcare initiative or programme designed, implemented, and managed primarily by nurses to address specific patient needs, promote health, prevent illness, or manage chronic conditions (Cheng et al., 2018). These interventions leverage the nursing profession's expertise in patient-centred care, clinical assessment and education.

- **Educational Intervention Programme:**

This is an umbrella term for anything that can potentially change a health outcome, such as medical treatments, food and drinks, beauty products, exercise or therapy, and behaviour changes (Cusack et al., 2018). According to Cusack et al. (2018), such programmes help participants make informed choices about lifestyle modifications and clarify preconceived incorrect perceptions or assumptions.

1.7 THEORETICAL FRAMEWORK

The theoretical assumptions for the study are selected from the Health Belief Model (HBM) (Tarkang & Zotor, 2015). This model emphasises that individuals are likely to act if they perceive a health threat and believe the benefits outweigh the barriers. Key aspects of this model, as summarised by Tarkang and Zotor (2015), are presented below:

- **Perceived susceptibility** – refers to an individual's belief about the likelihood of contracting a health condition. It encompasses a range from complete denial of risk to acknowledgement and recognition of actual danger (McClendon, 2011). Understanding the potential harm of a condition and its complications can motivate individuals to adopt preventive behaviours. Behavioural change occurs when people perceive themselves to be at genuine risk.
- **Perceived severity** – relates to an individual's perceptions of the seriousness of a condition and its potential consequences. Awareness of the severity of adverse outcomes encourages individuals to take proactive measures to avoid those outcomes.
- **Perceived benefits** – describes the belief in the effectiveness of actions or advice in reducing health risks. Confidence in the benefits of change motivates individuals to act as they anticipate positive outcomes. People are more likely to alter their behaviour if they perceive tangible rewards.
- **Perceived barriers** – such as cost, effort, time, accessibility, and inconvenience, can hinder health behaviour changes (Boskey, 2024). These obstacles are critical determinants of whether individuals engage in healthy behaviours. (Boskey, 2024) highlighted: "Perceived barriers are the single most powerful predictor of whether people are willing to engage in healthy behaviours."
- **Cues to action** – triggers such as personal experiences (e.g. symptoms), interpersonal influences, or environmental factors (e.g. health education or media campaigns) – prompt individuals to take health-related action. Effective cues inspire motivation and compliance with health-promoting behaviours.
- **Self-efficacy** – refers to an individual's confidence and belief in their ability to take effective health action. Empowerment arises when individuals are equipped with

knowledge, skills, and a supportive environment, enabling them to adopt and sustain desired behaviours.

The application of HBM in this study underscores the role of structured interventions to address perceptions, reduce barriers, and enhance self-efficacy, thereby fostering sustained health-promoting behaviours**.** The three major components of this model are the individual's perceptions about health. The modifying factors include demographic, socio-psychological and structural variables. **Figure 1.1** displays the HBM key concepts.

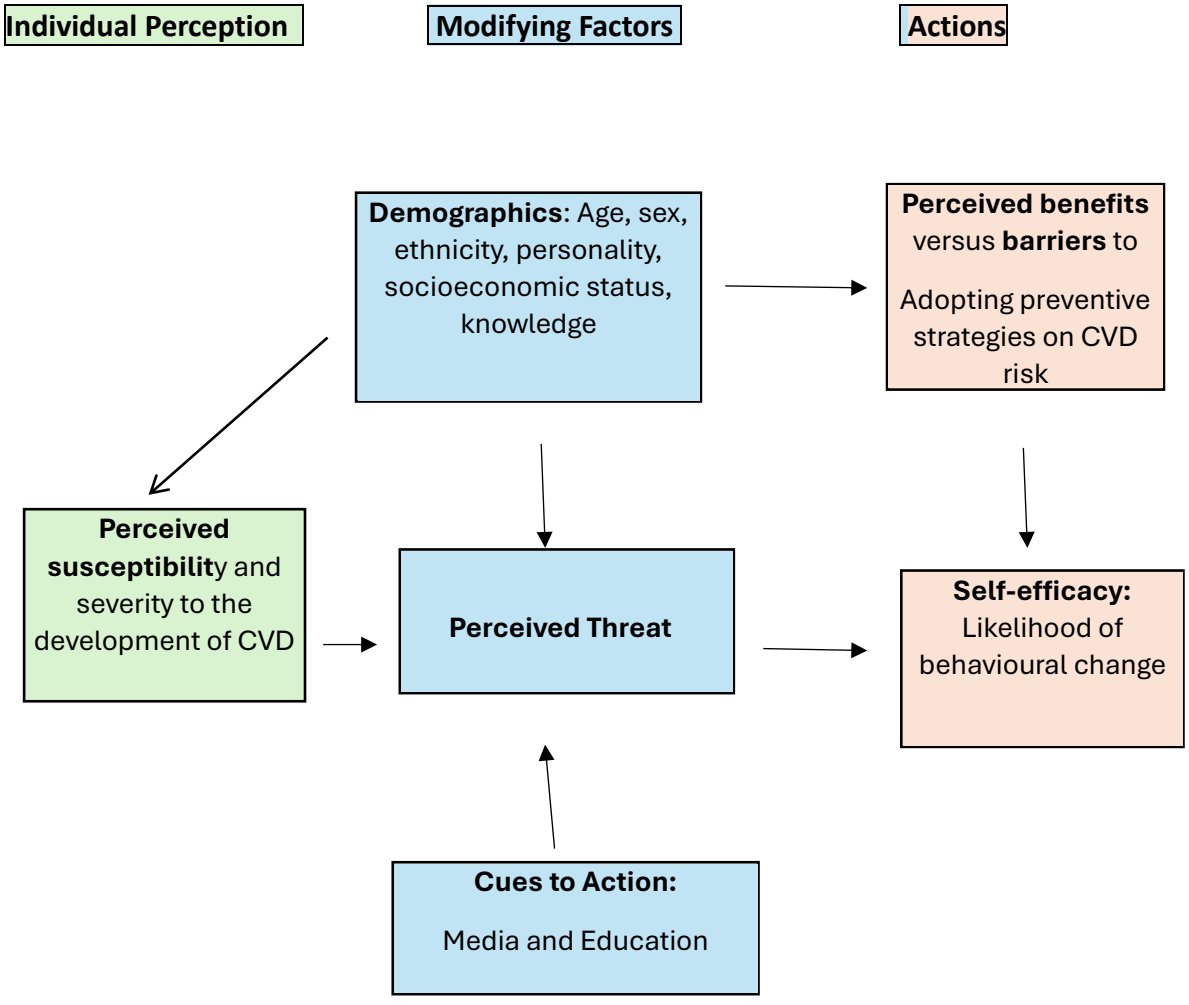


Figure 1.1 The HBM key concepts Tarkang and Zotor (2015)

1.8 RESEARCH METHODOLOGY

This study utilised a multimethod approach and was conducted in three phases to meet the set objectives of the study. The following phases were operated.

Phase 1 = Exploratory phase

Phase 2 = Development and verification phase

Phase 3 = Pilot testing phase

1.8.1 Phase 1: Part 1 – Systematic review

A systematic review was conducted and guided by The Joanna Briggs Institute systematic review model. The search used five data bases to identify, critically appraise, and synthesise all relevant intervention studies that met the inclusion criteria for educational interventions on CVD risk prevention in Africa. The keywords searched were educational, interventions, prevention, cardiovascular diseases, older adults. The inclusion criteria were studies within the period of 2011 to 2023. While protocols and abstracts of studies similar studies were excluded.

1.8.2 Phase 1: Part 2 – Qualitative study

The study used focus group discussions (FGD) and was conducted in three senatorial districts in Osun state amongst retired older adults. The focus was to explore barriers and facilitators of educational intervention programmes on CVD risk reduction among retired older persons. Content and thematic analysis provided answers to the set objective.

1.8.3 Phase 2 – Triangulation - Developmental and validation phase

Findings from the study's first phase were triangulated and formed the framework for the development of the educational intervention programme. An intervention programme was developed and subjected to two rounds of Delphi review for content and face validity as well as reliability. The developed programme was reviewed and refined based on suggestions gathered from experts in the Delphi study.

1.8.4 Phase 3 – Pilot testing of the intervention

The developed educational intervention was pilot-tested using **a** one-group quasi-experimental study over six weeks for successful empowerment and reinforcement strategies

(Aerts et al., 2022). Six weeks after the programme's implementation, a post-test was administered to measure older adults' knowledge of CVD risks and their disposition to desired changes.

Table 1.1 provides an overview of the design and methods used in the study.

Table 1.1 Overview of the research design and method

Phase	Objective	Method	Sample and Sampling	Data collection	Data analysis
Phase 1	1. To explore documented literature on previous interventions engaged in reducing CVD risk in Africa.	Systematic Literature review (The JBI systematic review model)	Related articles within Africa for 10 years (from January 2011 to December 2023	Desktop search with search engines such as CINAHL, Web of Science, PubMed, Cochrane and SCOPUS.	Content analysis of key characteristics of study design, participants, interventions and outcomes. JBI-SUMMARI
	2. To identify the barriers and facilitators of educational intervention programmes on CVD risk reduction among retired older persons.	Qualitative/exploratory	Purposive sampling Focus Group Discussions 8 – 10 participants at three selected study sites	Structured open-ended questions, Interviews will be conducted to explore views on CVD risk, barriers, and facilitators to group learning.	Thematic analysis (Braun & Clark, 2017)
Phase 2	3. To develop a new educational intervention programme and conduct an expert review of the developed programme	Convergent triangulation of results Delphi study	 Review by a panel of experts (Public Health Nurse specialising in CVD care, Cardiologist, Dietician, and Educator).	Instrument validation Two round Delphi review	Validity and Reliability Content and construct validity (Lynn's Model, 1986).
Phase 3	4. To pilot test the newly developed educational intervention programme on the reduction of CVD risks among retired older persons in Osun state	Quasi-experimental One-group, pre-test, post-test **Stage 1:** Pre-test (T1) Cross-sectional survey **Stage 2**: Intervention **Stage 3**: Post-test (T2)	Simple random sampling Sample = 40 (n=40) Purposive sampling Sample = 40 (n=40) Purposive sampling Sample: 40 (n=40)	ABCD Risk Questionnaire Six sessions of the intervention programme ABCD Risk Questionnaire	Descriptive and Inferential Descriptive analysis Primary and secondary outcomes measurements

1.9 STUDY SETTING

The research was carried out in a selected state of Nigeria (Osun). Nigeria has the most significant number of older adults in Africa (Mbam et al., 2022), with about ten million as per the national population records in 2020. Further, 29.38% of these populations are identified as poor and vulnerable (Ugbe, 2021).

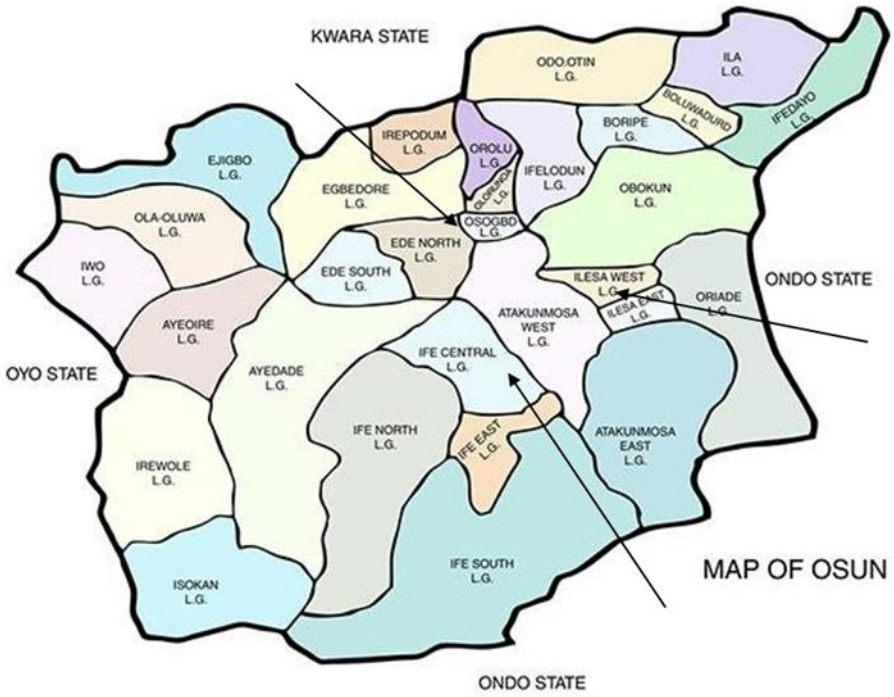


Figure 1.2 A map of showing the selected regions of the study [source (Akinluyi, 2015)]

There are six geo-political zones within the country, with 36 States aside from Abuja's Federal Capital Territory. The southwest zone comprises 6 States (Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti) (Oluyombo et al., 2015). At the same time, the estimated population of older adults 60 years and above was close to ten million as of 2019 (Ugbe, 2021). Osun-state is an inland state in the southwestern part of Nigeria; its capital is Osogbo with three senatorial districts, namely: Osun West, Osun Central, and Osun East. There are thirty local government areas within the three senatorial districts, while each Senatorial district has about ten local government areas (Adzandeh et al., 2016). The state has various Federal and State tertiary institutions, with some parastatals strategically located within it. Many older adult persons had

worked until retirement and are residents in the state; they also belong to registered bodies of retirees. This study was carried out amongst retired individuals 60 years and above as the target population at their respective homogeneous association levels or unit.

A report from the Federal Ministry of Health (2018), as gathered by Mbam et al. (2022), shows that most Nigerians source their health service through out-of-pocket and private healthcare services, while only about 5% of Nigerians have access to comprehensive medical insurance. The physiological ageing process alone makes older adults more vulnerable to health expenditures. Therefore, these older adults find comfort in forming local associations and unions to enable them to socialise and support one another through their challenges. The meeting points are the most accessible means of gathering information for them and the avenue to reach out to them on health matters and awareness creation. Therefore, this study used those meeting locations and was conducted amongst retired individuals sixty years and above as the target population at their respective homogeneous association levels or units.

1.10 OUTLINE OF THE THESIS

The research was conducted in phases (refer to Table 1.1). The execution of the plan resulted in the following chapter layout:

Chapter One:	Overview of the study
Chapter Two:	Literature review
Chapter Three:	Research Methodology
Chapter Four:	Phase One: Part 1 – Results and discussion of the systematic review
Chapter Five:	Phase One: Part 2 – Findings and discussion of the qualitative study
Chapter Six:	Phase Two: Development, validation and pilot testing of the educational intervention programme
Chapter Seven:	Phase Three: Results of the pilot test and outcome measurement
Chapter Eight:	Conclusions, strength, limitations and recommendations of the study

1.11 SUMMARY

In this chapter an overview of the study was given, the background of the study, research rationale and questions were detailed. The study's theoretical framework was discussed and the research methodology described. An outline pertaining to the thesis was given.
In the next chapter, the literature review will be discussed in greater detail.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

The literature review aims to present established, up-to-date scholarly sources on an issue of interest. It is pertinent to all research undertakings and helps to assess evidence collection in a specified area of interest from many verifiable findings. It also often identifies the gaps in existing studies (Snyder, 2019).

This chapter consequently elaborates on established submissions made by scholars on reducing CVD. The topics of interest were CVD (its pathophysiology, signs and symptoms, and the associated risk factors), the susceptibility of older adults to developing CVD, and preventive strategies. Other points explored are the role of nursing in creating awareness of CVD and the need for an educational intervention programme in Nigeria. The researcher performed a comprehensive literature review using some search engines such as CINAHL, PubMed, Google Scholar, and grey literatures. Key variables and concepts searched include CVD risk, older adults, educational interventions and programmes.

2.2 OVERVIEW OF CVD

There are numerous and varied disorders affecting the heart and the blood vessels. Some might develop simultaneously or lead to other conditions or diseases within the group (World Health Organization, 2021). One such is CVD, a major global severe issue (Amini et al., 2021). CVD is described as a disease that affects the heart or blood vessels, thereby disrupting its structure and function (Mares et al., 2022, Mensah et al., 2019). According to the World Health Organization (2021), CVD is the leading cause of death worldwide. About 23.6 million people are estimated to die from CVD conditions, mostly from stroke and heart disease, by 2023 (Amini et al., 2021, Mensah et al., 2019).

CVD is highly ranked in mortality and disability impact among other diseases in the global health system, and this is a substantial universal economic burden (Roth et al., 2020). There is an alarming global projection of more than 23 million deaths by 2030 due to CVD (Amini et al., 2021, Hassen et al., 2022). Records have shown that four out of the five deaths from CVD were caused by heart attack or stroke, with one-third of such deaths occurring among individuals who are less than 70 years of age (World Health Organization, 2021) and submitted that low- and middle-income countries (LMIC) have a high record of global burden and deaths (75%) related to CVD. It was similarly reported that CVD accounts for 1 in 3 early deaths in men, while in women, it is as high as 1 in 5 premature deaths (Hassen et al., 2022). This report differs in some climes, mainly in high-income countries. For instance, findings from the NIH National Institute on Aging (NIA) in European countries revealed that these conditions affect equal numbers of men and women. However, in Nigeria, a study conducted (Alikor & Emem-Chioma, 2018) recorded a higher probability of CVD in males over sixty years compared to females paired in the same age range.

Generally, a broader perspective identifies interconnectedness between the ageing of other body organ systems and CVD (Díez Villanueva et al., 2022, Rodgers et al., 2019). Thus, this connection tends to increase the high prevalence of CVD among older persons who have been identified as more at risk (Roth et al., 2020, World Heart Federation, 2023). Africa bears its disproportionate burden (Amini et al., 2021), which reviewed the global patterns of CVD incidence, mortality, and other health index markers for nearly three decades. They reported a constant rise in the incidence and mortality of CVD. Although some regions of the world experienced a decline at some point during the review, there were established statistics of a constant rise in the mortality-to-incidence ratio globally.

Another leading study on the burden of CVD cutting across global regions between 1990- 2019 attested to these findings with a growing epidemic in the LMIC (Minja et al., 2022). Notwithstanding, the incidence and mortality rate of CVD varied from one region of the world to another. In the past, CVD had more incidence in developed countries (Amini et al., 2021). However, most advanced countries actively and steadily tackle this health challenge (Minja et al., 2022, World Heart Federation, 2023). Significant investment in health systems through advanced technology, improved medical and clinical facilities, and active reorientation has

yielded positive results in effective management and control of CVDs in high-income countries (Hassen et al., 2022, Okube et al., 2023). There is also an improved level of awareness of the risk factors of CVD and the adoption of a healthy lifestyle in developed nations (Hassen et al., 2022, Mares et al., 2022, World Health Organization, 2021). However, CVD is still of great concern in most Low-medium-income countries (LMIC), especially among poor or socioeconomically disadvantaged individuals or communities, with an increase in incidence and mortality rate (Owolabi et al., 2016, World Health Organization, 2021, World Heart Federation, 2023). The primary causes of death in Africa about three decades ago were communicable diseases like HIV and tuberculosis and other health issues of maternal and child mortality, malnutrition, and the like (Minja et al., 2022). However, studies have shown an epidemiological transition to non-communicable diseases, with CVD taking the lead from the sixth to the second cause of death between 1990 and 2019 (Kganakga et al., 2022, Minja et al., 2022, Musinguzi et al., 2019). More recently, the World Heart Federation (2023) now has reported that around 4 in every 5 CVD deaths occur in low- and middle-income countries, with more significant numbers due to an ageing and growing population. Africa has registered close to a 50% increase in the burden of CVDs within the last three decades (Minja et al., 2022). The demography presents as a "double burden" for retired older African adults typically disadvantaged in most African countries (Chillo et al., 2022, Faronbi et al., 2021). Many underlying factors are linked to this challenge, ranging from social, economic, and cultural changes of globalisation, urbanisation and population ageing with sequelae of poverty, stress, and hereditary factors (World Health Organization, 2021).

Some other contributory factors are lack of access to and non-affordability of a functional healthcare system, poor awareness of the disease conditions, unhealthy lifestyle and choices, and limited preventive healthcare services, amongst others (Alikor & Emem-Chioma, 2018, Amini et al., 2021, Haykin et al., 2020, World Heart Federation, 2023).

2.2.1 Pathophysiology of CVD in Older Adults

Studies have shown that ageing can cause changes in the heart and blood vessels, which might increase an individual's risk of developing CVD (Roth et al., 2020, World Health Organization, 2021). Primarily, any interference with the blood supply to the heart or brain could be caused

by the accumulation of fatty deposits on the inner walls of the blood vessels and narrowing (atherosclerosis), resulting in a heart attack. It could also result from the formation of clots along the vessels or bleeding from a blood vessel in the brain. The outcome of such pathology presents with clinical symptoms of coronary heart disease, peripheral heart disease, aortic disease, stroke, and lots. These clinical outcomes are more plausible as ageing sets in. Older adults have, therefore, been identified to be more at risk of developing CVD (Díez Villanueva et al., 2022, Rodgers et al., 2019). Díez Villanueva et al. (2022) again affirmed that arterial injury is more familiar with advancement and age progression, which significantly begins from fifty to sixty years.

2.2.2 Risk Factors of CVD

Most CVD risk factors are interlinked; one risk factor could lead to another if unchecked (Bays, 2020). Scholars have identified some threats, primarily behavioural risk factors of CVD (Hamid et al., 2019, Kganakga et al., 2022, Musinguzi et al., 2019). The World Heart Federation (2023) also comprehensively categorised these risk factors as a combination of socio-economic, metabolic, behavioural, and environmental components. Some of these factors include high blood pressure, unhealthy diet, high cholesterol, diabetes, air pollution, obesity, tobacco use, kidney disease, physical inactivity, harmful use of alcohol and stress. About 60% of these risk factors account for 60% of mortality globally (Hamid et al., 2019).

As further extensively discussed by Rodgers et al. (2019), several factors contribute to the susceptibility of older adults, such as increased oxidative stress, inflammation, the normal cycle of body cell death (apoptosis), overall myocardial deterioration, and degeneration. The afore-mentioned factors depicts the physiological changes that takes place at the body ages. Rodgers et al. (2019) further identified that oxidative stress and inflammation alone could weaken the heart muscles in old age. All these occur in varying degrees, but the female gender is more at risk because of the decline in the production of sex hormones associated with ageing. However, as both groups advance in age, they become more susceptible to CVD-associated risks. Although age is a significant independent risk factor for CVD, it is worth noting that CVD is not a consequence of ageing (Díez Villanueva et al., 2022).

Besides the physiological ageing process, health behaviours are essential in developing or being susceptible to CVD (Hassen et al., 2022). From the general overview, Díez Villanueva et al. (2022) identified some non-communicable diseases as classical CVD risk factors, specifically for older persons. These include hypertension, type 2 diabetes, dyslipidaemia, and obesity. Other risk factors are essentially linked to habits and lifestyle, such as tobacco abuse, alcohol abuse, air pollution, co-morbidity, chronic kidney disease, hyperuricemia, and cognitive impairment.

2.2.3 Signs and Symptoms of CVD

Primitively, CVD may not present with symptoms, or the symptoms may be hardly recognised and may present its first sign as a heart attack or stroke (World Health Organization, 2021). The common signs of heart attack are

- pain or discomfort in the centre of the chest and
- pain or discomfort in the arms, the left shoulder, elbows, jaw, or back.
- shortness of breath, nausea or vomiting, light-headedness or faintness, a cold sweat, or paleness.

Hupp (2015) reviewed the clinical symptoms of CVD and other comprehensive characterising features of CVD to watch out for, as outlined by the (World Health Organization, 2021).

- Pain, numbness, and tingling in the shoulders, arms, neck, jaw, or back, especially on one side of the body.
- Shortness of breath when active, at rest, or while lying flat
- Chest pain during physical activity that gets better with rest.
- Light-headedness, Dizziness, Confusion, Headaches, Cold sweats, Nausea/vomiting, Tiredness, or fatigue with no known cause; and
- Fainting or unconsciousness
- Swelling in the ankles, feet, legs, stomach, and neck
- Reduced ability to exercise or be physically active.
- Difficulty seeing with one or both eyes
- Problems doing everyday activities.
- Difficulty walking, dizziness and loss of balance or coordination

- Another critical sign to check with adults is arrhythmia skips or complex heartbeats or sounds.

2.3 GENERAL OVERVIEW ON THE PREVENTION CVD

Although CVD remains prevalent with high global mortality rates, it is primarily preventable (Freeley et al., 2022, Stewart, Manmathan & Wilkinson, 2017), and the WHO also affirmed that about 70% of premature CVD are preventable (Stewart et al., 2017). However, reports have established that knowledge of CVD and the risk factors is still low globally (Mares et al., 2022), most especially in Africa, where awareness and understanding of CVD among the general population are deficient, with a dearth of records on preventive strategies (Hamid et al., 2019, Ndejjo et al., 2021, Okube et al., 2023). However, the benchmark for reducing CVD is getting acquainted with CVD's behavioural and metabolic risks (World Heart Federation, 2023). Several studies have established that prevention and control programmes could be effective in both lower, middle-income countries (LMICs) and High-income countries (HICs) (Hassen et al., 2022, Musinguzi et al., 2019). However, studies on CVD are more prominent in the (HICs) whereas the burden and effect are high in the LMICs. Therefore, effective community-based intervention for CVD prevention remains essential in LMICs. Ferraro, Pallazola and Michos (2019) also identified CVD as the "number one cause of mortality among older adults and a significant source of healthcare spending". Lifestyle modification is the most appropriate way of preventing or reducing the risk of developing CVD (Hassen et al., 2022, World Heart Federation, 2023). This modification helps in no little way to improve healthy ageing (Díez Villanueva et al., 2022). Thus, recommendations from an extensive range of previous evidence-based studies in developed countries are outlined as primary prevention guidelines.

2.3.1 Body Weight Management

The body mass index is reliable for determining a person's body fat range. Overweight and obesity often classify such individuals' health risk levels (Rippe, 2019). Rippe (2019) suggested that a 5-10% reduction in body weight of adults whose BMI is greater than 25 (>25) could

significantly reduce the risk of developing CVD. The universal categorisation of BMI can be seen below (Harvard T H Chan School of Public Health, 2024).

- Under 18.5 – This is described as underweight.
- Between 18.5 and 24.9 – This is described as the 'healthy range'.
- Between 25 and 29.9 – This is described as overweight.
- Between 30 and 39.9 – This is described as obesity.
- 40 or over – This range is described as severe obesity.

2.3.2 Exercise

Some scholars recommend 2.5 hours of moderate to vigorous weekly activities (Díez Villanueva et al., 2022). Another set believes that 150 minutes per week of moderate to vigorous exercise is good enough for older adults' cardiac health (Ferraro et al., 2019). Physical exercise is often downplayed in the preventive strategy for CVD. It is essential to identify activities that are accessible and enjoyable but with significant consideration for the safety of older adults (Orkaby & Forman, 2018). The American Heart Association (AHA) recommends that about 150-300 minutes per week of moderate-intensity aerobic exercise, or 75 to 150 minutes of vigorous exercise for older adults, is good enough to maintain good cardiac health (Ferraro et al., 2019). These activities are, however, relative and unique to everyone, depending on their well-being (Rich, 2014). Therefore, physical activities can be classified as either low, moderate, or high-intensity activities in older populations. These activities could include walking or biking within a short distance, gardening, volunteering, and participating in community projects. These activities could also involve active engagement in activities of daily living (ADL), such as cooking, housekeeping, and shopping (Rich, 2014). This submission also aligns with the WHO global action plan on physical activity designed for international use (World Heart Federation, 2023) in the review of one study which focused on community-dwelling older adults (Rich, 2014) discovered from the report that those who reported sitting more than 6 hours per day had increased all-cause and CVD mortality relative to those who spent an average of less than 3 hours sitting per day. He, therefore, suggested that an exercise program reduces morbidity and mortality. Physical exercise can reduce disability and increase active life expectancy (Rich, 2014).

2.3.3 Diet

Dietary factors are directly linked to the development of CVD (Rich, 2014). The dietary recommendation for most high-income countries (HICs) is the same, with few adjustments to meet the overall aim of meeting the guidelines on CVD prevention (Reidlinger et al., 2015). While high ingestion of simple sugars is associated with weight gain and the development of Type II diabetes mellitus, the high intake of fruits, vegetables, nuts, cocoa, tea, and wine has also been associated with a lower risk of cardiovascular death (Rich, 2014). Other examples of heart-friendly diets are more unsaturated fats and omega-3, which are rich in many fruits and vegetables. Limiting the intake of processed food and salt, with balanced caloric intakes, can also reduce the risk of CVD (Stewart et al., 2017). On another note, Siervo et al. (2015) recommended the Dietary Approach to Stop Hypertension (DASH) diet as approved by the American Heart Association for the non-pharmacological management of hypertension. Beyond reducing blood pressure, the DASH diet could significantly reduce CVD (Siervo et al., 2015). Briefly described by Siervo et al. (2015), the DASH diet is a dietary pattern that promotes the consumption of fruits, vegetables, and low-fat dairy products; it includes whole grains, poultry, fish, and nuts and attempts to reduce the intakes of red meat, sweets, sugar-containing beverages, total fat, saturated fat and cholesterol. Considering the relativity of cultural differences and preferences, the broad perspective of dietary intake of a heart-friendly diet was considered.

2.3.4 Smoking Cessation

Quitting is the best option for smokers as smoking is linked majorly to all forms of CVD (Gallucci et al., 2020). Smoking is also identified as the leading cause of preventable deaths (Stewart et al., 2017). Another issue of importance around smoking is the danger it poses to secondary smokers. Secondary smokers are exposed to several components (e.g., carbonyls and particulate matter) that have toxic cardiovascular effects (Gallucci et al., 2020). Smokers should, therefore, consider their health and well-being as important as that of everyone around them. As explained by (Gallucci et al., 2020), the health effects of smoking are quite complex as it does not only predispose to chronic CVD and acute atherothrombotic events such as stroke or myocardial infarction. Smoking further has an impact on glucose tolerance

and levels of HDL cholesterol. Excessive consumption of alcohol also predisposes to the same level and effect of CVD. Therefore, alcohol consumption should be moderated to >150g per week (Neumann et al., 2022). There is also a common link between excessive or harmful intake of alcohol, smoking and the development of CVD.

2.3.5 Stress Management

Stress is a complex and highly subjective construct (Popovic et al., 2022). The impact of psychosocial stress and stress conditions varies from person to person, depending on the cause, degree and duration of the stressors (Dar et al., 2019). Socio-economic adversities, among other things, are present every day in LMICs and much more among older adults, leading to other issues such as depression, social isolation, anxiety, and lots more. Be that as it may, there is no 'one size fits all approach in stress management (Popovic et al., 2022). Therefore, older adults must be intentional with coping strategies, staying positive, engaging more in social interaction, and finding time to relax and cope with life's challenges. However, recognising individual traits and lived experiences is vital to help cope better with stress (Popovic et al., 2022).

2.3.6 Strict Adherence to Prescribed Medications

Some older adults do have co-existing health problems such as hypertension, diabetes, hypercholesterolemia and are on regular medications. However, they have many challenges with adherence to time, dosage and use or administration. They could also need help with the issue of polypharmacy, where multiple drugs are taken per day (Rich, 2014). Older adults should be encouraged to note and speak up regarding the side effects of medications they take, dosage, brands, timing, and combinations (polypharmacy) to be regularly reviewed at clinic visits (Rich, 2014, Roth et al., 2020). The WHO summarises the importance and effectiveness of behavioural risk factor modifications. The highlight reports, "Cessation of tobacco use, reduction of salt in the diet, eating more fruit and vegetables, regular physical activity and avoiding harmful alcohol use have been shown to reduce the risk of cardiovascular disease" (World Health Organization, 2021).

2.4 OLDER ADULTS AND CVD IN NIGERIA

Submissions of Ruan et al. (2018) revealed that the total global burden of disease is seen more in people 60 years and older. In 2010, CVD accounted for about 30.3% of the total burden in older people. According to the WHO Study on Global Ageing and Adult Health (SAGE) Wave 1, Low- and Medium-income countries have experienced a shift in social, environmental, and economic factors and thus increased the CVD burden and mortality among older adults (Ruan et al., 2018).

Whilst Nigerian statistics of older adults take the lead in Africa and are ranked 19th in the global record, the government adjudged the population negligible compared to the entire national population, thus creating a gap in enacting and funding policies that favour the well-being of older adults (Mbam et al., 2022). Again, a report from the Federal Ministry of Health (2018), as gathered by Mbam et al. (2022), shows that most Nigerians source their health service through out-of-pocket and private healthcare services, while only about 5% of Nigerians have access to comprehensive medical insurance. The conventional support system for older adults has dwindled, coupled with the country's widespread challenge of socio-economic inequality. Academic experts have propounded that the current state of affairs has severe implications for the social, political, economic, psychological, and health of older adults in Nigeria. (Mbam et al., 2022, Owolabi et al., 2016)

Likewise, the financial demand and lack of social security, amongst many other problems, increase the vulnerability of older adults to non-communicable diseases such as CVD. (Faronbi et al., 2021, Owolabi et al., 2016). Some risk factors and contributory factors to developing CVD, as outlined earlier (point 2.2.2), were alien in Africa years back (Ndejjo et al., 2021). For example, most traditional meals were prudent, rich in high-density lipoproteins (HDL), and protected against CVDs. Older adults ages ago had limited access to technology but were very active and less sedentary (Kganakga et al., 2022).

Modernisation, as good as it is, has also made some older adults less active, and that could be more compounded at retirement with a significant impact on their quality of life (Faronbi et al., 2021). The physiological ageing process alone makes some older adults more vulnerable

to health expenditures. Preventing strategies will go a long way toward curtailing excessive spending on health care, which could further impoverish them.

2.5 INTERVENTION PROGRAMMES FOR THE PREVENTION OF CVD

Several strategies exist singly or multidimensionally across the globe (Schorr et al., 2021). In advanced countries, access to health information has significantly improved through the technology age notwithstanding. The Internet has given rise to apps such as mobile health (mHealth), electronic health (eHealth), internet of Things (IoT) and many other methods. This advancement has dramatically helped older adults in some climes to stay healthy by making informed choices and reducing CVD risk (Schorr et al., 2021). Okop et al. (2023) asserted that a good intervention programme should consider varying local contexts. There have been lots of systematic reviews both within and outside the continent on educational interventions to prevent CVD prevention (Haykin et al., 2020, Okube et al., 2023). However, most of these studies were conducted in high-income countries. (Lee et al., 2022, Ramôa Castro et al., 2017) They showed different levels of effectiveness of most methods adopted for the intervention programme.

A systematic review conducted by Ramôa Castro et al. (2017) listed a few of the educational interventions used by scholars with examples such as face-to-face sessions, use of telephone, group sessions and a combination of face-to-face, telephone, and group sessions. Most of the time, these interventions were also supported by using questionnaires. Examples include group work, videos, telephones, workshops, educational material, and counselling (Cusack et al., 2018). The frequency of sessions and the length of the interventions, from the reviews reported from previous studies, differed and ranged from six hours to 12 months. These educational interventions have positively influenced most biochemical risk factors, body composition indices (like total cholesterol fasting blood glucose), systolic and diastolic blood pressures, and reductions in body weight (Soltani et al., 2021) . The outcome report from Soltani et al. (2021) revealed generally favourable effects on biochemical risk factors i.e. LDL-C, triglyceride, total cholesterol, and fasting blood glucose, body composition indices, and systolic and diastolic blood pressure. The more specific outcomes measured were reductions in body weight compared with control groups and decreases in blood pressure, total

cholesterol, and triglycerides after the intervention, as also corroborated by other studies (Crouch, Wilson & Newbury, 2011). This report shows that educational intervention programmes could be adopted as an effective tool to create awareness of CVD risk among older adults in Osun State, Nigeria.

2.6 Nurses' Role in Prevention and Reduction of CVD Risks

Low or inadequate health literacy is widespread globally, which is more critical in LMICs (Hassen et al., 2022, Okube et al., 2023). Meanwhile, in developed countries, health literacy is strengthened to empower people to make informed choices about their well-being and make conscious efforts to sustain such decisions (Mares et al., 2022). Given that many intervention programmes are conducted by different professionals within the health sector with varying approaches (Freeley et al., 2022). Nursing activities are pivotal to providing health-promoting information to individuals and groups, thus helping them make informed choices that could help them prevent illness and diseases (Schultz et al., 2018). The WHO acknowledged that a slight reduction in major risk factors could significantly impact long-term cardiovascular disease risk reduction **(**World Health Organization, 2024)**.** This assembly also recognise nurses as crucial stakeholders in primary preventive services and, most importantly, in preventing CVD (Schultz et al., 2018).

Nurses' role in the health care system expanded from taking and recording clinical observations to multi-level evidence-based practices (Aerts et al., 2022, Himmelfarb, Commodore-Mensah & Hill, 2016). Nurses are now more involved in other essential roles, such as leading, coordinating, managing, delivering, and facilitating programmes that promote healthy lifestyles (Freeley et al., 2022). Different levels of involvement are education and counselling, knowledge, skill building, and public health management (Haykin et al., 2020, Himmelfarb et al., 2016). However, the major setback for most nursing activities in the past was the need for more evidence-based records, especially in Africa (Aerts et al., 2022). A scoping review conducted by Freeley et al. (2022) showed a limited number of studies that are nurse-led and channelled towards the prevention of CVD, especially among the disadvantaged or otherwise 'at-risk' groups in the past two decades.

There has been a paradigm shift to this trend as more nurses are involved in research and publications (Himmelfarb et al., 2016). Some of the reviewed nurse-led intervention programmes around the globe used different research tools and methods that effectively prevented CVD (Aerts et al., 2022). Most of these studies had more comprehensive coverage of enlightening programmes and initiatives in advanced countries compared to LMIC (Aerts et al., 2022). Few studies in the last decade also have a pointer to better outcomes with primary prevention (Aerts et al., 2022, Connolly et al., 2017, Haykin et al., 2020).

2.7 THE NEED FOR EDUCATION INTERVENTION PROGRAMME ON CVD RISK IN NIGERIA

Many studies have been conducted around cardiovascular disease risk concerning the prevalence, knowledge, perception, and measurement of cardiovascular disease risk levels among various age groups using different research designs and tools in developed and developing nations (Díez Villanueva et al., 2022, Hassen et al., 2022, Stewart et al., 2017). As one of the vulnerable groups in Nigeria, records have needed to be more detailed regarding the level of Information and support given to older adults in reducing the risk of developing CVD (Ozoemena et al., 2019). Most studies in high-income countries used modern Information technology devices and sophisticated methods like emails, telephone calls, mobile phones, and applications. This advancement may be a barrier in low and medium-income countries where the socio-economic status of average older persons is of great concern (Hassen et al., 2022, Owolabi et al., 2016). Some studies have acknowledged that ageing is a critical non-modifiable risk factor; therefore, limiting the risk in old age is crucial (Díez Villanueva et al., 2022, Stewart et al., 2017).

In southeastern Nigeria, for example, a quasi-experimental study was conducted to enlighten retirees of that region on hypertension (Ozoemena et al., 2019). The programme was administered to the end-users using content from previous studies. Altogether, the study reported successful and practical outcomes of improved awareness on prevention of hypertension through community-based health education intervention. However, there is a need to extend the study beyond hypertension alone and expatiate other predisposing factors to cardiovascular diseases among this group, who are identified as at high risk of CVD (Chillo et al., 2022, Ndejjo et al., 2020). There is also the need to check on the existing gaps in previous

interventions and fill them for a more robust evidence-based intervention programme, which is the essential strategy for preventing CVD (Musinguzi et al., 2019).

A review of some studies by Aerts et al. (2022) shows that targets in preventive or health promotion guidelines might not be met or executed adequately if the context or conceptual framework is faulty (Aerts et al., 2022, Okop et al., 2023). In Nigeria, multi-level barriers and facilitators exist to effectively implement intervention programmes, especially in preventing CVD (Owolabi et al., 2016). A study conducted among the generally disadvantaged community also made a critical recommendation that interventions should be tailored to specific groups in the community at the time (Aerts et al., 2022). Hence, one of the justifications for this study is that it targets retired older adults as they are more susceptible to developing CVD.

Overall, there is a high need to enlighten people on healthy lifestyles and basic strategies for CVD prevention through education, which is the hallmark of all preventive interventions (Hassen et al., 2022). There is also the need to intensify the use of cost-effective, population-based interventions (Musinguzi et al., 2019) to meet one of the Sustainable Development Goals (SDG) number 3, which targets the reduction of mortality due to non-communicable diseases (Roth et al., 2020). The current study adequately considered the developed programmes' end users regarding how the intervention programme delivers set targets and objectives as outcomes to be measured.

2.8 SUMMARY

This chapter broadly examined the issues related to CVD globally, its pathophysiology, signs and symptoms, and the associated risk factors. Documentation has also shown that the physiological ageing process significantly impacts older adults' well-being, especially when they have limited access to information that could minimise their health risk. Most risk factors of CVD are modifiable and can be well managed if the needed awareness is created, thus reducing further strain on the socio-economic status of Nigerian older adults. The review further analysed the challenges retired older adults face in Nigeria, the need to create more awareness through intervention programmes, and nurses' role in identified intervention

programmes to reduce CVD risk. The following chapter focuses detailed steps on the study's methodology.

The following chapter will discuss the research methodology.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter explains the research methodology, design, and setting. It also presents the research phases and details for each phase of the study as they relate to the objectives, the outlined methods used, and how data were analysed in all the phases.

3.2 RESEARCH DESIGN

A research design is structured to provide an appropriate framework for a study. Indu and Vidhukumar (2019) described research design as the overall strategy for integrating a study's different components coherently and logically to ensure that the research problem is addressed effectively. Sileyew (2019) emphasised that research design is a framework that determines how relevant information is obtained through interrelated research activities.

Looking critically at the objectives of the study, the preferred research design for this type of study was a sequential multi-method approach, which consisted of three phases.
Making reference to their previous submissions, Hunter and Brewer (2016), describe multi-method as the process of “employing two or more different methods or styles of research within the same study or research program rather than conning the research to the use of a single method” (Hunter & Brewer 2016:187). In other words, whilst mixed method accommodates only qualitative and quantitative study, multi-method allows the combination of any different research method.

The purpose of employing multi-method is to elaborate on argument that is consistent, in agreement with the data gathered and valid. The purpose is to increase the credibility of the study and reduce bias, while it synergises the strength and weaknesses of the combined study (Creswell & Creswell, 2022). Nanthagopan (2021), therefore, reiterated that multimethod provides a better insight into the complex situations of interest through broad methods than

a single approach. Therefore, a mixed-method can be referred to as a subset of multimethod (Hunter & Brewer, 2016). Scholars agreed that each study has its limitations therefore combining two or more methods further provides compensation for relative weaknesses of each research design, thereby allowing for corroborating evidence to draw a cause-and-effect relationship (Beach, 2020, Hunter & Brewer, 2016, Nanthagopan, 2021). One of the limitations of multi-method is that it requires time and money, which notwithstanding, it improves the accuracy and enhances the analysis and result of any study it applies (Nanthagopan, 2021).

Multi-method triangulation can ease the incorporation of the findings of studies, and such eased incorporations will provide a good understanding of the connection between theoretical and empirical findings and will help to create new theories, and challenge the existing theoretical assumptions (Nanthagopan, 2021). A sequential multi-method is designed to allow earlier phases to inform the development of later phases Adams et al. (2015).

3.3 RESEARCH METHODS

This section discusses the method and process of data collection to create a better understanding of the topic of interest. Research methods are broadly classified into quantitative and qualitative designs. However, the research problem determines the type of design to be operated logically and coherently (Indu & Vidhukumar, 2019). Therefore, Hunter and Brewer (2016) described research method simply as what researchers do. To achieve the set objectives, the researcher combines existing records with what people say and what is observed in real life. This is with the mindset of deriving empirical data that is verifiable and logical (Beach, 2020, Sileyew, 2019).

The initial phase occurred concurrently using a mixed-method approach. Creswell and Creswell (2022) describe this as the collection of two types of data: open-ended and close-ended, or qualitative and quantitative data, to study a research problem or question. The systematic synthesis of these different research styles helps to get a better outcome and increase the body of knowledge on the subject matter. The process of synthesis is also referred to as integration. According to (Adams et al., 2015), The term ‘integration’ describes the

interconnectedness derived from qualitative and quantitative components of a research study conducted in series. The submission explicitly shows the importance of one phase of the study as it hinges on developing the next phase.

Another vital step in the process of the study is triangulation. Adams et al. (2015) further defines triangulation as; "a general approach whereby the convergence, complementarity and dissonance of results on related research questions, obtained from different methodological approaches, sources, theoretical perspective, or researchers are explored". Invariably, triangulation enhances the validity of a study when different research methods produce convergent findings (Adams *et al 2015:* 95).

