

EFFECTS OF CARDIOVASCULAR EDUCATION ON KNOWLEDGE, ATTITUDE AND
HEART DISEASE AT-RISK BEHAVIOUR OF SECONDARY SCHOOL TEACHERS IN
IBADAN, OYO STATE, NIGERIA

BY

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CERTIFICATION

I certify that Idowu Funmilayo FAMILONI of the Department of Human Kinetics and Health Education, Faculty of Education, University of Ibadan, carried out this work titled: Effects of Cardiovascular Education on Knowledge, Attitude and Heart Disease At-Risk Behaviour of Secondary School Teachers in Ibadan, Oyo State, Nigeria, under my supervision.

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DEDICATION

This thesis is dedicated to God Almighty.

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ABSTRACT

Cardiovascular Disease (CD) is a prominent life threatening, non-communicable disease leading to death of many men and women. The working condition of teachers in secondary schools in Ibadan among other factors exert pressure on them, making them prone to Cardiovascular Disease (CD). Previous studies focused largely on prevalence, causative factors and management of CD using descriptive survey with little emphasis on how Cardiovascular Education (CE) can build teachers' capacity to enhance their knowledge, attitude and reduce CD at-risk behaviour among them. This study therefore was carried out to determine the effects of CE on knowledge of, attitude towards CD and CD at-risk behaviour among secondary school teachers in Ibadan, Nigeria. It also examined the moderating effects of age and gender.

Extended Parallel Process and Health Belief models were employed, while the pretest - posttest control group quasi experimental design of 2x3x2 factorial matrix was adopted. Two Local Government Areas (LGAs) (Ibadan North and Ibadan Southwest) were randomly selected from the existing five LGAs in Ibadan metropolis, while 20 public secondary schools were randomly selected from each LGA. Five classroom teachers who were purposively selected from each school; making a total of 200 teachers. The two groups were randomly assigned to treatment (Ibadan North- 100) and control (Ibadan Southwest- 100), while treatment lasted eight weeks. Instruments used were CD knowledge ($r=0.83$), Attitude towards CD ($r=0.79$) and CD at-risk Behaviour ($r=0.91$) scales. Data were analysed using descriptive statistics, Analysis of Covariance and Scheffe post-hoc test at 0.05 level of significance.

Participants were male (39.0%) and female (61.0%) with mean age of 40.2 ± 3.1 years. There were significant main effects of treatment on CD knowledge ($F_{(1;185)}=48.31$; partial $\eta^2=0.21$), attitude towards CD ($F_{(1;185)}=5.82$; partial $\eta^2=0.30$) and CD at-risk behaviour ($F_{(1;185)}=5.33$; partial $\eta^2=0.03$) of the teachers. Participants in CE had higher post mean scores (knowledge: 62.55, attitude: 69.48 and CD at-risk behaviour: 71.09) than those in the control (knowledge: 48.64, attitude: 60.07 and CD at-risk behaviour: 63.00). The main effects of age and gender on knowledge, attitude and CD at-risk behaviour were not significant. There was a significant two-way interaction effect of treatment and age on CD at-risk behaviour ($F_{(2;185)}=3.97$; partial $\eta^2=0.04$) in favour of teachers between 30-39 years from CE group, while there were none on knowledge and attitude. The two-way interaction of treatment and gender as well as age and gender were not significant. There was a significant three-way interaction effect of treatment, age and gender on CD at-risk behaviour ($F_{(2;185)}=3.97$; partial $\eta^2=0.04$) in favour of female teachers from CE group, but not on knowledge and attitude to CD.

Cardiovascular education enhanced knowledge of and attitude towards heart disease as well as reduced heart disease at-risk behaviour among secondary school teachers in Ibadan, Oyo State, Nigeria. Health and safety education experts should utilise this intervention on teachers periodically.

Keywords: Heart disease at-risk behaviour, Cardiovascular education, Secondary school teachers in Ibadan

Word count: 464

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CHAPTER ONE

INTRODUCTION

Background to the Study

Globally, health challenges remain a threat to the entire human race and prominent amidst such health issues is cardiovascular disease which has become a burden and public health concern in many nations of the world. World Health Organization (WHO), (2015) asserted that cardiovascular diseases (CVDs) are the leading causes of death and disability among men and women. They also accounted for 46% of global mortality. Studies have shown that, nearly 2,400 people die of CVD each day, translating to 1 death every 37 seconds. As huge numbers of individuals are dying worldwide from cardiovascular disease, it is estimated that 25 million people will die from these diseases by 2025 (Lloyd-Jones, Adams and Brown, 2010). Additionally, the increased longevity due to enhanced social and economic conditions associated with lifestyle changes in the directions of a rich diet and sedentary habits, is believed to be one of the main contributors to the incremental trend in CVD in the last century (Dominguez et al, 2006). These are startling statistics; notwithstanding, at this alarming rate, CVD when left unattended to or untreated may take greater effort to combat, rendering victims incapacitated for life, unless significant prevention efforts can halt this rise.

Cardiovascular disease is defined as a class of diseases that involves the heart and blood vessels (Aje, Adebisi and Falase, 2009). They are non-communicable diseases that are often referred to as chronic diseases which develop in the body progressively over a long period. These include hypertension, stroke, coronary heart disease, myocardial infarction, peripheral vascular disease and a host of other diseases associated with the heart. Adeoye, Adebisi and Falase (2014) portrayed CVD as diseases that affect the normal structure and function of the cardiovascular system. In the cardiovascular system, the heart pumps blood around the body through arteries (big blood vessels) and capillaries (small blood vessels) that take blood through the lungs via other blood vessels known as veins. In this way, the cardiovascular system makes sure that oxygen and nutrients are transported to every part of the body and carbon dioxide is removed via the lungs.

In the domain of cardiovascular disease, the probability of a man in sub-Saharan Africa dying in 2013 at 0.110 is almost double that of North America at 0.065 (Roth, 2013). However, in cardiovascular disease, the condition develops as a result of complex interactions between genes (chromosomal disorders) and environment (infections, drugs and toxic agents). The causes depend on the types of heart disease and structures involved. Irrespective of the factors involved, the deposition of fatty plaques in the blood vessels is significant which in return narrow and reduces blood flow to the tissues and body organs progressively over a long period of time which may put strain on the heart. The force of blood pushing up against the blood vessels becomes harder and higher causing high blood pressure otherwise known as hypertension which is characterized by long-term no warning signs, fatigue, chest pain, breathlessness, swelling of the extremities and cough (Adeoye, Adebisi and Falase, 2014).

The incidence of cardiovascular disease continues to increase in different parts of the world. In Western Europe, prevalence is 44%, about 80 million in United States representing 12% of the population, in Asian countries, there is disproportionately high morbidity and mortality from CVD, accounting for 12.7% of all global deaths, while the sub-Saharan Africa accounted for 80% of deaths and 87% of related disability (Lloyd-Jones, Adams and Brown, 2010). In the meta-analysis of 45 studies conducted across Cote d'Ivoire, Ghana, Liberia, Nigeria, Senegal and Togo on cardiovascular disease (hypertension), it was revealed that there is a high prevalence of hypertension among West African workforce of which a significant proportion is undiagnosed, severe and complicated (Bosu, 2015). Consequently, the clustering of risk factors, co-morbidities and general low awareness warrant an integrated and multi-sectorial approach at all levels.

The high burden of CVD in the developing countries are attributable to the increasing incidence of atherosclerotic diseases (condition due to fatty deposition in the blood vessel), urbanization, higher risk factor levels, the relatively early age at which they manifest and the high proportion of individual who are young adults or middle aged in these countries (Yusuf, Reddy, Ounpuu, and Anand, 2001). Also, the prevalence of cardiovascular disease in Nigeria was reported to have accounted for 12% of all deaths (WHO, 2011). Further studies established that CVD cause as twice as many deaths as HIV, malaria and tuberculosis combined and this has also contributed significantly to 20% of all medical admissions across Nigeria (Odenigbo and

Oguejiofor, 2009). Cardiovascular diseases continue to exert a lot of unimaginable stress on the nation's economy thereby putting significant strain on the very fragile health care infrastructure.

It is important to note that, unless the heart is deliberately nurtured and protected from the various risk factors, there is tendency for it to fail temporarily, progressively or permanently in its function. There are factors that contribute to the development of cardiovascular disease in the body. Ogah and Rayner (2013) defined cardiovascular risk factor as a measurable characteristic that is causally associated with increased disease frequency and a significant independent predictor of an increased risk of presenting with the disease. Also, CVD risk does not only increase with each additional risk factor, but the presence of target organ damage and co-morbid conditions such as diabetes, renal involvement and left ventricular mass.

Brewster, Kleijnen and Van-Montfrans (2005) reported that risk factors such as abnormal lipids, smoking, hypertension, diabetes, abdominal obesity and alcohol accounted for most of the risk in men and women in every inhabited continent of the world and more importantly occurring at younger age groups. In the same vein, the American Heart Association (AHA) and American College of Cardiology (ACC) recognised the CVD risk factors as major independent risk factors, pre-disposing risk factors and conditional risk factors. These risk factors are identified as controllable and non-controllable in nature (Lloyd-Jones, Hong and Barbarthe, 2010).

The non-controllable risk factors are age, sex and family history while some controllable (modifiable) risk factors are smoking, alcohol, obesity among others. Studies have reported CVD risk factors prevalence in many nations of the world. Awosan, Ibrahim, Makusidi, Essien and Adeniji (2013); Hijazi and Al-Bar (2008); Ali and Al-Asad (2008); Ansa, Oyo-Ita and Essien (2007) reported CVD risk factors among secondary school teachers in Jeddah, Saudi Arabia, Iraq, Calabar and Sokoto in Nigeria respectively. Similarly, several studies have been conducted in different parts of Nigeria. Mohammed (2012) reported significant prevalence among members of the Armed Forces while Awosan, Ibrahim, Sabir and Ejimodu (2011) reported incidence among teachers and bankers in Sokoto, North West Nigeria. Ojji, Stewart Ajayi, Manmak and Sliwa (2013) reported significant contribution of CVD risk factor among men and women in Abuja, capital city of Nigeria. Sani, Wahab, Yusuf, Gbadamosi, Johnson and Gbadamosi (2006) reported incidence among apparently healthy Nigerians. Ordinioha (2013); Ugwuja, Ogbonna, Nwibo and Onimawo (2013) reported its prevalence among lecturers in a medical school and civil servants in South-South and South-East Nigeria.

Professionals such as school teachers are vulnerable to non-communicable disease. Studies have shown that there is an association between teaching work and development of CVD (Choudhary, Rao and Suneetha, 2004). Teaching is an all-consuming profession, which involves knowing subject through and through, having constant update in an ever changing world. In addition, there is high expectations from students, parents and society, hence, the emotional intensive nature of the activities makes it so stressful for teachers. Studies also established that, school teachers are more prone to heart disease due to repetitive work related stress, in form of intensive verbal communication during teaching and handling of students, job burn-out, multiple roles played coupled with family responsibilities (Karikatti, Naik, Hallappanarvar and Mallapur, 2016; Ayanniyi, Akinremi, Odunnaiya and Adenaike, 2016; Marriamal, Jaisheeba and Sornaraj, 2012;). Also, study has revealed that there is increased cardiovascular reactivity during process of teaching among teachers which is absolutely attributed to physiological and hormonal changes in their working environment (Choudhary, Rao and Suneetha, 2004). However, teachers are also representative of health status in the society, as they portray health status of the community where they live.

In the same vein, studies established prevalence of CVD risk factors among Nigerian coaches, traders in an urban market in Lagos, South-West Nigeria, among lecturers and other members of staff in a university community in Ile-Ife, Osun State, among adults aged 60 years and above in urban (Iseyin) rural (Ilua) areas of Oyo State as well as among age 15 years and above which accounted for 12.4% in Ibadan, Oyo State (Onuma, 2016; Abegunde and Owoaje, 2013; Odugbemi, Onajole and Osibogun, 2012; Erhum, Olayiwola, Agbani and Omotosho, 2005; Lawoyin et al, 2002).

Health education is a tool of providing knowledge, skills and motivation to make healthier lifestyle choices. According to Moronkola (2012), health education is a process whereby individuals are motivated and equipped with information for the promotion, protection, restoration and maintenance of health. It is multi-dimensional in nature with various ways that may impact knowledge and in gathering information. The advancement of a significant health education programme ought to include an acceptance of various avenues for disseminating knowledge and instituting framework that encourages professionals and citizens to work together to develop and achieve public health and health promotion goals. Notwithstanding, a typical health education of such is cardiovascular education.

Cardiovascular education is a programme that improves overall health and quality of life. It offers a practical and proven approach to effectively manage cardiovascular health. It provides correct information on risk factors, causes, symptoms, development, complications and preventive measures against heart diseases. It also combines education, support and exercise. Effective, cardiovascular education programme must therefore be planned and delivered in such a way that beneficiaries will be motivated to develop skills and confidence for the adoption of positive and lasting healthy life style behaviour. However, cardiovascular education has been used to impact positively in public health and health promotion issues among children and adolescents with emphasis on nutrition and obesity, while many studies reflected community implementation programmes among adults in achieving cardiovascular health knowledge, attitude and behavioural changes (Addison, Jenkins, White and Young, 2006; Hayman et al, 2004; Farquhar et al, 1990; Mittlemark et al, 1986).

Knowledge relating to human existence equips people with adequate information. Knowledge is the representation of facts and concepts that are organized for future use. Gbefwi (2004) defined knowledge as information, skill and understanding acquired through experience or education. Often times, knowledge does not translate to behaviour change. Adequate knowledge of cardiovascular disease has tendency of improving healthy lifestyles and correcting those risky lifestyles which may ultimately inform their health seeking behaviours. Studies conducted by Holiman, Olsson and Ek, (2006); Alma-Roijer, Fridlund, Stagmo and Erhardt, (2006) asserted that knowledge of cardiovascular risk factors significantly improved adherence to advice on lifestyle changes.

Attitudes are predispositions or tendencies to respond positively or negatively towards a certain idea, object, persons or events in one's environment. It is also a way of thinking, a way of looking at things, a point of view or frame of mind. Kendra (2013) asserted that attitude is learned through experience and observation which may influence behaviour. Cardiovascular health attitude is the disposition to improved positive heart health in order to reduce or prevent heart diseases. The strategy for reduction in heart disease requires both knowledge gaining and attitudinal change. Robinson, Fox and Grandy (2009) reported significant association between positive health attitudes and healthy behaviours in individuals with CVD.

Risk behaviour is an action carried out by a person that may result in a terrible outcome. Centers for Disease Control and Prevention (2011) described heart disease risk behaviours as

activities or lifestyle choices that can increase risk for heart disease such as the modifiable risk factors; which to some degree exert a strong influence on health. Controllable risk factors are described to be the leading factors that add to the advancement of CVD. Some of the prominent risk factors include hypertension, smoking, alcohol, obesity, stress, diet and physical inactivity. Hypertension is a major risk factor in the development of cardiovascular disease. Blood pressure increases progressively and exponentially. Olaifa, Oladapo and Babatunde (2013) asserted that high blood pressure (also known as hypertension) remains an acknowledged potent risk factor and strongly associated with CVD. The Seventh Report of the Joint National Committee (JNC VIII) on Detection, Evaluation Treatment and Prevention of Hypertension (2015), defined hypertension as blood pressure persistently equal to or greater than 140/90 millimeter of mercury (mm Hg). Studies asserted hypertension to be a serious threat to health care system in low and middle income countries especially sub-Saharan Africa. It affects approximately 1 billion individuals and contributing to more than 7.1 million deaths per year worldwide (Dreisbach, 2014; Aje, Adebisi and Falase, 2009).

Cigarette smoking and exposure to secondhand smoke also contribute to the development of CVD. The Surgeons-General Report (2005) stated that smoking advances the development of coronary changes and predisposes to premature rupture of the blood vessels thereby accelerating the development of peripheral arterial disease in the body. Smoking enhances the destruction and dysfunction of the body cells. It adds to 5 million deaths all round every year (Mackay and Ericksen, 2002). Mendis, Puska and Norrving (2011) established that there is an association between alcohol use and the risk of CVD. The study further reported that people who drink in excess of 40 gram of alcohol everyday and or have an alcoholic disorder are at greater risk of cardiovascular disease. The organic chemical compound for example, ethanol in alcohol activates the sympathetic nervous system to constrict blood vessels which increases the contractile force of the heart causing damage to the myocardium and lining of the blood vessels. Roberts and Robinson (2007) attested that excessive and binge drinking increase the risk of stroke, obesity, breast cancer, suicide and accidents.

Dietary composition of fatty acids (cholesterol saturated fatty acids and trans-fatty acids) has a dramatic effect and undoubtedly contributes to the development of CVD. World Heart Federation (2013) asserted that consumption of foods rich in cholesterol are injurious to the body, build up in the arteries causing narrowing and blockages leading to heart problems such as

left ventricular hypertrophy (enlargement), stroke and heart attack causing 31% of coronary heart disease and 11% of stroke worldwide. Obesity is another vital risk factor that contributes to the advancement of cardiovascular disease. It is a main factor underlying insulin resistance that assist and co-exist with a variety of cardiovascular risk factors. Ogunbode, Ladipo, Ajayi and Fatiregun (2011) established that the accumulated fat in the waist and body is a powerful contributor to the increase in Low Density Lipoprotein (LDL) as they are stored in the blood vessels. Around the world, at least 2.8 million individuals die yearly as a result of obesity.

Physical inactivity is documented to be strongly associated with CVD. Living a life of physical inactivity is synonymous with sedentary living. According to Wardham, Albanese and Roberts (2004), physical inactivity is characterized by weight gain, muscle bulk loss and fatigue which may vary from each individual. There is accumulation of pro-inflammatory effect of C-reactive protein by induction of cellular adhesion molecule on endothelial nitric oxide (NO) synthesis and production which is associated with atherosclerotic process (deposit of fatty substances in the artery). Stress is an important risk factor of CVD that contributes to its progression to disease in the body. Oparil, Zaman and Calhoun (2003) affirmed that exposure to stress increases sympathetic outflow and repeated stress-induced vasoconstriction may result in vascular hypertrophy (enlargement) leading to progressive increases in peripheral resistance and blood pressure. Also, further studies asserted that negative emotional states including depression, anger, hostility, anxiety and inability to cope may lead to mental, social and cardiovascular problems (Everson-Rose and Lewis, 2005; Moronkola and Okanlawon, 2003). Taubman, Ben-Ari and Findler (2005) established that risky health behaviour is strongly associated with CVDs and mortality. Often, these health risk behaviours are established during childhood as well as adolescence; extend into adulthood, interrelated and preventable.