Furthermore, triangulation can be derived from four primary sources:

- Methodological triangulation-more than one research method is used for data collection.
- Data triangulation collects information from multiple data source
- Investigator triangulation synchronises data from integrated analysis of two or more researchers
- Theoretical triangulation: Adopts multiple theoretical perspectives or interpretative frameworks.

Other research design which are equally feasible for this study include explanatory sequential design, exploratory sequential design or the convergent parallel design of the mixed method design. However, these research designs are particularly interdependent on each other from the inception of the study and cannot be differently interpreted as are intertwined to meet common set objectives (Creswell & Creswell, 2022). While qualitative and quantitative data are mixed in multimethod, a level of independence is maintained in conducting, analysing and interpreting each study while both results provide the groundwork for the next phase of the larger investigation.

Consequently, the multimethod best suits this study. The study's first phase implemented a systematic review and focus group discussion. The subsequent two phases followed a sequential order of data integration for developing the educational intervention programme and pilot testing the newly developed programme.

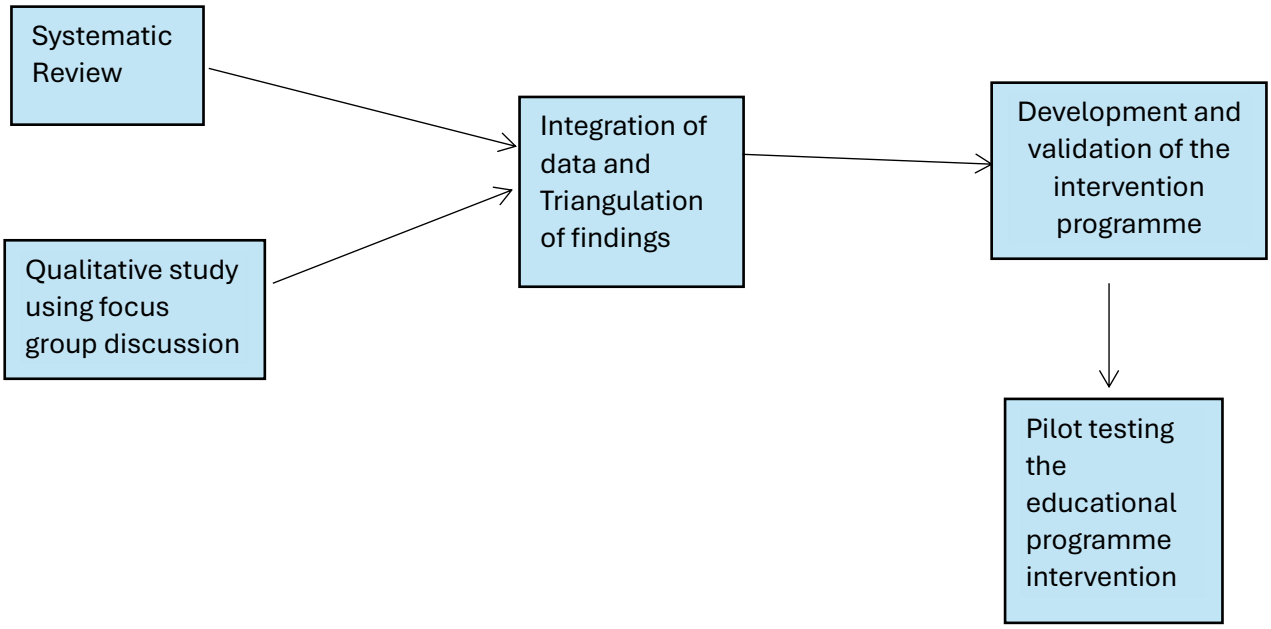


Figure 3.1 The multi-method approach of the study

3.4 PHASE ONE: THE EXPLORATORY PHASE

The first phase of this study (exploratory phase) has two parts. The first part is a systematic review of existing literature on previous educational intervention programmes on preventing or reducing CVD risks. The second part analysed the factors that enhance or prevent programme implementation through a qualitative study (focus group discussion). Both studies were carried out concurrently and independently of each other. The results from this phase contributed to developing an educational intervention programme in the conceptual phase of the study.

3.4.1 Part One: Systematic Review

Munn et al. (2018) reiterated that systematic review involves several coordinated processes that ultimately summarise the best available evidence in answering clinical research questions and, thus, a gold standard. Pollock and Berge (2018) further explain that Systematic reviews follow a pattern of predefined questions that explicitly are answered, and they follow a sequence of activities to analyse and combine the results of studies conducted critically; this is to be comprehensive and unbiased (Aromataris & Pearson, 2014). Munn et al. (2018:9) described the systematic review as "the pillar on which evidence-based healthcare rests". Further, they described it as a rigorous integration of best available evidence to guide health policy and practice in a given study of interest (Munn et al., 2020).

3.4.1.1 The Review Questions

What are the existing educational intervention programmes for the prevention of CVD compared to other routine medical management of older persons in Africa? Other subset questions to this broad objective are stated below.

- What are the types and methods of educational interventions used for effective reduction of CVD risk?
- What was the outcome of the educational intervention programmes?

3.4.1.2 Methods

The study engaged explicit, rigorous methods to identify, critically appraise, and synthesize all relevant intervention studies that met the inclusion criteria for CVD risk prevention. The systematic review was conducted using the Joanna Briggs Institute (JBI) methodology for systematic reviews of effectiveness (Munn et al., 2018). The systematic review registration number was CRD42022374643, and it registered a priori protocol with the International Prospective Register of Systematic Reviews (PROSPERO) (Appendix A).

Inclusion Criteria

Articles published in English, full text available, educational interventions, older adults, Published between 2011-2023.

a. *Participants*

The search targeted studies on older adults aged sixty years and above domiciled within African communities. The study participants were identified to be at risk of developing CVD from modifiable risk factors.

b. *Interventions/exposure of interest*

The review considered published literature on all educational interventions conducted in clinical and community settings in Africa aimed at providing adequate information to older adults on preventing CVD.

c. Comparator

Educational intervention programmes were compared to other routine clinical services to prevent cardiovascular diseases among older adults.

d. *Outcome of the intervention studies*

This review included studies that measure at least one of the following post intervention primary outcomes: regulated body mass index and controlled blood pressure. It also noted any reported or recorded secondary behavioural outcomes like smoking and alcohol cessation and overall improvement in participants' quality of life.

Exclusion criteria

The following benchmarks were used to eliminate some studies from the review

- Studies conducted outside Africa
- Study protocols yet to be implemented
- Non-experimental studies, qualitative studies
- Previous systematic reviews
- Studies conducted among youth or younger adults

3.4.1.3 The Search Strategy

This review considered educational intervention studies on preventing CVD among older persons aged 60 and above conducted in Africa between 2011 and 2023**.** The researcher used the three-step search strategy recommended by the Joanna Briggs Institute. The study engaged the initial search strategy of exploring the PubMed and CINAHL databases, to identify text words contained in the titles and abstracts of relevant articles and their index terms. In the next step, a second search was conducted using the identified keywords and index terms across MEDLINE (PubMed), CINAHL (EBSCO), Web of Science, SCOPUS, and the Cochrane Central Register of Controlled Trials. Sources of unpublished studies and grey literature was searched including Sigma Theta Tau International repository. Studies published from 2011 to 2023 were included in the search and limited to the English language for ease of review. Further scrutiny was conducted by analysing text words by title and abstract using the index terms. In the third step, additional studies were searched through the reference lists of the citations retrieved for full-text screening to identify studies that met the inclusion criteria.

3.4.1.4 Selection of Included Studies

Following the search, all prospectively suitable articles were imported into the Endnote reference management software package (Version 20.5), while all duplicates were eliminated. For a comprehensive analysis, suitable articles were further imported into the Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI, The Joanna Briggs Institute, Adelaide, Australia). Relevant studies were retrieved in full, and their citation details were imported into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI, JBI, Adelaide, Australia).

The full text of relevant selected studies was assessed in detail against the inclusion criteria independently by the researcher in collaboration with the supervisors. The systematic review recorded and reported Reasons for excluding papers in the full text that do not meet the inclusion criteria (see Appendix B). Disagreements between the independent reviewers at each stage of the selection process were resolved through discussion, with input from an additional reviewer (supervisor). The results of the search and the study inclusion process

were reported in full in the final systematic review and presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram.

3.4.1.5 Data Extraction

Data adjudged relevant to the research questions and objectives of the study were extracted and included in the review by the researcher in collaboration with the supervisors, using the standardized JBI data extraction tool. This analytical tool was developed by a working group of researchers and methodologists (JBI reviewers) with the objective of critiquing and appraising the research evidence in existing methodological, epidemiological, and health research literature (Munn et al., 2020). The analytical tool further explain that the JBI extraction tool allows for transparent and repeatable appraisals of evidence in systematic reviews with a diverse range of questions to support the evidence.

The data extracted included specific details about the participants, study methods, interventions, statistical significance, and outcomes of significance to the review objective. Any disagreements that arose between the reviewers were resolved through discussion and with a third reviewer.

3.4.1.6 Data synthesis and analysis

The JBI tool also assesses the methodological quality of the study and evaluates the extent to which bias was checked in the design, conduct and analysis of the study (Munn et al., 2020). The data extracted included specific details about the participants, study methods, interventions, statistical significance, and outcomes of significance to the review objective. It has a scoring framework of "yes," "no," or "not applicable (N/A)" as a guide to appraise the list of evidence presented in reviews critically. A response of "no" to any of the questions negatively impacts the overall quality of a case series.

3.4.1.7 Data presentation

The results were presented in a table to summarise the existing literature. Data gathered were further analysed by comparative, narrative data analysis. The table contained information such as year of publication, country of origin, area of intervention and research method used. Chapter four presents further details on the results of this study with a narrative summary. A narrative summary describes the key information relevant to the study objectives and is often used where data is heterogeneous. The categories used to present the data included location, study aims, study population (sample size), context, research design, outcome information, main findings about the review questions and gaps in research.

Meta-analysis, on the other hand, is used for systematically assessing and combining the results of two or more similar studies, with the aim of producing an overall summary effect of the results. Although meta-analysis cannot improve the quality of included studies, it increases statistical power and greater precision (Munn, Tufanaru & Aromataris, 2014)**.** However, suggest that where meta-analysis is not possible, a narrative summary could be adopted**.**

The systematic review results are presented and discussed in detail in the fourth chapter of this study.

3.4.2 PART TWO: THE QUALITATIVE STUDY.

This section gives a detailed overview of the design and method utilised in the second part of the exploratory phase.

3.4.2.1 Objective of the study

This study aimed to identify the barriers and facilitators of educational intervention programmes on cardiovascular disease risk reduction among retired older adults.

3.4.2.2 Study design

This section was a descriptive qualitative study, using Focus Group Discussions (FGD) as its data collection method to identify the barriers and facilitators of an educational intervention programme on CVD risk reduction among retired older adults in Osun state.

A qualitative study is described as an in-depth evaluation of 'social responsive action' and interpretation of people's life experiences to social reality for a better understanding. The key feature of qualitative study lies within the dynamics of its humanistic, naturalistic and holistic approach (Muzari, Shava & Shonhiwa, 2022).

3.4.2.3 Sampling and Participants for the study

The study participants were selected by a purposive sampling technique from their homogenous groups on pre-arranged dates at their meeting places. To purposively select participants into a qualitative study, such individuals must possess the typical characteristics of population of interest to the study (Muzari et al., 2022). This further corroborated that purposive sampling is applied where samples are gathered among populations with similar characteristics of interest and with equal chances of being included in the study (Acharya et al., 2013). Prior visits were carried out to give information sheets on the purpose of the study and what to expect, and participation in the study was voluntary. This is the most used sampling method in qualitative studies, and participants are selected because they are at the right place and time. The advantages of this sampling technique are that they are less expensive and there is no need for a list of all the population elements (Muzari et al., 2022).

3.4.2.4 Study population

Retired older adults are considered highly vulnerable to developing CVD (Ojo & Mohammed, 2013), and the best strategy for assessing their knowledge on the subject matter (CVD risk) can be better achieved through their group support system. The study population of this arm of study comprised Ile-Ife (10), Ilesa (8) and Osogbo (10) all totalled 28. Mutual dates were

agreed on for the meeting to be held at their meeting places which were either owned or rented by their association.

Inclusion criteria: This study's participants were retired older adults, male and female, sixty years and above, registered members of an organised body or group of retirees within three selected local governments and senatorial districts of Osun State, Nigeria. (coded as FGD1, FGD2 and FGD 3).

The exclusion criteria include retired older persons who:

- Are an unable to attend the full sessions of the intervention programme
- Who are ill or cognitively impaired to comprehend teachings and information shared.

3.4.2.5 Data collection and guides

One of the primary data collection tools in qualitative study is Focus group discussion**.**

- The Focus Group Discussions (FGDs)

A focus group discussion is defined as “a technique where a researcher assembles a group of individuals to discuss a specific topic, aiming to draw from the complex personal experiences, beliefs, perceptions and attitudes of the participants through a moderated interaction" (Nyumba *et al.*, 2018; p.21). It is believed to offer differing worldviews and paradigms, which also helps to gain an in-depth understanding of social issues. Participants in focus group discussions are usually homogeneous groups of people, which promotes comfortable group dynamics (Nyumba et al., 2018).

One of its distinct features is that researchers adopt the role of a "facilitator" or a "moderator", unlike an in-depth interview where the researcher adopts the role of an investigator. In this setting, the researcher facilitates or moderates a group discussion between participants and not between the researcher and the participants. (Gammie, Hamilton & Gilchrist, 2017) also supported the opinion that not all who were recruited for the FGD often attend or participate

fully in the discussions. Therefore, the average of eight to ten participants are recommended per group (Nyumba et al., 2018). It is presumed that this number is large enough to gain various perspectives and small enough to become fragmented (Gammie et al., 2017, Nyumba et al., 2018). Consenting participants who met the inclusion criteria were invited to the FGD on pre-arranged dates at each meeting place.

- **Instrument**

The study used an open-ended interview guide. The objective was to identify the barriers and facilitators of educational intervention programmes to reduce cardiovascular disease risk among retired older adults. A pre-check of the instrument was done among a smaller group of retired older adults not in the locations selected for the study. Necessary adjustments were made where needed for the instrument's coherence and suitability.

Questions discussed centred around barriers and facilitators of educational intervention programmes based on their experience, what helped them acquire new knowledge and what hindered them from actively participating in educational intervention programmes (see **Appendix C**). A recap of the information gathered was also done to check for accuracy, precision, and agreement with the participants' submissions. All interviews were audio-recorded and transcribed verbatim. This technique is used to validate participants' submissions and to explore the credibility of research findings as supported by Creswell and Creswell (2022).

3.4.2.6 Data management and analysis

Data gathered from the focus group discussion were analysed using thematic analysis. A theme is described as patterned responses that provide insight to research questions, through either inductive, deductive approaches or pre-existing framework (Kiger & Varpio, 2020). Thematic analysis as a practical analysis approach identifies, analyse and reports repeated patterns of data within a various paradigmatic or epistemological orientations (Kiger & Varpio, 2020).

In this study, three pre-existing categories of themes (a priori) were formulated based on the focus of the subject matter to identify themes of interest. The data generated were further

analysed into themes and subthemes using COREQ guidelines for reporting qualitative research (Abukari & Schmollgruber, 2024). Therefore, this study's analytic technique consists of a six-step framework, which is widely used to conduct qualitative data analysis (Kiger & Varpio, 2020).

- **Step 1: Becoming familiar with the data.**

Notes and early impressions expressed by the participants were jotted as interpreted from the discussions. The compiled audio recordings were also downloaded and transcribed into a written form, which was read and re-read repeatedly. Submissions from the three groups were listened to several times with rapt attention and then transcribed into three separate transcripts, one for each group. The researcher, who understood English and Yoruba well, transcribed the audio recordings manually and verbatim. The principal investigator (PhD student) conducted a back-translation from Yoruba to English, and the initial transcript was compared to confirm the transcript's accuracy, consistency, and dependability. The data was translated into a working script for content analysis in addition to the manual documentation made by the research assistants while ensuring that the participants' voices were preserved.

- **Step 2: Generating initial codes.**

Secondly, the researcher began to have an overview of the data by reading the full text and reviewing the scripts of all the data sources. The data was reviewed several times to make sense of the information and reflect on its meaning. There was an identification of trends and patterns that reappeared within and between groups. Significant statements (sentences, phrases, and quotes) were highlighted and extracted from the script with the frequency of occurrence, and meanings were formulated and organised into categories and subcategories as guided literature on qualitative study (Elo et al., 2014).

In this phase, data were organised in a systematic and meaningful way. The codes were carefully classified as guided by the responses gathered from the research questions asked. Therefore, the phase was more of a theoretical thematic approach. Each segment of the codes classified were responses of interest focused on specific research questions with divergent or

similar opinions. The study also utilised ATLAS-ti version 8.0 (Soratto, Pires & Friese, 2020) as the qualitative data analytic software for electronic management of the data, and to help further with the coding process .

- **Step 3: Searching for themes.**

The theme, an essential aspect of qualitative study, is characterised by its distinct noteworthiness. Some could overlap from generated codes with similar characteristics, responses, and opinions. However, some distinctions separate each theme as per research questions into preliminary themes. The themes generated from this study were predominantly descriptive.

- **Step 4: Reviewing themes.**

In this next stage, the preliminary themes of stage 3 are reviewed, modified, and well-developed. This process is set out to make sense of all the themes collated effectively with the assistance of data analysis software.

Themes work in the context of the entire data set. Further assessment was done within the group and compared to other study groups, relating it to the research questions. At this stage of the study, the researcher checked for themes that might be generated within themes and eliminated codes or themes that needed to be sufficiently relevant or backed up with any code.

- **Step 5: Defining themes.**

This stage aims to have definite answers to the research questions generated from the qualitative study and participant submissions. It gives an overview of all themes and their distinct and interrelated features. Three themes were set a priori while outcome labels for the themes were further classified into subthemes.

- **Step 6: Writing-up**

In the final analysis and report writing stage, all findings were succinctly captured, analysed, and reported accordingly.

All data analysis used in this study were based on specific objective and design of each phase of the study. The data analysis was done sequentially and, in the end, in conjunction with one another to present the overall outcome of the study through inferential data analysis.

3.5 MEASURES OF TRUSTWORTHINESS

This concept gives a rich and succinct description of the qualitative study through consistency and transparency while analysing its value and impact. Measures of Trustworthiness is presented in many ways to address the usefulness and integrity of research findings. Connelly (2016) cited Polit **and** Beck's definition of trustworthiness as "the degree of confidence in data, interpretation, and methods used to ensure the quality of a study" (Polit & Beck, 2020). A generally acceptable criteria for trustworthiness was developed by Lincon and Guba in 1985 and is still in use to date (Connelly, 2016). Therefore, the study utilised Polit and Beck (2020)'s five criteria of trustworthiness: credibility, dependability, confirmability, transferability, and authenticity.

3.5.1 Credibility

This concept is synonymous with what is known as internal validity in quantitative research (Polit & Beck, 2020). This study applied standard qualitative design procedures to ensure its credibility. Thorough scrutiny was done by the researcher's supervisors from the proposal stage. Before receiving final approval, the PhD assessors' committee of the Faculty of Health Sciences, Wits University, made further corrections and suggestions. Hence, details of their experience and perspectives were obtained through direct engagement with the older adults themselves for the true representative of the participants' reality. Participation in the study was entirely voluntary and anonymous within the group context. The researcher also informed participants of their right to withdraw from the study without hard feelings or critical

judgment. Prolonged engagement with the data helped ensure the data's credibility and how well the participants' perspective was represented.

3.5.2 Dependability

Dependability refers to the data's stability over time and the study's conditions (Polit & Beck, 2020). Thorough documentation ensured strict adherence to the protocol and question guidelines so that the data collection and analysis process could be repeated in similar settings in the future. All activities were adequately documented in a process log for reference and review when needed for further analysis.

3.5.3 Confirmability

Confirmability is the neutrality or the degree to which the findings are consistent and can be repeated (Polit & Beck, 2020). This concept could be called research objectivity (Polit & Beck, 2020). Confirmability was ascertained by keeping an audit trail of analysis and methodological memos of logs. All research findings were based on the participant's submissions as recorded in the audiotape and field notes; none were from the researcher's perspective. Records were kept as decisions and analysis progressed and were reviewed by the researcher's supervisors. These steps helped to prevent bias and gave the true reflection of the participant's perspectives. Therefore, submissions as highlighted were checked with the research participants to reflect their submissions accurately.

3.5.4 Transferability

It allows for replicating findings with the original research question and how they could be applied in similar group (Polit & Beck, 2020). Such features comprise inclusion criteria, sample size, data collection methods, and detailed information about the study site and participants. The reporting section of the study also discussed details on the analysis and findings.

3.5.5 Authenticity

Authenticity is the extent to which researchers show various realities and realistically convey participants' lives (Polit & Beck, 2020). This concept was added to the research trustworthiness because it specifically described the peculiarity of the research participants and how relevant their participation is to the study. Retired older adults are the sample of interest in this study, and a full description was also given in the population and sampling section (Section 3.6.2.4).

Table 3.1 Measures of trustworthiness applied in the study

Strategy	Criteria	Application
Credibility	Truthfulness of the study and the findings	• The researcher ensured standard qualitative design procedures • Preservation and representativeness of participants' voices
	Member checking	• Allowing participants to review and give feedback on collected data to correct errors or add opinions
	Triangulation	• The researcher pulled data together from three study sites' source
	Reflexivity	• The researcher was mindful of personal interference from background.
	Prolonged engagement	• The researcher gave enough time to familiarise the participants, the settings, and the study context.
Transferability	The research process	• Providing detailed information from the sampling process to analysis
Confirmability	Objectivity	• The researcher ensured the true representation and interpretation of data
	An audit trail	• Ensured recorded and transcribed interviews were accessible for reuse or as reference
		• Detailed records of how the study was conducted
Dependability	Peer debriefing	• Informational writing • Reliability of the results and outcome of the study
Authenticity	Genuineness	• Prolonged engagement with the study • Adding accurate findings to the body of knowledge

3.6 PHASE TWO: DEVELOPMENT AND VALIDATION OF THE EDUCATIONAL INTERVENTION PROGRAMME

The second phase of the study presents the programme development and validation process. Items generated from the integration and triangulation of findings of the systematic review and qualitative study were classified into domains which served as a layout for drafting the content of the educational intervention programme. The WHO guidelines for the prevention of CVD risk (World Health Organization, 2007) further guided the preliminary draft of the programme and was prepared for verification. In intervention research, a programme is designed, implemented and tested, essentially to improve health outcomes (Polit & Beck, 2020). Consequently, this educational interventional programme was predicated on the interventional study design. This type of approach is a form of experimental research design that evaluates the direct impact of treatment of preventive strategies on identified disease or health outcomes (Thiese, 2014). There are different types of intervention study, and the dominant one is the randomised controlled trial. However, other interventional study designs do exist with their strengths and weaknesses. Examples of such designs are; pre-post study design, non-randomised controlled trials and quasi-experiments (Thiese, 2014).

This design measures the specific outcome before and after an intervention is implemented. Usually, the group or arm of study could be single, that measures a before and after intervention outcome. It could also be multiple groups where comparison takes place (control and intervention group) (Thiese, 2014). To meet the set objective of this study, a Quasi-experimental (one group; pre-post-test) design was used. Details explained in section 7.2 of pages 122-126.

3.6.1 Programme validation

The study engaged the logical systematic approach to validate the content of the programme as recommended by Lynn (1986) for content and face validity. This section was also guided by the construct of the Health Belief Model and presented to a group of experts.

- **Research design**

The researcher conducted a two-round Delphi review to assess the content of the developed intervention programme for its validity. The purpose of the review is to evaluate the relevance, representativeness, and clarity of the items developed and their suitability for the study's objective.

- **Population, sample and sample technique**

The target population consisted of experts in cardiovascular medicine, adult nursing (geriatrics), physiotherapy, nutrition and dietetics, and education with over fifteen years of experience.

Inclusion criteria: Experts were selected based on the following criteria**.**

- A senior consultant and expert in cardiovascular and internal medicine, a cardiologist
- A professor of advanced nursing with expertise in gerontology
- A senior consultant physiotherapist with expertise in Cardiovascular Health
- A consultant nutritionist and expertise in adult nutrition.
- A senior lecturer and educationist in adult education

All the included experts are seasoned professionals highlighted above with a minimum working experience of fifteen years and are affiliated with a national health or tertiary institution in Nigeria.

Exclusion criteria:

- Experts that were not available or accessible for the Delphi review

3.6.2 Data collection and content validity procedure

The list of potential experts for the Delphi study was initially sorted, and a letter of invitation was sent to them via email requesting their participation in the first version of the instrument developed (see Appendix D). Details of expectations and information about the study phases were also sent as a separate document to the experts invited (see Appendix E). After receiving positive responses from five experts, a set information kit containing complete information on the purpose of the study, a brief description of the instrument, instructions and assessment criteria for completing the content validity assessment and the proposed rounds of the review was sent via email alongside an informed consent form.

A brief conceptual and operational definition of the instrument was also provided to guide the experts in the review of the instrument. The instrument assessment was based on a 4-point scale recommended by Lynn (1986); rated as 1= poor, 2= fair, 3= good and 4=excellent. The rating criteria evaluate the instrument based on the clarity of the items measuring the construct and their relevance to measuring the construct the instrument intends to measure.

3.7 PILOT TESTING THE DEVELOPED EDUCATIONAL INTERVENTION PROGRAMME

3.7.1 Study Design

The educational intervention programme was designed as a one-group pre-test–post-test study (Quasi-experimental) (Stratton, 2019). This type of design is usually carried out among a single set of participants, who are exposed to the same intervention process and evaluated before and after the intervention. The research design is commonly used to elicit the effect of a treatment or intervention on a specific population of interest (Allen et al., 2011). In other words, the same dependent variable (outcome of interest) measured at baseline (pre-test) is reevaluated in the same group of participants after exposure to a form of research activity (post-test).

The design was identified as the weakest form of quasi-experimental design because it lacks randomisation, control or comparison and has varying threats to internal validity, which could generate regression to the mean. That notwithstanding, the design has its merit, which includes the possibility of evaluating achievements (programme evaluation) at the end of the intervention and how much change occurred from participating in the programme effectively (Ma, Shek & Chen, 2019). Though the study as a one-group pre-test–post-test intervention has its demerits of not having a control group, the design prevents the ethical dilemma of withholding important health information on CVD risk from a control group (Varkey, 2021).

The educational intervention programme was designed to create needed awareness and reduce the risk of developing CVD among retired older adults of Osun state. From the triangulated result in the early phase of the study, identified barriers were considered in designing the programme and determining how to address issues raised effectively. The verification process results were revaluated, and the preliminary programme was revised. The final version of the developed educational programme was ready for implementation.

3.7.2 Intervention Hypothesis

Considering the proposed outcomes of the intervention, the following hypotheses were formulated. They were put together with reference to the set objective of this section of the study.

H_1 The educational intervention programme will improve the participants' knowledge; therefore, their post-test knowledge and attitude scores will be higher than their pre-test scores.

H_1 2 The educational intervention programme will reduce CVD risk among retired older adults of Osun state, Nigeria.

3.7.3 Recruitment

Brief feedback meetings were held between December 2023 and January 2024, and members of each association unit participated in the focus group discussions. The aim was to give an

update on the findings and outcome of the study while the next phase of the study was also introduced to them.

3.7.4 Sample and Sampling Method

The researcher used a purposive non-probability sampling method to select 40 participants from two association units of retired older adults in Ile-Ife and Ilesa, one of the senatorial districts in Osun State. The minimum sample size was calculated to be 30, and adjusted to 40 to compensate for non-response and missing data (with an anticipated 95% response rate) as analysed by a previous study (Rosner, 2011).

Sample size parameters used for automated calculation were;

Incidence population at 80% occurrence of cardiovascular diseases in low and middle-income countries (Mensah et al., 2019).

Incidence, study group as 58% of retirees with risk of developing cardiovascular diseases (Ojo et al, 2013)

Alpha at 0.05

Beta =0.2

Power=0.8

Due to time and financial constraints, a one-group pre- and post-intervention cohort was formed at Ilesa and Ile-Ife. Another reason for better coordination was that it was a homogeneous setting within the senatorial district of Osun State. The educational intervention programme's implementation schedule was introduced to ascertain voluntary participation.

3.7.5 Inclusion and Exclusion Criteria

Inclusion criteria

- Older adults above 60 years old
- Retired from formal work engagement
- Registered member of an association for retired persons

Exclusion criteria

- Retired older adults with cognitive impairment

- Older adults who are unable to attend the 6 weeks long programme
- Older adults who are unlearned or illiterate

3.7.6 Implementation of the educational intervention programme

The educational intervention programme was pilot-tested between the first weekend of February and April 2024. It was conducted once a week for one and a half hours on Wednesdays at Ile-Ife and Saturdays at Ilesa (see Appendixes F and G).

The researcher having had training sessions in research ethics (see Appendixes H-J), re-trained four research assistants who were recruited from the preliminary phase of the study. These research assistants participated in the ethics training recommended by the Human research ethics committee at the University of Witwatersrand (see Appendixes K-N). The training was for two days in January 2024. The research assistants are two registered nurses and two postgraduate students at the Institute of Public Health Obafemi Awolowo University, Nigeria. All materials for the study were tested and analysed for its functionality and reliability. A trial run of the educational intervention programme and all instruments was carried out on a smaller group, and amendments were made as needed.

3.7.7 Data Collection Tools

- **Pre-intervention assessment**

At the study's inception, consent was obtained to ensure voluntary participation after introducing and giving information sheets. All participants were assessed at baseline during the first week of the intervention programme. The following parameters were taken at baseline: blood pressure, height, weight, and body mass index using standardised pre-tested apparatus. The apparatus used for assessment includes an Omron digital sphygmomanometer for blood pressure, a stadiometer for height, and calibrated scales for weight. All these were pre-tested to ensure proper functionality and record accuracy. A questionnaire (ABCD) was also administered to check the participants' baseline knowledge of CVD. The researcher facilitated the programme while the research assistants helped with the data collection.

- **The Questionnaire- ABCD risk questionnaire**

The Attitudes and Beliefs about Cardiovascular Disease (ABCD) Risk Questionnaire (see Appendix O) was developed by Woringer et al. (2017) used to elicit baseline information before the commencement of the educational intervention programme. It has been described as a suitable tool for evaluating the accuracy of perceived CVD risk, general knowledge of CVD and intention to change behaviour regarding diet and exercise. The revised version has 31 questions subdivided into five main parts (Bowyer et al., 2023).

The 31-item questionnaire that has shown satisfactory reliability and validity is also approved for evaluating the accuracy of perceived cardiovascular disease risk (Woringer et al., 2017). Several assessment tools in the past assessed knowledge, perception, and intention for behavioural change distinctly, with only a few tools addressing these concepts altogether. Therefore, the ABCD Risk Questionnaire was assessed to incorporate all these factors (Bowyer et al., 2023) and thus be suitable for this study. These scales are Perceived Risk (Cronbach's α=0.85) and Perceived Benefits and Intention to Change Behaviour (Cronbach's α=0.82) have satisfactory reliability (Cronbach's $\alpha \geq 0.70$). Healthy Eating Intentions (Cronbach's α=0.56) is below the minimum threshold for reliability but acceptable for a three-item scale (Woringer et al., 2017). The revised version has 31 questions, which are subdivided into five main parts (Bowyer & Hassen, 2021).

The participants' responses were analysed based on the following subdivisions. There were eight standard questions on the instrument, which reviewed the common risk factors of CVD. The options were analysed separately as either 'True' or ‘false’. Different sessions of lectures and teachings with power point presentations and teachings were used to deliver the intervention programmes for 6 weeks consecutively.

- **Post-intervention assessment**

The post-intervention assessment was conducted 12 weeks after the programme started. All baseline data were reevaluated, and the ABCD risk questionnaire was reassessed among the

same participants post-intervention. Chapter six of this thesis presents details of the pre- and post-intervention phases of the implementation phase (Page 118).

- **Remuneration**

Provision was made for light refreshments *moin-moin* (bean cake), puff-puff, and other local Indigenous snacks) for the six weeks and the twelfth week of the study, and a little token was given to the participants to support their transportation during the study period.

3.8 Data Analysis

After scoring the questionnaires, the researcher entered them onto a Microsoft Excel sheet for analysis. The data was cleaned, and any missing values were removed. Pre- and post-intervention data were securely stored, cleaned, and imported into the STATA version 15.1 software for analysis (STATA, 2017). The statistical distribution of data collected was assessed for normalcy, and when there was skewness, STATA was used to correct the deviations. The demographic characteristics were analysed descriptively using frequency tabulations and summary measures, with the results presented using tables, graphs and charts. Analysis was on the data from all participants (n=40) initially (pre-test) and on a lesser number (n=39) in the post-test assessments due to an unavoidably absent participant who travelled out of town. The descriptive analysis of data was illustrated as means, standard deviation (SD) for continuous variables and categorical variables as percentages.

Subtraction of baseline measure (pre-test) mean scores from the post-test mean scores was used to calculate outcome changes. Inferential data analysis were applied to measure the impact of the program by comparing the mean scores of the within-group pre- and post-tests in a paired t-test. The paired t-test results determined the programme's statistical significance, which was $p \leq 0.05$ at 95% confidence interval and an alpha level of .05.

3.8.1 Primary Outcome

More knowledge of modifiable cardiovascular disease risks. The evaluation helps to know the difference between the level of knowledge of retired older adults before and after the intervention programme. This was calculated with the analysis of the P-value and the mean difference pre- and post-intervention

3.8.2 Secondary Outcome

The targeted secondary outcome of this intervention study include; biological changes in BMI, blood pressure, sustained attitudinal and behavioural changes. The change in perception and disposition towards CVD risk was evaluated by percentages and statistical diagrams.

3.9 Validity and Reliability

"Validity is the extent to which a concept is accurately measured in a quantitative study" (Heale & Twycross, 2015: 66). The extent to which a research process is enhanced in terms of quality, or rigour, is the hallmark of validity and reliability (Heale & Twycross, 2015). Good research work is not only reflected in the result but also in the rigour of the research. In quantitative studies, the quality is therefore measured by evaluating the validity and reliability of the instruments used. Reliability, on the other hand, measures the accuracy of an instrument. This evaluates the consistency of how a research instrument measures an outcome of interest when repeatedly carried out.

According to the extensive review and submission of Heale and Twycross (2015), validity can be categorised into three major types;

1. Content validity- This determines whether the instrument appropriately covers all the content and variables of interest designed for it to measure in the study. A subdivision of content validity is face-validity, which gathers opinions from experts to assess if a research instrument measures the intended concept.
2. Construct validity, on the other hand, establishes how inferences are drawn from the test scores as it relates to the concept of interest. The empirical evidence that confirms

these categories of validity are homogeneity, convergence, and the theory of evidence. These characteristics validate the instrument developed.

3. The third category of validity is criterion validity. The key characteristic here is that it evaluates the extent to which different instruments measure similar variables. The outcome could bring about convergent, divergent, or predictive validity.

In reliability, the consistency of a measure is analysed. The exact calculation of reliability might not be quantifiable; estimated attributes that can be achieved through reliability are homogeneity, which measures the internal consistency through many instruments, and the commonest is Cronbach's α. Other attributes are stability through test and re-test and equivalence, which is also achieved through inter-rater reliability, which is agreement between two or more observers.

The findings from phase one informed the validity and reliability of this study. The instrument for the intervention programme was developed and reviewed by the researcher and supervisors before being sent out for expert review. The two-round Delphi review and the content validity index (CVI) score further affirm the validity and reliability of the instrument.

3.10 ETHICAL CONSIDERATIONS

The study was conducted and guided by the universal ethical principles of autonomy, informed consent, beneficence, non-maleficence, and dissemination of research findings (Polit & Beck, 2020). The ethical considerations guiding this study are to ensure that participants are not endangered or harmed during the research activities. Thus, their rights were protected, and appropriate ethical permission was obtained.

3.10.1 Permission to Conduct the Study

Before the study commenced, permission and ethical approvals were obtained from the Postgraduate and Human Research Ethics Committee of the University of the Witwatersrand with clearance certificate no. M200534 (see Appendix P). Ethical approval for the study was also sought from the Osun State Health Research Ethics Committee, Nigeria (see Appendixes

Q & R). A letter of introduction (see Appendix S) and permission to conduct the study were obtained from the Executives of each retiree's association at Ile-Ife, Ilesa, and Osogbo, Osun state, Nigeria (see Appendixes T, U and V).

3.10.2 Informed Consent and Voluntary Participation

Participants were approached at meeting units (Ile-Ife, Ilesa and Osogbo). Eligible participants were invited to participate in the study at the scheduled time, and their meeting places and consent were obtained for voluntary participation. No participant was coerced to accept the invitation. The participants were provided with adequate and detailed written information about the study to make informed decisions. Each participant (FGD 1=10, FGD 2=8, 2 participants absent and FGD 3= 10) read the information letter (see Appendix W) and were enthusiastic about being part of the study. The consent to audio-record the interviews was requested from the participants, and consent forms were signed to that effect (see Appendix X). The participants were also informed that they had the right to withdraw their participation at any time, even after signing the consent forms. Letters of invitation were also sent to the respective experts that were included in the study.

3.10.3 Confidentiality and Anonymity

For the qualitative study participants' confidentiality and anonymity were ensured within the agreed context of the social network of the focus and intervention group (retirees). All information gathered in this study was kept confidential and anonymous, with consideration given to a group of participants for the intervention phase of the study**.** Questionnaires and all documents related to the study were safely kept in a locked cabinet while data stored in the computer was secured in coded form.

Participants' Confidentiality and anonymity were ensured within the agreed context of the social network of the focus and intervention group (retirees). Other principles of beneficence, non-maleficence, privacy, and confidentiality were observed within the study group. All information gathered in this study was kept confidential and anonymous, with consideration given to the group of participants for the intervention phase of the study with prior

information sheet and consent obtained (see Appendix Y and Z). The results were reported in a coded pseudonym. Questionnaires and all documents related to the study were safely kept in a locked cabinet while data stored in the computer was secured in coded form.

3.10.4 Data Management and Storage

The researcher had custody of all documentation and stored it well. All hard copies of documents used in the study were kept in a lock-secured cabinet that was only accessible to the researcher. The electronic data were stored in a password-locked computer and had restricted access only to the researcher, supervisors, and data analyst. Published data will be deleted after two years, whereas unpublished information will be appropriately deleted after six years. The study's findings are based on fact without any falsifications or fabrications.
Furthermore, in the implementation phase, the researcher ensured that participants understood the information provided about the study from the information sheet and their individual decision to participate without coercion. Each participant duly signed the informed consent form, and each questionnaire was coded per participant (see Appendix Z). The documents were locked in the safe locker and only accessible to the researcher.

3.11 SUMMARY

This chapter discussed the overview of the research design, methodology, and data collection methods used in the entire study. It further gave information on the study population, sampling technique, sample, and procedures of data collection. Finally, the chapter gave details of the ethical considerations and academic rigour conducted in the study.

In the next chapter the results of the systematic review will be discussed

CHAPTER FOUR

PART 1: RESULTS AND DISCUSSION OF THE SYSTEMATIC REVIEW

4.1 INTRODUCTION

The first part of the exploratory phase of this study is the systematic review. The systematic review is a pillar of evidence-based healthcare because it follows structured and rigorous research processes that guide clinical practices through well-grounded, valid results (Munn et al., 2018). There are various types of systematic reviews; however, this study focused on the effectiveness of educational interventions in reducing CVD among older adults in Africa. The results generated are tangible and form the basis for knowledge for clinical judgements. The Joanna Briggs Institute Reviewers Manual (2021) guided the review (Lizarondo et al., 2019).

This chapter focuses on analyzing existing educational intervention programmes in Africa and their impact on reducing CVD among older adults in Africa. The section summarizes the search strategy and the list of articles for the review. It also provides methodological quality assessment results and the characteristics of the included studies. Data was then presented and discussed to determine the educational interventions identified in the review that effectively reduced CVD risk in Africa.

4.2 RESEARCH DESIGN

The systematic review involved quantitative research, randomised controlled trials, quasi-experimental case studies, and cohort studies. Chapter three of this thesis explicitly discusses all details of the research design.

4.3 RESEARCH METHOD

The study engaged explicit, rigorous methods to identify, critically appraise, and synthesise all relevant intervention studies that met the inclusion criteria for CVD risk prevention. All study details are outlined in the methodology session and imputed into a study protocol**.** The

systematic review followed the Joanna Briggs Institute (JBI) methodology for systematic review of effectiveness.

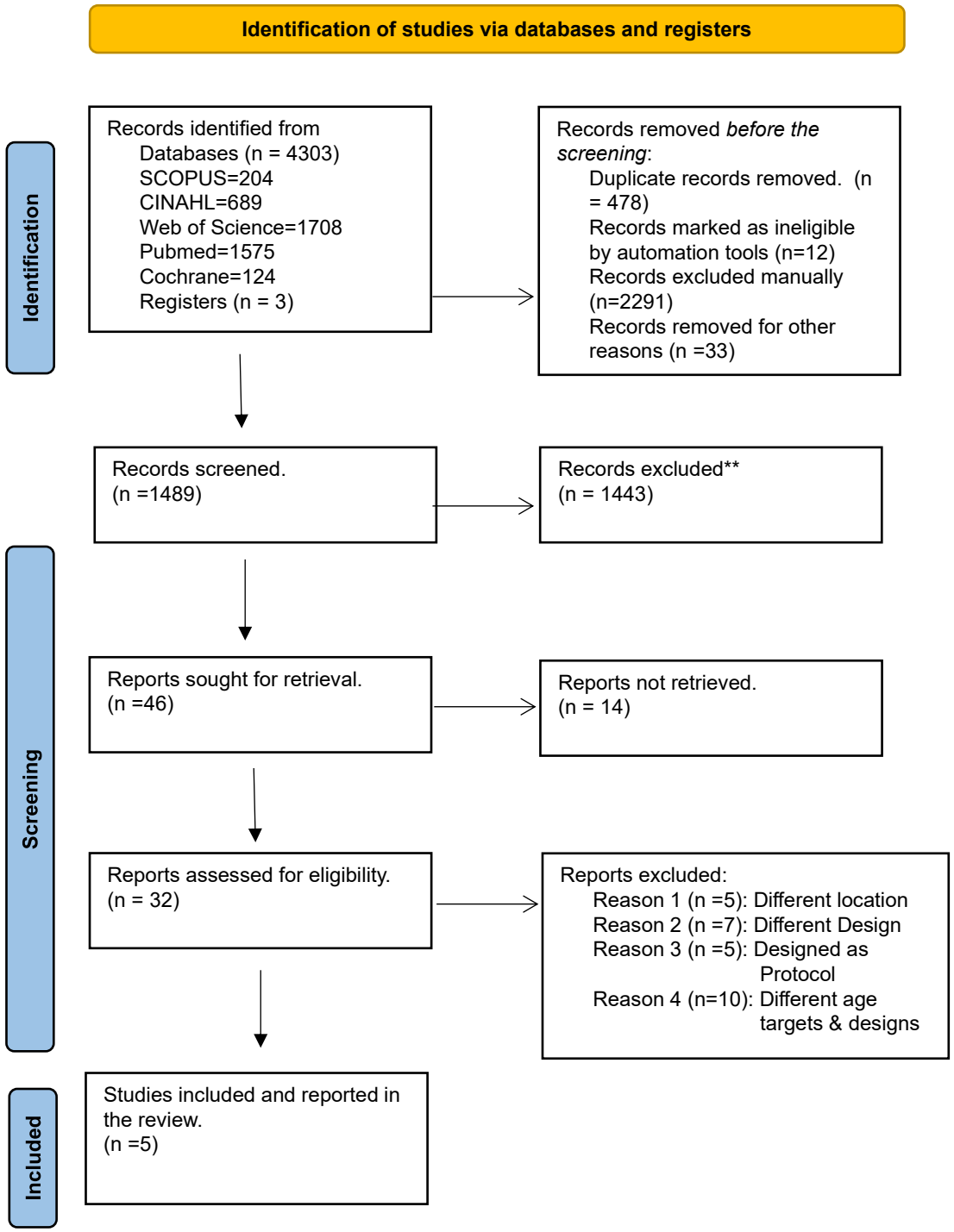


Figure 4.1 The PRISMA Flow Diagram of Searched Outcome

Out of the 32 articles retrieved from the screened record, after the full text and methodological review, 27 studies were further excluded for reasons (see Appendix B). Of the excluded studies (n=27), five were conducted outside Africa (n=5), seven (n=7) had different

research designs and focuses, five (n=5) were designed protocols, and ten (n=10) had a different focus, design, or target population. The excluded studies are listed as; [(Allen et al., 2011, Bose et al., 2020, Bowyer & Hassen, 2021, Chillo et al., 2022, Chow et al., 2016, Gerber et al., 2016, Hassen et al., 2021, Haykin et al., 2020, Holst et al., 2021, Joanna Briggs Institute, 2014, Katende & Becker, 2016, Kganakga et al., 2022, Lee, Park & Min, 2015, Musinguzi et al., 2019, Ndejjo, 2021, Ndejjo et al., 2020, Okop et al., 2023, Okube et al., 2023, Ovbiagele, 2015, Sarfo et al., 2021, Sarfo et al., 2016, Tan et al., 2020, van de Vijver et al., 2016, Vilme et al., 2019, Wahab et al., 2015, Watson et al., 2015, Wood et al., 2021)].