Aging is a significant risk factor in the development of cardiovascular (heart) disease. Studies have reported the contribution of aging and heart diseases. This is more prevalent in older adults (65 years and above) than in younger adults. The older an individual is, the greater the risk of heart disease. Surprisingly, it has also been established that heart diseases are more importantly occurring at younger age groups (Wang, Lee, Fabsitz, Devereux, Best and Welty, 2006; Yusuf, Hawken and Ounpuu, 2004). However, it is obvious that younger ones have tendency towards heart diseases due to social, affluence and environmental factors, such as

consumption of junk foods, lack of interest in physical exercises and long hours with social media and a host of others.

Studies have reported the influence of gender on the burden of cardiovascular disease. Mosca, Barret-Connor and Wenger (2011) submitted that there is significant genetic susceptibility to CVD development due to hormonal influence. The XX chromosomes producing oestrogen protects women until menopause. The production of oestrogen decreases after menopause and this may change the female lipid metabolism toward a more atherogenic form by decreasing the HDL cholesterol level while increasing LDL and total cholesterol levels. However, the incidence of Coronary Heart Disease (CHD) is higher in men until after 75 years of age as more men are living with and dying than the women. Gender influence is associated with attitude and behaviour towards cardiovascular disease. Kolo and Chijioke (2008) reported that females low endurance threshold and attention seeking characteristics in response to ill health may contribute to their attitudes and behaviours towards CVD as compared to the generally tough male masculine nature with implication for more admissions among women. Adequate training programme remains a key element in cardiovascular prevention. In recognition of the magnitude of CVDs, studies have established the need for health education training and awareness creation on knowledge sharing, attitude and skills that can influence behavioural change (WHO, 2012; United Nations Educational Scientific and Cultural Organization (UNESCO), 2010).

Ibadan Metropolis consists of five Local Government Areas namely: Ibadan North, Ibadan North-East, Ibadan North-West Ibadan South-East and Ibadan South-West. According to Teaching Service Commission (TESCOM) (2015), there are three hundred and three public secondary schools with five thousand, two hundred and eighteen public secondary school teachers in Ibadan Metropolis respectively. Ibadan city is urbanizing at a rapid pace. The effects of urbanization in many ways tend to hinder individuals ability to live healthily as most cities are exposed to marketing schemes, higher levels of pollutions and spread of diseases. Therefore, the study examined the effect of cardiovascular education on knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State, Nigeria.

Statement of the Problem

Cardiovascular disease is a life threatening disease and remains the main source of death and morbidity all over the world. In recent years, there has been increasing concern about burden of CVD and over the past few decades, the absolute burden of CVD has been greater in developing countries. Studies suggest that cardiovascular risk factors characterized by lifestyle habits tend to contribute to the expansion in the advancement of cardiovascular disease. It was also reported that lack of knowledge, attitudes and at-risk behaviours exist among various categories of people in various parts of the world, fuelling the explosion in cardiovascular disease hence the need to stem the tide.

Some studies conducted among teachers on heart disease were descriptive survey in nature. (Awosan, Ibrahim, Makusidi, Essien and Adeniji 2013; Awosan, Ibrahim, Sabir and Ejimodu, 2011 and Ibrahim, Hijazi and Al-Bar, 2008).

For sometime now, teachers have been facing problems of work overload, job insecurity, and irregular payment of salaries which together with other challenging situations and lifestyle related factors may make them prone to cardiovascular diseases. Consequently, an intervention programme that will facilitate sound understanding of heart disease at-risk factors, attitudinal change that promotes positive health behaviour, increase in quality of life and ultimate reduction in the occurrence of cardiovascular disease among secondary school teachers is essential. Based on the aforementioned, the researcher studied effect of cardiovascular education on knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State.

Objectives of the Study

The general objective of the study is to examine the effect of cardiovascular education on knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo-State

Specific Objectives

The study accomplished the following specific objectives:-

- (i) Examined the main effect of cardiovascular education on knowledge, attitude and heart disease at- risk behaviour of secondary school teachers in Ibadan, Oyo State.
- (ii) Determined the main effect of age on knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State.

- (iii) Investigated the main effect of gender on knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State.
- (iv) Established the moderating effect of age and gender on knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State.
- (v) Determined the interaction effect of treatment and age on knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State.
- (vi) Established the interaction effect of treatment and gender on knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State.
- (vii) Examined the interaction effect of treatment, age and gender on knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State.

Research questions

Answers were provided to the following research questions;

1. What is the knowledge of secondary school teachers in Ibadan on heart disease?
2. What is the attitude of secondary school teachers in Ibadan towards heart disease at-risk behaviour?
3. What is the heart disease at-risk behaviour of secondary school teachers in Ibadan?
4. How often do secondary school teachers in Ibadan check their blood pressure?

Hypotheses

The following hypotheses were tested.

1. There will be no significant main effect of treatment on:
 - a. Knowledge
 - b. Attitude
 - c. Heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State
2. There will be no significant main effect of age on;
 - a. Knowledge
 - b. Attitude
 - c. Heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State

3. There will be no significant main effect of gender on:
 - a. Knowledge
 - b. Attitude
 - c. Heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State
4. There will be no significant interaction effect of treatment and age on:
 - a. Knowledge
 - b. Attitude
 - c. Heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State
5. There will be no significant interaction effect of treatment and gender on:
 - a. Knowledge
 - b. Attitude
 - c. Heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State
6. There will be no significant interaction effect of age and gender on:
 - a. Knowledge
 - b. Attitude
 - c. Heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State
7. There will be no significant 3-way interaction effect of treatment, age and gender on:
 - a. Knowledge
 - b. Attitude
 - c. Heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State

Delimitation of the Study

The study was delimited to the following;

1. Pretest-posttest control group quasi-experimental research design.
2. Public secondary school teachers in Ibadan Metropolis, Oyo State as population of the study.
3. Multi stage sampling procedure (simple random sampling technique, systematic sampling technique and voluntariness) to select the participants.
4. Self-developed and validated questionnaire as instrument for data collection
5. Cardiovascular Education package
6. Independent variable of cardiovascular education
7. Dependent variables of knowledge, attitude and heart disease at-risk behaviour.

8. Moderating variables of age and gender.
9. Descriptive statistics of frequency counts, mean and percentages for demographic data. Inferential statistics of Analysis of Covariance (ANCOVA) for testing hypotheses at 0.05 level of significance.
10. Ten trained research assistants.

Limitation of the Study

The following is the limitation of the study:

The participants were not camped and therefore they could be exposed to any other form of information on cardiovascular education which may interfere with the result. However, the researcher gave information that they should only depend on information obtained from the training session.

Significance of the Study

There is no doubt that cardiovascular diseases or heart diseases are of global concern with their attendant morbidities and mortalities. The study would be helpful to secondary school teachers who participated in the training programme and those that the trainees will share information with, thereby equipping them with adequate knowledge to develop positive attitude and heart health promoting behaviours that will result in living a fulfilled life. Since some of the trainees may be transferred later to educational agencies in Oyo State, the outcome of this study will be disseminated to the secondary school teachers who participated in this study. This would influence their health seeking behaviour against development of risk factors and subsequent complications.

The outcome of this study would be published and officers in Non-Governmental Organizations, Ministries of Health and health educators etc at all levels will be encouraged to intensify effective health education programmes on cardiovascular health. This would help to reduce and prevent the progression from risk factors to development of the disease at various settings. Also, it would build the capacity of the study participants to become peer educator to friends, family and community members.

Operational Definition of Terms

- **Knowledge:** This is the understanding of heart disease by secondary school teachers.

- **Attitude:** This is an individual or person disposition or feelings towards heart diseases.
- **Heart disease at-risk behaviour:** Actions or lifestyle choices that can increase the chances of developing heart diseases such as smoking and sedentary living.
- **Cardiovascular education:** Heart health base education programme to bring about positive healthy heart knowledge, attitude and behaviour in people.
- **Cardiovascular risk factor:** Factor that predisposes people to disease of the heart. e.g smoking and alcohol consumption.
- **Cardiovascular disease:** This is also known as heart disease; which include hypertension, coronary heart disease, myocardial infarction etc.

CHAPTER TWO

LITERATURE REVIEW

The review of related literature was discussed under the following sub-headings:-

1. **Conceptual Framework**

2. **Theoretical Framework**

- Extended Parallel Process Model (EPPM)
- Health Belief Model (HBM)

3. **Conceptual Review**

- (a) Concept of cardiovascular education
- (b) Overview of heart and its diseases
 - i. Human heart
 - ii. Hypertension
 - iii. Stroke
 - iv. Coronary heart disease
 - v. Myocardial infarction
 - vi. Heart failure
 - vii. Peripheral vascular disease
- (c) Cardiovascular/heart disease risk factors
- (d) Prevention of cardiovascular disease

4. **Empirical Review**

- (a) Cardiovascular education and impact on human lives
- (b) Influence of age on knowledge, attitude and heart disease at-risk behaviours
- (c) Influence of gender on knowledge, attitude and heart disease at-risk behaviours
- (d) Prevalence of cardiovascular/heart disease risk factors in Nigeria
- (e) Risk factors and development of cardiovascular/heart disease
 - i. Cigarette smoking as a risk factor of cardiovascular disease
 - ii. Alcohol consumption as a risk factor of cardiovascular disease
 - iii. Diet as a risk factor of cardiovascular disease
 - iv. Obesity as a risk factor of cardiovascular disease
 - v. Blood pressure as a risk factor of cardiovascular disease
 - vi. Stress as a risk factor of cardiovascular disease
 - vii. Physical inactivity as a risk factor of cardiovascular disease

5. **Appraisal of Related Literature**

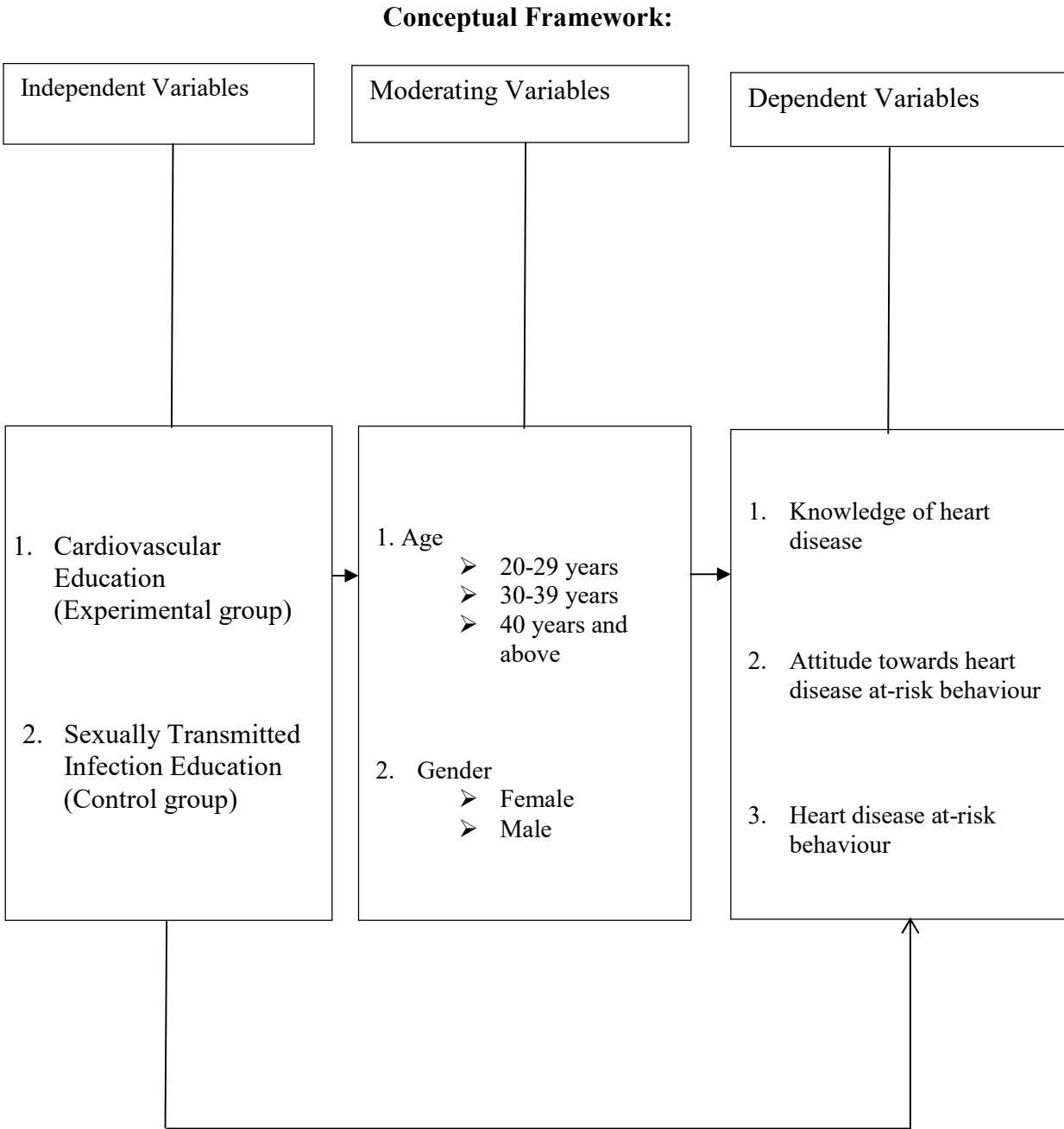


Figure 2.1: Effect of cardiovascular education on knowledge, attitude and heart disease at-risk behaviour

Source: Self-developed for the study

Figure 2.1 represents the conceptual framework for this study. It was conceptualised in this study that cardiovascular education would bring about improvement in the knowledge, attitude and heart disease at-risk behaviour among secondary school teachers in Ibadan, Oyo State. It was also conceptualized that age and gender might act to moderate the effect of cardiovascular education on knowledge, attitude and heart disease at-risk behaviour among the teachers.

Theoretical Framework for the Study

For the purpose of this study, Extended Parallel Process Model (EPPM) was adopted to guide the design of the study. The theory is useful in explaining interaction between risky behaviour and their consequences, in guiding many decisions of public communication campaigns as well as foundation for many experimental investigations.

It was developed by Kim Witte in 1992. It is a theoretical framework which attempts to predict how individuals will react when confronted with fear inducing stimuli. It is an information processing approach which allows an individual to take in information, assimilating it with existing knowledge and experience consequently, making effort to internalize and bring out meaning from such information particularly when a message is attempting to persuade audience to adopt healthy behaviour. It maintains the Protection Motivation Theory linkages among perceived levels of severity, susceptibility, response efficacy and self-efficacy that lead to message acceptance and ultimately intention and behavioural changes in individuals.

Many studies have utilized EPPM in relation to health communication programmes that brought about positive behavioural changes such as in the uptake of vaccination among mothers, condom use among youths and adults as well as in the control of tobacco smoking (Brewer, Champman, Gabbons, Gerrard, McCaul and Weinstein, 2007; Albarracin, Gillette, Earl, Glasman, Durantini and Ho, 2005; Thesenvitz, 2000). EPPM is characterized by four key factors (severity, susceptibility, response-efficacy, self-efficacy) that predict the likely outcome of communications which involve a fear appeal. A fear appeal is an informative communication about a threat to an individual's well-being with details of the threat itself. In order for it to be effective, it must induce a moderately high level of fear and higher level of self-efficacy and response efficacy.

In severity, it is the perception an individual has concerning the magnitude of the threat of cardiovascular disease. As such, fear is aroused and the individual is motivated to act and

appraise the extent to which the recommended response will effectively prevent the threat and the ability to perform the recommended action. Susceptibility is the degree to which an individual perceives he or she is at risk of cardiovascular disease or how the threat will affect well being. When individuals believe they are susceptible to a cardiovascular disease they believe themselves able to perform the recommended measures that will effectively reduce the threat, they will control the danger. However, when perceived threat is high, but the individuals doubt their ability to effectively reduce the threat, they result to controlling their fear and engage in denial, defensive mechanism or mocking the recommended actions. Response efficacy is the perception that the action such as the preventive measures of cardiovascular disease if well carried out will successfully control the risk while self-efficacy refers to the perception that one is capable or competent to control the risk or threat of cardiovascular disease.

Extended Parallel Process Model predicts three possible outcomes namely; fear control, danger control and no response. In fear control, the Model predicts that perceived threat (perceived susceptibility and severity) such as thinking that one may be prone to cardiovascular disease will motivate action, perceived efficacy (recommended response efficacy and self-efficacy) in terms of what are those things to do in order to overcome the scary disease of the heart will determine whether individuals will control the danger and engage in the recommended practice or control their fear through psychological defense mechanisms such as wishful thinking, avoidance, denial and anger. Danger control is when individuals act to reduce the threat effectively (response-efficacy and self-efficacy). No response means the individual perceives severity and susceptibility of the threat (cardiovascular disease) as low.

Extended Parallel Process Model is viewed as appropriate for this study since fear appeal messages have been useful in behaviour change as they identify the risk factors associated with the development of cardiovascular disease that may act as threat to health and safety of an individual in performing or not performing the recommended health action such as avoiding those risky behaviours (smoking, alcohol, stressful situations, sedentary living) and the preventive measures towards cardiovascular disease.