Table 4.1 List of studies included in the final review (n=5).

Author(s)	Country	Title	Journal, Issue, volume and page (s)
Dessie et al. (2021)	Ethiopia	Effect of a self-care educational intervention to improve self-care adherence among patients with chronic heart failure: a clustered randomised controlled trial in Northwest Ethiopia.	*BMC cardiovascular disorders*, *21*(1), 1-11.
Sarfo et al. (2018)	Ghana	PINGS (Phone-based intervention under nurse guidance after stroke) interim results of a pilot randomised controlled trial.	*American Heart Association Journal* *49*(1), 236-239
Hickey et al. (2021)	Kenya and Uganda	Effect of a patient-centered hypertension delivery strategy on all-cause mortality: Secondary analysis of SEARCH, a community-randomised trial in rural Kenya and Uganda	*PLoS medicine*, *18*(9), e1003803.
Ademuyiwa and Okubadejo (2021)	Nigeria	Effect of a nurse-led secondary stroke prevention intervention on medium-term stroke outcome in a teaching hospital in Nigeria: A quasi-experimental study.	*Journal of Clinical Sciences*, *18*(3), 168.
(Adler et al., 2019)	Ghana	Can a nurse-led community-based model of hypertension care improve hypertension control in Ghana? Results from the ComHIP cohort study.	*BMJ open*, *9*(4), e026799.

Table 4.2 Characteristics of Included Studies (n=5)

Study	Hickey et al. (2021)
Country	Kenya and Uganda
Study design	Randomised Controlled Trial
Setting/Context	This is a secondary analysis of the SEARCH trial (NCT:01864603), in which 32 communities underwent baseline population-based multi-disease testing, including hypertension screening, and were randomised to standard country-guided treatment or to a patient-centred integrated chronic care model including treatment for hypertension, diabetes, and HIV.
Participant characteristic	The analytic population included non-pregnant adults (≥18 years) with baseline uncontrolled hypertension (blood pressure ≥140/90 mm Hg). Among 86,078 adults screened at the study baseline (June 2013 to July 2014), 10,928 (13%) had uncontrolled hypertension. Median age was 53 years (25th to 75th percentile 40 to 66); 6,058 (55%) were female; 677 (6%) were HIV infected; and 477 (4%) had diabetes mellitus.
Group	Hypertension, diabetes, and HIV treatment were provided using an integrated care model. The study featured a nurse-driven triage system using standardised protocols adapted from national guidelines. In control communities, NCD care was provided at the general outpatient department in larger clinics and the HIV clinic in smaller clinics.
Outcomes measures	The primary outcome was 3-year all-cause mortality with comprehensive population-level assessment. Secondary outcomes included hypertension control, which was assessed at a population level in year 3. At baseline and year 3, hypertension was classified according to the lowest measured blood pressure, described above, as controlled (<140/90mm Hg) grade 1, (140 to 159/90 to 99 mmHg grade 2 (160 to 179/100 to 109 mm Hg), or grade 3≥180/110 mmHg.
Description of main results	Patient-centred hypertension treatment integrated into the HIV care delivery system improved all-cause mortality and hypertension control among adults with uncontrolled hypertension, identified through the community-based multi-disease

Study	Dessie et al. (2021)
Country	Ethiopia
Study design	Randomised Controlled Trial
Setting/Context	Assessed the effectiveness of an educational intervention to improve self-care adherence among patients with chronic heart failure in two public referral hospitals in Ethiopia's Amhara region: Debre Markos and Felege Hiwot Referral Hospitals in Northwest Ethiopia.
Participant characteristic	All adult patients with a diagnosis of CHF (either by imaging or by New York Heart Association (NYHA) functional Class I–IV) who were conscious, and literate were eligible for recruitment.
Group	219 participants were randomly selected into the two arms (intervention n= 109; control=110). However, 33 were subsequently lost to follow-up (LTFU). Hence, 186 patients completed the study. The intervention(n=88) and control groups (n=98) were unbalanced in terms of several socio-demographic characteristics at baseline. Variables were, therefore, included in regression analysis as possible confounders. The study engaged a cluster-level, hospital-based educational intervention. At the intervention facility, the intervention group received education about self-care. At the control facility, a randomly selected group of patients received the usual care and were followed by the project
Outcomes measures	The study outcome variable was a heart failure self-care adherence score measured by the eight-item validated Medical Outcomes Study-Specific Adherence Scale (MOS-SAS).
Description of main results	Self-care adherence scores were balanced at baseline. After the intervention, patients in the intervention group (n=88) had higher adherence scores than those in the control group (n=98). This difference was statistically significant ($\beta=4.15$, $p<0.05$).

Study	Sarfo et al. (2018)
Country	Ghana
Study design	Randomized Controlled Design
Setting/Context	The study tested the feasibility and preliminary efficacy of an m-Health technology–enabled, nurse-guided intervention for improving blood pressure (BP) control among Ghanaian stroke patients within one month of symptom onset.
Participant characteristic	The participants recruited were 60 recent stroke survivors encountered within a single tertiary medical system in Ghana.
Group	Subjects in the intervention arm (n=30) received a Blue-toothed UA-767Plus BT BP device and smartphone for monitoring and reporting BP measurements and medication intake for 3 months compared with the standard of care (n=30). 2 clusters in the intervention arm and 2 in the control arm. Mean±SD age was 55±13 years,
Outcomes measures	The primary outcome measure was systolic BP <140mmHg at month 3; secondary outcomes included medication adherence and autonomous self-regulation. The proportions of intervention versus standard-of-care groups with Systolic BP <140 mmHg at month 3 by intention to treat was 20/30 (66.7%) versus 14/30 (46.7%) (P=0.12)
Description of main results	Systolic BP < 140 mmHg at month 3 was found in 20/30 subjects (66.7%) in the intervention arm versus 14/30 subjects (46.7%) in the control arm (P=0.12). Medication possession ratio scores at month 3 were better in the intervention (0.88 ± 0.40) versus the control (0.64±0.45) arm (P=0.03). It was concluded from the study that it is feasible to conduct a–Health-based, nurse-guided BP control intervention among recent stroke patients in sub-Saharan Africa.

Study	Ademuyiwa and Okubadejo (2021)
Country	Nigeria
Study design	Quasi-Experimental Study
Setting/Context	The research was carried out at Lagos University Teaching Hospital (LUTH), a 760-bed tertiary institution located in Idi Araba, Lagos, Nigeria.
Participant characteristic	Sixty (60) consenting acute stroke patients surviving till discharge were consecutively recruited into the study and conveniently assigned to either group in a 1:1 ratio. The study recruited 39 (65%) males and 21 (35%) females. The mean age of participants in the intervention group was 55.0 ± 14.5 years, while it was 56.0 ± 11.2 years in the non-intervention group. Other demographic parameters were similar between both groups.
Group	Participants were conveniently assigned to one of the two groups – the intervention group or the non-intervention group in a 1:1 ratio (30 per group). The intervention group received standardised intensive in-person counselling for cases and designated caregivers at discharge and again at 3-, 6-, and 9 months post-discharge. They also had additional telephone calls and weekly short messages to reinforce information and communication during follow-ups. The non-intervention group received discharge instructions provided by the managing physician only.
Outcomes measures	Outcome assessment was conducted at nine months post-stroke. At the end of the follow-up period of 9 months, compliance with lifestyle and diet modification, clinic and physical therapy attendance, and drug compliance was statistically significantly higher in the intervention compared to the non-intervention group ($P < 0.05$ for all comparisons).
Description of main results	Twenty-five participants (83.3%) complied with lifestyle modification instructions in the intervention group compared with 10 (33.3%) in the non-intervention group. Twenty-seven participants (90%) in the intervention group complied with expected dietary modification, while only three (10%) did so in the non-interventional group.

Study	Adler et al. (2019) Adler, AJ, Laar A, Prieto-Merino D, Der RMM, Mangortey D, Dirks R, et al. 2019. (Adler et al., 2019)
Country	Ghana
Study design	Cohort study
Setting/Context	The study was conducted in Lower Manya Krobo, a municipality in the Eastern Region of Ghana.
Participant characteristic	All adult hypertensive community members, except pregnant women, were eligible for inclusion in the study. 1339 participants, 69% female, were enrolled for the study. A total of 552 had a 6-month visit, and 338 had a 12-month visit.
Group	CVD nurses confirmed diagnoses of known hypertensive and newly screened individuals. Participants were treated according to the clinical guidelines established through the project's Technical Steering Committee. Such as reminder and adherence messages, keeping BP monitoring appointments and 6-monthly follow-up assessments
Outcomes measures	Primary outcome: Hypertension control, which was defined as blood pressure (BP) under 140/90mm Hg. Secondary outcomes: changes in BP and knowledge of risk factors for hypertension.
Description of main results	After one year of intervention, 72% (95% CI: 67% to 77%) of participants had their hypertension under control. Systolic BP was reduced by 12.2 mm Hg (95% CI: 14.4 to 10.1) and diastolic BP by 7.5 mm Hg (95% CI: 9.9 to 6.1).

4.4 METHODOLOGICAL QUALITY ASSESSMENT OF THE SELECTED STUDIES

Two independent reviewers (researcher and supervisor) extracted and appraised studies using a standardised JBI data extraction tool (JBI-SUMMARI). The data extracted gave detailed information about the populations, interventions, study methods, and outcomes that were significant to the review's objectives. The JBI data of the tools have 13 items. One had nine, and another had eleven items. The answers to each appraised tool were scored as yes=2, unclear=1 and no=0, and 'not applicable' answers had no scores allotted.

4.4.1 Quantitative studies

Almost all the quantitative studies included in the review met the minimum methodological quality assessment score. Table 4.4 presents the results of the methodological quality of the studies included and appraised. From the review, all appraised studies were unblinded to the caregivers and assessors as part of the uniqueness of RCT in healthcare research, and this was stated as an expected limitation in all three RCT studies.

Table 4.3: Critical appraisal of eligible studies using the JBI Critical Appraisal Checklist for Randomized Controlled Trials (n = 3)

Article	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Dessie et al. (2021)	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y
Hickey et al. (2021)	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y
Sarfo et al. (2018)	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y
Total	3	3	2	3	0	0	3	3	3	3	3	3	3

Key: Y= Yes; N=No; U=Unclear (score 0); NA= Not applicable
Q1 = Was true randomisation used for assignment of participants to treatment groups?
Q2 = Was allocation to treatment groups concealed?
Q3 = Were treatment groups similar at baseline?
Q4 = Were participants blind to treatment assignment?
Q5 = Were those delivering treatment blind to treatment assignment?
Q6 = Were outcome assessors blind to treatment assignment?
Q7 = Were treatment groups treated identically other than the intervention of interest?
Q8 = Was follow-up complete and if not, were differences between groups in terms of their follow-up adequately described and analysed?
Q9 = Were participants analysed in the groups to which they were randomised?
Q10 = Were outcomes measured in the same way for treatment groups?
Q11 = Were outcomes measured in a reliable way?
Q12 = Was appropriate statistical analysis used?
Q13 = Was the trial design appropriate, and any deviations from the standard RCT design (individual randomisation, parallel groups) accounted for in the conduct and analysis of the trial?

Table 4.4: Critical Appraisal of eligible studies using the JBI Critical Appraisal Checklist for the Quasi-experimental studies (n=1)

Article	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Ademuyiwa & Okubadejo (2021)	Y	Y	Y	Y	Y	Y	Y	U	Y
Total	1	1	1	1	1	1	1	0	1

Key: Y= Yes, N=No, U=Uncertain
Q1= Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?
Q2= Were the participants included in any comparisons similar?
Q3= Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?
Q4= Was there a control group?
Q5= Were there multiple measurements of the outcome both pre and post the intervention/exposure?
Q6= Was follow-up complete, and if not, were differences between groups in terms of their follow-up adequately described and analysed?
Q7= Were the outcomes of participants included in any comparisons measured in the same way?
Q8= Were outcomes measured in a reliable way?
Q9= Was appropriate statistical analysis used?
Only one quasi-experimental study was eligible and appraised, as displayed in Table 3.3.

Table 4.5: Critical appraisal of eligible studies using the JBI Critical Appraisal Checklist for **Cohort studies** (n = 1)

Article	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Adler et al. (2019)	NA	NA	Y	Y	N	N	Y	Y	Y	N	Y
Total	0	0	1	1	0	0	1	1	1	0	1

Key: Y= Yes; (score 1) N=No (score 0); U=Unclear (score 0); NA= Not applicable

Q1= Were the two groups similar and recruited from the same population?
Q2= Were the exposures measured similarly to assign people to both exposed and unexposed groups?
Q3= Was the exposure measured in a valid and reliable way?
Q4= Were confounding factors identified?
Q=5 Were strategies to deal with confounding factors stated?
Q6= Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)?
Q7= Were the outcomes measured in a valid and reliable way?
Q8= Was the follow-up time reported and sufficient to be long enough for outcomes to occur?
Q9= Was follow up complete, and if not, were the reasons to loss to follow up described and explored?
Q10= Were strategies to address incomplete follow up utilised?

The only observational study in this review was appraised, as presented in Table 4.5 above. The reviewer consensus was to include all five studies; the fifth study was included, not minding the low methodological quality. This decision was made as there were a limited number of RCTs that met all the inclusion criteria.

4.5 RESULTS

The five included studies were published between 2011 and 2023 and conducted within different African countries. The findings analysed the characteristics of included studies with an overview of the characteristics of the participants, interventions, comparisons, and outcomes, as presented later in this section.

4.5.1 Characteristics of Studies

This systematic review included three randomised controlled trials (RCTs), one quasi-experimental and one cohort study. A total of 12,573 participants who had educational intervention programmes on preventing CVD diseases were included. Sample sizes ranged from 60 to 10,928 participants within the studies.

4.5.2 The Educational Interventions

Three of the studies were Randomised Control Trials (n=3). One (n=1) was a quasi-experimental while the other was a cohort study. The levels of evidence of the included quantitative studies using the JBI Levels of Evidence tool (GRADE approach) (Joanna Briggs Institute, 2014).

Grade is a methodological approach used to ascertain a body of evidence. The process involves the collection of evidence aside from research design and methodological quality to appraise the certainty of outcome as it relates to the level of importance in decision-making and summary of findings (Stern et al., 2024). In Systematic review, GRADE is more important in the JBI methodology of ‘effectiveness’ among others. The tool is graded from levels 1 to 5 and there are sub-visions on these levels of effectiveness in each level. The grading, however, does

not downplay any of the research methodology. The first on the grade as level 1 is experimental design, level 2-Quasi-experimental designs, Level 3-Observational Analytic designs, Level 4-Observational-Descriptive studies, Level 5-Expert opinion and Bench Research. Therefore, using the GRADE approach, the levels of evidence in this study and the reviewed studies are as follows: 1c for a Randomised Controlled Trial under experimental design, 2c for a Quasi-experimental design, and 3c for a cohort group for a controlled group, respectively.

4.5.2.1 Types and methods of educational interventions

One of the studies focused on a randomised and standardised country-guided approach to minimise mortality among adults with uncontrolled hypertension in rural Kenya and Uganda (Hickey et al., 2021). The intervention was patient-centred care, including an on-site introduction to clinic staff at screening, nursing triage to expedite visits, reduced visit frequency, flexible clinic hours, and a welcoming clinic environment. Details of further intervention are not stated but referred to as standardized protocol of national guidelines. From the approach engaged by (Dessie et al., 2021), an interventional programme of self-care through multiple health education sessions was utilised to mitigate the impact of cardiovascular diseases. A validated 8-item self-care adherence scale was further administered, and a generalised estimating equations model thereafter analysed its effect on health education. This was hoped to prevent complications, improve quality of life, and reduce financial burdens on the fragile health systems.

The study conducted by Sarfo et al. (2018) tested the feasibility and preliminary efficacy of an m-Health technology-enabled, nurse-guided intervention in improving blood pressure (BP) control among Ghanaian stroke patients within one month of symptom onset. The study was a 2-arm cluster pilot randomised controlled trial involving 60 recent stroke survivors. In the study, subjects in the intervention arm (n=30) received a Blue-toothed UA 767 Plus BT BP device and smartphone for monitoring and reporting BP measurement and medication intake for three months, compared with standard of care, given to participants in the control group (n=30).

In another trial reviewed, a nurse-led secondary stroke prevention strategy was exercised (Ademuyiwa & Okubadejo, 2021). The intervention focused on modifiable risk factors. They evaluated compliance to lifestyle, diet, clinic and physical therapy attendance, and drug compliance over the medium-term poststroke. The study utilised a case (interventional group)–control (noninterventional group) quasi-experimental design to recruit sixty (n=60) stroke patients post-discharge and gave a standardised intensive in-person counselling. They also made additional telephone calls and weekly short messages to the intervention group to reinforce information and communication during follow-up. The non-intervention group received discharge instructions provided by the managing physician only.

On the other hand, Adler et al. (2019) evaluated the effectiveness of the Community-based Hypertension Improvement Project (ComHIP) in increasing hypertension control. Trained community-based cardiovascular disease (CVD) nurses administered a package of interventions. The intervention was given to a cohort of adult (n=1339) hypertensive community members in Ghana. The intervention package was guided by an existing clinical guideline for case management and referral tools.

4.5.2.2 Outcome of the educational interventions

The summarised statistical outcome of Hickey et al. (2021) study is outlined in Table 4.3. Overall, compared to the cluster-randomised group, the intervention resulted in a 21% reduction in all-cause mortality. The study also reported a 22% improvement in hypertension control compared to standard care among adults with baseline uncontrolled hypertension. The approach shows the effect of long-term intervention studies on controlling one of the modifiable risk factors of CVD. Their overall submission was that the model could be adopted to reduce the overall burden of cardiovascular mortality in Sub-Saharan Africa.

From Dessie et al. (2021) educational intervention, results showed a balanced score of the self-care adherence model at baseline. Post-intervention, patients in the intervention group (n = 88) had higher adherence scores than those in the control group (n = 98). This difference was statistically significant ($\beta = 4.15$, $p < 0.05$) and increased with each round of education. Other factors significantly associated with adherence scores were being single

(β = − 0.25, $p < 0.05$), taking aspirin (β = 0.76, $p < 0.05$), and having a history of hospitalisation (β = 0.91, $p < 0.05$). They suggested that social support was consistently associated with reduced cardiovascular disease. They also suggested that the intervention led to better health-seeking and self-care behaviours among the participants, especially multiple health education sessions. Hence, the relevance of educational intervention programmes, social groups and networking.

The primary outcome of Sarfo et al. (2018)'s nurse-guided intervention was systolic BP <140 mm Hg at month 3; secondary outcomes included medication adherence and autonomous self-regulation. Analysis accounting for clustering was made using a generalised linear mixed model by intention to treat. Statistically, the mean ±SD age was 55±13 years, 65% male. Systolic BP <140 mmHg at month three was found in 20/30 subjects (66.7%) in the intervention arm versus 14/30 subjects (46.7%) in the control arm (P=0.12). Medication possession ratio scores at three months were better in the intervention (0.88±0.40) versus the control (0.64±0.45) arm (P=0.03). Therefore, a potential signal of efficacy with the intervention programme was acknowledged. The researchers suggested that an m–Health–based, nurse-guided BP control intervention among African stroke survivors was feasible and effective.

At the end of the follow-up period of nine months, Ademuyiwa and Okubadejo (2021) recorded better compliance with lifestyle and diet modification. The study also noted improvement in clinic and physical therapy attendance, with drug compliance. All these were statistically and significantly higher in the intervention compared to the non-intervention group ($P < 0.05$ for all comparisons). Therefore, the study showed that nurse-led secondary stroke prevention intervention effectively improved adherence to lifestyle modification, dietary adjustment, clinic attendance, physical therapy rehabilitation program, and drug compliance. The primary outcome reported by Adler et al. (2019) was controlled blood pressure (BP) under 140/90 mm Hg. In comparison, the secondary outcomes looked at BP changes and knowledge of hypertension risk factors. After one year of intervention, 72% (95% CI: 67% to 77%) of participants had their hypertension under control. Systolic BP was reduced by 12.2 mm Hg (95% CI: 14.4 to 10.1) and diastolic BP by 7.5 mm Hg (95% CI: 9.9 to 6.1).

Considering the study's heterogeneity, a meta-analysis of the data was not feasible; therefore, a narrative synthesis was adopted (Smigorowsky et al., 2020). Because each study reviewed had variations in methodological approach, pooling the summary might be statistically ambiguous. Hence this forms part of the limitation of this systematic review.

Table 4.6 Summary of the measured primary and secondary outcomes of the included studies

Primary outcome	Dessie et al. (2021)	Hickey et al. (2021)	Sarfo et al. (2018)	Ademuyiwa & Okubadejo (2021)	Adler et al. (2019)
Reduced Body mass index	N	N	N	N	N
Controlled blood pressure,	Y	Y	Y	Y	Y
Controlled blood sugar and lipid profile	N	N	N	N	N
Secondary outcomes					
Reduction/cessation Smoking	N	N	N	Y	N
Reduction/cessation in Alcohol intake	N	N	N	Y	N
Compliance with behavioural learning sessions.	Y	Y	Y	Y	Y

The primary outcome constantly measured in the reviewed studies was blood pressure control, while others were compliant with information obtained from the intervention sessions.

4.6 DISCUSSION OF RESULTS

Five studies were retrieved from different databases for this review. The set objective was to answer the question of assessing existing intervention programmes in reducing cardiovascular risk in Africa. Three studies were randomised controlled trials, one quasi-experimental and one cohort study.

4.6.1 Types of Interventions

There were records of different levels of interventions and measured outcomes in the review. One of the most typical approaches in educational interventions reviewed is health education. This method is universally relevant and adopted in different ways and styles but is identified to be effective in creating needed awareness (Okop et al., 2023). In this review, Dessie et al. (2021) utilised multiple health education sessions to improve self-care and adherence to preventive strategies and improve participants' quality of life. This is related to one of the contemporary educational intervention programmes conducted by Kganakga et al. (2022). The study engaged a multi-national and multi-professional prospective cohort study as part of a global initiative addressing CVD reduction. This collaborative effort adopted health education and intervention programmes, and the outcome was improved cardiovascular health awareness.

Another recent study conducted by Okube et al. (2023) was a nurse-led two-armed, parallel-group randomised controlled trial design. Although the age range of participants was 18-64, over 40% were older adults. To reduce CVD risk, they presented comprehensive individualised and group-based health education. The primary source of the intervention arm was the World Health Organization (WHO) guideline recommendations for CVD control and prevention. In the end, there was a change in levels of knowledge on the modifiable risk factors, which was attributed to the nurse-led lifestyle intervention programme (Okube et al., 2023). This further shows the importance of health education as a vital part of intervention programmes.

In this review, Adler et al. (2019) and Ademuyiwa & Okubadejo (2021) operated text messages and reminders. This strategy provides additional telephone calls and weekly short messages to the intervention group to reinforce information and communication during follow-up. Information and Communication Technology has gained many grounds in research studies and is one of the easiest and quickest ways of reaching out to research participants (Schorr et al., 2021). In similar example, Okop et al. (2023), in a multi-national study, used mobile phones, surveys, photographs, and voice recordings to provide context-specific insights on CVD prevention. These contents were locally relevant solutions for CVD risk prevention for community participants aged 18-75. Another method adopted in the review was standardized

intensive in-person counselling (Ademuyiwa & Okubadejo, 2021). This has a few challenges, as it requires time and commitment from health professionals and participants. The method is still feasible with proper planning as used by Ndejjo (2021) in their community-based interventions for CVD prevention among adults. The study facilitated the creation of support and strengthening of community networks. The networks promoted community mobilisation and lifestyle counselling for adequate social support and reinforcement of messages. Therefore, having individuals of similar characteristics, such as older adults, in a cohort of educational intervention and counselling will help them look out for one another and support themselves in reinforcing learning as well as lifestyle counselling.

Likewise, is the use of standardized protocol of national guidelines (Hickey et al., 2021). The World Health Organization developed a guideline recommendation for CVD control and prevention. This has been widely used and is still globally relevant (Okube et al., 2023). This guideline, therefore, serves as part of the vital benchmark and source of providing detailed information needed for the prevention of CVD and reducing its risk. The last method identified in the reviewed studies was using smartphones to monitor and report blood pressure measurements and medication intake (Sarfo et al., 2018).

As universally acknowledged, modern technology has improved access to health information (Schorr et al., 2021). Scholars have identified these methods as suitable for effectively reducing CVD risk (Lee et al., 2022, Ramôa Castro et al., 2017). For example, Hassen et al. (2021) suggested that using information and communication technology further creates the needed awareness and improves preventive strategies for CVD risk. Deploring technology-based intervention programmes has shown that it could help the participants make informed choices, thereby reducing CVD risk (Schorr et al., 2021). These intervention programmes are evidence-based and have good outcome as set in their objectives.

4.6.2 Strength of Reviewed Studies

All the studies reviewed were rigorously conducted and followed evidence-based guidelines with specific objectives achieved.

- **Nurses' Involvement**

Nurses were reviewed to be actively involved in three of the reviewed intervention programmes (Ademuyiwa & Okubadejo, 2021; Adler *et al.*, 2019; Sarfo *et al.*, 2018). The level of involvement ranged from screening, triaging, referral, one-on-one and group counselling, coordinating and giving health talks, and telephone follow-up, among other listed activities. This finding corroborates the submission of scholars such as Himmelfarb et al. (2016) and Aerts et al. (2022) on nurses' expanded roles from essential clinical practice to active involvement in research.

It also affirms the pivotal role of nursing in the prevention of cardiovascular diseases globally (Katende & Becker, 2016). Many of these methods are being adopted in LMIC countries, with nurses and other multidisciplinary teams collaboratively tackling the burden of CVD prevention (Katende & Becker, 2016). Katende and Becker (2016) also identified various effective, evidence-based strategies used by nurses in the control of high blood pressure in their integrative review. The strategies ranged from patient/provider education, patient/provider reminder system, nurse prescribing, team-based care and social support, home BP monitoring and use of treatment algorithms, among other activities.

As acknowledged by (Schultz et al., 2018), the submission of the World Health Organization (WHO) is that Nurses' involvement helps address the challenge of global low knowledge on CVD risk prevention by adopting effective evidence-based strategies in identifying, preventing, and managing CVD and its associated risk factors (Mares et al., 2022, Schultz et al., 2018). This review affirmed the importance of a nurse-led initiative in this study. As recommended by most of the studies reviewed, nurses, as the primary care providers in the health sector, should be well-trained, equipped and supported. This initiative will help to facilitate, coordinate, and deliver more prevention programs and contribute to reducing stroke burden in Africa.

- **Schedule of the Educational Intervention Programmes and Collaborations**

All the studies reviewed were adequately sponsored and supported by local and international organisations. Collaborative effort as such enhances extensive coverage and implementation

of evidence-based studies. Therefore, a concerted effort is desired in the research hub of nursing in Africa. The duration of the reviewed studies ranged from 3 months to 3 years for the evaluation of the outcome of the intervention programmes. 60% of the reviewed studies were conducted and evaluated after nine months. Others were also evaluated or outcome measures after three months. The finding shows the need for sufficient timing for successful and effective educational intervention programmes.

4.6.3 Limitations of Reviewed Studies

In relation to the set objective of this systematic review, the following issues were of concern.

- **Limited educational intervention studies**

This systematic review indicates that educational interventions focusing on older adults are limited in Africa. Ozoemena et al. (2019) confirmed this in their studies, and it was further corroborated by (Ademuyiwa & Okubadejo, 2021) that there were scanty previous studies on such intervention programmes in Nigeria. Therefore, a concerted effort is needed to pay attention to the vulnerable group, considering the uniqueness of the ageing process and its interconnectedness to CVD risk (Rodgers et al., 2019). Correspondingly, older adults should be given adequate attention and empowered to improve their health (Aerts et al., 2022).

- **Need to prioritise older adults in educational intervention programmes.**

The age range of participants in the studies reviewed was between fifty (50) and sixty-nine (69). Thus, there needed to be a deviation from the inclusion criteria of the study participants, which were meant to be sixty years and above. It also shows a paucity of programmes or interventions explicitly targeting older adults in Africa. This result is discordant with one of the Sustainable Development Goals that seeks to 'ensure healthy lives and promote well-being for all, at all ages' (United Nations, 2023). It indeed calls for concern and a more proactive approach in Africa. Unlike most developed and high-income countries where adequate and all-inclusive strategies have been implemented for older adults. With such provision, they can access health information and promote healthy ageing (Mares et al., 2022).

- **Clinical status of participants in the reviewed studies.**

Furthermore, it was gathered from the review that all the participants enrolled in the studies already had one form of cardiac-related problems or were survivors of CVD in the recuperating phase. The typical heart problems range from uncontrolled hypertension (Adler et al., 2019, Hickey et al., 2021) to stroke (Ademuyiwa & Okubadejo, 2021, Sarfo et al., 2018) and Chronic Heart Failure (Dessie et al., 2021). All these were enrolled for post-case management to prevent reoccurrence or worsening of the situation of CVD (Oluyombo et al., 2016) raised concern about how much attention is being given to managing most of these non-communicable diseases (NCDs) separately. However, according to Hassen et al. (2022), preventive strategies still stand a better chance of reducing the burden of care for CVD. Therefore, advocating for more preventive strategies among the underserved and vulnerable groups is pertinent, focusing on comprehensive educational intervention programmes on prevention strategies for CVD risks (Tan et al., 2020).

- **Need for local, regional, or national programmes or policies.**

From the studies reviewed, it was realised that there were variations in the outcomes of the interventions. Almost all the studies focused more on the control of blood pressure and compliance with a regimen of treatment or clinic visits (Ademuyiwa & Okubadejo, 2021, Adler et al., 2019, Dessie et al., 2021, Hickey et al., 2021, Sarfo et al., 2018). None of the studies reviewed concentrated comprehensively on other biophysical profiles identified in previous studies as key risk factors of CVD (Díez-Villanueva et al., 2022, Stewart et al., 2017). This finding suggests more comprehensive local, regional, and national programmes that prevent and reduce CVD risk among older adults in Africa.

In all the five studies reviewed, there were some methodological limitations with reporting information related to proper randomisation, allocation concealment, blinding, access to the full content of the intervention programmes, follow-up of participants, intention-to-treat and statistical analysis procedures. The uniqueness of RCTs in most clinical trials involving educational intervention is the unblinding of individuals involved in delivering interventions

and analysis (Dessie et al., 2021, Hickey et al., 2021, Sarfo et al., 2018). This, however, does not lessen the efficacy of the research design. Ademuyiwa and Okubadejo (2021) 's study had more self-reported outcomes, such as reduction or cessation of alcohol intake. They acknowledged that the study needed to be expanded due to scanty previous studies on such intervention programmes in Nigeria.

4.6.4 Outcomes of the Reviewed Studies

In their study, Dessie et al. (2021) stated that social support was consistently associated with reduced cardiovascular disease. They suggested that the intervention led to better health-seeking and self-care behaviours among the participants, especially multiple health education sessions. Hence, the relevance of educational intervention programmes, social groups and networking. The multi-level approach adopted by Hickey et al. (2021) brought about a 22% improvement in hypertension control during the study's evaluation phase (after three years). The approach shows the effect of long-term intervention studies on controlling one of the modifiable risk factors of CVD.

Modern technologies could be trusted to improve blood pressure monitoring and CVD risk control, as Sarfo *et al*. (2018) operated. The researchers suggested that an m–Health–based, nurse-guided BP control intervention among African stroke survivors was feasible. A similar approach, using a short message service to send reminders on medication adherence, counselling, and more health tips, significantly impacted the control of blood pressure, adherence to medication, and overall outcome compared to the control groups (Ademuyiwa & Okubadejo, 2021, Adler et al., 2019, Sarfo et al., 2018).

All these outcomes were statistically significantly higher in the intervention compared to the non-intervention group ($P < 0.05$). However, it was unclear if the self-reported outcomes were measured reliably and consistently. There might be limitations in accessibility, literacy, and affordability. This is where partnerships and adequate funding could help design culturally adaptable technology that could be within reach and better help access, retain, and utilise the information given to make better health choices. Such intervention programmes should be evidence-based, accessible, understandable, and age-friendly.

4.8 SUMMARY OF FINDINGS FROM SYSTEMATIC REVIEW

Table 4.7: Summary of findings from the systematic review

Category (Domain)	Sub-category (sub-domain)	Sub-category (element)
1. Screening and assessment	Screening	-
2. Intervention approaches	Guideline-based interventions	Standardized protocol of national guidelines
		World Health Organisation developed a guideline recommendation for CVD control and prevention.
		Intervention package guided by an existing clinical guideline
	Patient-centred interventions	Intervention was patient-centred care
		Nurse-guided intervention in improving health outcomes
	Nurse-led strategies	Nurse-led secondary stroke prevention strategy
3. Education and Counselling	Health education	Multiple health education sessions
	Counselling interventions	Standardized intensive in-person counselling
		Additional telephone calls
4. Technology-enabled interventions	Digital Health Tools	m-health technology enabled intervention
		Blue-tooth UA 767 Plus BP device and smartphone
	Monitoring and reporting	Monitoring and reporting BP measurement and medication intake
5. Lifestyle and Self-Management	Lifestyle and adherence	Lifestyle, diet, clinic, and physical therapy attendance
		Drug compliance
		Self-care adherence scale
6. Intervention packages	Comprehensive packages	Package of interventions
		Contents were locally relevant solutions for CVD risk prevention
7. Outcomes and Goals	Targeted outcomes	Focused on modifiable risk factors
		Increasing hypertension control

The dataset synthesizes evidence from a systematic review of interventions aimed at reducing cardiovascular risks in older adults' populations. The review explores diverse strategies to enhance health outcomes and promote adherence to preventive care. Findings are summarized as follows:

- **Guideline-Based Interventions**: Standardized protocols, including WHO guidelines, are foundational for consistent care.

- **Patient-Centered and Nurse-Led Care**: Tailored, patient-focused interventions and nurse-led strategies improve health outcomes.
- **Education and Counselling**: Multiple sessions of health education and counselling enhance patient understanding and adherence.
- **Technology-Enabled Solutions**: Digital health tools, such as mHealth apps and BP monitoring devices, support remote care and self-management.
- **Lifestyle and Adherence**: Interventions targeting lifestyle changes, including diet, exercise, and medication compliance, are effective in managing modifiable risk factors.
- **Comprehensive Intervention Packages**: Locally relevant, multifaceted packages address diverse needs and improve hypertension control.

4.9 SUMMARY

The findings underscore the importance of guideline-based interventions, patient-centered care, and nurse-led strategies. Education, digital tools, and tailored intervention packages enhance self-management and hypertension control, emphasizing personalized, technology-enabled care for elderly populations. This evidence synthesis provides part of the framework for developing this thesis's educational intervention programme.

The findings and discussion of the qualitative study is elaborated in the next chapter.

CHAPTER FIVE

PART TWO: FINDINGS AND DISCUSSION OF THE QUALITATIVE STUDY

5.1 INTRODUCTION

This chapter is the second section of the exploratory phase of the main study. It presents the significant findings of the qualitative arm of the study and discusses them thematically.

5.2 OBJECTIVE OF THE STUDY

This study aimed to identify the barriers and facilitators of educational intervention programmes on cardiovascular disease risk reduction among retired older adults.

5.3 DESCRIPTION OF THE RESEARCH PARTICIPANTS

The research participants of the FGD **were** members of an organised association that meets regularly at their owned halls or designated meeting places. Consenting participants who met the inclusion criteria were invited to the FGD on pre-arranged dates at each discussion venue. In this section of the study, three focus group discussions were conducted, each consisting of ten, eight, and ten participants, respectively, at the three different locations of the study. All the groups had a facilitator and co**-facilitator**. After a brief introduction, the purpose of the study was shared, and guiding rules were outlined for proper coordination of the study. Open-ended semi-structured questions were engaged. The interviews were recorded in Yoruba, the indigenous language of Osun state, Southwest Nigeria.

The researcher moderated the group discussions, and two research assistants trained by the researcher two weeks before the actual data collection helped record the discussion proceedings. The researcher conducted training of the research assistants in February 2023, and all instruments were pre-tested before commencing the actual data collection. The research assistants also signed the confidentiality clauses and ethical training as required by

the university's Institutional Review Board. The FGDs were conducted between February and April 2023. Each session lasted between sixty–ninety minutes.

5.4 RESULTS

5.4.1 Participants of the study

The results from the data analysed among the study participants are presented below. The demographic characteristics of the sample are outlined in Table 5.1 below.

Table 5.1 Participants' characteristics (n=28)

Age	**Frequency**	**Percentage (%)**
60-64	8	28.6
65-69	9	32.1
70-74	8	28.6
75-79	2	7.1
80 and above	1	3.6
Gender		
Male	16	57.1
Female	12	42.9
Marital Status		
Married	23	82.1
Widowed	5	17.9
Divorced/separated	0	0
Religion		
Christian	24	85.7
Muslim	4	14.3
Traditionalist	0	0
Level of Education		
Tertiary	22	78.5
Diploma	5	17.9
Post-secondary	1	3.6
Year post-retirement		
0-5	7	25
6-10	7	25
11-15	10	35.7
16-20	2	7.1
21-25	1	3.6
26-30	0	0
30 and above	1	3.6

The study engaged 28 retired older adults with a mean age of 68.1 (SD=5.12). About two-thirds were male (57.1%). All participants had at least one form of higher education, while only 3.6% had post-secondary education (Technical school). All key characteristics are detailed in the table above.

The FGD generated important opinions that were identified meaningfully, and the formulated meanings were grouped into categories a priori. Based on their unifying characteristics and objectives of the FGD, these central themes were connected to the sub-themes as they relate to the established opinions.

5.4.2 Themes derived from the Data.

Three (3) Themes and fourteen (14) sub-themes emerged and are summarised in the table 5.2 below. The first two themes were set a priori to analyse the factors that help older adults participate effectively in educational interventions, as well as the elements that prevent them from benefiting from such. Suggestions made for improvement by the participants were clustered in the third theme and discussed in detail in the latter part of this section. Quotes from the respondents are highlighted as verified by at least two participants and transcribed by the researcher. The researcher also ensured that quotes were **representative** of the points presented for each category of the theme and sub-theme. The codes FGD 1, 2 and 3 represents submissions from each interview of the Focus group discussion.

Table 5.2: Theme and sub-theme generated from the qualitative study

Theme	Sub-theme	Element
1. Facilitators	Support from health professionals and institutions	Medical people from the hospitals, and health centres, religious bodies
		Health visits organised by some research people like the doctors, nurses, and community health workers
		General body tests conducted for us
	Community and group-based support	Health talks given in booklets

		Generally, the programme talks
		Even in the church during health week
		Gathering walks, group discussions and sharing experiences
		Exchanging ideas on common health problems
	Use of technology and media	Facebook and YouTube
		Use of radios and television for sensitization
		The health talks enjoyed most include pictures, films, and multimedia aids
		Booklets, pamphlets, machines, screens, and takeaways like pens and stickers
	Family support and learning	Children or grandchildren help opera devices and phones
		We seek information and keep learning
2. Barriers	Financial and logistical challenges	Financial challenges and burdens as retired persons
		Distance as a barrier to attending sessions
		Lack of government schemes or inadequate pensioner support
	Social and psychological barriers	An isolated attitude, not joining groups, and lack of socialization
		Disunity among peers hinders group efforts
		An unyielding mind and resistance to change
		Some do not listen to or take doctor's advice seriously
	Technological and educational limitations	Limited use of phones beyond basic calls
		Difficulty operating complicated Android phones
		Poor participant knowledge of CVD and associated risks
		Illiteracy contributing to lack of awareness and disease management

		Erroneous beliefs about CVD
3. Suggested ways of improvement	Educational and awareness strategies	Organise more health talks against diseases
		Show interest and be open-minded during group activities
		Regular campaigns with free seminars for CVD education
		Use media such as internet, radio and social networks for wider reach
	Government and financial support	Government to implement an effective elderly care scheme
		Financial assistance for retirees
		Good pension packages and small rewards for participation
	Community and health professional engagement	Regular visits by professionals every three months
		Program with easy general applications that everyone can use
		Create a regular program to educate and reach more people

These main objectives were, to explore the facilitators and barriers to the effective implementation and uptake of educational intervention among older retired adults in Osun state, Nigeria. Participants (FGD 1=Ile-Ife, n=10; FGD 2=Ilesa, n=8; FGD 3=Osogbo, n=10) shared their opinions and experiences on matters discussed as follows:

5.4.2.1 Theme 1: Facilitators of effective educational interventions

In this section the set theme identified enhancing factors that help the older adults with accessing, sharing. adoption and retention of health information, as it relates to CVD risk.

Many factors contributed to the disposition of participants to educational intervention programmes in general. From their submission, many of the participants had, at some point, benefitted from such educational programmes in the past.

Sub-theme 1: Support from health professionals and institutions

In this study, participants spoke about their past experiences with educational intervention programmes. They identified medical experts and professionals as key organisers of intervention programmes. Some others claimed were organised by religious bodies, groups, or organisations. This submission shows that older adults are also recognised in the public health space. The past experiences were shared by the participants as follows:

> *"Yes, we have medical people from the hospitals and health centres. Even students from campus here come to teach us about different-different types of health topics" (P6*-FGD 1*).*
>
> *"There are some research people like you, doctors, nurses, and community health officers who usually come regularly to teach and explain matters of health and even bring machines to check our health for free (P1*-FGD 3*)"*.

Some also go the extra mile to keep notes of all health talks and information shared with them by the health care professionals. One of the participants said;

> *"We have compiled some of the health talks given to us into booklets, and we have two volumes already. So, by June or so, we will be having a meeting of retired principals in Osun State in Ilesha here to share them with our people" (P4*-FGD 2*).*
>
> *"Generally, the program talks about always eating something rich and nutritious. We were told that eating vegetables, okra, and using locus beans to prepare our meals will help our body function properly, and that we retirees should endeavour to get enough rest" (P2*-FGD-1*).*
>
> *"Also, even in the church, when we are having health week, they came to check our blood pressure and talk to us about hypertension and what it can result in if we do not control it" (P6* FGD-1*).*

Sub-theme 2: Community and group-based support

Again, the participants identified mutual support as a key factor that helps them to organise and participate effectively in such programmes. They share experiences, learn from one another, and give adequate support where needed. They also influence healthy habits and the uptake of new knowledge among their social group. This shows the effect of social group on

learning process and how effective learning process could be in the uptake of new knowledge. This was common to all the groups, and this is what they said:

> *"In this group, we exchange ideas on common health problems with one another; we also try to maintain good relationships where there is no fight or rancour" (P6* FGD-1)

> *"We invite nurses on a regular basis to do general body tests for us, after which some advice will be given to us on how not to have ailments like stroke and hypertension and how to maintain our health generally". (*7FGD-1)

> *"Yes, I have said gathering together and teaching, educating ourselves and helping anyone that has a problem. Then …because there are some people that don't know what they are supposed to do, but when you get to see one another, you will be able to discuss and there will be solutions"* (P3 FGD-2)

> *"We often do some group walks, group discussion and sharing of experiences about our health, surviving tough conditions like this and general well-being".* (P4 FGD-3).

Sub-theme 3: Use of technology and media

In this study, modern technology has been of great help to some of the participants. This has enhanced their attitude to seeking information and the uptake of new knowledge. In a way, older adults it could be inferred that some older adults have access to information using electronic devices. This was a bit controversial. One of the participants said this:

> *"Yes, it is true; one may be asked to practice something relating to how to cure some health challenges on Facebook and YouTube and when one tries it, it will work"* (P3 FGD-1).

And some in another group said:

> *"Things are changing so fast…..In this age of technology, one must look for information may be apart from attending seminars, reading, checking the internet." (5FGD-*2).

> *"We get better information and sensitisation too through radios, television, and more from other previous methods in health talks said earlier" (*P1 FGD 3).

However, the opinion is subjective based on each participant's technology prowess. Some participants still struggle with the use of modern telecommunication gadgets.

"Not everybody does that o, I use my phone mostly for calls. …(P8 FGD-1)

"I use my phone mostly for calls too, I am too old for all these computer gadgets"(P4 FGD- 3)

Sub-theme 4: Family support and learning

The participants had different views on how they learn new things. While some learn through health talks given by medical experts, some still desire age-friendly learning aids. Some others rely on radio and television as other sources of enlightenment. Here is what they share:

"...But we have our children or grandchildren to help us operate some of these devices and phones. It could be very difficult to use at times" (P8 FGD-1).

"I think I prefer regular physical visits by doctors and nurses to come teach us like we have churches and some of our meeting days" (P6 FGD-1).

"Thank you. … You see we can ask questions and confirm what you are not sure about from medical people directly. If you go to chemist shop, they will give you medicines, and some are not trained to know what is wrong with you. They will just take the little money on you and ask you to try another one if you go there again" (P5 FGD-1).

"…Somebody said that a man starts to die the moment he stops learning; that is very true ...we will keep learning" (P3 FGD-3).

"Any good programme must have easy universal application, irrespective of your place of origin, religion, or social group" (P6 FGD-2).

"We also gain more knowledge from radio, television and by checking health matters on social media, well for those who can use it" (P8 FGD-1).

"Our elders use to say, "what you hear you may forget but what you see you are likely to remember". The health talk we enjoy the most are the ones that show pictures, films on how to stay healthy, what to do and what not to do as an elderly person. They gave us booklet or jotter like pamphlet that contains everything they are saying as take-home materials to learn more" (P4 FGD-2).

"Different groups come with different styles o. Some will come with charts and show us as they are talking, some distribute posters too. But the big ones are more organised. They come with machines, screens, chart, pen as take away, stickers containing information of what they are teaching us. There was one we had recently on nutrition and prevention of cancer; in fact, it was very educative I like it" (P7 FGD-3).

5.4.2.2 Theme 2: Barriers to the uptake of educational interventions

In this section of the study, participants shared various reasons hindering their disposition towards intervention programmes. Most factors are socio-economic, thus limiting their level of awareness or willingness to participate in organised programmes.

Sub-theme 1: Financial and logistical challenges

Finance is another common ground to which all participants agreed and a key factor to empowering the older adults achieve optimal access to needed health information. All the participants unanimously identified poverty as a major factor that significantly hinders the adoption of any preventive, healthy lifestyle learned from any intervention programme. This further shows the alarming socioeconomic status of most participants of this study. They share their experience as follows:

> *"We have many, financial challenges, and burden as retired persons, when will that not lead to stroke"* (P3 FGD-1).

> *"It is money o. That is the major thing affecting people. When one is not financially buoyant to be amongst his/her peers. A lot of people will want to meet with their colleagues, but money will tie him/her down*" (P6 FGD-2).

> *"There is no provision for the elderly in this Nigeria…it's such a shame.*" (P7 FGD-3).

Sub- theme 2: Social and psychological barriers.

Submissions made by some participants revealed that some older adults rarely participate in any form of socialisation after retirement. Thus, they are oblivious to new ideas and knowledge shared within the group. This could be a major obstacle in getting such individuals informed or empowered as desired on health matters**.** Others suggested that some level of conflict and disagreement can hinder the effective organisation of intervention programmes within a group. This was what some of the participants said:

> *"An isolated attitude may hinder one from learning in a group. Some of us don't come for meetings regularly"* (P5 FGD-1).

> *"Not joining a group, not socialising is part of the barrier*. There are some people that don't even listen to the radio, they don't go out or mix with people after retirement. You see them just once in a while" (P4 FGD-2).
>
> *"Disunity can hinder people from coming together. Once we are not united, we may not enjoy any longer the benefit that we get from the experience that we share as regards our health status, living far from one another may also cause barrier*" (P7 FGD-1).

In line with this as well, one of the participants identified the challenge of transportation. And they agreed it makes things difficult for them to interact effectively. Therefore, some individuals might be restricted in participating in laudable programmes that borders on their health and well-being if such programmes are not within their reach. **T**his is what they have to say:

> *"I think another barrier I know is distance. It is affecting us in making arrangements for socialisation to take place, for us to hear from ourselves and relate with ourselves…the cost of transportation is high now. Even if you have your own car do you know how much it cost to fuel a car in one week now?"* (P6 FGD-2).

Some participants also mentioned that some older adults are resistant and uncompromising to change. They find it challenging to adopt a new lifestyle against their beliefs or way of life. Hence, it could be difficult for such persons to change or modify their lifestyle.

> *"An unyielding mind is another factor. There are some who have heart problems and are still taking alcohol, such people may die at any time"* (P2 FGD-1).
>
> *"You see, some of us do not listen to advice on how he or she could take care of his body and concerning how not to develop all these heart problems. If you talk, they say if it did not kill me before now, it cannot kill me again"* (P5 FGD-2).
>
> *"Some people do not take doctors' advice seriously. I have someone who says that he cannot stop cigarettes even after the doctors told him to stop smoking and not stopping the foods doctors told us not to eat again"* (P8 FGD-3).

Sub- theme 3: Technological and educational limitations

Much as technology is desired, its use appears to be challenging for some older adults. While some find it easy to access information using most modern communication technological devices, some participants still need help with their use. Hence, using advanced internet services could be difficult for some older adults. Here is how they expressed their thoughts:

"I use my phone mostly for calls. But we have our children or grandchildren to help us operate some of these devices and phones" (P8 FGD-1).

"Then another barrier that can affect learning within the group will be the inability of old people to have good knowledge of all these internet yahoo-yahoo, Facebook things. For instance, most of us cannot operate all these highly complicated Android phones apart from the ones you use to receive messages and calls" (P2 FGD-2).

"...what do they call it? Technology! Thank you… It will be difficult because what we grew with, we cannot forget it. But now, you have left work, they are talking about all these …It is not part of the old man's nature, so it is a very serious problem" (P1 FGD-2).

Another participant mentioned the issue of literacy. This could hinder older adults from participating in informative programmes.

"Illiteracy is also one of the causes of this disease because, such a person will not know what to do on time to arrest any form of the disease that may be troubling the body before it degenerates into a serious problem. An illiterate might not be aware of the steps to take to either prevent or cure any disease" (P8 FGD-1).

Additionally, participants' level of information on CVD was assessed, and they had varying opinions of the cause and management of CVD. While opinions are partly correct, some ideas were conflicting about CVD risk. This divergent opinion shows the need for adequate and correct information dissemination to help the older adults make informed choice on CVD risk reduction and prevention. A few mentioned the risk factors correctly while some are unsure of specific information to give when it comes to CVD and its risk factors. Here are some of their perceptions:

"We heard many things like people saying it is hereditary and can be caused by sleepless nights, burdened mind, eating too much fatty food, and too much of alcoholic drinks can as well cause raised blood pressure and stroke" (P7 FGD-1).

"Cardiovascular diseases are very similar to high blood pressure, which is caused by one, not being able to sleep; two, troubled mind concerning a problem, and three, thinking about the economy of the family" (P1 FGD-1).

*"We've heard that consumption of salty food, and consumption of canned food can lead to this disease because of what has been used to preserve it...*and even too much sugar and eating meat that contains too much fat can cause the disease" (P4 FGD2).

"I think cardiovascular diseases are the diseases that can be caused by the environment you live. For example, someone living in a place where there is always noise, he or she may get scared easily" (P4 FGD-3).

"I don't really know about it. One thing I know is, for those that have, they can suddenly get an attack which can leads to death... Something will sha happen to people…Youths most times often suffer from mental problems and adults mostly suffer from stroke" (P8 FGD-3).

Some participants also gave an array of questionable ideologies regarding CVD, its causes, predisposing factors. Other opinions were unfounded or linked to spiritual causes as outlined in their comments below;

"Well, I used to believe that anything from heart disease is linked to hypertension, high blood pressure, tuberculosis, kidney problem, diabetes and even cancer or …even severe malaria can cause it" (P3 FGD-1).

"When one relies too much on what the government promised to possibly do for you but they failed, it leads to hopelessness, which eventually causes cardiovascular disease" (P6 FGD-1).

"Particularly when someone has the blood sugar, the blood sugar usually leads to hypertension, and the hypertension usually leads to what next? Stroke!!! Usually, they come combined together" (P6 FGD-2).

"...some heart conditions that they say are hereditary, you know, when it is in the blood, there is nothing you will say you can do to prevent it by all means you can only control it, by checking it regularly, even personally,…… whether hereditary or not, you must not think too much about it" (P4 FGD-2).

"... you see, heart attack, heart failure, and these diseases, they are all in the same category. One Yoruba proverb says, "A thief is a thief you can only give them different names". Hypertension is… heart attack, heart failure; all these types of things are actually a result of hypertension. I even heard that if you have too much sex you can transfer or get it through that" (P1 FGD-2).

"As we have said earlier, business wise, working in a factory where they produce cements like silica can cause it, thinking excessively can affect the heart, cooking with firewood can cause it" (P5 FGD-3).

"We can talk of the religious factor too. Some of us, our religion does not sup port drug, and we believe that God will heal us. You don't have to go to the hospital for all sicknesses. if your faith can carry it… Don't let us debate that here now. Some will not believe what I am saying, I am telling you fact." (P7 FGD-3).

5.4.2.3 Theme 3: Suggested ways of effective Health literacy

In this third theme, the study participants suggested how the identified barriers could be overcome to implement effective educational intervention programmes. Some were individual-based approaches, while others were intra-group and organisational in their submissions.

Sub-theme 1: Educational and awareness strategies

Some participants suggested ways of showing commitment to the programme at an individual level. They believed having regular health talks or programmes could create needed awareness, which is vital to information retention, early diagnosis and sustained precautionary checks. Their points of view are presented like this:

> *"We should be patient enough to listen and keep to all advice offered during the program* (P6 FGD-1)".
>
> *"We will educate ourselves on how to run away from things that can make one develop heart problem* (P1 FGD-1).
>
> *"We should organise more health talks against the diseases where we will teach ourselves about what to eat and what not to eat, and that women should desists from disturbing their minds with negative taught"* (P4 FGD-2).
>
> *"You see another thing is to show interest, have interest in whatever they are doing in the group. One Yoruba proverb says, "It's what your house mates do that influences what you do… it is from organised educational programme that I am learning one or two things"* (P8 FGD-2).
>
> *"I believe we should just be open-minded and not think the disease cannot happen to us. We pray not to experience it but as they say. Prevention is better than cure*" (P3 FGD-3).

Sub-theme 2: Government and financial support

From their submissions, all participants clamoured for adequate welfare and support services for older adults to help them enjoy the ageing process more comfortably. It further reveals the place of socioeconomic support as major support system desired by all the participants of this FGDs. Here is what they said:

"The main preventive measure will be for the government to have definite and effective scheme of taking care of the elderly. Yes o, government should *provide good package for the pensioners. Then, this NHIS privileges (Health Insurance) should be extended to we pensioners*" (P4 FGD-1).

"Part of the things I will suggest is that representatives from the government or other corporations in charge should be visiting us maybe once in three months. They can be visiting us through our union and groups like this, let discuss how they can take care of old people in the community" (P1 FGD-2).

"There is a poor provision from the government for we retirees. The government should make provisions to assist retirees financially in living well and settling their hospital bills. We will appreciate if the government can pay more attention to this and cater for our welfare in old age" (P7 FGD-3).

Sub-theme 3: Community and health professional engagement

All the participants preferred healthcare practitioners' visits and educational programmes, compared to just random sources of information. Regular visits and routine health care checks paves way for adequate preventive strategy, social bonding and effective and they shared their viewpoints as these:

"You can simply give little-little rewards. For example If there is announcement that if you come to the hospital to check your high blood pressure that is just, maybe twice in a week, you will take a free medical drug, one time in a week that's an incentives, people will come- The program can be enlarged, and you also create free seminars for people in the community, supply medicines and multivitamins, for the elderly" (P2 FGD-3).

"If I am aware that such a programme is available, I will gladly attend and inform others, so awareness is essential" (P6 FGD-2).

"I will suggest regular campaigns for those who are about to retire long before their retirement time and prompt pension payment so that retirees can take good care of him/herself" (P5 FGD-1).

The participants desired age-friendly, easy-to-use, and familiar methods of getting needed information from any educational intervention programme planned to be utilised*. Here is what they said:*

"The health talk we enjoy the most are the ones that show pictures, films on how to stay healthy, what to do and what not to do as an elderly person. They gave us booklet or jotter like pamphlet that contains everything they are saying as take-home materials to learn more. Any good programme must have easy general application ….. everybody should be able to use it" (P4 FGD2).

"If you cannot reach them, it can't be checked, except you put regular programme in place where you reach the people, then educate them properly, encourage them and then gradually such factors will be reduced, and people will yield to whatever advice that is given in other to live a good life" (P8 FGD-3).

Not minding the challenge of advanced technology, some participants still embraced the idea of using the social media and technologies to create needed awareness for the prevention of illness as diseases generally. This shows that some level of technology could still be used in creating health awareness among older adults. Some participants shared their view in this manner:

"By using the media advantage to ensure that people become aware of the need to take care of their health, internet, radio, electronics, all these are available" (P4 FGD 1).

"The social media is even enough to get information and place it on a social network, even Facebook for people to read and entice them, so that they can take care of their health" (P1 FGD-3).

5.5 DISCUSSION OF THE MAIN FINDINGS

This study aimed to explore and describe the perceived facilitators and barriers to the effective implementation of educational intervention programmes among retired older adults in a Southwestern state of Nigeria. From the participants' point of view, the current findings revealed the factors contributing to new knowledge uptake among older adults, such as previous experience, mutual support, modern technology, and multimethod interventions. In contrast, factors like finance, social isolation and conflicts, resistance to change, advanced technology, poor knowledge and erroneous belief about CVD risk were identified as barriers to their effective participation in educational intervention programmes. This finding further confirmed the submission of Owolabi et al. (2016) that there are multi-level facilitators and

barriers to the effective implementation of intervention programmes, especially in preventing CVD in Nigeria.

As mentioned earlier, participants in this qualitative arm of the study claimed to be familiar with educational intervention programmes, which greatly benefited them. Most enlightenment programmes were organised or scheduled within identified groups. Dessie et al. (2021) affirmed that the number of educational programmes and enlightenment influences health awareness and outcomes. Furthermore, group learning activities, such as social interactions and unity, have been identified to help uptake new information within the group. Peer influence is essential for adequate knowledge (Haykin et al., 2020). Therefore, Aerts et al. (2022) suggested a critical recommendation that interventions should be tailored to specific groups in the community at the time (Aerts et al., 2022). Participants in the study also attested to the impact and effectiveness of group learning sessions. This social interaction influences how well the older adults are receptive and willing to utilise knowledge gained. As confirmed by the participants, the social circle means a lot to them, helps them to share experience, knowledge mutually and learn new things.

A few participants affirmed that modern technology has helped them access information on health and well-being. However, this is not a generalisable statement because others claimed they struggled with using these devices. In addition, Schorr et al. (2021) posited that the internet has birthed various applications that have enhanced access to health information in the most advanced countries. Prior studies affirmed that most low and middle-income countries, especially older adults, have limited access to health information through technology (Hassen et al., 2022, Kganakga et al., 2022).

The methods preferred by participants in the FGDs were the ones conducted by health professionals and had adequate, easy-to-use, supportive learning aides. Such methods are suggested to be effective in disseminating needed information. It further confirms the importance of nurse-led educational intervention programmes (Aerts et al., 2022, Amraei et al., 2020). Participants trust health professionals to give detailed and needed information without exploring or extorting them financially. It further promotes professionalism as nursing is globally recognised as a profession of trust (Haykin et al., 2020, Schultz et al., 2018).

Therefore, coordinating and implementing an educational intervention programme comes as part of the expanded roles of a nurse (Himmelfarb et al., 2016). Apart from health talks and seminars, some participants still access needed information by listening to the radio, television, and newspapers. Participants identified diverse methods as methods deplored in previous educational programmes they have had. Some of them are health talks, *pictures, films*, *machines, screens, charts, pen as take away, and stickers containing vital health information.* All these and many other acceptable methods have been previously engaged in educational intervention studies. (Cusack et al., 2018, Schorr et al., 2021).

Another important aspect of this study is some factors highlighted as barriers to effective educational intervention programmes among the participants. A crucial element identified was finance and how it affects their socio-economic status. This opinion corroborates the submissions of Ojo and Mohammed (2013) and, Ozoemena et al. (2019), who posited that, among many other things, retired older adults in Nigeria face socio-economic, physiological and psychological challenges regularly. Such a challenge could limit their overall well-being (Faronbi et al., 2021) and hinder their effective participation in educational intervention programmes. This further supports the submissions of Owolabi et al. (2016) that the socio-economic status of an average older adult in Nigeria calls for concern as it sets limitations on their overall well-being. Consequently, educational intervention programmes requiring a specified period must consider the socio-economic status of the participants and the need to support them appropriately. The challenge of social isolation and conflict within a group might also be linked to the socio-economic problems facing older adults. Poverty could strain relationships and group interactions. Therefore, advocacy is needed to adequately support older adults in living as they desire and promote healthy social interactions (Mbam et al., 2022, Owolabi et al., 2016).

Furthermore, the study discovered that not all older adults are technology inclined. Some participants can rarely operate sophisticated devices such as smartphones or use social media handles like Instagram, Facebook, and other software applications. This challenge could be resolved by developing simple, user-friendly programmes or learning aids for older adults. As a result, deploring advanced technology must be done with caution when designing intervention programmes, as seen in some advanced countries or contemporary nations

(Mares et al., 2022, Sarfo et al., 2016). Whilst almost all the study participants claimed to have been exposed to some form of educational intervention, some gave conflicting information about CVD and its risk factors. Additionally, wrong preconceived ideas could stem from poor knowledge base and awareness, unhealthy choices and lifestyles, and limited preventive healthcare services (Amini et al., 2021).

Some participants had a vague idea of what the causes of CVD are and what to look out for as preventive measures, while others still held on to some misconceptions about the topic. Some of the identified misconceptions were explicitly on religious and cultural grounds about CVD. It further confirms the limited knowledge of CVD and the associated risk factors (Amini et al., 2021, Hassen et al., 2022, Okube et al., 2023). Such erroneous ideas can be corrected in the place of enlightenment and sharing of experience within the group and given credence that peer influence is essential for adequate knowledge. Therefore, interventions should be narrowed to specific groups in the community at the time (Aerts et al., 2022).

Another salient issue was the general opinion on CVD risk, which centres more on hypertension as the leading cause of CVD. This finding further confirms the results compiled in the systematic review section of this research work (Chapter 4.9). Much attention has been given over time to hypertension, which is very significant. However, there is a need to give comprehensive coverage to other CVD risk factors for effective preventive strategies in reducing CVD risk (Adedoyin et al., 2018). Hassen et al. (2022) presented the dire need for enlightening people on healthy lifestyles and basic strategies for CVD prevention through education, which is the hallmark of all preventive interventions.

Participants suggested ways of making educational intervention programmes well delivered to older adults. According to the participants, having a level of personal or group interest with an open disposition is crucial for active participation in the intervention programme. Therefore, any programme presented to older adults must be of interest to them in order to enhance voluntary participation. Another recommendation made by the participants was for effective schemes and services by the government. Records show that global efforts to control CVD are yielding successful outcomes; however, there is still a growing epidemic in developing nations (Cusack et al., 2018, Owolabi et al., 2016, Ramôa Castro et al., 2017).

Government and policymakers are significant in helping older adults live healthy lives and reducing their CVD risk. Schemes and services that promote awareness, free health screening, health insurance, and prompt payment of entitlements as identified by the participant are amongst a few other things that need to be prioritised for older adults in Nigeria. There are also limited agencies in public-private partnerships of health promotion services for older adults in Nigeria (Mbam et al., 2022, Owolabi et al., 2016). Hence, there is a need to create more awareness, use all local means of communication to reach the unreached, and promote collaboration and involvement of stakeholders.

Some of the methods of enlightenment recommended by the participants are health visits and talks, giving of leaflets, booklets, and social interactions within groups. Several methods of educational programmes have been engaged in previous African studies as outlined in the systematic review (Chapter 4), ranging from health talks to phone-based interventions, text messaging, visits, and other indigenous (Ademuyiwa & Okubadejo, 2021, Adler et al., 2019, Sarfo et al., 2018). Many other methods identified and commonly used on global scenes are group work, videos, telephone, workshops, educational material, group sessions and counselling (Cusack et al., 2018, Ramôa Castro et al., 2017). However, as suggested by the participants, consideration must be given to local learning methods among older adults (Okop et al., 2023). Hence, it is expedient to exercise caution while developing educational programmes for older adults to be in simple language, easy to comprehend and effect the desired change.

5.6 SUMMARY OF FINDINGS FROM THE QUALITATIVE STUDY

This dataset captures older adults' perceptions of cardiovascular health interventions, highlighting both facilitators and barriers to their participation in preventive care programs. Findings are as summarized in the following section.

Table 5.3 Summary of findings of the Qualitative study

Factors identified	Elements
Facilitators of Engagement	Support from healthcare professionals, community groups, and family members encourages participation in health programs
Effective Education Tools	Health talks, multimedia aids, and accessible materials like booklets improve understanding and engagement.
Technological Assistance	Older adults rely on family and simplified tools to navigate digital health solutions
Barriers to Participation	Financial challenges, social isolation, limited technological skills, and misconceptions about CVD hinder effective participation.
Need for Government Support	Better financial aid, pension packages, and regular healthcare visits are essential for sustaining elderly care.
Preferred Program Features	Regular health campaigns, interactive sessions, and incentives are recommended to enhance engagement and adherence

The study shows older adults value support from healthcare professionals, community networks, and family in managing cardiovascular health. Facilitators include health talks, group activities, and multimedia education. Barriers like financial constraints, technological challenges, and social isolation hinder participation. Key improvements include regular healthcare visits, better government support and targeted educational campaigns. It has also ushered in a searchlight to guide the design of a comprehensive educational intervention programme for the prevention of CVD among retired older adults in a Southwestern state of Nigeria.

5.7 SUMMARY

This chapter focuses on part two of the exploratory phase, which discussed the opinion of retired older adults on the barriers and facilitators of implementing educational intervention programmes among them as a group through focus group discussions. participants value support from healthcare professionals and family while financial, technological, and support barriers hinder participation. The study highlights the need for government support, simplified technology, and regular healthcare engagement, with suggestions for more accessible health programs, targeted campaigns, and financial incentives.

The next chapter will **present** the development and validation of the educational intervention programme.

CHAPTER SIX

PHASE TWO: DEVELOPMENT AND VALIDATION OF THE EDUCATIONAL INTERVENTION PROGRAMME

6.1 INTRODUCTION

This chapter of the thesis presents the programme development process and methods of verifying the educational intervention developed aimed at creating needed awareness for reducing cardiovascular disease (CVD) risk among retired older adults in Osun state, Nigeria. Findings from the first study (systematic review and qualitative study) formed the framework for developing the intervention programme. It also presents how a group of experts validated the intervention programme through the Delphi study.

6.2 TRIANGULATION OF FINDINGS

Triangulation design is a one-phase design that deploys a well-known approach to mixing methods (quantitative and qualitative) in research studies (Creswell & Creswell, 2017). This design aims to strengthen the validity and reliability of research studies of interest from multiple data sets during the same timeframe and with equal weight (Creswell & Creswell, 2022). The process helps to understand the research problem best as it synergises contrasting strengths and weaknesses of both quantitative and qualitative studies that are non-overlapping. Triangulation also helps to compare quantitative statistical results with qualitative findings or to validate or expand quantitative results with qualitative data (Creswell & Creswell, 2022).

6.2.1 Triangulation Design Procedures.

In this study, there was a concurrent but separate collection and analysis of quantitative and qualitative data. The aim was to provide better understanding of the research problem. The researcher attempted to merge the two data sets, typically by bringing the separate results

together in the interpretation or by transforming data to facilitate integrating the two data types during the analysis.

- **Step 1: Research question and design: Overall objective of the study.**

The subset research questions of this study explored what educational intervention programmes with evidence-based strategies were effective in creating needed awareness for reducing cardiovascular disease (CVD) risk among older adults in Africa. It also assessed barriers, facilitators, and gaps in implementing previous educational intervention programmes among retired older adults.

- **Step 2: Data collection**

The two principal methods engaged were a systematic review of literature on existing educational intervention programmes in Africa for a broader scope. A focus group discussion among retired older adults in Osun state, Nigeria, was also conducted to explore barriers, facilitators, and gaps in implementing previous educational intervention programmes.

- **Step 3: Data analysis**

The researcher appropriately analysed findings from both studies (systematic review and focus group discussion) to generate data using statistical tools. The systematic review **generated descriptive and inferential statistics,** while the focus group discussion (FGD) generated vital themes explored by **thematic analysis**.

- **Step 4: Integration of Findings**

The findings of chapters 4 and 5 were discussed extensively in each thesis chapter. Therefore, the researcher analysed the two sets of findings meaningfully and compared data for the convergence of ideas. The summary of the findings is presented below.

- **Step 5: Triangulation of the two findings**.

Working through this study's conceptual framework, the outcome of the first phase functioned as a guide to developing an educational intervention programme for retired older adults in Nigeria.



Figure 6.1 The concurrent triangulation design (adopted from Creswell & Creswell 2022).

Table 6.1: Re-organised findings from dataset 1 (systematic review)

Category (Domain)	Sub-category (sub-domain)	Sub-category (element)
Screening and assessment	Screening	-
Intervention approaches	Guideline-based interventions	Standardized protocol of national guidelines
		World Health Organisation developed a guideline recommendation for CVD control and prevention.
		Intervention package guided by an existing clinical guideline
	Patient-centered interventions	Intervention was patient-centred care
		Nurse-guided intervention in improving health outcomes
	Nurse-led strategies	Nurse-led secondary stroke prevention strategy

Education and Counselling	Health education	Multiple health education sessions
	Counselling interventions	Standardized intensive in-person counselling
		Additional telephone calls
Technology-enabled interventions	Digital Health Tools	m-health technology enabled intervention
		Blue-tooth UA 767 Plus BP device and smartphone
	Monitoring and reporting	Monitoring and reporting BP measurement and medication intake
Lifestyle and Self-Management	Lifestyle and adherence	Lifestyle, diet, clinic, and physical therapy attendance
		Drug compliance
		Self-care adherence scale
Intervention packages	Comprehensive packages	Package of interventions
		Contents were locally relevant solutions for CVD risk prevention
Outcomes and Goals	Targeted outcomes	Focused on modifiable risk factors
		Increasing hypertension control

This review highlights interventions for reducing cardiovascular risks in the older adult, including guideline-based approaches, patient-centred care, and nurse-led strategies. Education, counselling, and digital health tools such mobile apps and remover monitoring improve health outcomes and hypertension control. Tailored intervention packages effectively address modifiable risk factors.

Table 6.2: Findings from dataset 2 (qualitative study)

Category (Domain)	Sub-category (sub-domain)	Sub-category (element)
Facilitators	Support from health professionals and institutions	Medical people from the hospitals, and health centres
		Visits by some research people like doctors, nurses, and community health officers
		General body tests conducted for us

Category (Domain)	Sub-category (sub-domain)	Sub-category (element)
	Community and group-based support	Health talks given in booklets
		Generally, the program talks
		Even in the church during health week
		Gathering walks, group discussions and sharing experiences
		Exchanging ideas on common health problems
	Use of technology and media	Facebook and YouTube
		Use of radios and television for sensitization
		The health talks enjoyed most include pictures, films, and multimedia aids
		Booklets, pamphlets, machines, screens, and takeaways like pens and stickers
	Family support and learning	Children or grandchildren help opera devices and phones
		In this age of technology, we seek information and keep learning
Barriers	Financial and logistical challenges	Financial challenges and burdens as retired persons
		Distance as a barrier to attending sessions
		Lack of government schemes or inadequate pensioner support
	Social and psychological barriers	An isolated attitude, not joining groups, and lack of socialization
		Disunity among peers hinders group efforts
		An unyielding mind and resistance to change
		Some do not listen to or take doctors advice seriously
	Technological and educational limitations	Limited use of phones beyond basic calls
		Difficulty operating complicated Android phones

Category (Domain)	Sub-category (sub-domain)	Sub-category (element)
		Poor participant knowledge of CVD and associated risks
		Illiteracy contributing to lack of awareness and disease management
		Erroneous belief about CVD
		Erroneous beliefs about CVD
Suggested ways of improvement	Educational and awareness strategies	Organise more health talks against diseases
		Show interest and be open-minded during group activities
		Regular campaigns with free seminars for CVD education
		Use media such as internet, radio and social networks for wider reach
	Government and financial support	Government to implement an effective elderly care scheme
		Financial assistance for retirees
		Good pension packages and small rewards for participation
	Community and health professional engagement	Regular visits by professionals every three months
		Program with easy general applications that everyone can use
		Create a regular program to educate and reach more people

The study conveyed older individuals' value support from healthcare professionals, community networks, and family in managing cardiovascular health. Facilitators include health talks, group activities, and multimedia education. Barriers like financial constraints, technological challenges, and social isolation hinder participation. Key improvements include regular healthcare visits, better government support and targeted educational campaigns.

Table 6.3: Final list of integrated findings from systematic review and qualitative study

Domain	Sub-domain	Element	Systematic Review	Qualitative study
1. Screening and assessment	Screening for risk factors	-	√	
	General body tests conducted by healthcare professionals	-	√	√
2. Intervention approaches	Guideline-based intervention	Standardized protocols of national guidelines	√	-
	Patient-centered care	Nurse-guided interventions for health improvement	√	-
	Nurse-led strategies	Secondary stroke prevention strategies led by nurses	√	-
3. Education and counselling	Multiple-health education sessions	-	√	-
	Standardized in-person counselling and follow-ups through telephone calls	-	√	
	Community health talks using multimedia aids (i.e. booklets, films, pamphlets)	-	-	√
4. Technology-enabled interventions	Digital health tools	m-health technology-enabled support	√	-
		Use of Bluetooth BP devices and smartphones	√	-
	Monitoring and reporting	BP measurement and medication intake tracking	√	-
		Sensitization through media (e.g. Facebook, YouTube, radio, television	-	√

Domain	Sub-domain	Element	Systematic Review	Qualitative study
5. Lifestyle and self-management	Promoting adherence to lifestyle changes: diet, physical therapy, and clinic attendance	-	**√**	
	Self-care adherence scale for evaluating compliance	-	**√**	
	Encouraging drug compliance	-	**√**	
6. Intervention packages	Comprehensive intervention packages tailored to local contexts for CVD prevention	-	**√**	
7. Facilitators of success	Comprehensive intervention packages tailored to local contexts for CVD prevention	-	-	**√**
	Support from healthcare professionals: doctors, nurses, and community health officers	-	-	**√**
	Group-based support (e.g. discussions, group walks, shared experiences)	-	-	**√**
	Family-assistance with technology and promoting learning	-	-	**√**
8. Barriers to success	Financial and logistical challenges	Financial burdens and lack of adequate pension support	-	**√**
		Distances from healthcare, facilitators or support system	-	**√**

Domain	Sub-domain	Element	Systematic Review	Qualitative study
	Social and psychological	Isolation, lack of socialization, and resistance to advance	-	√
		Erroneous beliefs, and limited knowledge about CVD devices	-	√
	Technological difficulties	Difficulty using modern smartphones or technology	-	√
		Limited use of phones beyond basic calls	-	√
9. Suggested ways of improvement	Educational and awareness strategies	Regular health talks, campaigns, and seminars using accessible media	-	√
		Easy-to-use programs for educating the older adults	-	√
	Government and Financial support	Financial support for retirees, and improvement pension schemes	-	√
		Effective government schemes for older adults	-	√
	Community and health professional engagement	Regular visits by health care professionals (e.g. every three months)	-	√
		Regular, community-focused educational programs	-	√

The final integration of domains (Table 6.3) to form the layout for drafting the content of the educational intervention programme. Further integration and classification of the items into

domains and sub-domains gave room to reorganise and reduce them into sizable meaningful numbers.

6.3 CONTENT OF THE EDUCATIONAL INTERVENTION PROGRAMME

Each research design in chapters 4 and 5 (Systematic review and Qualitative study) generated findings that were highlighted in the conclusional statements of Tables 6.1 and 6.2 the aggregation of findings from both data sets produced tables 6.3. Overall, there were nine domains generated from the triangulation of findings.

The researcher analysed the evidence generated from the study as reflected in Table6.5. These findings were integrated into developing the intervention programme. Merging the highlights in the domains and sub-domains of the findings, the evidence outlined included screening and assessment, intervention approaches, education and counselling, technology-enabled interventions, lifestyle and self-management, intervention packages, facilitators of success and barriers to success, with suggested ways of improvement. The WHO guidelines for the prevention of CVD risk further guided the developed programme(World Health Organization, 2007). This was with the aim of providing a comprehensive programme, as indicated in the findings used in other international communities (Tan et al., 2020).

Participants in the study's FGD also identified the need for indigenous methods of learning in a simple and comprehensible language (*chapter 5, page 93*). The submission synchronised with the report of the intervention package domain, which suggested that a comprehensively developed programme should be tailored to local contexts for CVD prevention (*Domain 7*). The content of the educational intervention programme was thus culturally tailored for older adults in the Southwestern part of Nigeria. The content of this programme includes a section on understanding the basic concept and general overview of CVD, as well as the causes or predisposing factors, signs, and symptoms (*Domain 9).* The information helped to demystify the wrong perceptions and assumptions about CVD, which were identified as the barriers to a successful intervention programme (*Domain 8*). Furthermore, it empowered participants to make informed choices on the lifestyle modifications needed to reduce the risk of CVD among them.

The second section uncovered the vulnerability of older adults to CVD as searched from existing literature (Chapter 2). It also embraced facilitators of successful intervention programme (*Domain 7*), how to overcome obstacles identified and maximise the facilitators of learning among study participants through personal and group interest, collaborative learning process, and reinforcement with support from healthcare professionals.

The third section addressed lifestyle and self-management (*Domain 5*) with vital information on modifiable risk factors of CVD and how to control them to prevent and reduce CVD risk (Adedoyin et al., 2018, Tan et al., 2020). The modifiable risk factors discussed were reasonable control of blood pressure, exercise and stress management, diet and nutritional needs of older adults, abstinence from alcoholism and smoking, body weight and obesity management, and lastly, adherence to prescribed medications and noting warning signs of CVD. The section further suggested how participants can overcome obstacles and maximise the facilitators of learning among study participants through personal and group interest, collaborative learning process, and reinforcement.

6.4 PROGRAMME APPROACH

In Nigeria, there are few studies on nurse-led activities, especially educational intervention studies, that reduce CVD risk (Ademuyiwa & Okubadejo, 2021). The procedural component of the programme was determined by utilising the combination of findings from the domains (1 to 4 and 9) as evidenced in Table 6.3. Experts from relevant disciplines and the thesis supervisors ratified the developed programme through an e-Delphi process. The health belief model was a guiding model for implementing the programme (Educational intervention programme).

Based on previous evidence-based studies, educational intervention programmes are best administered to a specific group of individuals with typical features for successful empowerment and reinforcement strategies (Aerts et al., 2022, Hassen et al., 2022). This informed the choice of retired older adults who often come together as a form of socialisation and will be best reached as a group to facilitate learning, as confirmed by the participants in the focus group discussion. The programme was structured in English and Yoruba (the

indigenous) language for the participants' ease of understanding. The schedule was a 6-week-long educational intervention programme. The programme was planned for a specific day of the week for about 45 minutes, while 15 minutes was for questions, interactions, and clarifications.

A baseline assessment using the ABCD risk questionnaire helps assess participants' knowledge and attitude on CVD and its risk factors. It is a 31-item questionnaire that has shown evidence of satisfactory reliability and validity for evaluating the accuracy of perceived cardiovascular disease risk (Woringer et al., 2017). Other validated, sustainable tools for enlightenment, such as a clinical sphygmomanometer, stadiometer and weighing scale, were also used for baseline data collection.

Primary outcome: Demystifying and creating more awareness of modifiable cardiovascular disease risks.

Secondary outcome: The targeted secondary outcome of this intervention study include biological changes in BMI, blood pressure, sustained attitudinal and behavioural changes as a reinforcement and empowerment strategy for older adults at risk of CVD. Table 6.4 illustrates the programme's outline/general overview.

Table 6.4: The Educational Intervention Programme outline

Session No.	Type	Title	Content
1a	Individual	Orientation and general introduction Pre-test	Getting consent: Discuss what the programme is all about and the mapped strategies. -ABCD Risk Questionnaire **[Domains 1 & 2]**
1b	Group	Module 1: General overview of cardiovascular disease Risk Factor 1: Blood pressure control and monitoring	-What is CVD? -The Risk factors (modifiable and non-modifiable) -Emphasis on modifiable risk factors and lifestyle modifications -Normal blood pressure range for older adults -Regular checks and keeping records of outcome

Session No.	Type	Title	Content
			-Adherence to medical advice and counsel on lifestyle modifications [**Domain 3, 4,]**
2	Group	Module 2: Exercise and Stress Management	-At least 150 minutes per week of accumulated moderate-intensity physical activity -75 minutes per week of vigorous-intensity physical activity - Examples of simple, safe activities for older adults -Staying optimistic about life and being intentional about rest -Learn to share concerns with trusted friends -Avoid unnecessary burnout - Good sleeping habits - Join support groups and volunteering networks **[Domain 7, & 9]**
3	Group	Module 3: Addressing diet and nutritional needs of older adults.	Classes of food Regular water intake and timing Moderated salt consumption Controlled use of herbs and spices Drafted sample of weekly diet for older adults [**Domain 7, 8 & 9]**
4	Group	Module 4: Abstinence from alcoholism and smoking b. Body weight and obesity management	-Information on the association between alcoholism, smoking, and CVD. - Information about how to manage body weight and prevent obesity. Information on standard body mass index (BMI). **[Domain 7, 8 & 9]**
5	Group	Adherence to prescribed medications & warning signs of CVD	-Strict compliance for those on regular medications and medical check-ups -Watching out for the cardinal signs of CVD **[Domain 5]**
6	Group	General evaluation and post-test	ABCD questionnaire **[Domain 7& 9]**

Using the findings from the nine domains, the programme further contained the following materials:

1. PowerPoint presentation to help direct the session in concise form and aid the teaching process. This method has a persuasive way of communicating ideas, knowledge and in a more concise and logical way. Information can be delivered through text, images, art, videos, charts, graphs, and tables.

2. Facilitator programme manual – this guides the facilitator to examine the full content of the designed programme and provides step by step process of conducting the intervention programme.

3. Participant handouts for activities the mini handouts help participants revise the topics presented in each session and the topics covered.

4. Collection of visual aids for reinforcement. This was presented as a summarised individualised mini poster at the end of the sixth week of the intervention programme to promote reinforcement and sustained learning process.

Table 6.5: Application of the six HBM concepts to the educational intervention programme on CVD risk reduction.

Concept	Systematic review	Qualitative study	Application
Perceived susceptibility	-Screening - BP measurement and medication intake tracking	General body tests conducted by healthcare professionals	Use self-monitoring, simulation, and personalisation/tailoring strategies to help individuals develop accurate perceptions of risk. -Blood pressure check -Body mass Index (BMI) -Pre-test ABCD risk Questionnaire
Perceived severity	-Guideline-based intervention	- Erroneous beliefs -Limited knowledge about CVD devices	Systemic desensitisation, comprehensive Educational inter and reinforcement, - individuals develop a realistic perception of the consequences of a condition and recommended action.
Perceived benefits	-Nurse-led strategies	- Support from healthcare	Use gain-framed appeal and positive

Concept	Systematic review	Qualitative study	Application
	- Promoting adherence to lifestyle changes: diet, physical therapy, and clinic attendance	professionals: doctors, nurses, and community health officers. -Group-based support (e.g. discussions, group walks, shared experiences)	reinforcement/reward mechanisms to portray the potential benefits of adopting healthy behaviour.
Perceived barriers	Limited access to health information - more local, regional, or national programmes or policies	-Financial and logistical challenges -Social and psychological -Technological difficulties	Teach problem-solving and decision-making strategies to overcome the perceived barrier of enacting healthy behaviour. -Cultural and indigenous methods of learning -Effective schemes and services
Cues to action	-Creating needed awareness -Multiple-health education sessions - Community health talks using multimedia aids (i.e. booklets, films, pamphlets)	- Community and health professional engagement - Easy and accessible methods of enlightenment - Regular health talks, campaigns, and seminars using accessible media	Employ reminder and suggestion strategies as an external prompt to perform the target behaviour. -simple learning aids
Self-efficacy	Schedule of educational intervention programmes	-More awareness strategies by professionals	Setting strategies to build an individual's belief about his/her ability to adopt healthy behaviour.

Table 6.5 shows specific outline of how the six concepts HBM was adopted in organizing specific strategies for the educational intervention programme.

6.5 VALIDATION OF THE EDUCATIONAL INTERVENTION PROGRAMME

6.5.1 Delphi Round One: Review of the first version of the instrument

The first collation of key findings (Appendix AA) consisted of 72 items organised under nine content domains and were merged to form precise items of relevance to the study. A draft of items identified for the development of the intervention programme (see appendix AB) was emailed to the panel of 5 experts who agreed to participate in the study (Details in chapter 3 section). A comment section was provided against each item for their suggested revisions and comments. An overall comment section was also created for their final comments on the first version of the instrument. Experts had to rate the item generated for relevance using a validation tool, which consists of a four-point Likert scale (see Appendix AB). A four-point scale was used where 1= not relevant, 2= slightly relevant, 3= relevant but needed minor amendment, and 4= very relevant. Further suggestions were also allowed to help improve the second version of the instrument.

6.5.2 Delphi Round Two: Review of the second version of the instrument

Based on the assessment and suggestions made in round one of the Delphi study**,** the researcher and supervisors revisited ambiguous, non-relevant, complex and poorly arranged themes and subthemes to view the second version better. The second version was, therefore, reduced to 32 items and nine domains (see Appendix AC). After the second Delphi review, a content validity index was calculated across each domain and sub-themes, and the outcome of the expert in agreement was 0.8, which is calculated as follows.

- Experts in agreement: 4/5=0.8
- Universal agreement (UA): 0.97
- ICVI (item-level content validity index) = the proportion of content experts giving the item a relevance rating of 3 or 4= agreed items)/ (number of experts) =0.8-1.0
- The average proportion of items judged as relevant across the five experts=0.99

All other calculations on the content validation index of the Delphi study are provided in Appendix AD) (Yusoff, 2019).

Face validity- The instrument validation was achieved via a Delphi review. The experts were also asked to rate the quality of other features of the programme, such as quality of content, programme design, comprehensiveness, clarity, and quality of presentation materials. The rating scale for these aspects was also a four-point scale with 1= poor, 2= fair, 3= good and 4=excellent (Lynn, 1986).

6.6 SUMMARY

This chapter explained the development process of the preliminary educational intervention programme and described the experts' verification of the programme for content validation. A report on the programme implementation process, the pre-and post-test results of the Phase three of the study was discussed in the next chapter.

CHAPTER SEVEN

PHASE THREE: PILOT TESTING, PRESENTATION AND DISCUSSION OF RESULTS

7.1 INTRODUCTION

This chapter details and presents the process of the implementation phase of this study. The intent of this phase was to pilot test the developed educational intervention programme to create awareness on reducing CVD risk among retired older adults. The chapter commenced with the description of the guiding theory, setting, recruitment and the delivery process. While the latter part of this chapter discussed the results as described, interpreted, and displayed in frequencies, percentages, means, and standard deviations. Finally, the chapter presented the results of the programme's evaluation.

7.2 IMPLEMENTATION OF THE PROGRAMME

Among many other theories and models, the Heath Belief Model (HBM) is affirmed to be very effective and widely used in the development of educational intervention studies targeted at improving behavioural health (Amraei et al., 2020). Findings from the first phase of the study though complete in its own were triangulated to form a complete whole. The HBM was used as a guide in the second phase of developing and implementing the educational intervention programme. Tarkang and Zotor (2015) described the HBM as one of the first theories developed to explain the change process in relation to health behaviour. When used appropriately, it provides organised assessment data about clients' abilities and motivation to change their health status.

The implementation of the educational intervention programme was based on the six dynamic underlying assumptions of the HBM. The model asserts that people's motivation to promote or prevent disease depends on how strongly they believe they are susceptible to it. The model also helps explore the participants' opinions on how the disease could seriously affect their lives if they develop it.

7.2.1 Study Setting

For ease of coordination and a homogeneous setting, a one-group pre- and post-intervention cohort was formed at two centres (Ile-Ife and Ilesa) with 20 participants at each location within (Ife-Ijesa senatorial district selected as part of the study setting from inception) Osun-state. The implementation plan of the educational study was introduced to encourage voluntary participation.

7.2.2 Recruitment

A brief stakeholders meeting was held in December 2023 and January 2024 with members of each association who participated in the Focus group discussion. The aim was to give an update on the findings and outcome of the study while the next phase of the study was also introduced to them. The developed educational intervention programme was initially tested among a group of retirees at a local council unit of Osun state who were not part of the study population. The full programme was pilot-tested between February 2024 and April 2024 and conducted once a week on Wednesdays in Ile-Ife and Saturdays at Ilesa for about one and a half hours per session.