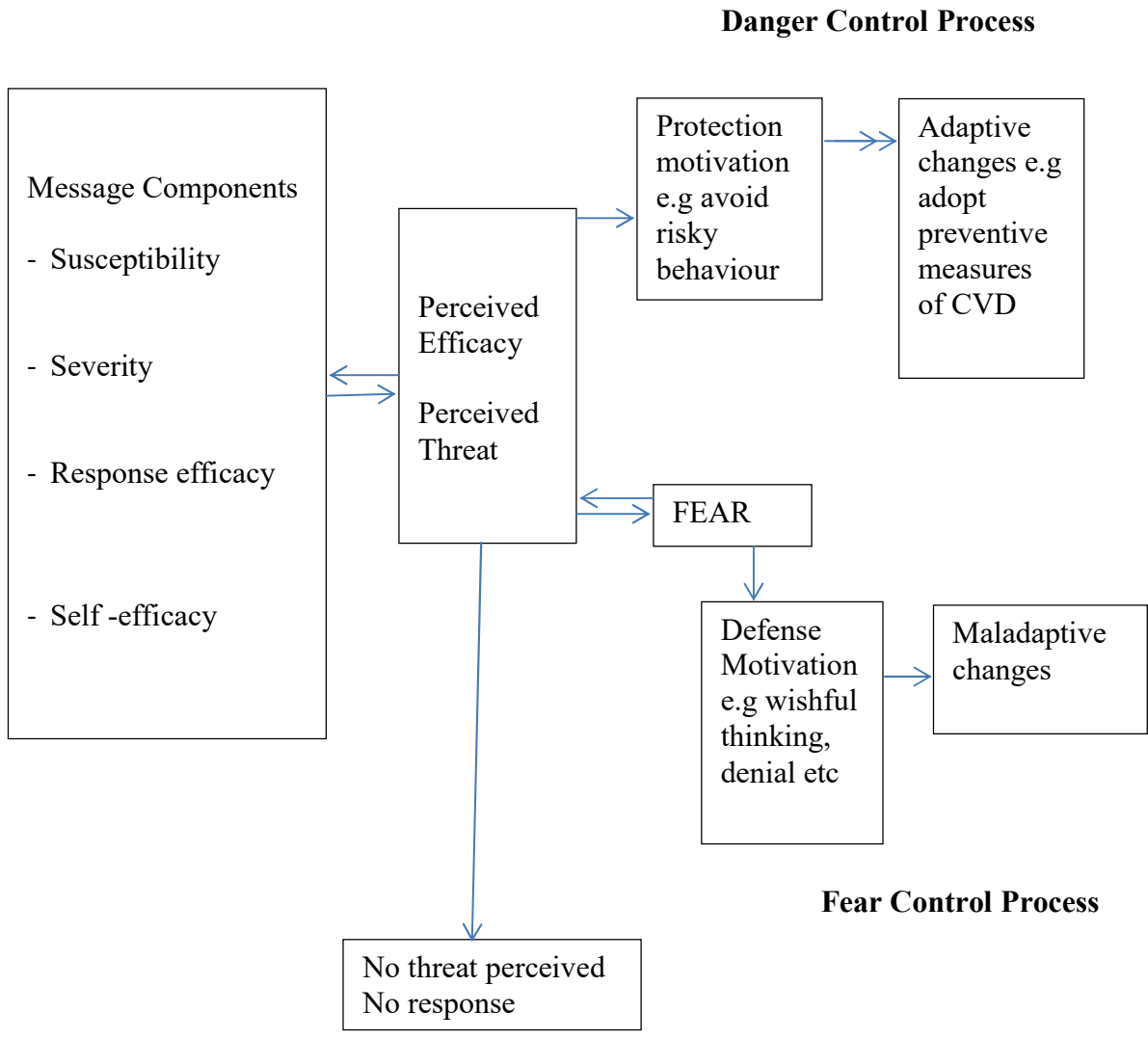


Figure 2.2: Extended Parallel Process Model

Source: Witte, K (1992) *Putting the fear back into fear appeals: The Extended Parallel Process*

Implication of EPPM to the study

Perceived Threat

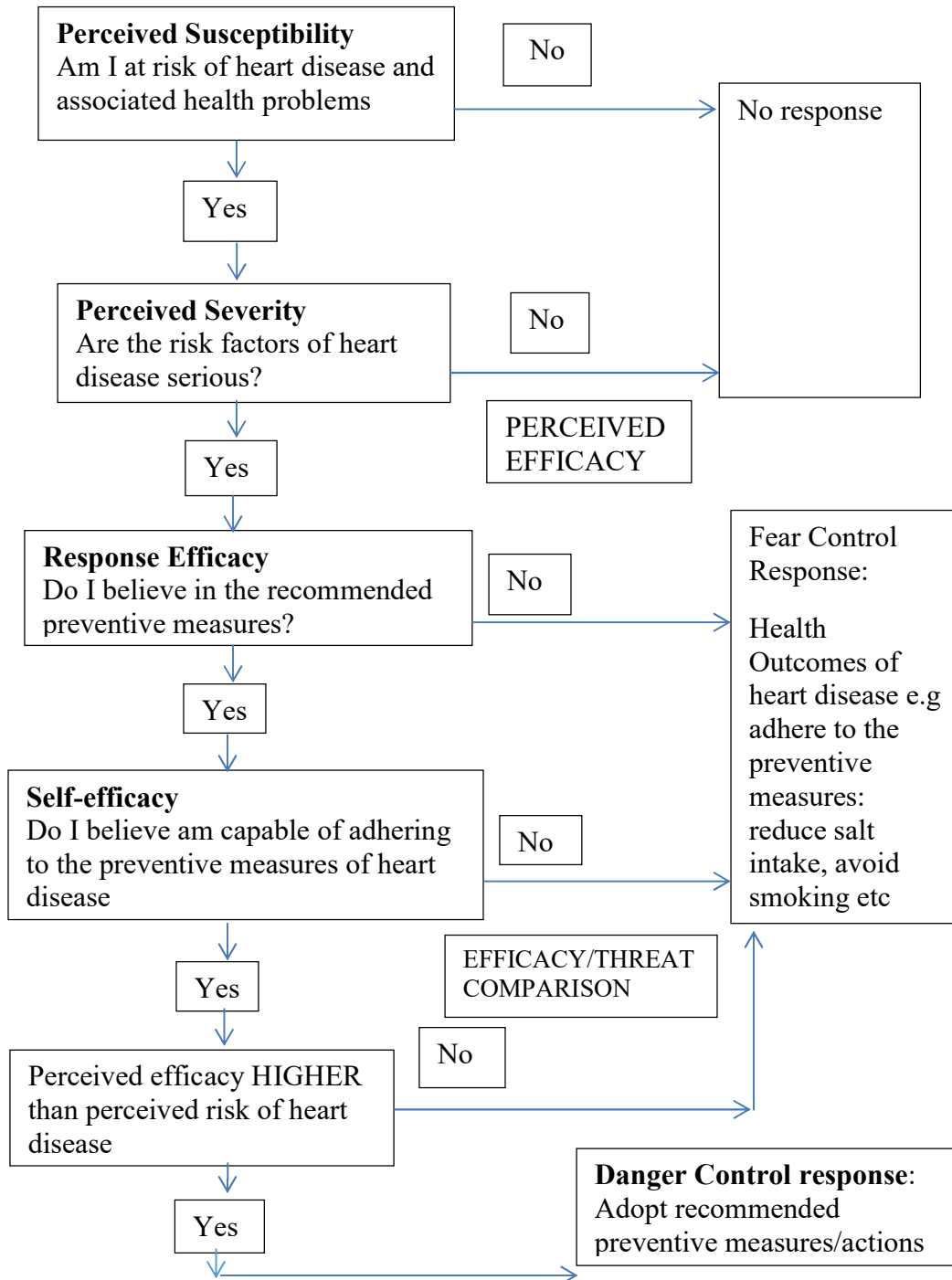


Figure 2.3: Extended Parallel Process Model: Incoming Message

Source: Adapted from Thesenvitz, 2000. Understanding and using fear appeals for tobacco control

The Health Belief Model (HBM)

The Health Belief Model (HBM) is a psychological model that attempts to explain and predict health behaviours. This is carried out by focusing on the attitudes and beliefs of individuals.

The HBM was first developed in the 1950s by social psychologists; Hochbaum, Rosenstock and Kegels working in the U.S. Public Health Services. The model was developed in response to the failure of a free tuberculosis (TB) health screening programme. Regardless of the way this service was offered without charge in a variety of convenient locations, the programme was of limited success. The question was “why?”

In any case, to discover an answer, social psychologists examined what was encouraging or discouraging people from participating in the programmes. They theorized that people’s beliefs about whether or not they were susceptible to disease, and their perceptions of the benefits of trying to avoid it, influenced their readiness to act.

The researchers expanded upon this theory, eventually inferred that six main constructs influence individual’s decisions about whether to take action to prevent and control illness. They argued that individual’s are prepared to act if they:

- i. Believe they are susceptible to the condition (perceived susceptibility)
- ii. Believe the condition has serious consequences (perceived severity)
- iii. Believe taking action would reduce their susceptibility to the condition or its severity (perceived benefits)
- iv. Believe costs of taking action (perceived barriers e.g cost of drug, investigations, exercising etc) are outweighed by the benefits
- v. Are exposed to factors that prompt action (for example, a television or reminder from health worker about lifestyle choices).
- vi. Are confident in their ability to successfully perform an action (Self-efficacy).

Glanz, Rimer and Viswanath (2008) detailed that HBM addresses the individuals perceptions of the threat posed by a health problem (susceptibility to and perceived seriousness of health condition), the benefits of avoiding the threat, and factors influencing the decision to act (barriers, cues to action, and self-efficacy) by providing health education about prevalence and

incidence of disease, individualized estimates of risk and information about the consequences of disease. They additionally included that interventions based on the Health Belief Model may provide cues to action to remind and encourage individuals to engage in health promoting behaviours. Interventions may also aim to boost self-efficacy by providing training in specific health promoting behaviours, particularly for complex lifestyle changes.

Since health motivation is its central focus, the HBM is a good fit for addressing problem behaviours that evoke health concerns (for instance, lack of physical exercises, intake of alcohol, cigarette smoking are risk factors in the development of cardiovascular disease). Altogether, the six constructs of the HBM provide a useful framework for designing both short term and long term behaviour change strategies (Carpenter and Christopher, 2010).

Application of HBM to the Study

The study examined the effect of a cardiovascular education on knowledge, attitude and heart disease at- risk behaviour of secondary school teachers in Ibadan, Oyo State, Nigeria. Parts of the objectives of the study is also to improve the knowledge, attitude and behaviour towards cardiovascular disease.

Based on the concept of HBM that people are ready to take action to positive health behaviour when they:

- i. Understand that they are prone to develop cardiovascular diseases/heart diseases.
- ii. Understand the severity of heart disease on their health that is, complications and death.
- iii. Know that their action taken may reduce the susceptibility or its severity.
- iv. Are made to know that the benefits of their action taken outweighs the constrains / barriers they might envisage.
- v. Are exposed to stimulus that will sensitize them to take action that is, the cardiovascular education.
- vi. Are confident in their ability to successfully perform an action (self efficacy).

This was done through training sessions taken by the researcher and assistants inform of teaching. The participants were made to have interactive sessions by asking questions, taken decisive actions in preventing heart diseases in order to build their confidence.

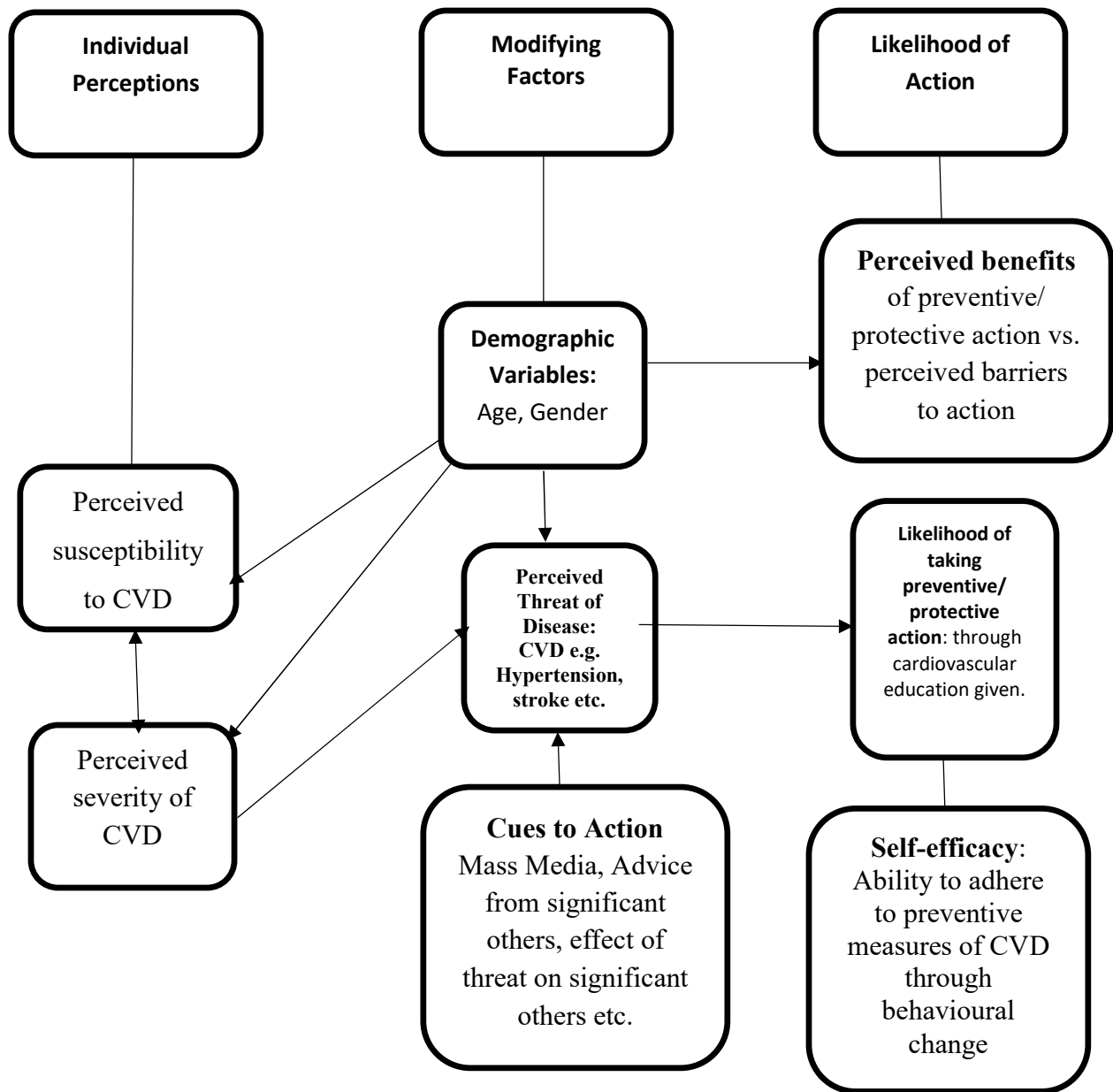


Figure 2.4: HBM. Source: Modified from Glanz, Rimer and Lewis, 2002, Pg. 52

Concept of Health Education

Health education is central to healthy living which is tailored towards helping individuals and communities to enhance their health. It aims to equip people with motivation capacity to be healthy. Health education is a process that informs, motivates and help individuals to adopt and maintain healthy practices and lifestyles. Joint Committee on Health Education and Promotion(2001) defined health education as any combination of planned learning experiences based on sound theories that provide individuals, groups and communities the opportunity to acquire information and the skills needed to make quality health decisions. Moronkola and Okanlawon (2003) affirmed that health education offers a level of health that allows every individual in the community to live a socially and economically productive life. Health education can be meaningful when individuals are empowered to see the relationship between health and other aspects for example; environment, genetics/heredity, behaviour, knowledge, attitude and belief.

WHO (2011) defined health education as consciously constructed opportunities for learning, involving some form of communication designed to improve health literacy, knowledge and developing life skills conducive to individual and community health. It is a concept, approach, or method by which right health information is made available to people in the community. Further explained that, health education is designed to achieve health related learning by measuring the extent to which it contributes to favourable changes in health related knowledge, attitudes or skills. The importance of health education cannot be over-emphasised as without health education many would live in ignorance of the criteria for achieving good health and the goals may be difficult to achieve as knowledge reinforces already appropriate behaviour positively.

Dorothy (2001) stated that health education might be viewed as the principle by which individuals and groups of people learn to behave in a manner that is conducive to the promotion, maintenance and restoration of health. It is an educationally oriented process of planned change, which focuses on those behaviour or problems that may indirectly or directly affect peoples health. In essence, health education is a process that bridges the gap between health information and health practices.

Health education motivates a person to make utilisation of health information given such that it makes sufficient impact on the attitude of the recipient positively. Also, it is an intentional

activity that encompasses study of individual risk factors, behaviours that endanger health and its effectiveness is commonly assessed by measuring the extent to which it contributes to favourable changes in health related knowledge, attitudes and skills (WHO, 2013; Coyne, 2013). Health education is an effective tool which does not only teaches prevention but also conditions ideas that re-shape everyday habits of individuals with unhealthy lifestyles. The conditioning not only affects the recipients of such education but also future generations that will benefit from such improved and properly cultivated ideas about health that will eventually be ingrained with widely spread health education. It helps in providing individuals with more aid and help to deal healthier with situations of extreme stress, anxiety and other associated psychological and emotional disturbances which can consequently lead to physical and unwholesome health events (Kann, Brener and Allensworth, 2001). Health education has a key role to play in promoting understanding and helping individuals, society and governments to make informed choices not just about giving information, additionally, it will orientate the general public towards sustainable attitude and behaviour.

Moronkola (2012) affirmed that health education may be carried out through different methods such as: individual health education, group health education, mass-media health education and special campaigns. Individual health education can take place in a clinic setting, at home; group health education can be in a family, health clinic, school, place of work, religious institution. Mass media health education can be through the radio, television, newspapers and public posters. Therefore, whatever method that is used, should be adapted to the needs and prevailing circumstances in the community. To enhance individual and community health, WHO (2010) submitted that various methods of health education are essential components of health programmes and services such as participant involvement, planning, needs and resource assessment, comprehensive programme, integrated programme, long term change, altering community norms, research and evaluation. Also it is designed to achieve health related learning by measuring the extent to which it contributes to favourable changes in health related knowledge, attitudes or skills.

Health education is further portrayed as not limited to the dissemination of health-related information but also fostering the motivation, skills and confidence (self-efficacy) necessary to take action to improve health as well as the communication concerning the underlying social, economic and environmental conditions impacting on health as well as individual risk factors

and risk behaviours and the use of the health care system. It is an educationally oriented process of planned change, which focuses on those behaviours or problems that may indirectly or directly affect peoples' health. Therefore, effective health education will help to correct erroneous beliefs, harmful cultural practices, taboos concerning compliance, promoting behavioural pattern that will enhance optimum level of health (Moronkola and Okanlawon, 2003; WHO, 2010).

Overview of Cardiovascular (heart) Diseases

Cardiovascular diseases (CVDs) are a class of diseases that involve the heart and the blood vessels. They include; hypertension, coronary heart disease, myocardial infarction, heart failure and peripheral vascular disease and a host of other diseases associated with the heart. In recent years, the dominance of chronic diseases as major contributors to global mortality has emerged. Within countries, cardiovascular disease is closely related to income level. Heart disease and its risk factors are concentrated among the lowest socio-economic groups of the more developed (upper middle and high income) countries, and among the middle and high income populations of low income countries (McLauren, 2007). Cardiovascular disease alone accounts for a third of all global deaths with 80% occurring in low and middle income countries (Adedoyin, Balogun and Adekanla, 2006).

The main components of the human cardiovascular system are the heart, blood, and blood vessels. It includes the pulmonary circulation 'a loop' through the lungs where blood is oxygenated and the systemic circulation, 'a loop' through the rest of the body to provide oxygenated blood. An average adult contains five to six quarts (roughly 4.7 to 5.7 litres) of blood. The digestive system also works with the circulatory system to provide the nutrients the system needs to keep the heart pumping. In addition, when foreign substances or organisms invade the body, the circulatory system swiftly conveys disease-fighting elements of the immune system, such as white blood cells and antibodies to regions under attack. In case of injury or bleeding, the circulatory system sends clotting cells and proteins to the affected site, which quickly stop bleeding and promote healing (The National Heart, Lung and Blood Institute (NHLBI) 2011).