The researcher is a certified public health nurse with more than 20 years of clinical nursing experience and has worked with older adults both in the public and clinical space. This background information made the researcher, otherwise referred to as the facilitator in this study session, well-equipped and trained for the programme. The facilitator organised a two-day update and re-training for the four research assistants who supported the logistics of setting up and the ease of coordinating the programme. The research assistants are two registered nurses and two postgraduate students at the Institute of Public Health Obafemi Awolowo University, Nigeria. These assistants were also part of the team that utilised the pilot-tested instrument on a smaller group two months before the commencement of the main educational intervention programme. All materials for the study were tested and analysed for its functionality and reliability. A trial run of the intervention programme and all instruments was carried out on a smaller group, and adjustments were made as needed. Confidentiality clause was signed by the research assistants as part of the requirements for conducting the study.

7.2.3 The Educational Intervention programme

The educational intervention programme had six modules and was conducted among 40 participants who volunteered to participate, but 39 completed the series of workshops held. The programme took place over six weeks as a group-facilitated educational programme, and an agenda was developed for each session. Consent was obtained from the study participants, who were initially 40 for the pretest and implementation phase. However, one of the participants was unavoidably absent from the post-test phase at the Ile-Ife centre of the study.

The delivery of the educational intervention programme was done through PowerPoint presentations (see Appendix AE), brainstorming and sharing from personal experiences, question and answer sessions. The participants also received a designed wall poster that captures a summative key point of the topics discussed at the end of the sixth week for reinforcement and sustainability of lessons learnt (see Appendix AF). It empowered participants to make informed choices on the lifestyle modifications needed to reduce the risk of CVD among them.

Table 7.1: Timeline of the assessments (pre-test and post-test)

Date	Test type	Method
February 2024	Initial assessment pre-test for all participants (test 1)	Pre-tests were administered individually immediately after the first session.
April 2024	Re-assessment at six weeks after the first test (test 2)	Six weeks post-test was administered to individual participant within a group setting.

7.2.3.1 The Pre-test (Test 1)

After presenting a general introduction, the programme facilitator (researcher) shared a brief overview of the programme's background, content, and schedule. The facilitator also distributed and read the information sheet aloud to ensure participants understood the objective and outline of the educational intervention programme. Participants of the

educational intervention programme had a pre-test questionnaire administered during the first group session. They were assured that there were no right or wrong answers, as all the answers were equally important in the analysis.

All clarifications were sorted to ensure participants understood the instructions, and the questionnaire was itemised and coded for post-test comparison. Participant's baseline biophysical profiles, as outlined in the questionnaire (see Appendix O), were also obtained by the researcher and trained research assistance for comparison with the post-test values. At the baseline assessment, some participants had distinctly elevated blood pressure and were counselled on the need for further medical review at the University Teaching hospitals (Ilesa and Ile-Ife). The facilitator followed up this set of participants during the educational intervention programme to ensure their compliance with medical advice.

7.2.3.2 Delivery of the programme (Group sessions)

The programme commenced with a sequential progression of session content from the first (1st) to the sixth (6th) module. The facilitator anchored the whole educational intervention programme in (6) sessions, each lasting about 90 (ninety) minutes. The researcher developed the educational intervention materials from the findings of triangulation of findings from the first phase of the study and outcome of content and face validity derived from the Delphi review**.** A Content Validation Index score of 0.99 was achieved. Calculations and tables are presented in Appendix AE.

The researcher coordinated the entire programme to identify the participants' concerns and ensure no compromises were made to the programme's quality. The researcher started with interactive participant-driven activities to create a group atmosphere. Sessions began with open questions to stimulate discussion, followed by an informative presentation and an effective learning activity. The facilitator engaged different learning strategies to suit the topic presented for a specific session (topic) of the programme. To illustrate these learning strategies further, the facilitator explained some sessions better in pictographs, PowerPoint presentations, brainstorming, and sharing personal experiences for in-depth group

interactions. To monitor participant retention and follow-up, the facilitator recorded attendance in an attendance register at every session.

In the first session, the facilitator presented the topic "Understanding CVD." Facts about CVD and the risk factors of developing the disease were unpacked in this regard. Further exploration of the risk factors presented the modifiable risk factors as the fundamental issues outlined to be discussed within the six weeks of the programme. The first to be discussed was Blood Pressure: monitoring and control. Although each session covered a new topic, there was a recap of the key aspects from the previous session and a discussion when necessary.

Session two (2) started with an activity where participants had to give feedback on the lessons learnt from the previous session with a brief discussion on the demystified concept of CVD. This was to promote teamwork and group cohesion. Participants were enthusiastic about the programme and eager to get the information to their units. The topic in this session was Exercise and stress management. All other sessions followed the same pattern of a recap of previous studies and presentation of new topics on other modifiable risk factors until the end of the sixth week.

At the end of the sixth week and upon the completion of the educational intervention programme, a designed wall poster (see Appendix AF) that captures a summative key point of topics discussed was given to each participant. This is being cognisant of the information retention capacity of older adults as identified in one of the findings of the qualitative study (page 97) and for reinforcement and sustainability of lessons learnt. Additionally, the programme was recapped by discussion and feedback using the programme evaluation forms (Appendix AG)

7.2.3.3 The Post-test (test 2) phase

Participants returned to the study sites six (6) weeks after attending the programme (12th week) to complete post-test assessment and evaluation. Similar to what was obtained in the pre-test, the programme facilitator used the same questionnaire (Appendix O) and read the

items aloud to the participants. All participants completed the questionnaires and had their post-intervention biophysical profiles rechecked.

The programme facilitator and trained research assistants were also present for this procedure. The participants received the same instructions as provided in the pre-test. The findings' results were analysed separately but interpreted together. One (1) of the participants was absent during the post-test due to an unforeseen long journey out of the state during post-test evaluations.

7.3 RESULTS

The main objective of this phase was to test an educational intervention programme that could help reduce CVD risk among retired older adults. The structuring of the results was consequently according to the objective of this phase. Firstly, the demographic characteristics of the participants were presented, followed by the results of their biophysical profiles measured at baseline and six weeks post-intervention. Scores on the level of knowledge of CVD and its associated risk factors were evaluated pre and post-intervention. Other variables of interest regarding the intention to change were evaluated pre and post-intervention as well. Finally, the report on programme evaluation assessed the satisfaction of the participants (older adults) with the conduct of the educational intervention programme.

7.3.1 Demographic characteristics

In total, 40 participants were recruited into the study, however 39 participants completed the study, therefore presenting a 97.5% response rate. Table 7.1 shows the socio-demographic characteristics of the participants. The sample included 21 (52.5%) males and 19 (47.5%) females. Majority of the participants (45%) were within the age range of 60-77 years with mean of 64.9±7.9SD for the participants of the study.

The majority of the participants (92.5%) had higher education, while about a quarter (35%) had a form of non-communicable disease (NCD). The NCDs were distributed around some familiar medical conditions like hypertension 35.7%, Diabetes (28.6%), Arthritis (14.3%) and a

few others. Less than one-fifth of the participants (17.5%) claimed they had a fair level of awareness of CVD risks, while the source of information is split between health personnel, family/friends, and social media.

Table 7.2 Socio-demographic characteristics of participants

Variable	Frequency (n=40)	Percentage (%)
Age (mean=64.9±7.9SD)		
60 - 65	9	22.5
66 -70	18	45.0
71 -75	8	20.0
76 -80	5	12.5
Gender		
Male	21	52.5
Female	19	47.5
Education		
No formal education	-	-
Primary	-	-
Secondary	3	7.5
Tertiary	37	92.5
Religion		
Christianity	38	95.0
Islam	2	5.0
Currently managed for non-communicable disease		
Yes	14	35.0
No	26	65.0
Challenges		
Diabetes	4	28.6
Glaucoma	1	7.1
High blood pressure	5	35.7
Arthritis	2	14.3
Ulcer	2	14.3
Pre-enlightened on CVD		
Yes	7	17.5
No	33	82.5
Source of enlightenment		
Health practitioner	4	57.1
Family/friends	2	28.6
Social media	1	14.3

7.3.2 Biophysical profile of participants

On the biophysical profile assessment of the participants, there was a significant difference in the baseline records of all the participants in some variables compared to their post-intervention report. The mean systolic blood pressure score was 140.2±27.2mmHg at the pretest phase compared to the post-test mean value of 126.1±13.9mmHg. The same goes for the diastolic measurement of 84.3±21.1mmHg pretest and the post-test mean score of 75.9±11.7mmHg. These scores had a significant p-value (< 0.001) for both systolic and diastolic records. However, there was no appreciable difference between the pre-test and post-test values of the participants' body weights.

Table 7.3 Biophysical profile of participants

Measured variables	N	Pre		N	Post		t-test	p-value
		Mean±SD	Median (IQR)		Mean±SD	Median (IQR)		
BP: Systolic (mmHg)	40	140.2±27.2	138.0 (41.0)	39	126.1±13.9	127.0 (19.0)	5.399	<0.001*
BP: Diastolic (mmHg)	40	84.3±21.1	83.0 (20.0)	39	75.9±11.7	75.0 (17.0)	3.609	<0.001*
Weight (kg)	40	61.5±11.6	63.0 (17.0)	39	61.1±10.8	63.0 (15.0)	1.634	0.111
Height (metre)	40	1.6±0.9	1.6 (0.07)	39	1.6±0.1	1.6 (0.07)	0.386	0.701

Key: * = statistically significant

Just about a quarter of the participants had a normal range of blood pressure at the pre-test (22.5%), with slight improvement at the post-test (28.2%). Meanwhile, about 60.0 % had elevated readings, and 17.5 % had highly raised blood pressure scores (> 160mmHg). However, the figure dropped significantly from 17.5% to 2.6% post-intervention. Also, about 69.2 % were still within the elevated blood pressure range during the post-test evaluation.

Table 7.4: Participants' Blood Pressure Levels

Blood pressure	Standard range mmHg	Pre-test n=40 (%)	Post-test n=39 (%)
Normal	90-120/60-80	9 (22.5)	11 (28.2)
Elevated	130-139/<90	24 (60.0)	27 (69.2)
Stage I Hypertension (at risk)	>140/>90	7 (17.5)	1 (2.6)

Over half (55%) of participants had their body mass index (BMI) measured within the normal range. The value improved slightly (64.1%) post-test with a moderate increase in study participants (n=25) measured within normal BMI. Whilst the underweight records dropped somewhat, those who were classified as overweight also reduced from 35% to 28.2%.

Table 7.5: BMI Levels of participants

BMI	**Normal BMI Range**	**Pre-test n=40 (%)**	**Post-test n=39 (%)**
BMI			
Underweight	>18.5	4 (10.0)	3 (7.7)
Healthy weight	18.5-24.9	22 (55.0)	25 (64.1)
Overweight	<25	14 (35.0)	11 (28.2)

7.3.3. The ABCD Risk Questionnaire

With the view that CVD was novel in Africa until a few decades ago, Ndejjo (2021) posited that there was no validated questionnaire on CVD prevention knowledge as of 2020. However, the ABCD Risk Questionnaire developed by Woringer et al. (2017) has been described as a suitable tool for evaluating the accuracy of perceived CVD risk, general knowledge of CVD and intention to change behaviour regarding diet and exercise. The revised version has 31 questions subdivided into five main parts (Bowyer et al., 2023). The participants responses were analysed based on the following subdivisions and gradings designed by Bowyer et al. (2023).

7.3.3.1 Knowledge about CVD

The instrument had eight standard questions that reviewed the common risk factors of CVD. The options were analysed separately as either 'True' or 'false'.

Item 1 Some of the leading causes of heart attack and stroke were identified fairly in the pre-test phase by 77.5%. The result improved in the post-intervention phase with a score of 97.9%, knowing heart attack and stroke as a main cause of CVD.

Items 2-8 further assessed the trend of knowledge on CVD in all the answers, and a paired t-test showed a mean difference in knowledge at pre and post-intervention. The score for the pre-intervention phase was a mean of 5.5 ±1.8 SD. Post-intervention with a significance of 6.6± 2.0 mean difference of 1.1. A paired t-test showed the effectiveness of the educational intervention programme with a significant value of p <0.014*****

Table 7.6: Knowledge about CVD

Knowledge	**Pre-test n (%)**	**Post-test n (%)**
One of the leading causes of heart attack and stroke is stress		
True	31(77.5)	37 (94.9)
False	9 (22.5)	2 (5.1)
Walking and gardening are considered types of exercise that can lower the risk of having a heart attack or stroke.		
True	33 (82.5)	37 (94.9)
False	7 (17.5)	2 (5.1)
Moderately intense activity of 2.5 hours a week will reduce your chances of having a heart attack or stroke		
True	28 (70.0)	33 (84.6)
False	12 (30.0)	6 (14.4)
People who have diabetes are at higher risk of heart attack or stroke		
True	29 (72.5)	30 (77.0)
False	11 (27.5)	9 (23.0)
Managing your stress levels will help you to manage your blood pressure		
True	36 (90.0)	36 (92.3)
False	4 (10.0)	3 (7.7)
Drinking high levels of alcohol can increase your cholesterol and triglyceride levels		
True	29 (72.5)	31 (79.5)
False	11 (27.5)	8 (20.5)
HDL refers to 'good' cholesterol, and LDL refers to 'bad' cholesterol		
True	18 (45.0)	28 (71.8)
False	22 (55.0)	11 (28.2)

Knowledge	Pre-test n (%)	Post-test n (%)
A family history of heart disease is not a risk factor for high blood pressure.		
True	15 (37.5)	24 (61.5)
False	25 (62.5)	15 (38. 5)

Table 7.7: Paired t-test showing the mean difference in knowledge about CVD at pre and post-intervention

	N	mean	std. Dev.	[95% CI]	t-stat.	p-value
Time						
Pre-intervention	40	5.5	1.8	4.9 – 6.1		
Post-intervention	39	6.6	2.0	5.9 – 7.2	2.591	<0.014*
Difference	39	1.1	2.5	0.2 – 1.9		

Key: **Significant at 95% CI*

7.3.3.2 Perception of risk of heart attack or stroke

On the participant's perception of their susceptibility to heart attack or stroke, there were eight questions with five options. These questions were examined with a pre-test value mean of 30.1 ± 7.5-SD. The post-test mean score was 29.0 ± 7.8 with a mean difference of -1.1. Hence, no significant difference in the mean score was evaluated.

Table 7.8: Perception of risk of heart attack or stroke

Perceived Risk of Heart Attack or Stroke	Pre-test n (%)	Post-test n (%)
9.I am concerned that I may suffer from a heart attack or stroke during my life		
Strongly disagree	18 (45.0)	16 (41.0)
Disagree	10 (25.0)	10 (25.6)
Agree	7 (17.5)	6 (15.4)
Strongly agree	5 (12.5)	1 (2.6)
Not applicable	0 (0.0)	6 (15.4)
10. It is likely that I will suffer from a heart attack or stroke in the future		
Strongly disagree	20 (50.0)	16 (41.0)
Disagree	11 (27.5)	10 (25.6)
Agree	5 (12.5)	6 (15.4)
Strongly agree	4 (10.0)	1 (2.6)
Not applicable	0 (0.0)	6 (15.4)
11. It is likely that I will have a heart attack or stroke sometime during my life		
Strongly disagree	18 (45.0)	19 (48.7)
Disagree	12 (30.0)	10 (25.6)
Agree	4 (10.0)	4 (10.3)
Strongly agree	1 (2.5)	1 (2.6)
Not applicable	5 (12.5)	5 (12.8)
12. There is a good chance I will experience a heart attack or stroke in the next 10 years		
Strongly disagree	15 (37.5)	12 (30.8)
Disagree	16 (40.0)	15 (38.5)
Agree	2 (5.0)	4 (10.3)
Strongly agree	2 (5.0)	1 (2.6)
Not applicable	5 (12.5)	7 (18.0)
13. My chances of suffering from a heart attack or stroke in the next 10 years are great		
Strongly disagree	21 (52.5)	15 (38.5)
Disagree	13 (32.5)	15 (38.5)
Agree	1 (2.5)	3 (7.7)
Strongly agree	1 (2.5)	1 (2.6)
Not applicable	4(10.0)	5 (12.8)
14. It is likely I will have a heart attack or stroke because of my past and/or present behaviours		
Strongly disagree	17 (42.5)	16 (41.0)
Disagree	13 (32.5)	12 (30.8)
Agree	3 (7.5)	4 (10.3)
Strongly agree	4 (10.0)	3 (7.7)
Not applicable	3 (7.5)	4 (10.3)

Perceived Risk of Heart Attack or Stroke	Pre-test n (%)	Post-test n (%)
15. I am not worried that I might have a heart attack or stroke (Reverse coded)		
Strongly disagree	11 (27.5)	10 (25.6)
Disagree	13 (32.5)	12 (30.8)
Agree	7 (17.5)	9 (23.1)
Strongly agree	3 (7.5)	1 (2.6)
Not applicable	6 (15.0)	7 (18.0)
16. I am concerned about the likelihood of having a heart attack or stroke in the near future		
Strongly disagree	17 (42.5)	16 (41.0)
Disagree	10 (25.0)	9 (23.1)
Agree	5 (12.5)	5 (12.8)
Strongly agree	4(10.0)	3 (7.7)
Not applicable	4 (10.0)	6 (15.4)

Table 7.9: Paired t-test showing the mean difference in perceived risk of heart attack or stroke about CVD at pre and post-intervention

	N	mean	std. Dev.	[95% CI]	t-stat.	p-value
Time						
Pre-intervention	40	30.1	7.5	27.6 – 32.5		
Post-intervention	39	29.0	7.8	26.5 – 31.5	0.737	0.466
Difference	39	-1.1	8.9	-3.9 – 1.8		

Significant at 95% CI

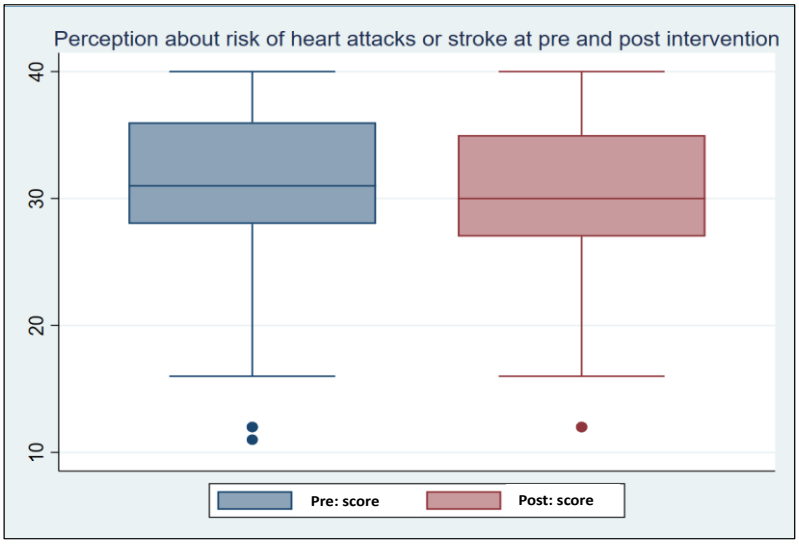


Figure 7.3 Mean score on CVD risk perception

7.3.3.3 Perceived Benefits and Intentions to Change

Seven questions were analysed on the intention of participants to work on their lifestyles and improve on healthy habits. The central focus of this section was on exercise and eating five portions of fruits and vegetables per day. The perceived benefit of exercise (Question 9) increased from 82.5% on the pre-test to 97.4% on the post-test. However, the willpower and actual intention to engage in about 30 minutes of exercise per day varied with limited intentions in pre and post-interventions (Questions 18 & 19) 87.5% to 92.3%. There was an appreciable difference in participants' perceptions of the impact of eating fruits and vegetables on their cardiac wellbeing. (Question 22), as the scores improved from 87.5% to 94.8%.

The overall mean score for this section at the pretest was 20.9±4.9, while at the post-test, it recorded 21.3±7.4 with a mean difference of 0.3±8.0. The t-test and p-value were neither significant.

Table 7.10: Perceived Benefits and Intentions to Change

Perceived Benefits and Intentions to Change	**Pre-test n (%)**	**Post-test n (%)**
17. I am thinking about exercising at least 2.5 hours a week		
Strongly disagree	3 (7.5)	1 (2.6)
Disagree	5 (12.5)	0 (0.0)
Agree	23 (57.5)	27(69.2)
Strongly agree	8(20.0)	11 (28.2)
Not applicable	1 (2.5)	0 (0.0)
18. I intend or want to exercise at least 2.5 hours a week		
Strongly disagree	3 (7.5)	2(5.1)
Disagree	1 (2.5)	1 (2.6)
Agree	26 (65.0)	25 (64.1)
Strongly agree	9(22.5)	11 (28.2)
Not applicable	1 (2.5)	0 (0.0)
19. When I exercise for at least 2.5 hours a week I am doing something good for the health of my heart		
Strongly disagree	2 (5.0)	0 (0.0)
Disagree	3 (7.5)	1 (2.6)
Agree	23 (57.5)	24 (61.5)
Strongly agree	10 (25.0)	14 (35.9)
Not applicable	2 (5.0)	0 (0.0)

Perceived Benefits and Intentions to Change	Pre-test n (%)	Post-test n (%)
20. I am confident that I can maintain a healthy weight by exercising at least 2.5 hours a week		
Strongly disagree	2 (5.0)	3 (7.7)
Disagree	2 (5.0)	0 (0.0)
Agree	25 (62.5)	20 (51.3)
Strongly agree	10 (25.0)	16 (41.0)
Not applicable	1 (2.5)	0 (0.0)
21. I am not thinking about exercising for 2.5 hours a week (Reverse coded)		
Strongly disagree	6 (15.0)	14 (35.9)
Disagree	20 (50.0)	17 (43.6)
Agree	7 (17.5)	4 (10.3)
Strongly agree	4 (10.0)	2 (5.1)
Not applicable	3 (7.5)	2 (5.1)
22. When I eat five portions of fruit and vegetables a day, I am doing something good for the health of my heart		
Strongly disagree	0 (0.0)	1 (2.6)
Disagree	4 (10.0)	1 (2.6)
Agree	23 (57.5)	20 (51.2)
Strongly agree	12 (30.0)	17 (43.6)
Not applicable	1 (2.5)	0 (0.0)
23. Increasing my exercise to at least 2.5 hours a week will decrease my chances of having a heart attack or stroke		
Strongly disagree	3 (7.5)	0 (0.0)
Disagree	4 (10.0)	1 (2.6)
Agree	21 (52.5)	17 (43.5)
Strongly agree	11 (27.5)	19 (48.7)
Not applicable	1 (2.5)	2 (5.2)

Table 7.11: Paired t-test showing the mean difference in perceived benefits and intentions to change about CVD pre and post-intervention.

	N	mean	std. Dev.	[95% CI]	t-stat.	p-value
Time						
Pre-intervention	**40**	20.9	4.9	19.4 – 22.5		
Post-intervention	39	21.3	7.4	18.9 – 23.6	0.239	0.812
Difference	39	0.3	8.0	-2.3 – 2.9		

Key: **Significant at 95% CI*

7.3.3.4 Healthy Eating Intentions

Furthermore, there were three questions on the plan to improve on a healthy diet for which most participants (80.0%) were not initially certain they could practice in the next two months. However, this wrong perception declined post-intervention to 38.5% **(Question 24).** On the other hand, while only 20.0% of the participants initially desired to take five portions of fruits and vegetables daily, they were satisfactorily increased to 69.3% post-intervention (**Question 25).** More than half of the participants (53.8 %) responded ambivalently to the reverse-coded question **(Question 26).** The response was in the context of planning to take action and eat five portions of fruits and vegetables daily. Although the mean score difference was 0.6 ± 2.8, the variations were not quite strong. Hence, the score reported a non-significant p-value.

Table 7.12: Healthy Eating Intentions

Healthy Eating Intentions	**Pre-test n (%)**	**Post-test n (%)**
24.I am confident that I can eat at least five portions of fruit and vegetables a day within the next two months		
Strongly disagree	7 (17.5)	6 (15.4)
Disagree	25 (62.5)	9 (23.1)
Agree	5 (12.5)	15 (38.5)
Strongly agree	2 (5.0)	7 (17.9)
Not applicable	1 (2.5)	2 (5.1)
25. I am thinking about eating at least five portions of fruit and vegetables a day		
Strongly disagree	5 (12.5)	2 (5.1)
Disagree	25 (62.5)	8 (20.5)
Agree	7 (17.5)	18 (46.2)
Strongly agree	1 (2.5)	9 (23.1)
Not applicable	2 (5.0)	2 (5.1)
26. I am not thinking about eating at least five portions of fruit and vegetables a day (reverse coded)		
Strongly disagree	6 (15.0)	3 (7.7)
Disagree	15 (37.5)	12 (30.8)
Agree	10 (25.0)	10 (25.6)
Strongly agree	5 (12.5)	11 (28.2)
Not applicable	4 (10.0)	3 (7.7)

Table 7.13: Paired t-test showing the mean difference in healthy eating intentions at pre and post-intervention

	N	mean	std. Dev.	[95% CI]	t-stat.	p-value
Time						
Pre-intervention	40	8.8	1.8	8.2 – 9.4		
Post-intervention	39	9.4	2.1	8.7 – 10.1	1.339	0.189
Difference	39	0.6	2.8	-0.3 – 1.5		

Key: **Significant at 95% CI*

7.3.3.5 Perceived Benefits and Intentions to Stop Smoking

Five questions were analysed on the smoking habits of participants and their intention to quit smoking. There was no direct question on alcohol intake, but this was linked together in the questions asked. Over four-fifths (80.0%) of the study participants reported they did not smoke or quit before the commencement of the educational intervention programme **(Question 28).** From the pre-test and post-test records, the plan to stop smoking among the other one-fifth improved from 10.0% to 17.9% **(Question 27).** Smokers shared the perceived benefit of smoking cessation in improving cardiac health by 17.5% to 20.5% **(Question 29)**. The same proportion of participants either stopped smoking or intended to stop smoking (**Question 30)**. On the reverse-coded questions, the response on intention to stop smoking also improved from 7.5% to 20.5%, respectively. The mean difference read-0.5±3.8 and the p-value was not significant.

Table 7.14: Benefits and Intentions to Stop Smoking

Benefits and Intentions to Stop Smoking	Pre-test n (%)	Post-test n (%)
27. I am thinking of stopping smoking within two months		
Strongly disagree	0 (0.0)	0(0.0)
Disagree	3 (7.5)	1 (2.6)
Agree	4 (10.0)	7 (17.9)
Strongly agree	1 (2.5)	0 (0.0)
Not applicable	32 (80.0)	31 (77.5)
28. I have reduced or stopped smoking		
Strongly disagree	0 (0.0)	0 (0.0)
Disagree	1 (2.5)	0 (0.0)

Benefits and Intentions to Stop Smoking	Pre-test n (%)	Post-test n (%)
Agree	6 (15.0)	3 (7.7)
Strongly agree	1 (2.5)	5 (12.8)
Not applicable	32 (80.0)	31 (79.5)
29. I intend or want to stop smoking		
Strongly disagree	0 (0.0)	0 (0.0)
Disagree	1 (2.5)	0 (0.0)
Agree	4 (10.0)	2 (5.1)
Strongly agree	3 (7.5)	6 (15.4)
Not applicable	32 (80.0)	31 (79.5)
30. If I stop smoking it will reduce my chances of having a heart attack or stroke		
Strongly disagree	1 (2.5)	0 (0.0)
Disagree	0 (0.0)	0 (0.0)
Agree	4 (10.0)	7 (17.9)
Strongly agree	3 (7.5)	1 (2.6)
Not applicable	32 (80.0)	31 (79.5)
31. I am not thinking about stopping smoking		
Strongly disagree	2 (5.0)	7 (17.9)
Disagree	1 (2.5)	1 (2.6)
Agree	3 (7.5)	0 (0.0)
Strongly agree	2 (5.0)	0 (0.0)
Not applicable	32 (80.0)	31 (79.5)

Table 7.15: Paired t-test showing the mean difference in benefits and intentions to stop smoking pre and post-intervention

	N	mean	std. Dev.	[95% CI]	t-stat.	p-value
Time						
Pre-intervention	**40**	22.7	3.7	21.5 – 23.9		
Post-intervention	39	22.1	4.5	20.7 – 23.6	0.876	0.386
Difference	39	-0.5	3.8	-1.8 – 0.7		

Key: *Significant at 95% CI

7.3.3.6 Overall Evaluation of the Educational Intervention Programme

All study participants were satisfied with the implementation of the educational intervention programme as it met their expectations. The level of satisfaction was spread across the board, with the highest being 'Facilitation of Activities by Trainers' (53.8%) and 'Participation in Group

Activities' (48.7%). We would love to give such a programme a wide publicity subsequently. Participants of the study made the following recommendations.

- Broader community awareness and intervention programmes for all adults
- Regular visits and follow-ups by the team
- Reduced number of sessions to encourage active participation.
- Free or subsided treatments for medications for older adults
- More programmes on other NCDs,
- Advocacy and partnership with NGOs and government agencies.

Table 7.16: Evaluation of the educational intervention programme

Evaluation (n=39)	Unsatisfied n (%)	Satisfied n (%)	Very satisfied n (%)	Excellent n (%)
Overall Content of Program	0 (0.0)	10 (25.6)	18 (46.2)	11 (28.2)
Presentation of Material by Trainer	0 (0.0)	8 (20.5)	15 (38.5)	16 (41.0)
Participation in Group Activities	0 (0.0)	16 (41.0)	19 (48.7)	4 (10.3)
Facilitation of Activities by Trainers	0 (0.0)	5 (12.8)	21 (53.8)	13 (33.3)

Evaluation continued	Yes n (%)	No n (%)
Did this programme meet your expectations	38 (97.4)	1(2.6)
Would you recommend it to a friend	39 (100.0)	0 (0.0)

Findings showed that all the participants confirmed that the program met their expectations and would recommend it to a friend. They suggested that the program should have widely spread publicity so that many people could benefit. Participants further stated that the program is good for all adults and should be done more frequently across the state.

7.4 DISCUSSION OF FINDINGS FROM THE EDUCATIONAL INTERVENTION PROGRAMME

The discussion of findings is based on the key variables and components of the implemented educational intervention programme. The researcher used best practices from the existing programmes and the Health Belief Model as a guide to inform the programme's content. The content of the programme included six main modules/sections, namely, General overview of

CVD and risk factors, Blood pressure control and monitoring, Exercise and stress management, Diet and nutritional needs of older adults to prevent CVD, Avoiding excessive use of alcohol and smoking, Body weight and obesity management and Adherence to medications**.** The programme's design was for two (2) tests to measure baseline information and programme outcome as a non-invasive CVD risk assessment (Gaziano et al., 2015).

7.4.1 Overview of CVD and risk factors

The results of the general overview of cardiovascular disease and its risk factors showed that there was a significant difference in the level of knowledge. The baseline scores of older adults who participated in the educational intervention programme. improved post-test by a mean difference of 1.1(2.5), P=< 0.014. This finding resonates with the study conducted by Okube et al. (2023), which initially reported critically low levels of knowledge in South-Saharan Africa as the major risk factor for CVD. However, with their nurse-led interventions programme, the study significantly improved the participant's knowledge of CVD risk factors and preventive measures. Therefore, we should advocate for creating more population-based awareness and prevention strategies**.** From the current study, it could also be inferred that the level of education influenced the participant's uptake of information**.**

This result further supports the findings of Ndejjo et al. (2020), which posits that the level of formal education, among other things, is a critical factor in adopting preventive lifestyles. Again, Okop et al. (2023)conducted a multi-national study in Ethiopia, Malawi, Rwanda and South Africa to identify the perceived causes of CVD among the target populations. Their findings uncovered mixed ideas among participants, some of which were right while others were wrong perceptions. A possible explanation for this might be the affirmed low level of awareness about CVD in most LMICs. Ndejjo (2021) therefore, suggested that the knowledge gap should inform suitable interventions and strategies for any intervention programme.

7.4.2 Blood pressure control and monitoring

A small fraction of participants, 22.5%, had their blood pressure checked to be within normal range before the commencement of educational intervention programme, while 60% and

17.5% had a form of elevated readings. The result also confirmed the submission of the WHO 2022 that there are many undiagnosed individuals with raised blood pressure and other CVD risk factors in Low- and middle-income countries. In addition, the WHR identified high blood pressure as the leading modifiable risk factor for CVD (World Heart Federation, 2023). However, the statistics in this current study improved after six weeks, with a slight increase in the number of participants whose blood pressure was recorded within the normal range from 9 (22.5%) to 11 (28.2%). Those participants grouped as Stage I hypertension also dropped from 17.5% to 2.6%.

This study supports evidence from clinical observations of Ruan et al. (2018) in their longitudinal cohort study of ageing and older adults from 2007 to 2010. The educational intervention study in six low- and middle-income countries (LMICs) recorded significantly reduced all-cause mortality and cardiovascular disease events. This outcome was linked to lowered blood pressure as a significant precursor to reducing CVD. However, a more concerted effort is required as a larger cluster of the participants of the current study were still within the elevated blood pressure range (69.2%) post-intervention. There are several possible explanations for this result, ranging from the socioeconomic status of the participants to the psycho-social and biological domains, as discussed in the literature review (World Health Organization, 2021).

7.4.3 Exercise and stress management.

There is a report of insufficient physical activity among older adults, which could predispose them to developing CVD (World Heart Federation, 2023). Further findings from this study further revealed that the participant's perception of exercise improved from 82.5% at the pre-test to 97.4%. However, there were slight changes in the intention to engage in daily exercise from 87.5% to 92.3%. In comparison, 150-300 hours of moderate to vigorous activities per week are recommended as minimum physical activity that could promote a healthy heart (Díez-Villanueva et al., 2022). This recommendation is also in line with the WHO global action plan on physical activity designed for international use (World Heart Federation, 2023) and the American Heart Association (Ferraro et al., 2019). Exercise should not be seen as a rigorous activity alone but as other moderate engagements that could improve cardiac activities as

tolerated by each individual (Rich, 2014). Being actively engaged is also seen as a form of stress management, which is a contributory risk factor of CVD as well (Popovic et al., 2022).

7.4.4 Diet and nutritional needs of older adults to prevent CVD

A large number of the participants of this study earlier indicated a level of certainty in their capability to eat five portions of fruits and vegetables per day. However, after presenting a drafted guide on the indigenous menu (Appendix G), there was a remarkable decline in the proportion of participants with uncertain dietary intakes (from 80.0% to 38.5%). The intent and confidence in taking fruits and vegetables also increased from 20.0 to 69.3 %. According to the focus of the (World Health Organization, 2024)**,** eating more fruits and vegetables is part of the dietary measures for reducing the risk of cardiovascular disease. Kganakga et al. (2022) also **buttressed** how a traditionally prudent diet, rich in high-density lipoproteins (HDL), served as protection against CVD development in most African populations in the past. In addition, Okop et al. (2023) stressed that a good intervention programme should consider varying local contents.

Although current findings also revealed a non-significant difference in the healthy eating intentions of the participants with a mean difference of 0.6±2.8 (p=0.189), one of the probable reasons for this is the socio-economic challenges faced by retired older adults in Nigeria. The challenge of implementing what is being taught might be a possible explanation for this. The World Health Report (WHR) also identified the socio-economic factor as one of the key precursors to other risk factors of CVD (World Heart Federation, 2023). Hence, there is a need for improved welfare for older adults to enable them to lead a healthy ageing experience and reduce high out-of-pocket expenditures. Such can be achieved through advocacy for more political commitment and universal health coverage (World Heart Federation, 2023).

7.4.5 Avoiding excessive use of alcohol and smoking.

Alcohol intake was not specifically mentioned in the ABCD Question. This was, however, added to the educational intervention programme as 'Avoiding Excessive and harmful use of alcohol', being a key variable identified alongside smoking to be one of the risk factors for developing

CVD (World Health Organization, 2021). From the pre-test records, only a small proportion of the participants (20.0%) claim they are still engaged in the habit of smoking. One of the outcomes of the educational intervention programme was that the thought and intention of smoking cessation increased from 10.0% to 17.9%, while the willingness to stop smoking from the reverse coded question still maintained this decision appreciably from 7.5% at the pretest to 20.5% post-test. This finding is quite encouraging. However, the challenge of quitting long habits takes time; hence, there is a need for regular follow-up and further counselling (Ruan et al., 2018) .

7.4.6 Body weight and obesity management

The baseline biophysical profiles of the participants revealed that more than half (55.0%) had normal body mass index (BMI). This result is unexpected, considering the physiological changes associated with ageing (Roth et al., 2020). However, the pre-test record identified about 35.0% of participants as overweight (BMI>25). Many participants were oblivious to their BMI and were happy to be enlightened on the health risks, especially on their cardiac health. The post-test evaluation revealed a slight drop in the proportion of participants at risk of being overweight (28.2%). This result supports the effectiveness of the educational intervention programme in helping the participants to make informed choices that could help reduce their risk of CVD. According to (Ndejjo, 2021), programmes such as this equip and empower communities with sufficient information for CVD prevention. However, there is no guarantee that the body mass index was solely because of the educational intervention programme.

7.4.7 Adherence to medications.

This was assessed based on the number of participants on regular medications before the educational intervention programme and records of their overall well-being with compliance to previously prescribed medications. In their study, Musinguzi et al. (2019) identified adherence challenges along with other issues as part of the difficulties encountered by some health service users in controlling hypertension. Therefore, some older adults need regular follow-ups and reminders due to the change in their physiological status. In addition, older adults are more susceptible to dwindling memory and poor retention of information. As a form

of reference, key signs of CVD were printed as wall posters at the end of the six weeks intervention and given individually to help participants with the retention of information passed (Appendix AF).

7.4.8 Overall Evaluation of the Educational intervention programme.

At the 12th-week post-intervention evaluation of the overall content of the programme, *Table 7.15* revealed all the participants (n=39;100.0%) had a level of satisfaction with the educational intervention programme, which was rated as**; '**satisfied', 'very satisfied' and 'excellent'. The highest scores were on the method of facilitation (53.8%), group activities (48.7%), and programme material (41.0%). Feedback has shown the relevance of the developed educational package. According to the WHR 2023, improving global cardiovascular health has no one-size-fits-all approach. In addition, (Minja et al., 2022) agree that implementing such population-based interventions has proven effective in several settings and adjudged the most reliable solution to the rising burden of CVD in Africa. The intervention programmes also contribute to primary prevention and control of CVD prevalence (Kganakga et al., 2022).

Recapitulating the WHO's concept of reducing CVD, the following submissions were made, and these have been rightly captured in the current study's findings. “Cessation of tobacco use, reduction of salt in the diet, eating more fruit and vegetables, regular physical activity and avoiding harmful use of alcohol have been shown to reduce the risk of cardiovascular disease” (World Health Organization, 2024). Furthermore, the result of this study suggests that the programme content was comprehensive, clear, and of excellent quality. The findings also indicated the instrument was valid and reliable as validated contextually by experts in the field.

7.5 Evaluation of the Theoretical Framework Used for This Study-HBM

The ABCD questionnaire was used to assess the study participants' pre- and post-intervention level of knowledge. The researcher evaluated the Health Belief Model as the theoretical framework for integrating goal-setting, decision-making and social learning among the study participants.

Perceived susceptibility-The baseline and post-intervention check of the participant's blood pressure and BMI gave insight into their level of CVD risk

Perceived severity- the health talks given over six weeks created awareness of the danger of neglecting all risks outlined in the educational intervention programme.

Perceived Benefits- Positive reinforcement from weekly review and feedback during the intervention study helped the participants desire more action plans in reducing CVD risk.

Perceived barriers- Financial and technological difficulties were managed by supporting the participants with transport fare while simple, cultural and indigenous methods of learning were also adopted to overcome the barriers.

Cues to action – The multiple health talk sessions and simple learning aids motivated and reinforced learning among the study participants.

Self-efficacy -Participants at the end of the six-weeks intervention programme felt empowered and willing to adopt healthy behaviour as evaluated by the twelfth week of the programme.

With that in mind, the hypothesis generated was upheld as follows:

H_1: The educational intervention programme improved the participants' knowledge of CVD risk. This outcome was evidenced by their higher post-test scores in knowledge and attitude on CVD

$H_1$2: The educational intervention programme was able to reduce CVD risk among retired older adults of Osun state, Nigeria.

7.6 SUMMARY

This chapter centres on the outcome of the pilot-tested educational intervention programme, and the results were analysed statistically and discussed extensively**.** Notwithstanding, the results of this study showed the need for improvement in some areas, with a special focus on older adults.

The next chapter gives a general overview of the study and further recommendations.

CHAPTER EIGHT

CONCLUSIONS, STRENGTHS LIMITATIONS AND RECOMMENDATIONS OF THE STUDY.

8.1 INTRODUCTION

This final chapter focuses the conclusions of the study's main findings according to the study objectives. In addition, there is an outline of the study's strengths and limitations related to the process. In the end, recommendations for public health and future research are made.

This study aimed to develop, refine, and test an educational intervention programme to improve cardiovascular disease risk prevention among retired older adults in Osun state, Nigeria. To achieve this aim, the researcher engaged a multimethod design and actualised the following objectives:

- To explore documented literature on previous interventions engaged in reducing cardiovascular disease risk in Africa.
- To identify the barriers and facilitators of educational intervention programmes on cardiovascular disease risk reduction among retired older adults
- To develop a new educational intervention programme and conduct an expert review of the developed programme.
- To pilot test the developed educational intervention on the reduction of cardiovascular disease risks among retired older adults in Osun state.

The researcher engaged a pragmatic research paradigm to achieve the set objectives, guided by the conceptual framework of the Health Belief Model and the Joanna Briggs Institute Model of Evidence-Based Healthcare, to draw meaningful evidence-based inference from the study (Wotela, 2018).

8.1.1 OBJECTIVE ONE

The first objective gathered and synthesised evidence in the literature on previous educational intervention programmes on preventing or reducing CVD risks. The JBI guide to systematic

review was used to search relevant databases, applying the protocol criteria systematically. The study engaged explicit, rigorous methods to identify, critically appraise, and synthesise all relevant intervention studies that met the inclusion criteria for CVD risk prevention. Searches of the five relevant databases generated many studies that were further pruned to meet the characteristics of interest in participants, interventions, comparisons, and outcomes. The study review included three Randomised controlled trials (Dessie et al., 2021, Hickey et al., 2021, Sarfo et al., 2018) a study each on quasi-experimental (Ademuyiwa & Okubadejo, 2021) and cohort studies (Adler et al., 2019, Sarfo et al., 2018). Many other studies excluded as at the time of the review, were protocols of ongoing studies with unpublished results or already conducted systematic reviews in other climes outside Africa (Appendix B). The limited number of studies retrieved confirmed the submission made by Ndejjo (2021) that there needs to be more evidence-based records on educational intervention studies targeted at preventing and reducing CVD risk among older adults in Africa.

Results from the systematic review convey the importance of guideline-based interventions, patient-centred care, and nurse-led strategies. It also revealed that education, digital tools, and tailored intervention packages enhance self-management and hypertension control, emphasizing personalized, technology-enabled care for elderly populations. These results matched the findings of previous systematic reviews where diverse educational intervention methods were used in high-income countries (Cusack et al., 2018, Ramôa Castro et al., 2017, Schorr et al., 2021). However, the evidence of programmes available for older adults was limited supporting the need for this study. The finding further revealed that older persons must be better prioritised when designing and implementing educational intervention programmes in Africa (Aerts et al., 2022).

The evidence also submitted clinically significant differences in the outcomes measured between the intervention group and the control in preventing CVD. Adler et al. (2019) and (Hickey et al., 2021) recorded hypertension control, there was a report of improved heart failure self-care adherence score (Dessie et al., 2021). Aside from controlled blood pressure, participants in another intervention programme had better medication adherence and autonomous self-regulation (Sarfo et al., 2018). Ademuyiwa and Okubadejo (2021) recorded a range of positive outcomes with significant scores in the intervention group in compliance

with lifestyle and diet modification, clinic and physical therapy attendance, and drug compliance.

This finding is consistent with that of Soltani et al. (2021), which reports evidence of positive health outcome measures after educational intervention studies. Further, considering the pre- and post-intervention programmes reviewed, nurses needed to be more involved in preventive health promotion strategies. Again, a broader, all-inclusive, comprehensive educational programme has been posited to reduce CVD risk among older adults (Ruan et al., 2018).

8.1.2 OBJECTIVE TWO

The study's second objective was to describe the barriers and facilitators of educational intervention programmes on cardiovascular disease risk reduction among retired older adults in Osun state, Nigeria. The qualitative study made use of focus group discussions (FGD) conducted in three senatorial districts in Osun state amongst retired older adults (n=28). Overall, it looked at a feasible, appropriate, and acceptable mode of providing intervention programmes for retired older adults in Osun state, Nigeria. The study identified three main categories (themes) from these focus group discussions through content analysis, and fourteen subthemes were generated (pages 82-84).

The analysis showed that older adults value support from healthcare professionals, community networks, and families in managing cardiovascular health. The finding confirms the importance of nurse-led educational intervention programmes (Aerts et al., 2022, Amraei et al., 2020) and collaboration with other relevant experts. This further supported the need for Delphi study in the course of the study.

Further facilitators identified in the study include health talks, group activities, and multimedia education. These effective educational interventions formed part of the items identified for the development of the intervention programme (Mbam et al., 2022), further suggesting the need to support older adults in the context of their desire to promote healthy ageing. Okop et

al. (2023) suggested collaborative engagement and participatory learning as a means of identifying what works best in every unique setting for effectively reducing the CVD burden.

Barriers like financial constraints, technological challenges, and social isolation hinder participation. These results match those observed in earlier studies describing the multifaceted challenges older adults encounter in Nigeria (Owolabi et al., 2016, Ozoemena et al., 2019). Suggested key improvements include regular healthcare visits, better government support and targeted educational campaigns. Other than tackling one or two barriers to effective interventional programmes, the study identified the multi-level factors that must be addressed. It has also ushered a searchlight to guide the design of an all-inclusive, comprehensive educational intervention programme adaptable in an indigenous setting, as recommended by (Aerts et al. (2022).

Findings from these focus group discussions validated the need for a more collaborative effort to create more awareness, achieve better results, build capacity, and effectively reduce CVD risk among older adults in Osun state, Nigeria.

8.1.3 OBJECTIVE THREE

As stated earlier, this section of the study focused on developing a new educational intervention programme targeted at older adults. The researcher integrated and triangulated the key findings of the two data sets (systematic review and qualitative study) in objectives one and two. The purpose of triangulation is to validate and expand quantitative results with qualitative data (Creswell & Creswell, 2022). The triangulation process produced preliminary items organised into domains and sub-domains, which informed part of the design for the developed intervention programme.

The preliminary domains identified after integration and triangulation were, screening and assessment, intervention approaches, education and counselling, technology-enabled interventions, lifestyle and self-management, intervention packages, facilitators of success and barriers to success, with suggested ways of improvement (Appendix AA). The WHO guidelines

for the prevention of CVD risk further guided the developed programme (World Health Organization, 2007).

Furthermore, the study moved on to the validation of the developed programme by five selected experts through the Delphi study. The selected experts ensured further ratification for face and content validity through two rounds of review (Delphi study). They had to rate the programme using Lynn's model four-point rating scale. Relevant adjustments were made from the comments and suggestions received after the first session of the expert review. The result of the Delphi study yielded a content validation index of between 0.8 and 1, with an average proportion of items judged as relevant across the five experts to be 0.99. (Appendix AD). This outcome suggests that the programme was comprehensive, clear and of good quality (Yusoff, 2019).

In the end, the developed educational intervention programme had six modules with subsets, all targeting the modifiable risk factors of CVD and healthy lifestyles that could be adopted to prevent and reduce its occurrence. The programme was designed for 12 weeks (6 weeks of implementation and a follow-up session six weeks post-intervention). The Health Belief Model was the programme's framework (Tarkang & Zotor, 2015). The model describes the six concepts that influence the decision to effect positive change and make informed choices on new knowledge acquired. These concepts are; Perceived susceptibility, Perceived severity, Perceived benefits, Perceived barriers, Cues to action, and Self-efficacy.

8.1.4 OBJECTIVE FOUR

The final goal of this study was carried out through pilot testing of the developed educational intervention programme on the reduction of cardiovascular disease risks among retired older adults in Osun state. The programme was implemented as a one-group quasi-experimental study over 12 weeks. As suggested by scholars (Aerts et al., 2022, Hassen et al., 2022), such intervention should be administered to a specific group of individuals with typical features for successful empowerment and reinforcement strategies.

Forty participants, with a mean of 64.9±7.9SD, were recruited into the study; however, thirty-nine participants completed the study. The researcher obtained baseline biophysical profiles and other opinion data via questionnaire at the inception of the programme and repeated the same data collection process in the 12th week.

At the end of the intervention programme, there were established differences in the recordings of the mean systolic and diastolic blood pressure of participants in the pre-test compared to the post-post. This revealed the importance of the intervention programme as recorded in previous studies (Adler et al., 2019, Hickey et al., 2021). Although there were no appreciable differences between the pre-test and post-test values of the participants' body mass indexes (Rippe, 2019), this suggests that a five to ten percent reduction in BMI for an individual whose BMI is greater than 25 could significantly reduce the risk of CVD. This finding suggests that the change process requires time, consistency and reinforcement. Participants of the intervention study identified to be at high risk due to their overly raised blood pressure had it checked three times. They were referred to the nearest health facility. They were also followed successfully.

There was also a significant impact on variables listed in the knowledge on CVD risk using the ABCD questionnaire pre- and post-intervention. The variables assessed with the questionnaire were; Knowledge about CVD, Perception of risk of heart attack or stroke, Perceived Benefits and Intentions to Change, Healthy Eating Intentions, Perceived Benefits and Intentions to Stop Smoking. Other topics delivered in modules from the developed educational intervention programme assessed were; Exercise and stress management, Diet and nutritional needs of older adults to prevent CVD, avoiding excessive use of alcohol and smoking, Body weight and obesity management, and Adherence to prescribed medications.

The primary outcome measured was the level of knowledge of participants on the key risk factors of CVD and their pre-and post-intervention biophysical profiles. At the same time, the secondary outcome was the participants' attitude to behavioural changes needed to prevent CVD. The educational intervention programme was overall assessed as effective in creating the required awareness. This finding justifies the conceptual framework of the Health Believe Model, which emphasises that individuals are likely to act if they perceive a health threat and

believe the benefits outweigh the barriers (Tarkang & Zotor, 2015) (Tarkang & Zotor, 2015). In addition, it provided a sustainable reference for increasing the knowledge base of older adults on CVD risk, hence reducing the burden and risk.

The finding further supports the submissions of Kganakga et al. (2022) that intervention programmes could contribute to primary prevention and control of the prevalence of CVD. In addition, an educational intervention programme is suggested to be one of the good and practical strategies to create awareness of CVD Okube et al. (2023).

8.2 STRENGTHS AND LIMITATIONS OF THE STUDY

The researcher conducted this study with a high level of diligence, rigour, ethical and empirical integrity, culminating in evidence-based outcomes. All these outcomes are presented as the strength of the set objectives as outlined earlier. Using multimethod design and multi-data sources helped generate an evidence-based approach for the educational intervention programme through triangulation, experts' review, and pilot study. Participants of the study who identified some misconceptions about CVD were able to make informed decisions on behavioural changes that could prevent and reduce CVD risk amongst them.

Furthermore, the educational intervention programme was able to produce an individualised sustainable reference material in the form of an average-sized wall poster that the participants could use to update their knowledge base regularly without being misguided through unverifiable information sources. The wall poster would also help with easy access to information retention, keeping cognisance of the challenge of information retention among older adults.

Lastly, this study's findings have contributed to the existing body of knowledge and may guide different professionals while developing intervention programmes for older adults, keeping in mind their unique needs and characteristics. They could again sensitise policymakers to prioritise affordable and accessible healthcare services for older adults as individuals at the highest risk of CVD to adopt and sustain healthy behaviours.

8.2.1 LIMITATIONS

The findings of this study need to be interpreted with the following limitations in mind. Firstly, the study was conducted in an urban, semi-urban region of Osun state, therefore, the experience of older adults in rural or megacities might differ, thus limiting the generalisability of the findings. Secondly, the study had no randomised controlled group to measure the difference in outcome from the different groups. Again, the study's time frame was probably insufficient to record more significant changes from the intervention programme.

Lastly, considering the peculiarity of the participants involved in the qualitative arm of the study, the focus group discussions might not be generalisable to a larger population of older adults, especially those who are illiterate within the state or country at large. Therefore, the generalisation of the findings should be made with caution.

8.3 RECOMMENDATIONS

8.3.1 Public Health Recommendations

Findings from this study presented information on the sparse intervention studies in Nigeria that prioritise older adults and provide sufficient information on CVD risk prevention. It is therefore recommended that more extensive community-based intervention be encouraged to adequately inform the entire populace on the burden and risk of CVD and how to prevent it.

The study found that older adults in Nigeria need more health insurance and services to promote healthy ageing and reduce their risk of CVD. Hamid, Groot, and Pavlova (2019) Suggested that public Health Policy makers in Africa often undermine the importance and burden of the prevalence of CVD. Therefore, policymakers and the government should ratify policies prioritising older adult care in Nigeria. Similarly, the government should provide regular access to information and health care services like insurance schemes for older adults and more regular, free screening checks across social and educational statuses for early detection and symptomatic management of individuals at risk of CVD.

8.3.2 Recommendations for future research

Having successfully developed and pilot-tested an educational intervention programme among older adults in Osun state, Nigeria, noting the strengths and limitations of the study, the following studies are recommended to scale up intervention programmes on CVD risk reduction:

- Comparative analysis of CVD risk factors among urban and rural populations of older adults in Nigeria
- A randomised controlled trial is suggested to evaluate the newly developed intervention programme's impact on two groups.
- Promoting sustainable educational intervention programmes on a larger national scale for the prevention of CVD among older adults in Nigeria
- More studies should be conducted among homogeneous groups or communities to promote active participation, group learning and sustained capacity building.
- More publications, webinars, and feedback will provide needed reliable information, primarily to policymakers, to appreciate the prevalence of CVD and make decisions that will adequately support funding for further research and adjust public health care services to be more beneficial in preventing and reducing the prevalence of CVD in Africa.

8.4 CONCLUSION

Having successfully identified existing literature on intervention programmes on CVD risk and its prevention in Africa, this study moved further to explore the facilitators and barriers to effective intervention programmes among older adults in Osun state. The integration of the first two studies culminated in empirical findings used as a framework to develop an educational intervention programme validated by experts through the Delphi study. The instrument developed was pilot-tested, and findings reported the effectiveness of the developed programme in empowering older adults who participated in the study to make informed decisions that could help reduce their risk of developing CVD. The intervention programme from this study was, therefore, effective in reducing CVD risk among older adults and could be scaled up to a larger population of older adults in Nigeria.

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APPENDIX A

Effect of Nurse-led interventions to reduce cardiovascular disease risk among older adults in sub-Saharan Africa: a protocol for a systematic review.

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Abstract

Objective:

This review aims at identifying the effectiveness of nurse-led interventions compared to other clinical interventions in the reduction of cardiovascular disease (CVD) risk among older persons in sub-Saharan Africa.

Introduction: Diverse studies have been conducted by health professionals with varying approaches to the reduction or prevention of CVDs. Nursing activities have also shown effective evidence-based records in the reduction of cardiovascular disease in most high-income countries. This study, therefore, seeks to evaluate the effect of nurse-led interventions on the reduction of CVD risk in sub-Saharan Africa.

Inclusion criteria: Nurse-led intervention studies or trials among older adults, aged 60 years and above, domiciled in sub–Saharan Africa be considered for the study. The outcome of interest will be reduced modifiable risk factors of cardiovascular diseases. Studies conducted by other health professionals will not be included in the study.

Methods: The proposed systematic review will be conducted in accordance with the JBI methodology for systematic reviews of effectiveness evidence. The search strategy will be aimed at locating published and unpublished studies. Electronic databases, including PubMed, SCOPUS, CINAHL, Web of Science and the Cochrane Central Register of Controlled Trials, will be systematically searched from 2012 to 2022. All searches will be in the English language, while critical appraisal and data extraction will be conducted using standardized tools. Certainty of the evidence will be assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach.

Systematic review registration number: CRD42022374643.

Keywords: Cardiovascular disease, Effectiveness, interventions, Nurse-led, Older adults.

Introduction

Cardiovascular disease (CVD) is highly ranked in mortality and disability impact among other diseases in the global health system and this is of huge universal economic burden (Roth et al., 2020). There is an alarming global projection of more than 23 million deaths by 2030 due to CVD (Amini et al., 2021; Hassen et al.,2022)

Reviewing the global patterns of CVD incidence, mortality, and other health index markers for a period of close to three decades, Amini et al. (2021) reported a constant rise in the incidence and mortality of CVD. Although some regions of the world experienced a decline at some point in the review, there were established statistics of a constant rise in the mortality-to-incidence ratio globally. Another leading study on the burden of cardiovascular disease cutting across global regions conducted between 1990- 2019, attested to these findings with a growing epidemic in the LMIC (Roth et al., 2020).

Notwithstanding, the record of incidence and mortality rate of CVD varied from one region of the world to another. In the past, CVD had more incidence in developed countries, (Amini et al., 2021) however, most of these countries are actively and steadily tackling this health challenge. This is further aided by advanced technology and improved medical and clinical facilities Hassen et al., 2022. There is also an improved level of awareness of the risk factors of CVD and the adoption of a healthy lifestyle in developed nations (Hassen et al., 2022; Mares et al., 2022). However, CVD is still of great concern in most Low-and Medium-Income countries (LMIC), especially among poor or socio-economically disadvantaged individuals or communities; with an increase in incidence and mortality rate (Owolabi et al., 2016).

In Africa where the typically disadvantaged communities are more likely classified, there are lots of factors further responsible for this constant rise (Owolabi et al., 2016). Some of them are lack of access to and non-affordability of a functional healthcare system, poor awareness of the disease conditions, unhealthy lifestyle, and choices, and limited preventive healthcare services amongst others (Amini et al., 2021; Haykin et al., 2020).Records as accessed by Amini et al. 2021 from the Human Development Index unit of the United Nations Development Programme (UNDP), over a period of 28 years measured the effect of CVD differently. The summative effect of these leads to a remarkable reduction in the quality of life and life expectancy among other health indexes (Roth et al., 2020). Some of these are Years of life (YLL), Years lived with disability (YLD), Disability-adjusted life (DALY), Quality of life (QOL) and Activity of daily living (ADL) among others.

Overall, there is a high need for enlightening people on healthy lifestyles, and basic strategies for CVD prevention through education which is the hallmark of all preventive interventions (Hassen et al., 2022). There is also the need to intensify the use of cost-effective interventions to meet one of the Sustainable Development Goals (SDG) 3 which targets the reduction of mortality due to non-communicable diseases (NCDs). (Roth et al., 2020).

Given that there are lots of intervention programmes conducted by different professionals within the health sector with varying approaches (Freeley et al., 2022). Nursing activities are pivotal to giving health-promoting information to individuals and groups, thus helping them to make informed choices that could help them in the prevention of illness and diseases (Schultz et al., 2018). The World Health Organisation (WHO) acknowledged that a small reduction in major risk factors could significantly impact the long-term reduction of cardiovascular disease risk (WHO

2007). The body also recognises nurses as key stakeholders in primary preventive services and most importantly, in the prevention of CVD (Schultz et al., 2018).

Nurses' role in the health care system expanded over time from taking and recording clinical observations to multi-level evidence-based practices (Himmelfarb et al., 2016; Aerts et al., 2022). Nurses are now more involved in other essential roles such as leading, coordinating, managing, delivering, and facilitating programmes that promote healthy lifestyles (Freeley et al., 2022). Some other levels of involvement are in; education and counselling, knowledge and skill building as well as public health management (Himmelfarb & Com-Mensah, 2016; Haykin et al., 2020). However, the major setback for most nursing activities in the past was the lack of evidence-based records especially in sub-Saharan Africa (Naomi et al., 2021; Aerts et al., 2022) A scoping review conducted by Freeley et al., 2022 showed a limited number of studies that are nurse-led and channelled towards the prevention of CVD, especially among the disadvantaged or otherwise 'at-risk' groups in the past two decades.

There has been a paradigm shift to this trend as more nurses are now involved in research, and publications (Himmelfarb & Mensah 2016). Some of the reviewed nurse-led intervention programmes around the globe used different research tools and methods which were found to be effective in the prevention of CVD. (Freeley et al., 2022; Aerts et al.,2022; Schultz et al., 2018). Most of these studies had wider coverage of enlightening programmes and initiatives in advanced countries compared to LMIC (Aerts et al., 2022). Modern Information technology devices and sophisticated methods like emails, telephone calls, mobile phones, and applications were deployed in such studies or trials. This may be a barrier in low and medium-income countries where the socioeconomic status of average older persons is of great concern (Owolabi et al., 2016). Therefore, the need to adopt and implement culturally acceptable and effective methods of enlightening older adults in Sub-Saharan Africa.

In Nigeria, few studies have been carried out mostly by other health professionals and were assessed to be successful and effective with the outcome of improved awareness (Ozomena et al., 2019). There is yet a need to extend the study beyond hypertension solely to include other predisposing factors of CVD among this group who are at high risk. There is also the need to check on the existing gaps and possibly fill them for a more robust nursing intervention programme which is the most important strategy for preventing CVD. Few studies in the last decade also have a pointer to better outcomes with primary prevention and nursing interventions (Hassen et al., 2022; Schultz et al., 2018; Aerts, Connolly et al., 2017), other than management strategies after the incidence might have occurred.

Review question(s)

The question of this review is:

What is the effectiveness of nurse-led interventions compared to other routine medical checks among older adults in sub-Saharan Africa?

1. What are the strengths, and the weaknesses of such interventions?

2. What was the outcome of the nurse-led intervention?

Keywords *Cardiovascular disease, Effectiveness, interventions, Nurse-led, Older adults*

Inclusion criteria

Participants

Participants: The search will be focused on older adults, aged 60 years and above, domiciled in sub–Saharan Africa. The older adult will be identified to be at risk of developing cardiovascular disease from modifiable risk factors such as hypertension, obesity, alcohol intake and cigarette smoking, lipid profile and diabetes mellitus. Studies conducted by other health professionals or among younger populations less than 60 years of age will not be included in the study.

Intervention(s)

Interventions: This review will consider published literature on all interventions carried out by nurses in clinical and community settings aimed at providing adequate information to older adults on the prevention of cardiovascular diseases.

Comparator(s)

The review is aimed at comparing interventions that are nurse-led and other routine clinical services for preventing cardiovascular diseases among older adults.

Outcomes

This review will include studies that measure at least one of the following outcomes: reduced CVD risk factors; regulated body mass index, controlled blood pressure, controlled blood sugar and lipid profile. It will also note reported or recorded behavioural outcomes like smoking and alcohol cessation as well as overall improvement in the quality of life of participants.

Types of studies

Edit set text as appropriate: This review will consider both experimental and quasi-experimental study designs including randomized controlled trials, non-randomized controlled trials, before and after studies and interrupted time-series studies on the prevention of cardiovascular studies.

Methods

The proposed systematic review will be conducted in accordance with the JBI methodology for systematic reviews of effectiveness. The results will be reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA-P) guidelines. PRISMA 2020 and PRISMA-S will be used to report the final systematic review. The protocol has been registered with PROSPERO (CRD42022374643).

A preliminary search of PROSPERO, the Cochrane Database of Systematic Reviews and the JBI Evidence Synthesis was conducted and no current or underway systematic reviews on the topic were identified.

Search strategy

The search strategy will aim to find both published and unpublished studies. A preliminary search of MEDLINE (PubMed; Appendix I) and CINAHL (EBSCO) was undertaken to identify text words contained in the titles and abstracts of relevant articles and their index terms. A second search using the identified keywords and index terms will be conducted across MEDLINE (PubMed), CINAHL (EBSCO), Web of Science, SCOPUS, and the Cochrane Central Register of Controlled Trials. Sources of unpublished studies and grey literature will also be used including Sigma Theta Tau International repository, ProQuest nursing and google scholar. Studies published from 2012 to 2022 will be included in the search and limited to the English language for ease of review.

Study selection

Following the search, all identified citations will be collated and uploaded into EndNote version 20.5, the year 2023 (Clarivate Analytics, PA, USA) and duplicates removed. Following a pilot test, titles and abstracts will then be screened by two or more independent reviewers for assessment against the inclusion criteria for the review. Potentially relevant studies will be retrieved in full, and their citation details imported into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI, JBI, Adelaide, Australia). The full text of selected citations will be assessed in detail against the inclusion criteria by two or more independent reviewers. Reasons for the exclusion of papers in the full text that do not meet the inclusion criteria will be recorded and reported in the systematic review. Any disagreements that arise between the reviewers at each stage of the selection process will be resolved through discussion, or with an additional reviewer/s. The results of the search and the study inclusion process will be reported in full in the final systematic review and presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram.

Assessment of methodological quality

Eligible studies will be critically appraised by two independent reviewers at the study level modify as appropriate if appraisal will occur at the outcome level for methodological quality in the review using standardized critical appraisal instruments from JBI for experimental and quasi-experimental studies. Authors of papers will be contacted to request missing or additional data for clarification, where required. Any disagreements that arise will be resolved through discussion, or with a third reviewer. The results of the critical appraisal will be reported in narrative form and in a table. All studies, regardless of the results of their methodological quality, will undergo data extraction and synthesis (where possible).

All studies, regardless of the results of their methodological quality, will undergo data extraction and synthesis (where possible). Following critical appraisal, studies that do not meet a certain quality threshold will be excluded. This decision will be based on the set objective of the review.

Data extraction

Data will be extracted from studies included in the review by 2 independent reviewers using the standardized JBI data extraction tool. The data extracted will include specific details about the participants, study methods, interventions, statistical significance, and outcomes of significance to the review objective. Any disagreements that arise between the reviewers will be resolved through discussion or with a third reviewer. Authors of papers will be contacted to request missingdata.

Data synthesis

Where pooling is not possible, a narrative synthesis will be conducted, and data will be presented in tables and figures. When multiple studies with similar outcome measures can be pooled, a statistical meta-analysis using RevMan (Copenhagen: The Nordic Cochrane Centre, Cochrane) or StatsDirect (Cambridge, UK) will be performed. Effect sizes will be reported for dichotomous data as odds ratios or risk ratios, and for continuous data, weighted (or standardized) final post-intervention mean differences will be calculated for the analysis with 95% CI. Heterogeneity will be examined statistically using the standard I2 test. Statistical analyses will be conducted using random effects models if moderate to high heterogeneity is present (I2 value > 50%), while fixed effects models will be used in the absence of heterogeneity. Subgroup analyses will be conducted when there are sufficient data to determine any differences in the effectiveness of the intervention. Statistical tests for funnel plot asymmetry will be performed, where appropriate.

Assessing certainty in the findings

The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach for grading the certainty of evidence will be followed, and a Summary of Findings (SoF) will be created using GRADEpro (McMaster University, ON, Canada). This will be undertaken by 2 independent reviewers at the outcome level. Any disagreements that arise between the reviewers will be resolved through discussion or with a third reviewer. Authors of papers will be contacted to request missing or additional data for clarification, where required. The SoF will present the following information where appropriate: absolute risks for the treatment and control; estimates of relative risk; and a ranking of the quality of the evidence based on the risk of bias, directness, heterogeneity, precision, and risk of publication bias of the review results. The outcomes reported in the SoF will be controlled blood pressure, controlled blood sugar and lipid profile. smoking and alcohol cessation as well as overall improvement in the quality of life of participants.

Funding

This study was self-funded.

Declarations

Author contributions

GF contributed to the conceptualization, methodology, writing of the original draft, and data curation. AT and SS contributed to the conceptualization, methodology, writing, editing, and supervision.

Conflicts of interest

No conflict of interest while conducting this review.

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Appendices

MEDLINE (PubMed)

Search conducted: Appendix I: Search strategy

("Nurse-led" OR "Nursing intervention studies" OR "nurs*") AND ("intervention programmes" OR "Prevention strategies" OR "prevent*" OR "reduc*" OR "improv*") AND ("cardiovascular disease" OR "cardiovascular disease risk" OR "heart disease" OR "Cardiovascular Diseases" [Mesh] OR "Cardiometabolic Risk Factors" [Mesh]) AND ("older persons" OR "Older Adults" OR "Elderly" OR "retired", OR "Senior citizens", OR "Ageing") AND " Sub Saharan Africa".

Search conducted on February 2023.

PubMed: initial search on 25/02/2023; Updated 30/6/3023

"Cardiovascular disease risk" NOT "coronary heart disease" NOT "cerebrovascular disease" AND "Older adults" OR "Older persons"OR "Older citizens"OR"Elderly" OR "Aged" OR " Senior citizen"AND "Retired"OR "Retirement" AND "Intervention" OR "intervention programmes" OR "Educational Programmes"

("Cardiovascular disease risk" NOT "cerebrovascular disease" AND "Older adults" OR "Older persons" OR "Older citizens" OR "Elderly" OR "Aged" OR " Senior citizen" AND "Retired" OR "Retirement" AND "Intervention" OR "intervention programmes" OR "Educational Programmes" AND "Africa") AND (("2011"[Date - MeSH] : "2023"[Date - MeSH]))

Filters: Abstract, Full text, older adults; English from 01/01/2011-31/01/2023

(ALL=(Medical)) AND ALL=(Cardiovascular disease risk)) NOT ALL=(cerebrovascular disease)) AND ALL=(older adults)) OR ALL=(older persons)) OR ALL=(older citizens)) OR ALL=(senior citizens))R ALL=(Elderly)) OR ALL=(aged)) OR ALL=(ageing)) AND ALL=(Retired))) OR ALL=(retirees)) OR ALL=(retirees)) OR ALL=(retirement)) AND ALL=(intervention))) OR ALL=(intervention programmes)) OR ALL=(Educational intervention programmes)) AND ALL=(Africa).

"[All Fields] AND ("program"[All Fields] OR "program s"[All Fields] OR "programe"[All Fields] OR "programed"[All Fields] OR "programes"[All Fields] OR "programing"[All Fields] OR "programmability"[All Fields] OR "programmable"[All Fields] OR "programmably"[All Fields] OR "programme"[All Fields] OR "programme s"[All Fields] OR "programmed"[All Fields] OR "programmer"[All Fields] OR "programmer s"[All Fields] OR "programmers"[All Fields] OR "programmes"[All Fields] OR "programming"[All Fields] OR "programmings"[All Fields] OR "programs"[All Fields])) OR (("health"[MeSH Terms] OR "health"[All Fields] OR "health s"[All Fields] OR "healthful"[All Fields] OR "healthfulness"[All Fields] OR "healths"[All Fields]) AND ("educability"[All Fields] OR "educable"[All Fields] OR "educates"[All Fields] OR "education"[MeSH Subheading] OR "education"[All Fields] OR "educational status"[MeSH Terms] OR ("educational"[All Fields] AND "status"[All Fields]) OR "educational status"[All Fields] OR "education"[MeSH Terms] OR "education s"[All Fields] OR "educational"[All Fields] OR "educative"[All Fields] OR "educator"[All Fields] OR "educator s"[All Fields] OR "educators"[All Fields] OR "teaching"[MeSH Terms] OR "teaching"[All Fields] OR "educate"[All Fields] OR "educated"[All Fields] OR "educating"[All Fields] OR "educations"[All Fields]) AND ("program"[All Fields] OR "program s"[All Fields] OR "programe"[All Fields] OR "programed"[All Fields] OR "programes"[All Fields] OR "programing"[All Fields] OR "programmability"[All Fields] OR "programmable"[All Fields] OR "programmably"[All Fields] OR "programme"[All Fields] OR "programme s"[All Fields] OR "programmed"[All Fields] OR "programmer"[All Fields] OR "programmer s"[All Fields] OR "programmers"[All Fields] OR "programmes"[All Fields] OR "programming"[All Fields] OR "programmings"[All Fields] OR "programs"[All Fields])) OR (("health"[MeSH Terms] OR "health"[All Fields] OR "health s"[All Fields] OR "healthful"[All Fields] OR "healthfulness"[All Fields] OR "healths"[All Fields]) AND ("educability"[All Fields] OR "educable"[All Fields] OR "educates"[All Fields] OR "education"[MeSH Subheading] OR "education"[All Fields] OR "educational status"[MeSH Terms]

(Effect) | (Impact | Outcome) (Educational intervention OR Intervention programme OR Educational Programme) (Cardiovascular Disease Risk OR CVD Risk) (Elderly Or Elderly citizens OR Older adults OR Older persons OR Senior citizensOr) ((Retirement OR Retirees OR Retired) NOT (Young adults Or Adults)) f:h b:(h7 | h) l:eng y:[2011-2023]

AND (Nigeria OR "South Africa" OR Kenya OR Uganda OR Tanzania OR Malawi OR Zimbabwe OR Angola OR Sudan OR “South Sudan” OR Ethiopia OR Somalia OR Botswana ORCongo OR Cameroon OR Burundi OR Gabon OR Kenya OR Senegal OR Togo OR Chad OR Rwanda OR Djibouti OR Lesotho OR Madagascar OR Mauritius OR Mozambique OR Namibia OR Seychelles OR ”Sao Tome Principe” OR Eswatini OR

Zambia OR Benin OR “Sierra Leone” OR “Cape Verde” OR Mali OR Ghana OR “Ivory Coast” OR Guinea OR Niger OR Liberia OR Mauritania OR “Guinea Bissau”).

Educational programme

[All Fields] OR "experiences"[All Fields]) AND ((("health"[MeSH Terms] OR "health"[All Fields] OR "health s"[All Fields] OR "healthful"[All Fields] OR "healthfulness"[All Fields] OR "healths"[All Fields]) AND ("program"[All Fields] OR "program s"[All Fields] OR "programe"[All Fields] OR "programed"[All Fields] OR "programes"[All Fields] OR "programing"[All Fields] OR "programmability"[All Fields] OR "programmable"[All Fields] OR "programmably"[All Fields] OR "programme"[All Fields] OR "programme s"[All Fields] OR "programmed"[All Fields] OR "programmer"[All Fields] OR "programmer s"[All Fields] OR "programmers"[All Fields] OR "programmes"[All Fields] OR "programming"[All Fields] OR "programmings"[All Fields] OR "programs"[All Fields])) OR (("health"[MeSH Terms] OR "health"[All Fields] OR "health s"[All Fields] OR "healthful"[All Fields] OR "healthfulness"[All Fields] OR "healths"[All Fields]) AND ("educability"[All Fields] OR "educable"[All Fields] OR "educates"[All Fields] OR "education"[MeSH Subheading] OR "education"[All Fields] OR "educational status"[MeSH Terms] OR ("educational"[All Fields] AND "status"[All Fields]) OR "educational status"[All Fields] OR "education"[MeSH Terms] OR "education s"[All Fields] OR "educational"[All Fields] OR "educative"[All Fields] OR "educator"[All Fields] OR "educator s"[All Fields] OR "educators"[All Fields] OR "teaching"[MeSH Terms] OR "teaching"[All Fields] OR "educate"[All Fields] OR "educated"[All Fields] OR "educating"[All Fields] OR "educations"[All Fields]) AND ("program"[All Fields] OR "program s"[All Fields] OR "programe"[All Fields] OR "programed"[All Fields] OR "programes"[All Fields] OR "programing"[All Fields] OR "programmability"[All Fields] OR "programmable"[All Fields] OR "programmably"[All Fields] OR "programme"[All Fields] OR "programme s"[All Fields] OR "programmed"[All Fields] OR "programmer"[All Fields] OR "programmer s"[All Fields] OR "programmers"[All Fields] OR "programmes"[All Fields] OR "programming"[All Fields] OR "programmings"[All Fields] OR "programs"[All Fields])) OR (("health"[MeSH Terms] OR "health"[All Fields] OR "health s"[All Fields] OR "healthful"[All Fields] OR "healthfulness"[All Fields] OR "healths"[All Fields]) AND ("educability"[All Fields] OR "educable"[All Fields] OR "educates"[All Fields] OR "education"[MeSH Subheading] OR

"education"[All Fields] OR "educational status"[MeSH Terms] OR ("educational"[All Fields] AND "status"[All Fields]) OR "educational status"[All Fields] OR "education"[MeSH Terms] OR "education s"[All Fields] OR "educational"[All Fields] OR "educative"[All Fields] OR "educator"[All Fields] OR "educators"[All Fields] OR "educators"[All Fields] OR "teaching"[MeSH Terms] OR "teaching"[All Fields] OR "educate"[All Fields] OR "educated"[All Fields] OR "educating"[All Fields] OR "educations"[All]

APPENDIX B

LIST OF STUDIES EXCLUDED FROM THE SYSTEMATIC REVIEW ON FULL TEXTS SEARCH WITH REASONS (N=27)

Authors	Title	Reasons for exclusion
Bose *et al.* (2020) Sweden	Adaptation of Coping Effectiveness Training for Patients with Heart Failure and Patient-Reported Experience of the Intervention	The study was conducted outside Africa.
Gerber *et al.* (2016) South Africa	A cohort study of older adults in Bloemfontein, South Africa, to determine health-related quality of life and functional abilities	The study had a different focus -Addressed comorbidities and functional capacities of older adults
Chow *et al.* (2016) (Multinational)-Australia, UK, Germany, US, Canada, South Africa, New Zealand	Text2PreventCVD: protocol for a systematic review and individual participant data meta-analysis of text message-based interventions for the prevention of cardiovascular diseases	The study is a designed protocol for a systematic review.
Holst *et al.* (2021) Tanzania	Digital Health Intervention to Increase Health Knowledge Related to Diseases of High Public Health Concern in Iringa, Tanzania: Protocol for a Mixed Methods Study	The study is a designed protocol. Implementation and outcome not documented
Katende and Becker (2016) Uganda	Nurse-led care interventions for high blood pressure control: Implications for non-communicable disease programs in Uganda	Different design: integrative review planned for adaptation in Uganda
Lee *et al.* (2015) Asia	Transtheoretical Model-based Nursing Intervention on Lifestyle Change: A Review Focused on Intervention Delivery Methods	Conducted outside Africa
Ovbiagele (2015) Ghana.	Phone-based intervention under nurse guidance after stroke: concept for lowering	Published study protocol implementation and outcome not documented.

Authors	Title	Reasons for exclusion
	blood pressure after stroke in Sub-Saharan Africa	
Sarfo *et al.* (2016) Ghana	Phone-based Intervention under Nurse Guidance after Stroke (PINGS): Study protocol for a randomised controlled trial	Published protocol implementation and outcome not documented.
Vilme *et al.* (2019) Durham, USA	Using Telehealth to Disseminate Primary, Secondary, and Tertiary CVD Interventions to Rural Populations	Conducted outside Africa
Watson *et al.* (2015) Belfast Northern Ireland	Effect of a Web-Based Behaviour Change Program on Weight Loss and Cardiovascular Risk Factors in Overweight and Obese Adults at High Risk of Developing Cardiovascular Disease: Randomized Controlled Trial	Study was conducted outside Africa
Hassen *et al.* (2021) Belgium and Uganda	Effectiveness of community-based cardiovascular disease prevention interventions to improve physical activity: A systematic review and meta-regression	Study is a different design: Systematic review
Haykin *et al.* (2020) Ghana	Adapting a nurse-led Primary care initiative to Cardiovascular Disease Control in Ghana: A Qualitative Study	Different designs and focus (Qualitative Study)
Stormacq *et al.* (2020) Belgium, Switzerland. Rwanda	Effects of health literacy interventions on health-related outcomes in socioeconomically disadvantaged adults living in the community: a systematic review	Different design- (systematic review)
Tan *et al.* (2020) Singapore	A systematic review of community nursing interventions focusing on improving outcomes for individuals exhibiting risk	Different design (Systematic review, conducted off African shore

Authors	Title	Reasons for exclusion
	factors of cardiovascular disease	
Wood *et al.* (2021) Ghana	Constructing a Nurse-led Cardiovascular Disease Intervention in Rural Ghana: A Qualitative Analysis	Different design Qualitative
Allen *et al.* (2011) USA	Community Outreach and Cardiovascular Health (COACH) Trial: a randomised, controlled trial of nurse practitioner/community health worker cardiovascular disease risk reduction in urban community health centres	Conducted outside Africa
Ndejjo (2021) Uganda	Cardiovascular disease prevention in Mukono and Buikwe districts in Uganda: evidence to implementation	-Study participants' age range-18-74 -Embed mixed method (cross-sectional, qualitative, and sequential cross-over)
Okube *et al.* (2023) Kenya	Effect of a Nurse-Led Intervention on Knowledge of the Modifiable Risk Behaviors of Cardiovascular Disease: A Randomized Controlled Trial	- Study participants' age range- (all ages of mature adults):18-64
Kganakga *et al.* (2022) South Africa	Prognostic values of modifiable risk factors for cardiovascular events in South African health promotion	-Different design and focus - Study participant's age range -29-94 -Cross-sectional design - quantitative study
Okop *et al.* (2023) Ethiopia, Malawi, Rwanda, and South Africa.	Multi-country collaborative citizen science projects to co-design cardiovascular disease prevention strategies and advocacy: findings from Ethiopia, Malawi, Rwanda, and South Africa.	-Study participants-18 to 75 years -Evaluated parameters for risk assessment and design of health programmes

Authors	Title	Reasons for exclusion
Sarfo *et al.* (2021) Ghana	Phone-based intervention under nurse guidance after stroke (PINGS II) study: protocol for a phase III randomized clinical trial	-Study protocol: Implementation and evaluation are not included
Wahab *et al.* (2015) Nigeria	Knowledge of stroke risk factors among Nigerians at high risk.	-Cross-sectional design on knowledge of participants -Study participant's mean age-= 56.4 ±12.6
Musinguzi *et al.* (2019) Uganda	An implementation science study to enhance cardiovascular disease prevention in Mukono and Buikwe districts in Uganda: a stepped-wedge design.	-Study protocol: Implementation and evaluation are not included.
Ndejjo *et al.* (2020) Uganda	Cardiovascular disease prevention knowledge and associated factors among adults in Mukono and Buikwe districts in Uganda	-Study participants' age range-25-70 years -Cross-sectional design
(Hassen *et al.*, 2021) Belgium and Uganda	Effectiveness of community-based cardiovascular disease prevention interventions to improve physical activity: A systematic review and meta-regression.	Systematic review
Chillo *et al.* (2022) Tanzania	Developing a sustainable cardiovascular disease research strategy in Tanzania through training: Leveraging from the East African centre of excellence in cardiovascular sciences project.	Systematic review and action plan
van de Vijver *et al.* (2016) Netherlands, Kenya, UK	Impact evaluation of a community-based intervention for prevention of cardiovascular diseases in the slums of Nairobi: the SCALE-UP study	The target population was 35 years and above -Prospective evaluation and intervention study as a form prior door to door campaign

APPENDIX C

WITS UNIVERSITY

GUIDING QUESTIONS FOR THE FOCUS GROUP DISCUSSIONS

Guidelines for the focus group discussion.

1. Welcome

- Introduction of moderator and assistants

2. Introduction

- Topic, aim and objectives.
- Anonymity -guaranteed within the sphere /confines of group.
- (separate sheets provided for personal demographics attached to participant's information and consent form).

3. Ground rules

- No right or wrong answers, only differing point of view which will be harmonised later.
- Only one person is allowed to speak at a time.
- We are tape recording the session.
- You do not need to agree with others, but you must listen respectfully as others share their views.
- All phones must be on silent mode, if you must pick your call, please do so as quietly as possible and re-join as quickly as you can.
- My role as a moderator is to guide the discussion.

SECTION B

1. Have you participated from any form of group health talk in the past?

1b. Can you describe what was done in some of those seminars? -

2. How often do you hold such programmes?

2b. what were the means used in those talks and seminars?

3. What are the easy, and preferred ways of learning new things in this group?

4. As a group, have you been enlightened on the prevention of cardiovascular before?

4b. Briefly describe what you know about cardiovascular diseases?

5. What are the promoters of learning or positive lifestyle modifications in this group?

6. What are the envisage group relational activities that could promote effective learning?

7. What do you envisage as barriers to learning within the group, how can all this be checked?

8. How could these barriers be addressed?

9. How can the knowledge gained be sustained?

APPENDIX-D

Nursing, School of Therapeutic Science
Faculty of Health Sciences, Private Bag 3, Wits 2050, South Africa.

INVITATION TO PARTICIPATE IN DELPHI REVIEW AS AN EXPERT

Dear Sir/Ma,

My name is Grace Oluwatoyin Faronbi. I am registered with the University of the Witwatersrand in the Department of Nursing Education for the degree of Philosophy in Nursing. I am conducting a research study that seeks to develop, refine, and test an educational intervention programme to reduce cardiovascular disease risk among retired older adults in Osun state, Nigeria. The study is under the supervision of Dr A. Tshabalala and Professor Shelley Schmollgruber.

In search of an answer to this question, the study utilised a multi-method that was divided into three phases: a systematic review of literature on existing intervention studies on CVD reduction among older adults in Africa and a qualitative study that analyses the facilitators and barriers to effective intervention studies among older adults. The outcome of findings from the two studies was triangulated to identify items needed to develop the proposed intervention study.

The second part of the study seeks to analyse the content and face validity of the developed intervention package through a Delphi review. I invite you to participate in the two-round Delphi study to determine the content and face validity of the developed provisional instrument.

I am inviting you to participate in this two-round Delphi study that seeks to determine the content and face validity of the developed provisional instrument. Your content expertise (cardiovascular diseases, research, experience, and knowledge) will be valuable to the development of a contextually sound and relevant measuring instrument. Ultimately, this instrument aims to bolster efforts towards CVD reduction among older adults in Nigeria. There is no right or wrong answer, and I am interested in your input.

In the first round of the Delphi study, you will be asked to utilise a 3-point rating scale recommended by Dr Lynn (1986) to independently assess the relevance and clarity of each item within the domains. Your feedback will be instrumental in refining the provisional instrument, with an opportunity to provide additional comments, item revisions, or suggestions for omitted but pertinent items.

In Round Two, you will revise the provisional instrument based on your comments and revisions. The panel will be provided with the refined questionnaire from Round One and asked to rank the priority of the items using a numerical scale, starting from 1 (least important) to 10 (most important). Each round has been allocated to a seven-day turnaround period.

Thank you in advance for considering this request to participate in this study.

Yours faithfully,

Grace Faronbi Researcher	Dr A.M Tshabalala Supervisor	Professor Shelley Schmollgruber Supervisor

APPENDIX-E

Nursing, School of Therapeutic Science
Faculty of Health Sciences, Private Bag 3, Wits 2050, South Africa.

DELPHI STUDY INFORMATION SHEET

Study title: CARDIOVASCULAR DISEASE RISKS AMONG RETIRED OLDER ADULTS IN OSUN STATE NIGERIA: AN INTERVENTION STUDY**.**

I, Grace Oluwatoyin Faronbi, am a PhD student at the University of Witwatersrand. I am looking to conduct an intervention study on reducing cardiovascular disease risks among retired older adults in Osun state, Nigeria**.** Your participation is voluntary, and this information sheet is designed to provide you with the essential information about the research to help you make an informed decision.

Invitation to participate: Your participation in this study will be highly appreciated and will greatly benefit the development of reducing CVD risk among older adults in Southwest Nigeria.

Purpose of the study. The study aims to develop, refine, and test an educational intervention programme to reduce cardiovascular disease risk among retired older adults in Osun state, Nigeria.

Study procedures: If you agree to participate, you will be asked to take part in a two-round Delphi study, which involves providing your expert opinion on a series of items guiding the development of an intervention programme. Your content expertise in CVD risk prevention and knowledge will be valuable for the development of a contextually sound educational intervention programme for older adults.

The study will consist of two rounds of reviews.

Round one: You will review a preliminary list of items triangulated to form the guideline for the designed program and the content of the drafted programme in modules.

Round two: In the second round, you will be presented with the refined draft of the programme based on the feedback received in the first round, and you will rank the item by importance.

Time Commitment: Each round of the Delphi study should take approximately 20-40

minutes to complete. You will receive the items guiding the content of the intervention plan and the drafted programme. This will be available for one week; you can complete it at your convenience.

Benefits of Participation: Although there are no direct benefits to your participation, your

valuable input in this study will contribute to the understanding of strategies and methods that could be adopted to reduce the risk of developing CVD among older adults in Osun-state and inform future efforts to reduce CVD risk within the communities of Nigerian older adults.

Participation is FREE, and it will NOT cost you anything, nor will you be paid to participate.

Confidentiality: Your responses will be kept confidential, and any data shared in the study will be anonymized. Your name will not be linked to your responses in any publications or reports resulting from this study.

Voluntary Participation: Participation in this study is entirely voluntary. You may choose not to participate or withdraw from the study at any time without any negative consequences.

Contact details of researchers:
Principal Investigator: Grace Faronbi Cell no: +2348035025228
E-mail: 2298692@students.wits.ac.za

Supervisor: Dr A.M Tshabalala Telephone no: +27 (0)11 488 4269
E-mail: Amme.Tshabalala@wits.ac.za

Supervisor: Professor Shelley Schmollgruber, Telephone no: 011-488-4271
E-mail: shelley.schmollgruber@wits.ac.za

Results of the study: Should you wish to see the results of the project at the end of the research a copy of the results and a summary of the outcomes will be sent to you at no cost of your own. Contact details of HREC chair – for reporting of complaints / problems
This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg. The principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in research.