The Heart

The human heart is a muscular organ of four chambers and four valves. It is a muscular organ that works all through life time without rest. The heart is located between the lungs, in the center compartment of the chest. It is estimated to be approximately the size of an individual fist. The heart of a normal grown-up produces approximately 4.7 to 5.7 liters of blood. It acts as two separate pumps operating side by side; the right heart generates the circulation to the lungs while the left heart feeds the rest of the body. The right atrium (RA) drains de-oxygenated blood from the superior and inferior venae cavae and discharges blood to the right ventricle (RV), which in turn pumps it into the pulmonary artery. The left atrium drains oxygenated blood from the lungs through four pulmonary veins and discharges blood into the left ventricle which in turn pumps it into the aorta. During ventricular contraction (systolic), the tricuspid valve in the right heart and mitral valve in the left heart close, and the pulmonary and aortic valve open. In diastole, the pulmonary and aortic valves close and the two atrio-ventricular valves open (Bloomfield, Bradbury, Grubb and Newby, 2006).

The disease of the heart and blood vessels develop over many years and most often do not become obvious until much later in life causing great mortalities and morbidities. Cross country evidence suggests that cardiovascular disease and other chronic disease incidence rises as countries move from lowest income to low- middle income, driven by exposure to lifestyle risks and low access to health services (Ezzati, 2005). It is estimated that the elderly population will increase globally over 80% during the next 25 years with a large share of this rise in the developing world because of expanding populations. The increased longevity due to improved social and economic conditions associated with lifestyle changes in the direction of a rich diet and sedentary habits, is believed to be one of the main contributors to the incremental trend in cardiovascular disease in the last century (Dominguez et al, 2006). Even in some countries that have seen little economic progress, a transition to chronic disease can be observed.

In 2010, the American Heart Association (AHA), the leading voluntary health organization in CVDs and stroke, changed its focus from reducing the burden of CVD to promoting cardiovascular health. It defined ideal cardiovascular health as the simultaneous presence of ideal health behaviours; non-smoking, body mass index less than 25kilogram per square metre, physical activity at goal levels, a diet consistent with current guideline recommendations and ideal health factors (untreated total cholesterol less than 200mg/dl,

untreated blood pressure less than 120/80mmHg and fasting blood glucose less than 100mg/dl. (Lloyd-Jones, Hong and Labarthe, 2010).

Cardiovascular disease mortality is top in the rank of mortality of related disease in both developing and developed countries. In developed countries, heart disease is still the leading cause of death followed by cancer despite the availability of more sophisticated technologies for the diagnosis and treatment and better management of cardiovascular diseases, unlike in the developing countries where these are limited. The most frequent forms of cardiovascular diseases are coronary heart disease and stroke, and other forms include hypertensive heart disease, arrhythmia and heart failure (Springer and Mauzon, 2011).

Dirk and Robinson (2006) asserted that hypertension remains a major risk factor in the development of cardiovascular disease. It often co-exists with other potent cardiovascular causes by about three-fold. Men are known to die at an earlier age than women. Wardlaw (2002) defined hypertension as sustained diastolic pressure exceeding 90mmHg. Adequate level of blood pressure control helps to delay or regress target organ damage in the body. It generates substantial morbidity due to complications such as stroke, peripheral vascular disease and retinopathy (Salako, Ajose and Lawani, 2003; Yusuff and Balogun, 2005). Hypertension in more than 95% of cases, a specific underlying cause of hypertension cannot be found. This is referred to as essential hypertension. The pathogenesis of essential hypertension is not clearly understood.

Studies revealed the kidney peripheral resistance vessels and the sympathetic nervous system as the seat of the primary abnormality. It is probably multi factorial. Hypertension is more common in some ethnic groups, particularly Black Americans and Japanese. Approximately 40-60% is explained by genetic factors. Important environmental factors include a high salt intake, heavy consumption of alcohol, obesity, lack of exercise and impaired intrauterine growth. In about 5% of unselected cases, hypertension can be shown to be a consequence of a specific disease or abnormality leading to sodium retention and or peripheral vasoconstriction (Allen, Lueck and Dennis, 2006).

In the same vein, Radm (2004) noted that risk of death due to stroke increases progressively and exponentially as blood pressure rises above 115/75mmHg doubling every 20/10mmHg. This in return may lead to high economic cost than controlled hypertension. The high burden of cardiovascular disease in the developing countries are attributable to the increasing incidence of atherosclerotic diseases, perhaps due to urbanization and higher risk

factor levels such as obesity, diabetes mellitus, hypercholesterolaemia and hypertension, the relatively early age at which they manifest the large sizes of the population and the high proportion of individual who are young adults or middle aged in these countries (Yusuf, Reddy, Ounpuu and Anand, 2001).

Hypertension according to JNCVII (2003) is defined as chronic systemic disease and sustained elevation of blood pressure measured on two different occasions with systolic pressure greater than 140mmhg and diastolic pressure greater than 90mmHg. It is a potent risk factor for morbidity and mortality. Aje, Adebisi and Falase (2009) asserted that hypertension has become an important public health issue and its prevalence is on the increase in all regions of the world despite advances in clinical assessment, diagnosis, management and prevention.

Meta-analysis of 45 studies from six West African countries (Cote d'Ivoire, Ghana, Liberia, Nigeria, Senegal and Togo) in a systematic review was conducted to assess the prevalence of cardiovascular disease (hypertension) as well as the level of awareness and control among workers in West Africa, involving aged 15 years and above between 1980 and 2014. Results from 40 studies revealed that prevalence ranged from 12.1% among automobile garage workers to 68.9% among traditional chiefs. In 15 of these studies, the prevalence exceeded 30%. Typically, sedentary workers such as traders, bank workers, civil servants and chiefs were at high risk. Among health care workers, the prevalence ranged from 17.5% to 37.5%. The prevalence increased with age and was higher among males and workers with higher socio-economic status. The crude prevalence increased progressively from 12.9% in studies published in the 1980s to 34.4% in those published in 2010-2014. The study concluded that there is a high prevalence of hypertension among West African workforce of which a significant proportion is undiagnosed, severe and complicated. Hence, clustering of risk factors, co-morbidities and general low awareness warrant an integrated and multi-sectorial approach (Bosu, 2015).

In Nigeria, the national prevalence rate of hypertension among individuals older than 15 years using 160/95mmhg cut-off is about 11.2% (Ike, 2008). Blood pressure is determined by the amount of blood the heart pumps and the amount of resistance to blood flow in the arteries. The more blood the higher the blood pressure. Opari, Zaman and Calhoun (2003) asserted that hypertension leads to increased perfusion and damage of functional and structural vascular components of the heart, kidney, brain, eyes and other organs of the body. Also, several

mechanisms such as vascular volume, peripheral resistance, autonomic nervous system, renin-angiotensin and calcium influx may aggravate the development of hypertension.

A great many people with hypertension have no signs or symptoms. In spite of the fact that a few people with early-stage hypertension may have dull headaches, dizzy spells, nose bleeds than normal. There are two major types of hypertension namely: primary and secondary hypertension. In primary hypertension (also known as essential), there is no identifiable cause. It tends to develop gradually over many years. Secondary hypertension is usually caused by an underlying condition such as kidney problems, adrenal gland tumours, thyroid problems, certain defects in blood vessels, medications, alcohol abuse, obstructive sleep apnea. Risk factors of hypertension include: age, race, family history, obesity, inactivity, smoking, alcohol, lack of vitamin D in diet and stress (World Heart Federation, 2013).

Definition of Hypertension

Category	Systolic blood pressure (mmHg)	Diastolic blood pressure (mmHg)
Blood pressure		
Optional	<120	<80
Normal	<130	<85
High normal	130 – 139	85 – 89
Hypertension		
Grade 1 (mild)	140 – 159	90 – 99
Grade 2 (moderate)	160 – 179	100 – 109
Grade 3 (severe)	≥180	≥110
Isolated Systolic hypertension		
Grade 1	140 – 159	<90
Grade 2	≥160	<90

Coronary Heart Disease (CHD)

Coronary Heart Disease (CHD) is also known as Ischaemic heart disease. Coronary heart disease is an illness of the arteries (blood vessels) that supply oxygen-rich blood to the heart muscle. When the oxygen supply to the heart muscle is interfered with, the heart cannot pump blood around the body properly. It is a condition in which fatty deposits (atheroma) accumulate

in the cells lining the walls of the coronary arteries. These fatty deposits build up consistently and sporadically in the large branches of the two main coronary arteries which encircle the heart. It is characterized by reduced blood supply to the heart muscles.

Park (2009) defined coronary heart disease as impairment of heart function due to inadequate blood flow to it compared to its needs, caused by obstructive changes in the coronary circulation to the heart. Moreover, evidence of increased risk of coronary heart disease and other clinical manifestations of cardiovascular disease with the presence of specific risk factors has been documented in previous epidemiological studies such as the Framingham heart study, the Stanford three-community study and the multiple risk factors intervention trial. Coronary heart disease is the leading cause of death globally resulting in over 7 million deaths. It may affect individuals at any age (males more than females) but becomes dramatically more common at progressively older ages with approximately a tripling with each decade of life (Finegold, Asaria and Francis, 2012).