Suppose you want any information regarding your rights as a research participant, or complaint regarding this research study. In that case, you may contact Prof Paul Ruff, Chairperson of the University of the Witwatersrand Human Research Ethics Committee (HREC), an independent committee established to help protect the rights of research participants. Prof Paul Ruff may be contacted by any member of the secretariat. The telephone numbers for the Committee secretariat are 011 717 2700/1234/2656/1252 and the email addresses are Zanele.Ndlovu@wits.ac.za, Rhulani.Mkansi@wits.ac.za, Mapula.Ramaila@wits.ac.za or Iain.Burns@wits.ac.za

Thank you for reading this Study Information Sheet.

August 2023

APPENDIX-F

THE EDUCATIONAL INTERVENTION MODULE ORIENTATION



UNIT OBJECTIVE 1

You understand what the educational intervention programme is all about.

- You will know why you should participate in the programme
- You will choose if you want to participate in the programme.
- You will know your role and how you will participate in this programme.
- We will be tested on our baseline knowledge before the programme

CONTENT

Week one; session one (individual/ group)

Time 30-45 minutes

Materials: note pad, pre-test question paper, pen, questionnaire box and programme guide/manual

1. Welcome the participant

(the aim is to make participants feel welcomed to the session)

2. Introduce the programme

- Give some background information and the purpose of the programme.
- Explain that the programme will help the older adults to learn new information about cardiovascular disease prevention.
- Explain the details of the programme and the sessions (frequency and duration)
- Describe what will happen during sessions (attend a lesson, discuss, do activities together and practice new skills)

- Discuss programme outline (this course will last for 6 weeks one session a week with a duration of 1 and ½ hours) slide presentation on each unit in group sessions.
- Evaluation, pre and post course assessment and course evaluation at the end of course.
- There will be a reassessment of the baseline evaluation by the 12th week.

3. Registration and signing of consent

4. Clarify roles

Facilitator's role

- Inform and educate participants on CVD and its risk factors**.**
- Act as a coach that help participants gain more insight to CVD risk
- Explain that in a group session, participants are homogenous, and the group will further foster group learning

Participant's role

- Explain that the participants know their own live better and you will all learn from each other
- Emphasise teamwork and collaboration ("we will work together as a team and share live experiences")
- Participant needs to be fully involved in the programme and keep the agreement.

5. Identify any group concerns, and address any concerns

- Ask the participants for feedback and questions.
- Paraphrase what was said and answer the questions in simple and understandable manner.

6. Offer a pre-test

Week one (group)-session 2

Time: one hour

Materials: power point slides, overhead projector, note pad, pen, question box, handouts, or worksheets

- **Introduce learning objectives**

By the end of this course, participants should be able to:

- Explain what CVD is

-Describe the causes, signs, and symptoms

-Explain the Risk factors (modifiable and non- modifiable)
-Emphasis on modifiable risk factors and lifestyle modifications

Modifiable Factor 1

-Explain-Normal blood pressure range for the older adults.
-Describe need for regular checks and keeping records of outcome

-Identify participants who need referrals for prompt medical review and follow-up
-Give room for questions and answers

WEEK TWO

Time: one and half hours

Materials: power point slides, overhead projector, note pad, pen,

1. **Daily** attendance

2. Recap from previous session

The participants and facilitator will recap from the previous session and provide feedback which can be useful for the next session. Every feedback is valued and appreciated.

3. Introduce topic of the day (discuss and present): exercise and stress management

4. Set goals

Steps in goal setting

- . Select goals and set priorities
- . Identify small steps towards the goal

6. Wrap up, Question and Answer time

7. Give date, time, place and topic for the next session

WEEK THREE

Time: one and half hours

Materials: power point slides, overhead projector, note pad, pen, handouts, or worksheets and programme guide/manual

1. Daily attendance

2. Recap from previous session

The participants and facilitator will recap from the previous session and provide feedback which can be

3. Introduce topic of the day (discuss and present) -**Diet and nutritional needs of older adults**

4. present drafted weekly menu and share paper copy with participants

5. Set goals

Steps in goal setting

A. Explain the principle of goal setting

B. Select goals and set priorities

C. Identify small steps towards the goal

6. Wrap up, Question and Answer time

7. Give date, time, place and topic for the next session

WEEK FOUR

Time: one and half hours

Materials: power point slides, overhead projector, note pad, pen.

1. Daily attendance

2. Recap from previous session

3. Introduce topic of the day

4. Topic of discussion -**abstinence from alcoholism and smoking**

5. Goal setting activity

Steps in goal setting

A. Explain the principle of goal setting

B. Select goals and set priorities

C. Identify small steps towards the goal

D. Choose skills, tools or resources that can help in achieving the goal

E. List possible obstacles to attaining the goal and plan how to overcome them.

Express confident and optimism that the participants can attain the goal by carrying out the plan.

6. Wrap up, Question and Answer time

7. Give date, time, place, and topic for the next session

WEEK FIVE

Time: One and half hours

Materials: power point slides, overhead projector, note pad, pen.

1. Daily attendance

2. Recap from previous session

3. Introduce topic of the day: **Body weight and obesity management (present and discuss)**

4. Activity: (present and discuss) How to calculate Body Mass Index (BMI) and obesity management

5. Plan to practice the skill or new behaviour between sessions (at home)

1. Wrap up and offer post-test

2. Give date, time, place and topic for the next session

WEEK SIX

Time: 1 hour

Materials: note pad, guide/manual

1.Welcome the participants.

2. Complete attendance

3. Ask the participant for feedback or any questions.

4. Express enthusiasm on working with the participants and give date for the next session

5. Introduce topic of the day: **-Adherence to medications and warning signs of CVD**

12TH WEEK POST INTERVENTION

1. Welcome the participants.

2. Ask the participant for feedback on how they have been able to utilise the lessons learnt from the programme or any questions about CVD risk.

3. Express enthusiasm with working with the participants

4. Complete daily attendance

5. Offer a post-test: post-test questionnaire, pen, and paper

6. Discussions and general evaluation of programme

7. discuss how the knowledge gain can be sustained individually and as a group

APPENDIX-G

CONTENT OF THE EDUCTIONAL INTERVENTION PROGRAMME



FACTS ABOUT CVD AND THE RISK FACTORS ASSOCIATED TO DEVELOPING THE DISEASE

- Numerous and varied disorders affecting the heart and the blood vessels disrupting its structure and function.
- It is developed at the same time or lead to other conditions or diseases within the group.
- Interconnectedness between aging of other organ systems of the body and CVD
- increasing the high prevalence of CVD among older persons who have been identified to be more at risk.
- level of awareness on the risk factors of CVD and adoption of a healthy lifestyle in developed nations
- There is also improved in incidence and mortality rate. Reasons for this include:
- lack of access to and non-affordability of functional health care system, poor awareness of the disease conditions, unhealthy lifestyle, and choices, limited preventive health care services amongst others.

Signs and symptoms of CVD

- Initially CVD may not sent with symptoms, or the symptoms may be hardly recognised, some characterizing features of CVD to watch out for include;
  - Pain, numbness, and/or tingling in the shoulders, arms, neck, jaw, or back.
  - Shortness of breath when active, at rest, or while lying flat

- Chest pain during physical activity that gets better with rest.
- Light-headedness, Dizziness, Confusion, Headaches, Cold sweats, Nausea/vomiting, Tiredness, or fatigue
- Swelling in the ankles, feet, legs, stomach, and/or neck
- Reduced ability to exercise or be physically active.
- Problems doing your normal activities.
- We shall discuss more about the key signs to watch out for before the programme ends.

- There are lots of risk factors associated with CVD. Some are modifiable while some are non-modifiable risk factors. The modifiable risk factors are controllable by making important changes in lifestyle and being intentional about activities of daily living to promote healthy lifestyles. Whereas the non-modifiable risk factors are traits that cannot be easily changed because they are inherited but can also be effectively managed as well.

- For this programme we are focused on the modifiable risk factors as it goes a long way to reduce the risk of developing CVD.

MODIFIABLE RISK FACTORS OF CVD

Factor 1: Blood pressure: Monitoring and control

Blood pressure tends to increase with age, as you age, your arteries may narrow and become stiff. Narrow arteries lead to an increase in blood pressure. High blood pressure can damage the walls of the arteries and the heart itself.

In some cases, high blood pressure could be a result of lifestyle, the environment, certain medications, or other conditions such as sleep apnoea, kidney disease, or thyroid problems. The abbreviation mm Hg stands for millimetres of mercury, the chemical element that was used in the first accurate blood pressure gauges.

Blood pressure categories for adults 65+	Systolic mm Hg	Diastolic mm Hg
Low blood pressure	90 or lower	60 or lower
Normal blood pressure	Lower than 120	Lower than 80
Elevated blood pressure	120-129	Lower than 80
High blood pressure stage 1 (severe)	130-139	80-89
High blood pressure stage 2 (more severe)	140 or higher	90 or higher
High blood pressure crisis (see your doctor immediately)	180 or higher	120 or higher

- **Normal blood pressure**

- If your blood pressure falls within a normal range of 91/61 mm Hg to 119/79 mm Hg, then you should maintain your healthy habits.

- **Elevated blood pressure**

- Older adults whose blood pressure is elevated but lower than 130/80 mm Hg can usually help regulate their blood pressure through lifestyle changes such as increasing physical activity, eating a heart-healthy diet that's low in salt, and limiting alcohol.

- If blood pressure continues to rise from an elevated state, then the individual will enter stage 1 to indicate that hypertension is at a severe level.

- **Stage 1 hypertension**

- Blood pressure ranging from 130/80 mm Hg to 139/89 mm Hg is considered stage 1. At this stage, a doctor will likely recommend medication in addition to lifestyle changes.

- **Stage 2 hypertension**

- If blood pressure readings continue to increase, the category will be in stage 2. The treatment options for stage 1 and stage 2 hypertension may include lifestyle changes and medication. However, someone with stage 2 may take multiple medications, while someone with stage 1 hypertension may focus more on lifestyle changes.

- N.B There may be fluctuations in your blood pressure reading due to:
    1. Different BP apparatus and correct handling when measuring
    2. Check for proper calibrations and half-life.
    3. Stress of keeping doctor's appointment (white coat hypertension)
    4. Remain calm 15-20minutes before measuring your blood pressure.
    5. Recheck for consistency.

RISK FACTOR 2: Enlightenment on exercise and stress management

- At least 150 minutes per week of accumulated moderate physical activity each week.
- 75 minutes per week of vigorous-intensity physical activity
- **Examples of simple, safe activities for older adults include walking, outdoor chores, gardening etc**
- Staying positive about life and be intentional about rest
- Learn to share your concerns and burden with trusted friends.
- Avoid unnecessary burnout.
- Good sleeping habit
- Join support groups and volunteering networks.
- Try simple relaxation techniques, such as deep breathing exercises or meditation.

Factor 3: Addressing diet and nutritional needs of the older adults.

There is a dietary approach to stop hypertension (DASH) and help control CVD risk. Generally, we talk about:

- Classes of food
- The importance of regular water intake
- Limiting salt consumption and the use of herbs and spices

However, the DASH regimen plan requires no special foods and instead provides daily and weekly nutritional goals. This plan recommends:

- Eating vegetables, fruits, and whole grains. Including fat-free or low-fat dairy products, fish, poultry, beans, nuts, and vegetable oils
- Limiting foods that are high in saturated fat, such as fatty meats, full-fat dairy products, and tropical oils such as coconut, palm kernel, and palm oils.
- Limiting sugar-sweetened beverages and sweets

- Sample of weekly diet for the older adults as discussed with experts is presented in the tables below
  (Traffic light method and Menu table)

Nutrition for guide for older adults.

- For older adults, reinforcement is needed to minimise challenge of memory loss. This will be addressed using chart and fliers to present the presentations and discussions.
- Factors and foods that can exacerbate or increase the risk of CVD are grouped using traffic light colours as warning signs.

Codes	Meaning	Examples
Green	Without risk and could be taken without restrictions	Vegetables, fruits, legumes, nuts, water
Amber	To be taken moderately or with caution	Oils, cereals, starchy foods, ats, concoction herbs and spices
Red	Dangerous to be avoided	Self-medication, Alcohol, smoking.

RECOMMENDED SAMPLE OF DIET MENU FOR THE OLDER ADULT IN SOUTH-WEST NIGERIA

Days	Breakfast	Lunch	Dinner
Sunday	Bread + Tea+ Boiled egg	Fruit salad (watermelon+ cucumber)	Amala & Ewedu
Monday	Eko & Akara	Boiled plantain &Fish Stew+vegetable	Yam /Potatoes Pineapple/water melon
Tuesday	Rice &Fish stew	Cucumber+ carrot	Beans & Eko
Wednesday	Boiled yam &fish stew	Watermelon	Semolina & okro/Ewedu
Thursday	Rice & eforiro +dry fish	Amala+ ewedu or egusi	Boiled plantain & fish stew
Friday	Eko & eforiro	Potatoes chips/	Rice & Beans
Saturday	Pap & moin-moin (Bean Cake)	Cucumber & carrot	Pounded yam & Efo riro

- **N.B Sample of weekly diet for the older adults was personally designed by the researcher and checked with experts not stringent rule to its use**

Key notes

- Amala- (Yam flour meal)- The dried yam flour has a thick, semi-solid consistency and a unique brown colour
- Ewedu- Jute soup made with jute leaves, locust bean and local spices.
- Eko-fermented cereal pudding cooked and made into a solid form.
- Akara- Bean-cake made from peeled beans ground bean into paste with onion, crayfish and pepper. Then fried in hot palm or vegetable oil
- Eforiro- Spinach and several local ingredients like locust bean, palm oil, pepper sauce, onions, mackerel, shrimp, and crayfish stew
- Moi-Moi- is a type of bean pudding made using ground beans that have been peeled and combined with pepper and onions. It is often wrapped in soft cane leaves and then boiled.

- Egusi-Melon stew. Made from ground melon seeds with pepper and onions, having all local ingredients added as desired from crayfish, assorted meats, tribe, other varieties as desired garnished with leafy vegetables.

What are LDL and HDL?
LDL and HDL are two types of lipoproteins. They are a combination of fat (lipid) and protein. The lipids need to be attached to the proteins so they can move through the blood. LDL and HDL have different purposes:

- LDL stands for low-density lipoproteins. It is sometimes called the "bad" cholesterol because a high LDL level leads to a buildup of cholesterol in your arteries.
- HDL stands for high-density lipoproteins. It is sometimes called the "good" cholesterol because it carries cholesterol from other parts of your body back to your liver. Your liver then removes the cholesterol from your body.

Factor 4a: Abstinence from alcoholism and Smoking

- Information on the association between Alcoholism, smoking, and CVD.
- Drinking alcohol can raise your blood pressure.
- Limit it to no more than one drink a day (if you must take it).
- Tobacco damages your artery walls.

Factor 4b: Adherence to medications

- Strict compliance for those on regular medications and medical check-ups
- Encourage the use of a reminders on phone, diary recordings.
- Do not be discouraged if doses are missed, however do not overdose on missed medications.

Factor 5: Body weight and calculating body mass index

- If your BMI is less than 18.5, it falls within the underweight range. If your BMI is 18.5 to 24.9, it falls within the Healthy Weight range. If your BMI is 25.0 to 29.9, it falls within the overweight range. If your BMI is 30.0 or higher, it falls within the obese range.
- There is a strong connection between BMI and CVD risk
- N.B persons who are overweight, for every 1kg lost you can reduce your blood pressure by 1mm Hg.

FACTOR 6: Warning signs of CVD

- Watching out for the cardinal signs of CVD
- It is characterised by group of symptoms like; reduced blood flow to the brain.
- Ruptured vessels around the brain tissue

WARNING SIGNS INCLUDE

- Slurred speech
- Numbness feeling around limbs
- Slowed movement not joint aches like arthritis.
- Blurred vision
- Frequent feeling of dizziness
- Staggering gait while walking
- Persistent headache/ throbbing

All these could lead to severe condition known as stroke if poorly managed and might eventually lead to death or delayed recovery.

The cardinal signs differ with gender.

For men

- Facial drops
- slurred speech
- Difficulty lifting upper limb
- Generalised body weakness

In Women

- Dizziness
- Vomiting and or retching
- Dyspnoea
- Transient fainting attack

Module 6: Evaluation and Feedback and reassessment

- ABCD Questionnaire
- Biophysical profile check (Blood pressure and BMI)

APPENDIX-H

ETHICAL TRAINING 1



TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Clinical Trials Centre
The University of Hong Kong

Grace Faronbi

a complété avec succès - has successfully completed

South Africa

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2022/04/17

CID : yTvPQAY5M2

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

APPROVED BY
SIWF FMH
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[REV : 20220217]

APPENDIX-I

ETHICAL TRAINING 2



TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
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Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2021/10/07

CID : bW4VqaPjwA

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

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[REV : 20170310]

APPENDIX-J

ETHICAL TRAINING 3



TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

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Training in the Nigerian National Code for Health Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Registration Number: NHREC/TR/08/10/2013A

Release Date: 2022/04/16

CID : 1IsAdeBEVD

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

This training is supported by Fogarty International Center and West African Bioethics

Ce programme est soutenu par - This program is supported by :

European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/2891.html) - Swiss Academy of Medical Science (SAMS/ASSM/SAMW) (www.samw.ch) - Commission for Research Partnerships with Developing Countries (www.kfpe.ch)

[REV : 20151109]

APPENDIX K

ETHICAL TRAINING (RESEARCH ASSISTANCE 1)



TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Clinical Trials Centre
The University of Hong Kong

Demilade Omotoyinbo

a complété avec succès - has successfully completed

Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2022/07/08

CID : mGX82XOgd5

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

APPROVED BY
SIWF FMH
ISFM
Programmes de formation continue (2 crédits)
Continuing Education Programs (2 credits)

Foederatio Pharmaceutica Helvetiae
FPH
Programmes de formation postgraduée et continue
Programmes de formation continue
Continuing Education Programms

Ce programme est soutenu par - This program is supported by :
European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/2891.html) - Swiss Academy of Medical Science (SAMS/ASSM/SAMW) (www.samw.ch) - Commission for Research Partnerships with Developing Countries (www.kfpe.ch)

[REV : 20220217]

APPENDIX-L

ETHICAL TRAINING (RESEARCH ASSISTANCE 2)



TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Clinical Trials Centre
The University of Hong Kong

Nofisat Soluade

a complété avec succès - has successfully completed

Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2022/07/30
CID : OE42AiR20V

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

APPROVED BY
SIWF FMH
ISFM
Programmes de formation continue (2 crédits)
Continuing Education Programs (2 credits)

Foederatio Pharmaceutica Helvetiae
FPH
Programmes de formation postgraduée et continue
Programmes de formation continue
Continuing Education Programms

Ce programme est soutenu par - This program is supported by :
European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/2891.html) - Swiss Academy of Medical Science (SAMS/ASSM/SAMW) (www.samw.ch) - Commission for Research Partnerships with Developing Countries (www.kfpe.ch)

{REV : 20220217}

APPENDIX-M

ETHICAL TRAINING (RESEARCH ASSISTANCE 3)



TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Clinical Trials Centre
The University of Hong Kong

Oluwaseyi Olabisi

a complété avec succès - has successfully completed

Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2022/07/28
CID : kuyD7FOEOg

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

APPROVED BY SIWF FMH ISFM
Programmes de formation continue (2 crédits)
Continuing Education Programs (2 credits)

Foederatio Pharmaceutica Helvetiae
FPH
Programmes de formation postgraduée et continue
Programmes de formation continue
Continuing Education Programms

Ce programme est soutenu par - This program is supported by :
European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/2891.html) - Swiss Academy of Medical Science (SAMS/ASSM/SAMW) (www.samw.ch) - Commission for Research Partnerships with Developing Countries (www.kfpe.ch)

[REV : 20220217]

APPENDIX-N

ETHICAL TRAINING (RESEARCH ASSISTANCE 4)



TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Clinical Trials Centre
The University of Hong Kong

Dorcas Akinlose

a complété avec succès - has successfully completed

Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2022/08/04
CID : xdLrgl4GBK

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

APPROVED BY SIWF FMH ISFM
Programmes de formation continue (2 crédits)
Continuing Education Programs (2 credits)

Foederatio Pharmaceutica Helvetiae
FPH
Programmes de formation postgraduée et continue
Programmes de formation continue
Continuing Education Programms

Ce programme est soutenu par - This program is supported by :
European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/2891.html) - Swiss Academy of Medical Science (SAMS/ASSM/SAMW) (www.samw.ch) - Commission for Research Partnerships with Developing Countries (www.kfpe.ch)

[REV : 20220217]

APPENDIX-O



QUESTIONNAIRE- (For the Quasi-experimental Phase)

Section A-Socio-demographic

1. Age……
2. Sex …… a) Male b) Female
3. Educational background (a) Primary (b)Secondary (c)Tertiary
4. Religion (a) Christianity (b) Islam (c) Traditional (d) others
5. Year of retirement…….
6. Are you currently being managed for any non-communicable disease? a)
7. If yes what health challenge(s)? (i) …….. (ii)…….
8. Have you ever been enlightened on CVD? (a) Yes (b) No
9. If yes, by who?..... ii) where?.....

Section B- Biophysical profiles

10. Blood pressure: Systolic……. (mmHg) Diastolic……(mmHg)
11. Weight …….kg
12. Height……. (metre)

Section C

Knowledge	**True**	**False**	**Don't know**
1. One of the main causes of heart attack and stroke is stress			
2. Walking and gardening are considered types of exercise that can lower the risk of having a heart attack or stroke			

3. Moderately intense activity of 2.5 hours a week will reduce your chances of having a heart attack or stroke			
4. People who have diabetes are at higher risk of heart attack or stroke			
5. Managing your stress levels will help you to manage your blood pressure			
6. Drinking high levels of alcohol can increase your cholesterol and triglyceride levels			
7. HDL refers to 'good' cholesterol, and LDL refers to 'bad' cholesterol			
8. A family history of heart disease is not a risk factor for high blood pressure			

Perceived Risk of Heart Attack or Stroke	**Strongly disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Not applicable**
9.I feel I **will** suffer from a heart attack or stroke sometime during my life					
10. It is **likely** that I will suffer from a heart attack or stroke in **the future**					
11. It is l**ikely** that I will have a heart attack or stroke some time during my life					
12. There is a **good chance** I will experience a heart attack or stroke in the next 10 years					
13. My **chances** of suffering from a heart attack or stroke **in the next 10 years** are great					
14. It is likely I will have a heart attack or stroke because of my **past and/or present behaviours**					
15. I am not worried that I might have a heart attack or stroke **(Reverse coded)**					
16. I am concerned about the likelihood of having a heart attack or stroke in the near future					
Perceived Benefits and Intentions to Change	**Strongly disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Not applicable**
17. I **am thinking about** exercising at least 2.5 hours a week					
18. I **intend or want to** exercise at least 2.5 hours a week					
19. When I exercise for at least 2.5 hours a week I am doing something good for the health of my heart					
20. I am confident that I can maintain a healthy weight by exercising at least 2.5 hours a week					
21. I am **not thinking about exercising** for 2.5 hours a week **(Reverse coded)**					
22. When I eat five portions of fruit and vegetables a day I am doing something good for the health of my heart					

23. Increasing my exercise to at least 2.5 hours a week will decrease my chances of having a heart attack or stroke					
Healthy Eating Intentions	**Strongly disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Not applicable**
24.I am **confident th**at I can eat at least five portions of fruit and vegetables a day within the next two months					
25. I am **thinking about** eating at least five portions of fruit and vegetables a day					
26. I am **not thinking** about eating at least five portions of fruit and vegetables a day (**reverse coded)**					
Benefits and Intentions to Stop Smoking	**Strongly disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Not applicable**
27. I am **thinking of stopping smoking** within two months					
28. I have **reduced or stopped** smoking					
29. I intend or want to stop smoking					
30. If I stop smoking it will reduce my chances of having a heart attack or stroke					
31. I am **not thinking** about stopping smoking					

GRADING OF QUESTIONNAIRE (Bowyer & Hassen, 2021).

Knowledge (Questions 1-8) True/False/Don't Know
Correct score =1, Incorrect/ Don't know score = 0
Higher sum score= more knowledgeable/ more correct about having a heart attack or stroke
Perceived Risk of Heart Attack or Stroke
4= Strongly disagree, 3= Disagree, 2= Agree, 1= Strongly Agree; N/A=0
Higher sum score = higher perception of risk of having a heart attack or stroke
Perceived Benefits and Intentions to Change
4= Strongly disagree, 3= Disagree, 2= Agree, 1= Strongly Agree; N/A=0
Higher average score = Higher perceived benefits of diet and exercise and higher perceived readiness for change in regards to exercise and behaviour
Healthy Eating Intentions
4= Strongly disagree, 3= Disagree, 2= Agree, 1= Strongly Agree; N/A=0
Higher average score = Higher perceived readiness for change with regard to healthy dietary behaviour
Benefits and Intentions to stop Smoking
4= Strongly disagree, 3= Disagree, 2= Agree, 1= Strongly Agree; N/A=0
Higher average score = Higher perceived readiness for change with regard to healthy dietary behaviour

APPENDIX P

ETHICAL CLEARANCE

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R14/49 Mrs Grace Faronbi

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M220534

NAME: (Principal Investigator)	Mrs Grace Faronbi
DEPARTMENT:	Nursing Education
PROJECT TITLE:	*Reducing cardiovascular disease risks among retired older adults in Osun State Nigeria: An intervention study*
DATE CONSIDERED:	27/05/2022
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr A. Tshabalala and Prof S. Schmollgruber
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	25/08/2022

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions.Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. I **agree to submit a yearly progress report.** The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in **May** and will therefore be due in the month of **May** each year. Unreported changes to the application may invalidate the clearance given by the HREC

Principal Investigator Signature

02/09/2022
Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX-Q

APPROVAL LETTER 1 (OSUN STATE HEALTH RESEARCH ETHICAL COMMITTEE)

MINISTRY OF HEALTH
PUBLIC HEALTH DEPARTMENT
PRIVATE MAIL BAG NO. 4421 OSOGBO, OSUNSTATE OF NIGERIA

Your Ref. No .....

All communications should be addressed to the Permanent Secretary quoting
Our Ref. No OSHREC/PRS/569T/237 — 7th July, 2022

FARONBI OLUWATOYIN GRACE
Department of Nursing
Education University of the
Witswatersand, Johannesburg
South Africa.

REDUCING CARDIOVASCULAR DISEASE RISKS AMONG RETIRED OLDER ADULTS IN OSUN STATE, NIGERIA: AN INTERVENTION STUDY.

I wish to inform you that the Osun State Health Research Ethical Committee (OSHREC) has granted you an approval to proceed on the above exercise.

The approval lasts on year spanning July 7th, 2022 and July 7th, 2023. You are to inform the Committee the starting date of the exercise and if there is any delay in starting, kindly inform the Committee to enable it adjust the date accordingly which will allow for monitoring by designated representative of the Committee. A copy of the outcome of the research must be made available to the Committee.

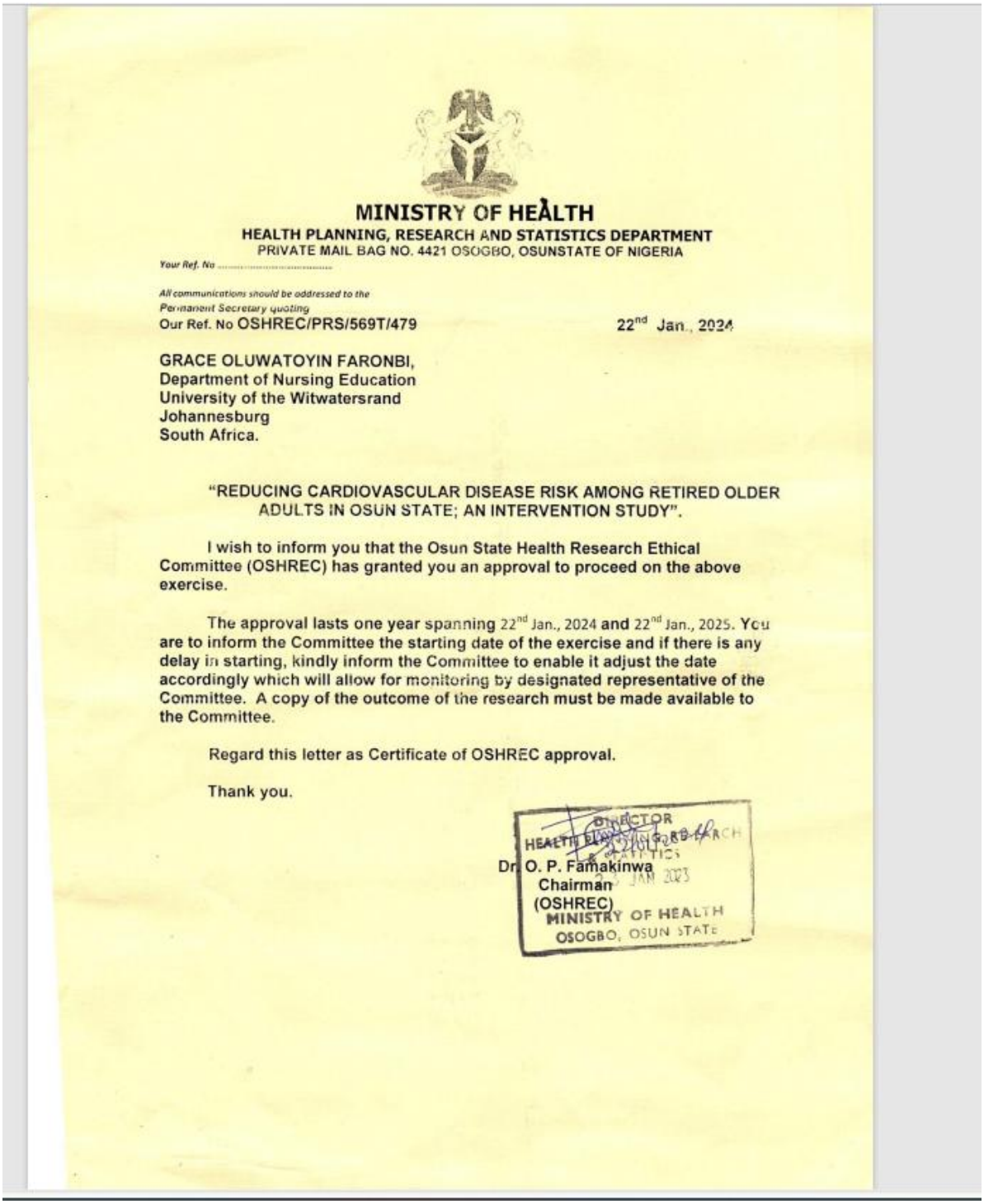
Regard this letter as Certificate of OSHREC approval.

Thank you.

Dr. I. A. Adekunle
Chairman
(OSHREC)

APPENDIX-R

APPROVAL LETTER 2 (OSUN STATE HEALTH RESEARCH ETHICAL COMMITTEE)



MINISTRY OF HEALTH
HEALTH PLANNING, RESEARCH AND STATISTICS DEPARTMENT
PRIVATE MAIL BAG NO. 4421 OSOGBO, OSUNSTATE OF NIGERIA

Your Ref. No .....

All communications should be addressed to the
Permanent Secretary quoting
Our Ref. No OSHREC/PRS/569T/479 22nd Jan., 2024

GRACE OLUWATOYIN FARONBI,
Department of Nursing Education
University of the Witwatersrand
Johannesburg
South Africa.

"REDUCING CARDIOVASCULAR DISEASE RISK AMONG RETIRED OLDER ADULTS IN OSUN STATE; AN INTERVENTION STUDY".

I wish to inform you that the Osun State Health Research Ethical Committee (OSHREC) has granted you an approval to proceed on the above exercise.

The approval lasts one year spanning 22nd Jan., 2024 and 22nd Jan., 2025. You are to inform the Committee the starting date of the exercise and if there is any delay in starting, kindly inform the Committee to enable it adjust the date accordingly which will allow for monitoring by designated representative of the Committee. A copy of the outcome of the research must be made available to the Committee.

Regard this letter as Certificate of OSHREC approval.

Thank you.

DIRECTOR
HEALTH PLANNING, RESEARCH & STATISTICS
23 JAN 2023
MINISTRY OF HEALTH
OSOGBO, OSUN STATE

Dr. O. P. Famakinwa
Chairman
(OSHREC)

APPENDIX-S

LETTER OF INTRODUCTION AND PERMISSION

Nursing, School of Therapeutic Science
Faculty of Health Sciences, Private Bag 3, Wits 2050, South Africa.

The Executive President/Chairman
Pensioners Association
…….. Branch
Osun-State, Nigeria.

Permission to conduct a research study in your facility

I am a PhD student at the University of the Witwatersrand, South Africa. I am conducting an intervention study on, **Reducing cardiovascular disease risks among retired older adults in Osun state Nigeria.**

I would like to obtain permission from you to invite participants from your division of the retirees' association for the study. This study aims to assess the level of awareness of cardiovascular disease, and the predisposing risk factors. In line with this, I also will be conducting a six-weeks educational intervention programme and be followed up for another 6 weeks before evaluation.

I would like to therefore obtain permission from you, to use your formal meeting place for this purpose. To obtain ethical clearance from the Human Ethics Research Committee of the University of the Witwatersrand, I require a permission letter from you stating that I may conduct my study in your facility. Would it also be possible for you to offer me a letter stating that you have permitted me to do so?

Ethical clearance will be obtained from the Human Ethics Research Committee of the University of the Witwatersrand, Johannesburg, South Africa and the National Health Research Ethics Committee, Osun-State in Nigeria.

Please contact me if you have any questions or concerns or would like more information regarding this study.

Yours sincerely,

Grace Faronbi

RN, BNSc, MPH

Tel: +234 803 502 5228

Email: 2298692@students.wits.ac.za

APPENDIX-T

APPROVAL ILE-IFE



FEDERAL UNIVERSITIES PENSIONERS ASSOCIATION
(FUPA)
OBAFEMI AWOLOWO UNIVERSITY BRANCH
P. O. BOX 1681, LAGERE POST-OFFICE,
NO 152 IREMO ROAD, ILE - IFE, OSUN STATE, NIGERIA.

Our Ref: _____
Your Ref: _____
Date: 14-04-22

B.O. LAWAL
Vice Chairman
08033721192

J. A. FALODUN
Financial Secretary
08032278779

J. O. OGUNMESIN
Public Relations Officer
08136166610

PASTOR J. K. ADEBOLA
Auditor
08069168178

T.A. OJEWALE
Assistant Secretary
08168189226

Mrs G.O Tatombi
University of the Witwatersrand,
Johannesburg
South-Africa

PERMISSION TO CONDUCT RESEARCH STUDY

This is to inform you that we have received and considered your request to conduct a research study at the arm of our association titled: **Reducing Cardiovascular disease risks among retired older adults in Osun-state.**

Based on your request for a letter of permission, we are writing this letter as a prerequisite to obtaining your ethical clearance and we hope you will give us further information on when the research program will commence.

Accept our best wishes.

J.O AKINTARO
Branch Chairman

A.Y. OYERINDE
Branch Treasurer
08038245514

J. O. AKINTARO (JP)
Branch Chairman
08031664792

NIYI OSHUNGADE
Branch Secretary
08033748078

APPENDIX-U

APPROVAL ILESA

Pencom Retirees Association
Ijesa Zone Branch
Osun-state
27th April, 2022.

Mrs Faronbi G.O
University of Witwatersrand,
South Africa.

RE: PERMISSION TO CONDUCT A RESEARCH STUDY

With reference to your request dated 24th April, 2022; for a research study with the title: "Reducing Cardiovascular Disease risks among retired older adults in Osun-state". You are hereby permitted to conduct your study among us as one of your study centres. We usually hold our meetings at the school hall of the United Anglican/Methodist Grammar school Ilesa and hope you will be punctual.

Members of the group have the free will of participation in the project and we wish you all the best in the study. Kindly contact us for further updates.

Mr V.O Daramola
Ijesa Zonal Chairman

APPENDIX-V

APPROVAL OSOGBO

Pencom Retirees Association
Osun Central Branch
Osogbo
Osun state.
26.04.2022

Mrs Faronbi G.O,

LETTER OF PERMISSION FOR RESEARCH STUDY

Your request to conduct a study in line with your PhD study, using our union group has been granted by the zonal executives. Please note that you should always come with a copy of this letter any time you will be visiting the unit for easy notification.

Our members are duly informed and will be willing to participate in the study at their own discretion. Wishing you all the best in the outcome of your study.

Kind regards,

Jimoh A.K
Chairman Osun Central Zone

APPENDIX-W

STUDY INFORMATION SHEET



Nursing, School of Therapeutic Science
Faculty of Health Sciences, Private Bag 3, Wits 2050, South Africa.

STUDY INFORMATION DOCUMENT ON FOCUS GROUP DISCUSSION

Dear Sir/Ma,

I am a PhD student at the University of the Witwatersrand, Johannesburg, South Africa. Research is a process used in seeking new knowledge, therefore, I am conducting a study on **REDUCING CARDIOVASCULAR DISEASE RISKS AMONG RETIRED OLDER ADULTS IN OSUN STATE NIGERIA: AN INTERVENTION STUDY.**

I am asking you to take part in a focus group discussion with a selected few of your association members (retirees). The discussion will be looking at the previous method of learning this group has been exposed to as a means of enlightenment on health matters and how well they were delivered. It will also be a means of identifying the hindrances to learning among older adults and suggest the preferred approach to delivering educational programmes to older adults.

An audio recording of this session will be done, and you will be required to sign a consent form permitting your involvement in the study.

Potential Risks of being involved in the study:

There is no risk associated with this focus group discussion.

Benefits of participating in the study include:

There is no direct benefit from this study, however intra-group support and help will be enhanced.

Participation is voluntary

Participation in this study is voluntary and refusal to participate will involve no penalty or loss of benefits of being a member of your retirement association. There is no requirement to provide a reason for your withdrawal and any data collected in the course of this study before you decide to withdraw will be destroyed automatically, except otherwise agreed for its retention by you

Confidentiality:

Since the study will be taking place within a group setting, there will be a level of openness among the participants therefore confidentiality cannot be guaranteed. However, data that may be reported in scientific journals will not include any information which identifies you, by name, as a participant in this study.

Question and Concerns:

If at any time you have any questions about the study, please feel free to contact me as indicated below:

Principal investigator: Grace Faronbi
RN, BNSc, MPH
Tel: +234 803 502 5228
Email: 2298692@students.wits.ac.za

Supervisor: Dr Amme Mardulate Tshabalala
Tel: +27 (0)11 488 4269
Email: Amme.Tshabalala@wits.ac.za

Supervisor: Professor Shelley Schmollgruber
Tel: 011-488-4271

Email: shelley.schmollgruber@wits.ac.za

If you have any concerns over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Clement Penny, who may be contacted by telephone number 011 717 2301, or by e-mail at Clement.Penny@wits.ac.za. The telephone numbers for the Committee secretariat are 011 717 2700/1234 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Thank you for reading this Study Information Sheet.

April 2022.

APPENDIX-X

CONSENT FOR AUDIO RECORDING



APPENDIX 5

Nursing, School of Therapeutic Science
Faculty of Health Sciences, Private Bag 3, Wits 2050, South Africa.

CONSENT FORM FOR AUDIO RECORDING OF STUDY PARTICIPATION

Reducing Cardiovascular Disease risks among Retired Older adults in Osun state Nigeria: An Intervention Study.

I hereby consent to an audio recording of the focus group

I understand that:

- The recording will be stored in a secure location (a locked cupboard or password-protected computer) with restricted access to the researcher and the research supervisor.
- The recording will be transcribed and any information that could identify me will be removed
- The recordings will normally be erased within either (a) two (2) years of the publication of the research findings, or (b) six (6) years if no publications arise from this research
- Anyone wishing to access this information in the future will first have to obtain the approval of the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg
- Direct quotes from my interview, without any information that could identify me, may be cited in the research report or other write-ups of research.

Contact details:

Grace Oluwatoyin Faronbi (Principal Investigator), telephone no.+234 803 502 5228, or by e-mail at 2298692@students.wits.ac.za,

Dr Amme Tshabalala (Supervisor), on telephone no. +27 (0)11 488 4269, or by e-mail at Amme.Tshabalala@wits.ac.za

Professor Shelley Schmollgruber, on telephone no: +27 (0)11-488-4271 or by e-mail at shelley.schmollgruber@wits.ac.za

Name of Participant: _____
Date: _____
Place: _____
Signature or mark _____

Witnessed by:

Name of Witness: _____
Signature: _____
Date: _____

APPENDIX-Y

STUDY INFORMATION DOCUMENT-2

Nursing, School of Therapeutic Science
Faculty of Health Sciences, Private Bag 3, Wits 2050, South Africa.

STUDY INFORMATION DOCUMENT-2

Dear Sir/Ma,

I am a PhD student at the University of the Witwatersrand, Johannesburg, South Africa. Research is a process used in seeking new knowledge, therefore, I am conducting a study on **REDUCING CARDIOVASCULAR DISEASE RISKS AMONG RETIRED OLDER ADULTS IN OSUN STATE NIGERIA: AN INTERVENTION STUDY.**

I am hereby inviting you to a consecutive six-weeks intervention programme which will be taking place at your meeting place with due permission granted by the leadership of your association. This intervention programme will be structured to hold on a chosen day of the week for about 45minutes, while 15 minutes will be for questions, interactions and clarifications. The enlightenment programme will be focused on topics addressing cardiovascular disease risk management, predisposing factors, exercise, diets and salt intake, lifestyle modifications, weight management and control. A follow-up review and evaluation will take place 6 weeks after.

Potential Risks of being involved in the study: There is no risk involved in this educational intervention programme.

Benefits of participating in the study include: There is no direct benefit to this study. However, participants in this study will be enlightened on lifestyle changes and the management of modifiable risk factors of CVD.

Participation is voluntary: Participation in this study is voluntary and refusal to participate will involve no penalty or loss of benefits of being a member of your retirement association. There is no requirement to provide a reason for your withdrawal and any data collected in the course of this study before you decide to withdraw will be destroyed automatically, except otherwise agreed for its retention by you

Confidentiality: Since the study and intervention programme will be taking place within a group setting, there will be a level of openness among the participants. However, all the information obtained during this study will be strictly confidential. Data that may be reported in scientific journals will not include any information which identifies you, by name, as a participant in this study.

You will be informed of any finding of importance to your health or continued participation in this study, but this information will not be disclosed to any third party in addition to those listed above, without your permission

Question and Concerns:

If at any time you have any questions about the study, please feel free to contact me as indicated below:

Principal investigator: Grace Faronbi
RN, BNSc, MPH
Tel: +234 803 502 5228
Email: 2298692@students.wits.ac.za

Supervisor: Dr Amme Mardulate Tshabalala
Tel: +27 (0)11-488-4269
Email: Amme.Tshabalala@wits.ac.za

Supervisor: Professor Shelley Schmollgruber,
Tel: +27 (0)11-488-4271
E-mail: shelley.schmollgruber@wits.ac.za

If you have any concerns over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Clement Penny, who may be contacted by telephone number 011 717 2301, or by e-mail at Clement.Penny@wits.ac.za. The telephone numbers for the Committee secretariat are 011 717 2700/1234 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Thank you for reading this Study Information Sheet.

APPENDIX-Z

PARTICIPANT CONSENT SHEET

Nursing, School of Therapeutic Science
Faculty of Health Sciences, Private Bag 3, Wits 2050, South Africa.

REDUCING CARDIOVASCULAR DISEASE RISKS AMONG RETIRED OLDER ADULTS IN OSUN STATE NIGERIA: AN INTERVENTION STUDY.

1. I have been given a Participant Information Sheet which explains the nature and processes involved in this study, which is attached hereto.
2. I was given time to read it, or had it read to me, in the language I best understand.
3. I was given time to ask any questions I wanted to and found any answers given to me to be reasonable and satisfactory.
4. I believe I fully understand why the study is being conducted and what the intended outcomes will be.
5. I understand that there will be no immediate benefit to me, should I agree to participate, nor will I receive any payment; conversely, participation will not cost me anything but my time.
6. I understand that, even if I initially consent to take part in the study, I may subsequently withdraw at any time and would not be required to give any reasons; if that happened, any data collected about me for the study would immediately be destroyed, unless I give consent for it to be retained
7. I have been given a range of contact details, listed below. If I require further information or become concerned about any aspect of this study, I am free to speak to any of these contacts.

Contact details:

Grace Oluwatoyin Faronbi (Principal Investigator), telephone no.+234 803 502 5228, or by e-mail at 2298692@students.wits.ac.za,

Dr Amme Tshabalala (Supervisor), on telephone no. +27 (0)11 488 4269, or by e-mail at Amme.Tshabalala@wits.ac.za

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Name of Participant: _____
Date: _____
Place: _____
Signature or mark _____

Witnessed by:

Name of Witness: _____
Signature: _____
Date: _____

APPENDIX-AA

KEY FINDINGS FROM THE SYSTEMATIC REVIEW AND THE QUALITATIVE STUDY

Chapter 4	**Chapter 5**
Systematic review findings	**Qualitative (FGDs) Findings**
1. Screening	**FACILITATORS** 1. Medical people from the hospitals and health centres
2. Intervention was patient-centred care	2. Visits by some research people
3. Standardized protocol of national guidelines	3. Doctors, nurses, and community health officers
3. Multiple health education sessions	4. Health talks given to us into booklets
4. Self-care adherence scale	5. Generally, the program talks
5. m-Health technology-enabled	6. Even in the church, when we are having health week
6. nurse-guided intervention in improving	7. we exchange ideas on common health problems with one another
7. Blue-toothed UA 767 Plus BT BP device and smartphone	8. do general body tests for us,
8. monitoring and reporting BP measurement and medication intake	9. gathering together and teaching, educating ourselves and helping anyone that has a problem.
9. nurse-led secondary stroke prevention strategy	10. some group walks, group discussion and sharing of experiences
10. focused on modifiable risk factors	11. Facebook and YouTube
11. lifestyle, diet, clinic and physical therapy attendance, and drug compliance	12. In this age of technology, one must look for information
12. lifestyle, diet, clinic and physical therapy attendance, and drug compliance	13. we will keep learning
13. Standardised intensive in-person counselling	14. children or grandchildren help us to operate some of these devices and phones
14. Additional telephone calls	15. I prefer regular physical visits by doctors and nurses to come teach
15. increasing hypertension control	16. we can ask questions and confirm
16. package of interventions.	17. must have easy general application
17. intervention package was guided by an existing clinical guideline	18. The health talk we enjoy the most are the ones that show pictures, films
18. contents were locally relevant solutions for CVD risk prevention	19. They gave us booklet or jotter like pamphlet that contains everything they are saying
19. World Health Organization developed a guideline recommendation for CVD control and prevention	20. Different groups come with different styles

	21. They come with machines, screens, chart, pen as take away, stickers
	22. Get better information and sensitisation too through radios, television.
	BARRIERS
	23. We have many, financial challenges, and burden as retired persons,
	24. “It is money o.
	25. A lot of people will want to meet with their colleagues, but money will tie him/her down
	25. An isolated attitude
	26. Not joining a group, not socialising
	27. Disunity can hinder people from coming together.
	28. I think another barrier I know is distance
	29. An unyielding mind is another factor
	30. some of us do not listen to advice on how
	31. Some people do not take doctors' advice seriously
	32. I use my phone mostly for calls
	33. most of us cannot operate all these highly complicated Android phones apart
	34. Illiteracy is also one of the causes of this disease
	35. Poor participants' level of information on CVD
	36. Erroneous belief about CVD
	SUGGESTED WAYS OF IMPROVEMENT 37. patient enough to listen
	38. organise more health talks against the diseases
	39. show interest, have interest in whatever they are doing in the group
	40. we should just be open-minded
	41. the government to have definite and effective scheme of taking care of the elderly
	42.Good package for the pensioners
	43. Be visiting us maybe once in three months
	44. to assist we retirees financially
	45. give little-little rewards
	46. check your high blood pressure
	47. The program can be enlarged, and you also create free seminars for people

	48. suggest regular campaigns
	49. must have easy general application ….. everybody should be able to use it
	50. put regular programme in place where you reach the people, then educate them properly
	51. By using the media advantage
	52. internet, radio, electronics
	53. place it on a social network

APPENDIX-AB

DELPHI STUDY (ROUND 1) **Code Number** _____

REDUCING CARDIOVASCULAR DISEASE RISKS AMONG RETIRED OLDER ADULTS IN OSUN STATE NIGERIA: AN INTERVENTION STUDY

Scale: 1= Not relevant and should be deleted

2 = Item needs major revision

3 = Relevant but need minor revision

4 = Very relevant

FINAL DRAFT OF ITEMS FOR DELPHI REVIEW ROUND 1

Categories	Subcategories	Rating Scale			
		1	2	3	4
1. **Screening and assessment**	1. Screening for risk factors				
	2. General body tests conducted by healthcare professionals				
2. Intervention approaches	3. Guideline-based intervention				
	4. Standardized protocols of national guidelines				
	5. Older adult-centred care				
	6. Secondary stroke prevention strategies led by nurses				
	7. Nurse-guided interventions for health improvement				
	8. Ensure multidisciplinary team collaboration				
3. Education and counselling	9. Multiple-health education sessions				
	10. Community health talks using multimedia aids (i.e. booklets, films, pamphlets)				
	11. Standardized in-person counselling and follow-ups through telephone calls				
	12. Community health talks using multimedia aids (i.e. booklets, films, pamphlets				

4. Technology-enabled interventions	13. Digital health tools				
	14. Use of Bluetooth BP devices and smartphones				
	15. Monitoring and reporting and reporting BP measurement and medication intake tracking				
	16. Easy-to-use programs for educating the elderly				
	17. Sensitization through media (e.g. Facebook, YouTube, radio, television				
	18. m-health technology-enabled support				
5. Lifestyle and self-management	19. Promoting adherence to lifestyle changes: diet, physical therapy, and clinic attendance				
	20. Self-care adherence scale for evaluating compliance				
	21. Encouraging drug compliance				
6. Intervention packages	22. Comprehensive intervention packages tailored to local contexts for CVD prevention				
	23. Pictures, documentaries in local language				
7. Facilitators of success	24. Support from healthcare professionals: doctors, nurses, and community health officers				
	25. Group-based support (e.g. discussions, group walks, shared experiences)				
	26. Family-assistance with technology and promoting learning				
8. Suggested ways of improvement	27. Address erroneous beliefs, and limited knowledge about CVD devices				
	28. Educational and awareness strategies				
	29. Regular health talks, campaigns, and seminars using accessible media				
	30. Easy-to-use programs for educating the older adults				
	31. Government and Financial support				
	32. Advocate for financial support for retirees				
	33. Improvement on pension schemes				

	34. Community and health professional engagement				
	35. Regular visits by health care professionals (e.g. every three months				
	36. Regular, community-focused educational programs				
	37. Address Erroneous beliefs, and limited knowledge about CVD				

Comments:

THANK YOU FOR YOUR PARTICIPATION

APPENDIX-AC



DELPHI STUDY (ROUND 2) **Code Number _____**

REDUCING CARDIOVASCULAR DISEASE RISKS AMONG RETIRED OLDER ADULTS IN OSUN STATE NIGERIA: AN INTERVENTION STUDY

Scale: 1= Not relevant and should be deleted

2 = Item needs major revision

3 = Relevant but need minor revision

4 = Very relevant

FINAL DRAFT OF ITEMS FOR DELPHI REVIEW ROUND 2

Categories	Subcategories	Rating Scale			
		1	2	3	4
1. **Screening and assessment**	1. Screening for risk factors				
	2. General body tests conducted by healthcare professionals				
2. Intervention approaches	3. Standardized guideline-based intervention				
	4. Older adult-centred care/programme				
	5. Nurse-guided interventions for health improvement				
3. Education and counselling	6. Multiple-health education sessions				
	7. Community health talks using multimedia aids (i.e. booklets, films, pamphlets)				
	8. Standardized in-person counselling and follow-ups through telephone calls				
	9. Locally relevant solutions for CVD risk prevention				
4. Technology-enabled interventions	10. Digital health tools				
	11. Pictures, documentaries in local language				
	12. Monitoring and reporting and reporting BP measurement and medication intake tracking				
	13. Sensitization through media; television, radio				

	14. Health technology-enabled support				
5. Lifestyle and self-management	15. Promoting adherence to lifestyle changes: diet, physical therapy, and clinic attendance				
	16. Self-care adherence scale for evaluating compliance				
6. Intervention packages	17. Comprehensive intervention packages tailored to local contexts for CVD prevention				
7. Facilitators of success	18. Support from healthcare professionals: doctors, nurses, and community health officers				
	19. Group-based support (e.g. discussions, shared experiences)				
	20. Family-assistance with technology and promoting learning				
8. Suggested ways of improvement	21. Address erroneous beliefs, and limited knowledge about CVD devices				
	22. Educational and awareness strategies				
	23. Encourage social circle interaction				
	24. Regular health talks, campaigns, and seminars using accessible media				
	25. Easy-to-use programs for educating the older adults				
	26. Government and Financial support				
	27. Advocate for schemes and services that promote CVD risk awareness				
	28. Financial support for retirees				
	29. Advocate for improvement pension schemes				
	30. Community and health professional engagement				
	31. Regular visits by health care professionals				
	32. Regular, community-focused educational programs				

Comments:

THANK YOU FOR YOUR PARTICIPATION

APPENDIX-AD

CVI-CONTENT VALIDATION INDEX- OF THE DELPHI STUDY (Round 2)

item	EXPERT 1	EXPERT 2	EXPERT 3	EXPERT 4	EXPERT 5	Experts in Agreement	I-CVI	UA
Q1	1	1	1	1	1	5	1	1
Q2	1	1	1	1	1	5	1	1
Q3	1	1	1	1	1	5	1	1
Q4	1	1	1	1	1	5	1	1
Q5	1	1	1	1	1	5	1	1
Q6	1	1	1	1	1	5	1	1
Q7	1	1	1	1	1	5	1	1
Q8	1	1	1	1	1	5	1	1
Q9	1	1	1	1	1	5	1	1
Q10	1	1	1	1	1	5	1	1
Q12	1	1	1	1	1	5	1	1
Q12	1	1	1	1	1	5	1	1
Q13	1	1	1	1	1	5	1	1
Q14	1	1	1	1	1	5	1	1
Q15	1	1	1	1	1	5	1	1
Q16	1	1	1	1	1	5	1	1
Q17	1	1	1	1	1	5	1	1
Q18	1	1	1	1	1	5	1	1
Q19	1	1	1	1	1	5	1	1
Q20	1	1	1	1	1	5	1	1
Q21	1	1	1	1	1	5	1	1
Q22	1	1	1	1	1	5	1	1
Q23	1	1	1	1	1	5	1	1
Q24	1	1	1	1	1	5	1	1
Q25	1	1	1	1	1	5	1	1
Q26	1	1	1	1	1	5	1	1
Q27	1	1	1	1	1	5	1	1
Q28	1	0	1	1	1	4	0.8	0
Q29	1	1	1	1	1	5	1	1
Q30	1	1	1	1	1	5	1	1
Q31	1	1	1	1	1	5	1	1
Q32	1	1	1	1	1	5	1	1
						S-CVI/Average	**0.99**	
Proportion relevance	**1.0**	**0.97**	**1.0**	**1.0**	**1.0**			
	Average proportion of items judged as relevant across the five experts					**S-CVI/UA**		**0.97**

BREAKDOWN OF CVI CALCULATIONS

The CVI indices	Definition	Formula
ICVI (item-level content validity index)	the proportion of content experts giving item a relevance rating of 3 or 4	I-CVI = (agreed item)/ (number of expert)
S-CVI/Ave (scale-level content validity index based on the average method	The average of the I-CVI scores for all items on the scale or the average of proportion relevance judged by all experts. The proportion relevant is the average of relevance rating by individual expert	S-CVI/Ave = (sum of I-CVI scores)/(number of item) S-CVI/Ave = (sum of proportion relevance rating)/ (number of expert)
S-CVI/UA (scale-level content validity index based on the universal agreement method)	The proportion of items on the scale that achieve a relevance scale of 3 or 4 by all experts. Universal agreement (UA) score is given as 1 when the item achieved 100% experts in agreement, otherwise the UA score is given as 0	S-CVI/UA = (sum of UA scores)/(number of item)

i) Experts in agreement: 4/5=0.8

ii. Universal agreement (UA): 0.97

iii. I-CVI: =0.8-1.0

iv. S-CVI/Ave (based on I-CVI):32.8/33= 0.99

v. S-CVI/Ave (based on proportion relevance):=0.97

vi. S-CVI/UA:
Average proportion of items judged as relevant across the five experts=
1.0+.97+1.0+1.0+1.0+1.0=4.97/5

=0.99

APPENDIX-AE

POWERPOINT PRESENTATION OF THE EDUCATIONAL INTERVENTION PROGRAMME



Understanding your role in Cardiovascular Disease risk prevention

Presented by

Grace Oluwatoyin Faronbi

(PhD student)

Department of Nursing Education

University of the

Witswatersrand, Johannesburg, South Africa.
February-April 2024.

OBJECTIVE OF THE PROGRAMME

At the end of the 12 weeks programme, you will:

- gain insight into facts about CVD
- Know more about the risk factors.
- Assess your level of risk at developing CVD
- We can explain and adopt preventive measures on how to control the modifiable risk factors of CVD



GENERAL OVERVIEW

- What comes to your mind when you hear about Cardiovascular disease?



❖ (Allow time for opinion sharing)

WHAT ARE THE FACTS ABOUT CVD ?

These are numerous disorders affecting the heart and the blood vessels disrupting its structure and function.

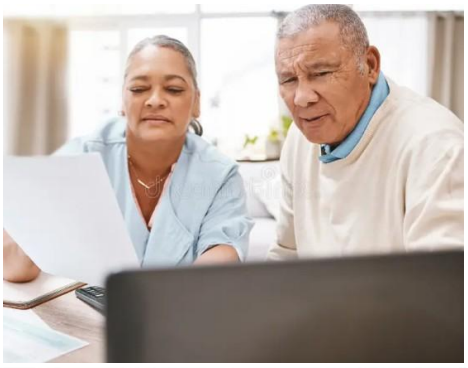
There is a connection between aging of other organ systems of the body and CVD

Heart and circulatory diseases are the world's biggest killers with about an estimated 20.5 million deaths in 2021

There are around 620 million people living with heart and circulatory diseases across the world

Each year around 60 million people across the world develop a heart or circulatory disease

Cardiovascular disease (CVD) - related admissions are on the increase in Nigeria and the rest of Africa.





Older Adults and CVD

- Older persons are more at risk of CVD especially in developing nations.
- In developed nations there is a greater level of awareness on CVD and its risk factors compared most African countries.
- Whereas in Africa there is progressive increase in incidence and mortality rate among older adults in Africa.



Older Adults and CVD (Cont'd)

Some of the reasons for this record are:

- Non-affordability of functional health care system (Expensive)
- Poor awareness of the disease conditions
- Unhealthy lifestyle, and choices.
- Limited preventive health care services amongst others.

General signs and symptoms of CVD

❖Initially CVD may not present with symptoms, or the symptoms may be hardly recognised.

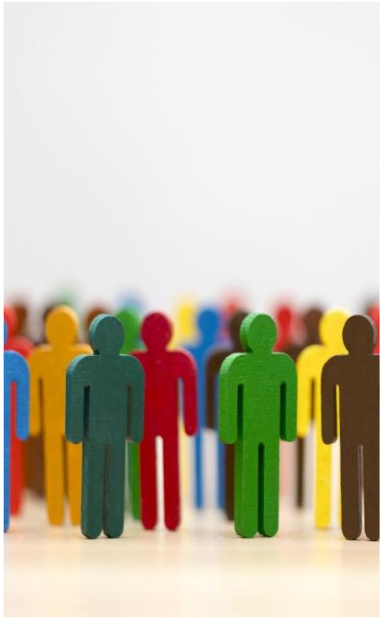
❖Some characterizing features of CVD to watch out for include;

- Pain, numbness, and/or tingling in the shoulders, arms, neck, jaw, or back.
- Shortness of breath when active, at rest, or while lying flat
- Chest pain during physical activity that gets better with rest.

Signs and symptoms of CVD

- Light-headedness, dizziness, confusion, headaches, cold sweats, Nausea/vomiting, Tiredness, or fatigue
- Swelling in the ankles, feet, legs, stomach, and/or neck
- Reduced ability to exercise or be physically active.
- Problems doing your normal activities.

❖ N.B **We shall discuss more about the key signs to watch out for before the end of this programme.**



RISK FACTORS OF CVD

There are lots of risk factors associated with CVD.

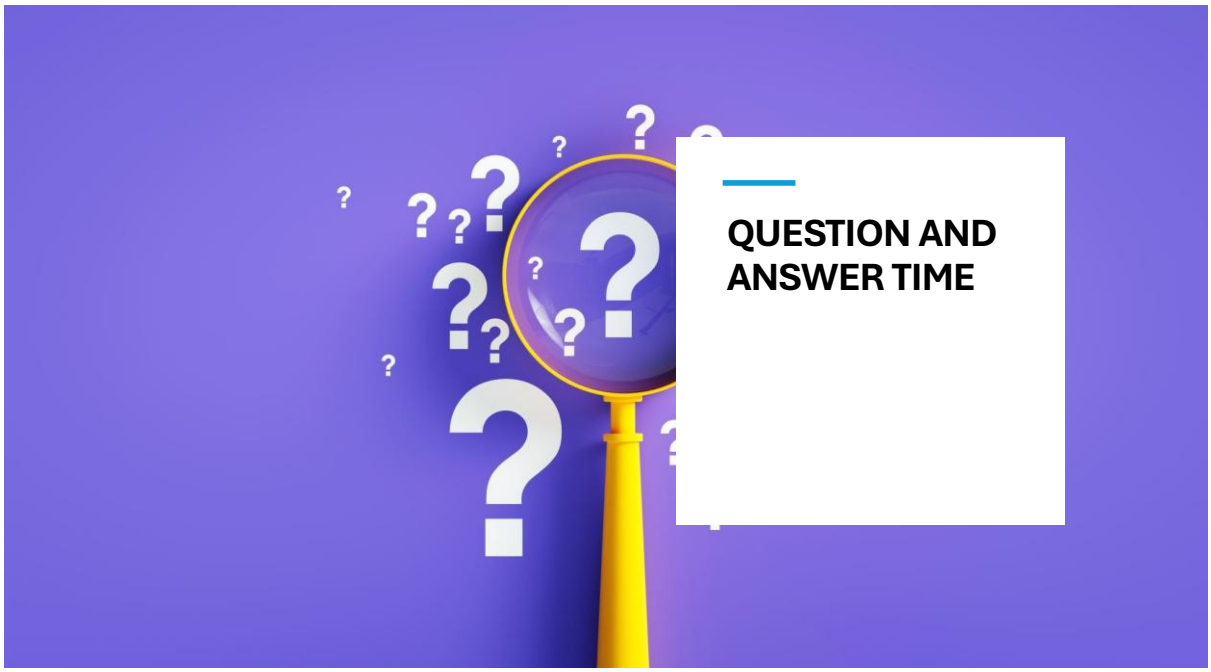
- Modifiable risk factors are controllable by making important changes in lifestyle
- Non-modifiable risk factors are traits that cannot be changed because they are inherited. E.g. Age, Gender, some family history

❖ **For this programme we are focusing on the modifiable risk factors**

The modifiable risk factors

The main modifiable risk factors to be considered in the next 6 weeks are;

- **Blood pressure: monitoring and control**
- Exercise and stress management.
- Addressing diet and nutritional needs of the older adults
- Abstinence from alcoholism and smoking
- Healthy body weight and understanding your body mass index
- Adherence to medications and noting the warning signs of CVD.





MODIFIABLE RISK FACTORS

Factor 1: Blood pressure: Monitoring and control

- Blood pressure tends to increase with age, as you age, your arteries may narrow and become stiff.
- Narrow arteries lead to an increase in blood pressure and that can damage the walls of the arteries and the heart itself.
- Sometimes, high blood pressure could be a result of lifestyles, the environment, certain medications, or other conditions sleeplessness, kidney disease, or thyroid problems.
- The abbreviation mm Hg stands for millimeters of mercury,

Blood pressure categories

Classification	Systolic mm Hg	Diastolic mm Hg
Low blood pressure Hypotension	<90	<60
Normal Blood pressure	90-129	60-80
Elevated blood pressure	130-139	<90
Stage 2 Hypertension	140 and above	>90

Blood pressure: Monitoring and control

Normal blood pressure

- If your blood pressure falls within 91/61 mm Hg to 119/79 mm Hg, you should maintain your healthy habits.

Elevated blood pressure

- Older adults whose blood pressure is elevated but lower than 130/80 mm Hg can usually help regulate their blood pressure through lifestyle changes.
- Such lifestyle changes are; increasing physical activity, eating a heart-friendly diet that is low in salt, and limiting alcohol.
- If blood pressure continues to rise from an elevated state, then the individual will enter stage 1 to indicate that hypertension is at a severe level.

Stage 1 hypertension

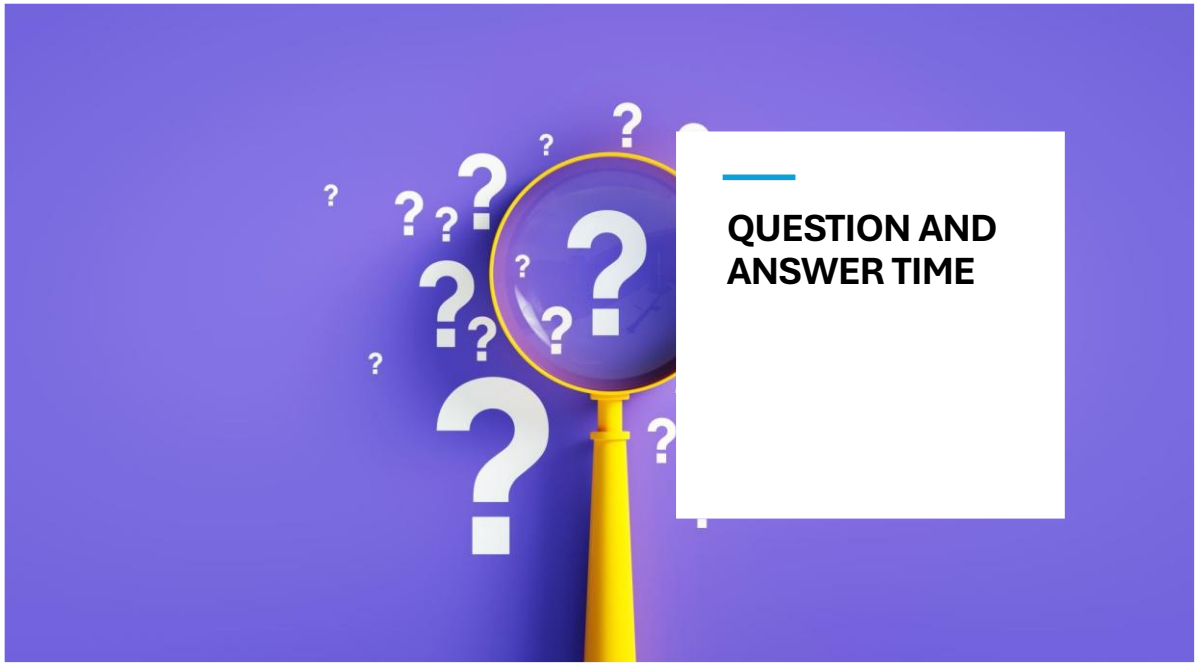
- Blood pressure ranging from 130/80 mm Hg to 139/89 mm Hg is considered stage 1.
- At this stage, a doctor will likely recommend medication in addition to lifestyle changes.

Stage 2 hypertension

- If blood pressure readings continue to increase, the category will be in stage 2.
- The treatment options for stage 1 and stage 2 hypertension may include lifestyle changes and medication.
- However, someone with stage 2 may take multiple medications, while someone with stage 1 hypertension may focus more on lifestyle changes



- N.B There may be fluctuations in your blood pressure reading due to:
  - Different BP apparatus and correct handling when measuring
  - Check for proper calibrations and half-life.
  - Stress of keeping doctor's appointment (white coat hypertension)
  - Remain calm 15-20minutes before measuring your blood pressure.
  - Recheck for consistency.



Week 2

- Recap on lessons learnt and information shared
- Introduction to module 2

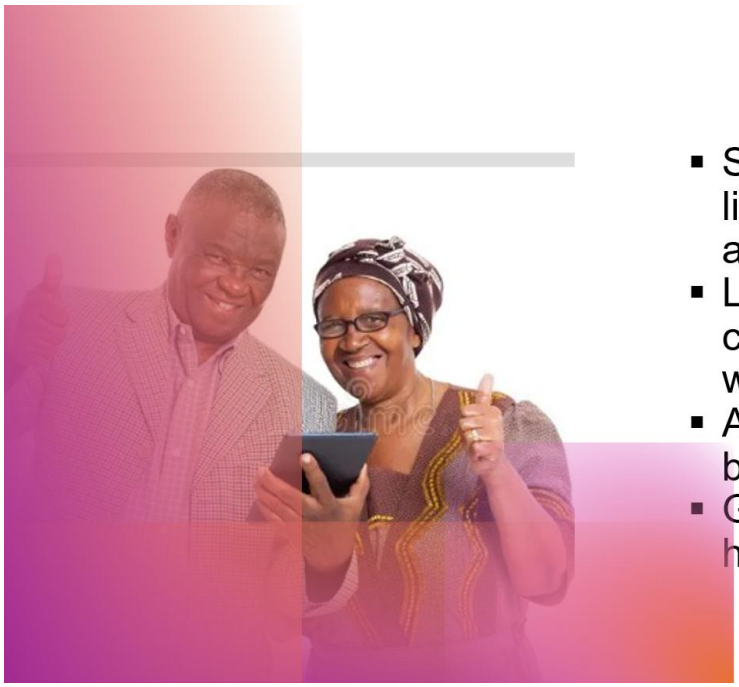
FACTOR 2: EXERCISE AND STRESS MANAGEMENT

- Regular exercise improves your heart's health
- Exercise reduces the symptoms of stress and improves blood circulation to the brain
- Exercise can promote better sleep patterns
- Anxiety and depression is minimised with regular exercises
- Group exercise can reduce loneliness, and social isolation

FACTOR 2: EXERCISE AND STRESS MANAGEMENT CONT'D

How to engage in exercise:

- Gentle regular walks-improve cardiovascular health and reduces stressAt least 150 minutes per week of accumulated moderate physical activity each week.
- 75 minutes per week of vigorous-intensity physical activity
- Examples of simple, safe activities for older adults include walking, outdoor chores, gardening etc



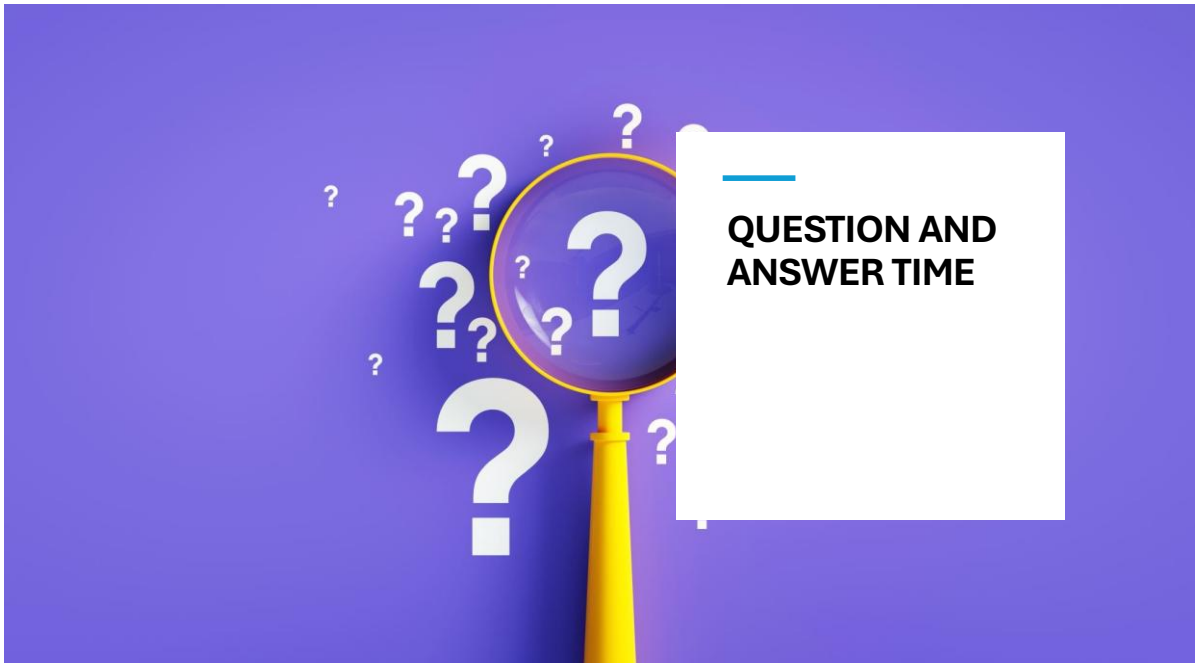
Stress management

- Staying positive about life and be intentional about rest
- Learn to share your concerns and burden with trusted.
- Avoid unnecessary burnout.
- Good sleeping habit (6-8 hours)

Stress management

- Join support groups and volunteering networks.
- Try simple relaxation techniques, such as deep breathing exercises or meditation.
- Engage in social activities like regular meeting days and outdoor engagements.

• N.B know you limits and do not unduly overstretch your health


QUESTION AND
ANSWER TIME

Week3

- Recap on lessons learnt and information shared
- Introduction to module 4

Factor 3: Addressing diet and nutritional needs of the older adults.

There is a dietary approach to stop hypertension (DASH) and help control CVD risk.

Generally, we talk about:

- Classes of food all well known
- The importance of regular water intake
- Limiting salt consumption and the use of herbs and spices

However, the DASH regimen plan requires no special foods and instead provides daily and weekly nutritional goals. This plan recommends:



Diet suggestions



- Eating vegetables, fruits, and whole grains. Including fat-free or low-fat dairy products, fish, poultry, beans, nuts, and vegetable oils
- Limiting foods that are high in saturated fat(LDL), such as fatty meats, full-fat dairy products, and tropical oils such as coconut, palm kernel, and palm oils.
- Limiting sugar-sweetened beverages and sweets
- Sample of weekly diet for the older adults as discussed with experts is presented in the tables below

Nutrition for guide for older adults.



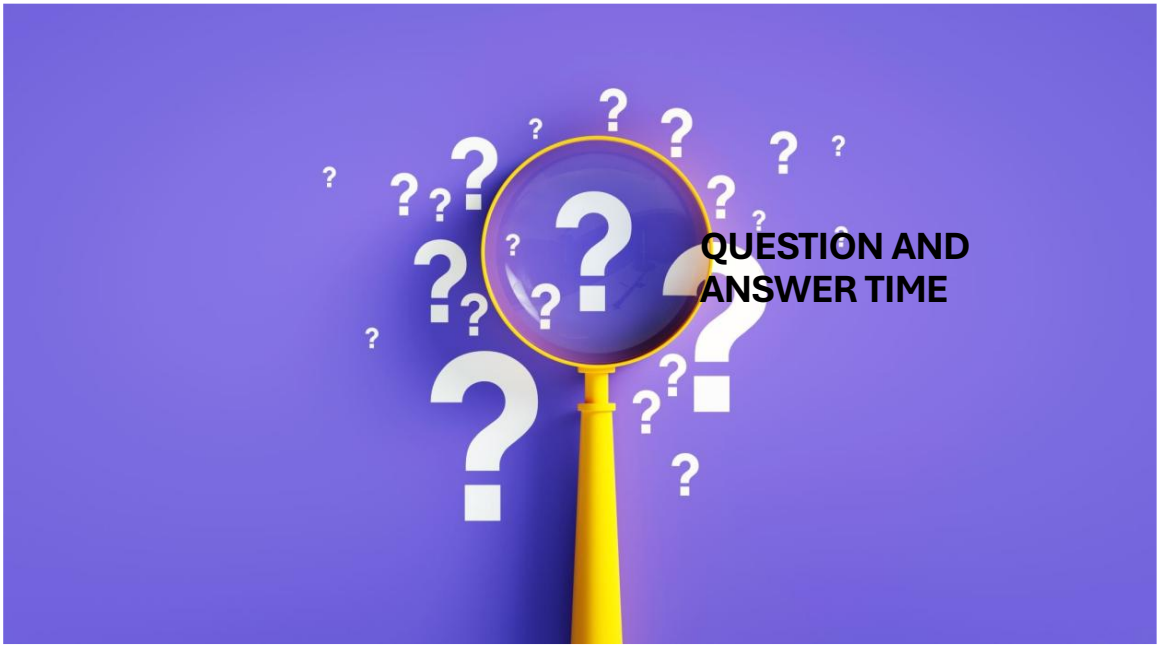
- Factors and foods that can exacerbate or increase the risk of CVD are grouped using traffic light colours as shown below

Codes	Meaning	Examples
Green	Without risk and could be taken without restrictions	Vegetables, fruits, legumes, nuts, water
Amber	To be taken or done with caution	Oils, cereals, starchy foods, Fats, **concoction herbs**
Red	Dangerous to be avoided	Self-medication, Alcohol, smoking.



RECOMMENDED SAMPLE OF DIET MENU FOR THE OLDER ADULT IN SOUTH-WEST NIGERIA

Days	Breakfast	Lunch	Dinner
Sunday	Bread + Tea+ Boiled egg	Fruit salad (watermelon+ cucumber)	Amala & Ewedu
Monday	Eko & Akara	Boiled plantain &Fish Stew+vegetable	Yam /Potatoes Pineapple/water melon
Tuesday	Rice &Fish stew	Cucumber+ carrot	Beans & Eko
Wednesday	Boiled yam &fish stew	Watermelon	Semolina & okro/Ewedu
Thursday	Rice & eforiro +dry fish	Amala+ ewedu or egusi	Boiled plantain & fish stew
Friday	Eko & eforiro	Potatoes chips/	Rice & Beans
Saturday	Pap & moin-moin (Bean Cake)	Cucumber & carrot	Pounded yam & Efo riro


QUESTION AND
ANSWER TIME

Week 4

- Recap on lessons learnt and information shared
- Introduction to module 4

Factor 4: Abstinence from alcoholism and Smoking

- Information on the association between Alcoholism, smoking, and CVD.
- **Moderate to heavy alcohol consumption** can have direct effects on the cardiovascular system.
- High intake of alcohol can raise your blood pressure.
- It can also contribute to **obesity**, and disrupt **lipid metabolism**



Abstinence from alcoholism and Smoking

- It's been established that excessive alcohol intake leads to higher risk of heart attack and other cardiovascular complications

HEALTH SUGGESTION:

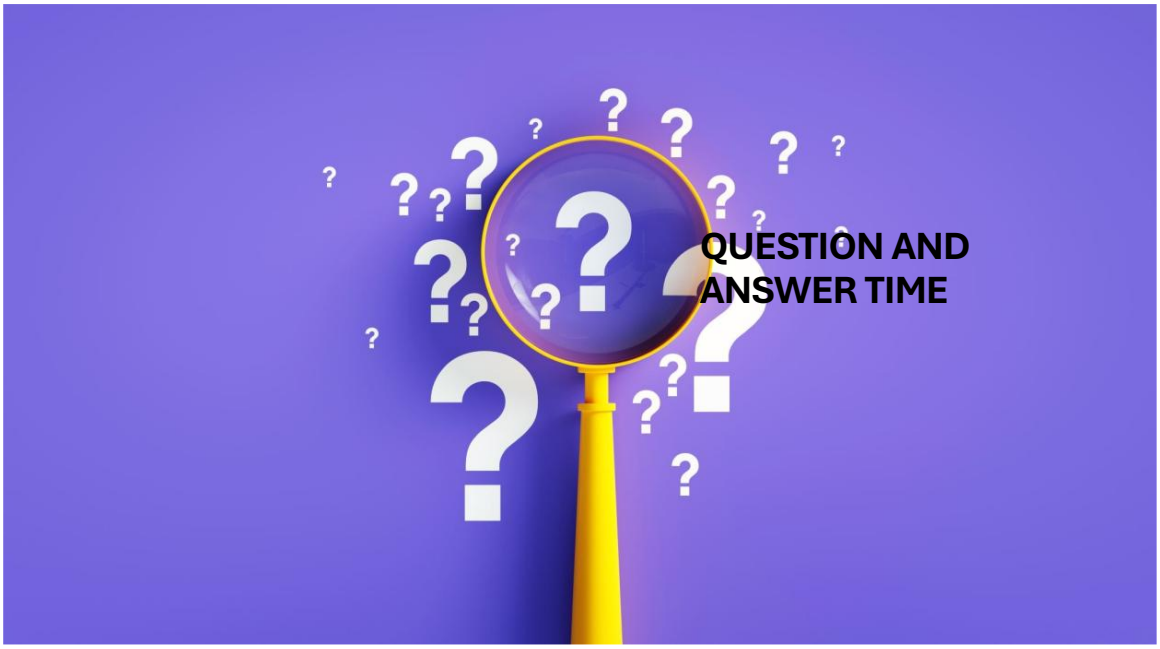
- Limit your alcohol intake to no more than one drink a day (if you must take it).
- Consider other alternative drinks to alcohol

Smoking

- Smoking is a well-established risk factor for CVD, particularly coronary artery disease.
- Tobacco damages the walls of human blood vessels (artery).
- Nicotine and other chemicals in cigarettes increase blood pressure and heart rate
- Smoking can cause blood clotting and reduce blood flow around the body and to the lower extremities increasing risk of stroke and heart attacks.

Smoking

- The older adult's blood vessels are physiologically lessefficient, smoking further damages the blood vessels
- The combination of heavy alcohol intake and smoking can further complicate cardiovascular health of older adults
- Leading a lifestyle with reduced or no alcohol consumption and quitting smoking is vital to improving heart health, particularly in older age.



Week 5

- Recap on lessons learnt and information shared
- Questions and answers on previous lesson
- Introduction to module 5

Body weight and CVD: Calculating body mass index

- Both underweight and obesity can increase the risk of various cardiovascular problems
- As people grow older, excessive weightimportantly increases the risk of cardiac problems
- Excessive body weight puts more load on the heart and make it difficult to function well
- The burden on the heart muscles can lead to heart failure, stroke and serious heart conditions.

Body weight and CVD: Calculating body mass index

- In contrast, being underweight in old age can be a greatchallenge

- The heart muscles can be weakened and unable to function effectively.
- Frailty and loss of muscle can increase the risk of heart failure
- An underweight older adult is highly susceptible to infection and ultimately affect the heart
- Maintaining a healthy body weight is key to healthy ageing and prevention of CVD



FACTOR 5: BODY WEIGHT AND CALCULATING BODY MASS INDEX

- There is a significant connection between BMI and CVD risk
- Calculation for BMI=weight/ Height^2
- **N.B** for persons who are overweight, for every 1kg lost you can reduce your blood pressure by 1mmHg

Body mass index Range	Classification
< 18.5	Underweight range
18.5-24.9	Healthy weight range
25.0-29.0	Overweight range
>30	Obesity



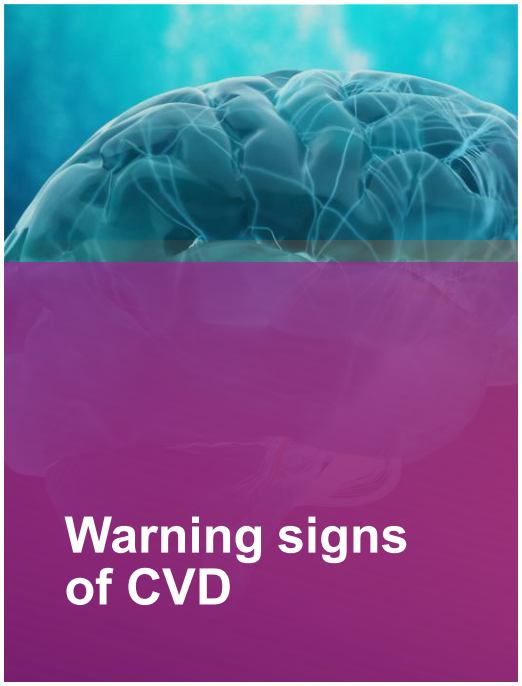
Week 6

- Recap on lessons learnt and information shared
- Introduction to module 3



Factor 6: Adherence to medications

- Strict compliance for those on regular medications and medical checks or follow-up clinics for all health issues
- Adopt the use of reminders on phone, diary recordings for good compliance
- Do not be discouraged if doses are missed, however do not overdose on missed medications



Warning signs of CVD

- Watch out for the cardinal signs of CVD

It is characterised by group of symptoms like;

- Reduced blood flow to the brain,
- Ruptured vessels around the brain tissue

WARNING SIGNS INCLUDE;

- Slurred speech
- Numbness feeling around limbs
- Slowed movement not joint aches like arthritis
- Blurred vision
- Frequent feeling of dizziness
- Staggering gait while walking
- Persistent headache/ throbbing

- All these could lead to severe condition known as stroke if poorly managed and might eventually lead to death or delayed recovery.
- The cardinal signs differs with gender.
- **For men**
- Facial drops
- slurred speech
- Difficulty lifting upper limb
- Generalised body weakness





In Women

- Dizziness
- Vomiting and or retching
- Dyspnoea
- Transient fainting attack

Recap of all lessons discussed from week one to six

- **Blood pressure: monitoring and control**
- **Exercise and stress management.**
- **Addressing diet and nutritional needs of the older adults**
- **Abstinence from alcoholism and smoking**
- **Healthy body weight and understanding your body mass index**
- **Adherence to medications and noting the warning signs of CVD.**


THANK YOU FOR PARTICIPATING IN THIS STUDY

CARDIOVASCULAR DISEASE (CVD)

MONITORING AND CONTROL



Blood Pressure Monitoring And Control

Classification	Systolic mm Hg	Diastolic mm Hg
Low blood pressure Hypotension	<90	<60
Normal Blood pressure	90-129	60-80
Elevated blood pressure	130-139	<90
Stage 2 Hypertension	140 and above	>90

Knowing and understanding your body mass index (BMI)

Body mass index Range	Classification
< 18.5	Underweight range
18.5-24.9	Healthy weight range
25.0-29.0	Overweight range
>30	Obesity

Traffic light indicator design

Codes	Meaning	Examples
Red	Dangerous to be avoided	Self-medication (herbal concoctions, Excessive alcohol consumption, smoking,
Amber	To be taken or done with caution	Oils, cereals, starchy foods, Fat
Green	Without risk and could be taken without restrictions	Vegetables, fruits, legumes, nuts, water

LDL: Stands for low-density lipoprotein which is **bad cholesterol.** (To be avoided)
HDL: Stands for **good cholesterol** (Safe for consumption)

WARNING SIGNS OF CVD

- Slurred speech
- Numbness feeling around limbs.
- Slowed movement not joint aches like arthritis.
- Blurred vision
- Frequent feeling of dizziness
- Staggering gait while walking
- Persistent headache/ throbbing

Exercise And Stress Management

- Walking, (At least 150 minutes per week)
- Outdoor chores,
- Gardening
- Staying positive about life and be intentional about rest
- Learn to share your concerns and burden with trusted friends.
- Avoid unnecessary burnout.
- Good sleeping habit
- Join support groups and volunteering networks.
- Try simple relaxation techniques, such as deep breathing exercises or meditation.

RECOMMENDED SAMPLE OF DIET MENU FOR THE OLDER ADULT IN SOUTH-WEST NIGERIA

Days	Breakfast	Lunch	Dinner
Sunday	Bread + Tea+ Boiled egg	Fruit salad (watermelon+ cucumber)	Amala & Ewedu
Monday	Eko & Akara	Boiled plantain &Fish Stew+vegetable	Yam /Potatoes Pineapple/water melon
Tuesday	Rice &Fish stew	Cucumber+ carrot	Beans & Eko
Wednesday	Boiled yam &fish stew	Watermelon	Semolina & okro/Ewedu
Thursday	Rice & eforiro +dry fish	Amala+ ewedu or egusi	Boiled plantain & fish stew
Friday	Eko & eforiro	Potatoes chips/	Rice & Beans
Saturday	Pap & moin-moin (Bean Cake)	Cucumber & carrot	Pounded yam & Efo riro

Diet And Nutritional Needs Of The Older Adults

- Eating vegetables, fruits, and whole grains
- Including fat-free or low-fat dairy products, fish, poultry, beans, nuts, and vegetable oils
- Limiting foods that are high in saturated fat, such as fatty meats, full-fat dairy products, and tropical oils such as coconut, palm kernel, and palm oils
- Limiting sugar-sweetened beverages and sweets

NOTE: ENSURE STRICT COMPLIANCE WITH PRESCRIBED MEDICATIONS AND CLINICAL APPOINTMENTS

APPENDIX AG

WITS UNIVERSITY

Evaluation tool (Phase 3)

Instructions

Please circle the response that best reflect your satisfaction with the educational intervention programme

Key to rating

1= Unsatisfied; 2= Satisfied; 3= Very satisfied; 4= Excellent

Please rate the quality of the following…	1		2	3	4
Overall Content of Program					
Presentation of Material by Trainer					
Participant / Group Activities					
Facilitation of Activities by Trainers					

Did this program meet your expectations? _____

_____

Would you recommend it to a friend? _____

_____ _____

Comments:_____

_____

Thank you for completing this evaluation

Source: (Dagenais *et al.*, 2015)