Symptoms of coronary heart disease may include: chest pain or discomfort around the shoulders, arms, neck, jaw or back, feeling of indigestion, shortness of breath. Some of the risk factors associated with coronary heart disease are: blood vessel inflammation, smoking, cholesterol deposit, hypertension, insulin resistance, obesity, heredity, lack of exercise, stress and haemostatic factors (high levels of fibrinogen and coagulation factor VII (The National Heart, Lung and Blood Institute, 2011).

Stroke

Stroke is a disease of the brain (cerebrum). It is known as cerebrovascular accident. It is a condition in which the blood flow to the brain is reduced or stopped. It is either the blood supply to the brain is blocked or a blood vessel within the brain ruptures (WHO, 2009). Stroke is the third most common cause of death in the developed world after cancer and ischaemic heart disease, and is the most common cause of severe physical disability. It is the most frequent clinical manifestation of diseases of the cerebral blood vessels. Traditionally, the term stroke has been used to include episodes of focal brain dysfunction due to focal ischaemia or haemorrhage. Stroke is a common medical emergency with an annual incidence of between 180 and 300 per 100,000. The incidence rises steeply with age and in many developing countries, the incidence is rising because of the adoption of less healthy lifestyles. About one-fifth of individuals with an acute stroke will die within a month of the event, and at least half of those who survive will be

left with disability. A silent killer and symptoms often occur suddenly without any warning (Allen, Lueck and Dennis,2006).

National Stroke Association (2010) asserted that stroke is the fourth leading cause of death in the world each year. It occurs quickly and as such their symptoms often appear suddenly without warning hence it is a medical emergency. There are three main types of stroke which include Ischaemic Stroke (when a blood clots and blocks the arteries to the brain), haemorrhagic stroke (when a blood vessel is damaged and bleeding occurs into the brain) and Transient Ischaemic Stroke (when there is a temporary drop in the blood supply to the brain).

The main symptoms of stroke are confusion, inability to speak and understand well, numbness of the face, arm or leg particularly one side of the body, lack of coordination and temperature changes. It can lead to long-term problems depending on the amount of damage, how quickly it is diagnosed and treated. Recurrent stroke is frequent with about 25% of victims who recover from their stroke will have another stroke within 5 years. Medication is the common treatment for stroke and post-stroke rehabilitation helps to overcome disabilities from stroke damage (World Heart Federation, 2012). Acute stroke is characterized by the rapid appearance (usually over minutes) of a focal deficit of brain function, most commonly a hemiplegia (paralysis of one side of the body) with or without signs of focal higher cerebral dysfunction, hemisensory loss, visual field defect or brain-stem deficit.

Classification of stroke; several terms have been used to classify stroke, often based on duration and advancement of symptoms. (1) Transient ischaemic attack (TIA): This describes stroke in which symptoms resolve within 24 hours. The term transient ischaemic attack traditionally also includes patients with transient monocular blindness due to vascular occlusion in the retina. (2)Progressive stroke (or stroke in evolution): This describes a stroke in which the focal neurological deficit worsens after the first presentation. Such worsening may be due to increasing volume of infarction, haemorrhage or related oedema.

(3) Complete stroke: This describes a stroke in which the focal deficit persists and is not progressing.

Complications of stroke

- i. Chest infection
- ii. Epileptic seizures
- iii. Deep venous thrombosis
- iv. Painful shoulder
- v. Pressure sores
- vi. Urinary infection
- vii. Constipation
- viii. Depression and anxiety (Allen, Lueck and Dennis,2006)

Myocardial Infarction

Myocardial infarction (also known as heart attack) is a cardiovascular disease which may occur due to inadequate perfusion that results from an imbalance between supply and demand. It occurs when there is an abrupt cessation in coronary blood flow following a thrombotic occlusion of a coronary artery, leading to irreversible heart muscle death. The common cause of myocardial infarction is atherosclerotic disease of epicardial coronary arteries, resulting into reduction in the lumen of the coronary arteries, causing absolute decrease in the basal state when demand for flow of blood is augmented (Schroeder, 2005). Atherosclerosis is a condition that develops when a substance called plaque builds up in the walls of the arteries making it difficult for blood to flow through. It may also be due to congenital malformation, hypertension or aortic stenosis or when myocardial oxygen demands are abnormally increased as oxygen demands are abnormally increased as in severe ventricular hypertrophy (American Heart Association, 2013).

Atherosclerosis is a progressive inflammatory disorder of the arterial wall that is characterized by focal lipid-rich deposits of atheroma that remain clinically silent until they become large enough to impair arterial perfusion or until ulceration or disruption of the lesion results in thrombotic occlusion or embolization of the affected vessel. It is a disorder that begins early in life; abnormalities of arterial endothelial function have been detected among high risk children and adolescents for example, cigarette smokers and those with familial hyperlipidaemia or hypertension. They develop when inflammatory cells, predominantly monocytes, bind to receptors expressed by endothelial cells, migrate into the intima, take up oxidized low-density

lipoprotein(LDL) from the plasma and become lipid-laden foam cells or macrophages(Allen, Lueck and Dennis,2006).

Myocardial infarction is almost always due to the formation of occlusive thrombus at the site of rupture or erosion of an atheromatous plaque in a coronary artery. The thrombus often undergoes spontaneous lysis and by this irreversible myocardial damage has occurred. Pain is the cardinal symptom of myocardial infarction, but breathlessness, vomiting and collapse or syncope are common features. The pain is usually more severe and lasts longer. It is often described as a tightness, heaviness or constriction in the chest. Sudden death from ventricular fibrillation may occur immediately; and many deaths occur within the first hour. The development of cardiac failure reflects the extent of myocardial damage and is the major cause of death in those who survive the first few hours of infarction. Symptoms include; prolonged cardiac pain (chest, throat, arms, epigastrium or back), anxiety and fear of impending death, nausea and vomiting, breathlessness and collapse or syncope (Bloomfield, Bradbury, Grubb and Newby, 2006).

About 25% of all heart attacks occur without any previous warning signs. It is a life-threatening condition, a quarter of all heart attack victims die before reaching a hospital; others suffer serious complications such as stroke, persistent heart arrhythmias (irregular heart beat), heart failure, formation of blood clots in the legs or heart and aneurysm or bulging in a weakened heart chamber. Recovery is always a delicate process as any heart attack weakens the heart to some degree (World Heart Federation, 2013).

Heart Failure

Heart failure (disease of the heart in which the heart pumping power is weak) is the pathophysiologic state in which an abnormality of cardiac function is responsible for the failure of the heart to pump blood at a rate commensurate with the requirements of the metabolizing tissues due to an abnormally elevated blood pressure (Braunwald, 2004). Heart failure is an imprecise term used to describe the state that develops when the heart cannot maintain an adequate cardiac output or can do so only at the expense of an elevated filling pressure. In the mildest forms of heart failure, cardiac output is adequate at rest and becomes inadequate only when the metabolic demand increases during exercise or some other form of stress. Heart Failure is frequently due to coronary artery disease, tends to affect elderly people and often leads to prolonged disability. The prevalence of heart failure rises from around 1% in the age group 50-59 years to between 5 and 10% of those aged 80-89 years (Bloomfield, Bradbury, Grubb and

Newby, 2006). It is also known as congestive heart failure. It is frequently caused by a defect in myocardial contraction, for example, cardiomyopathies, valvular abnormality and or by the rheumatic process.

Precipitant causes of heart failure may include infection, anaemia, thyrotoxicosis, arrhythmias, diet, fluid, environmental and emotional excesses, hypertension, myocardial infarction and pulmonary embolism. It is more common in the elderly and prevalence is likely to continue to increase as the population rises. In nearly all regions of the world, heart failure is both common and on the rise. In Hong Kong, based on admissions, the incidence rate is 3 to 3.8/1000 per year rising to 20/1000 per year in women over the age of 85years. This is comparable to rates in western countries than range from 1 to 5 cases/1000/year (McMurray and Stewart, 2000). In Africa, at least 3-7% of all hospital admissions are caused by heart failure (Amoah and Kallen, 2000). In South America, cardiovascular disease is now the leading cause of death and prevalence rate of heart failure is about 4% in those older than 65years. Similar prevalence rates were found in an Arab population (Amoah and Kallen, 2000).

Aetiology of heart failure varies around the world. In China and Hong Kong, hypertension is the most common cause, particularly in women. In sub-Saharan Africa, rheumatic heart disease is still common, especially in the young, but hypertension is the major cause in the large cities. In certain areas of Africa, especially northern Nigeria, cardiomyopathy, endomyocardial fibrosis related to local heating customs are relatively common causes of hospital admission for heart failure (Amoah and Kallen, 2000). Heart Failure can be described or classified in several ways such as; left, right and bi-ventricular heart failure. The left side of the heart is a term for the functional unit of the left atrium and left ventricle, together with the mitral and aortic valves. The right heart comprises the right atrium, right ventricle, triscupid and pulmonary valves.

- (1) Left-sided heart failure: There is a reduction in the left ventricular output and or an increase in the left atrial or pulmonary venous pressure. An acute increase in left atrial pressure may cause pulmonary congestion or pulmonary oedma.
- (2) Right-sided heart failure: There is a reduction in right ventricular output for any given right atrial pressure. Causes of isolated right heart failure include chronic lung disease, multiple pulmonary emboli and pulmonary valvular stenosis.

- (3) Biventricular heart failure: Failure of the left and right heart may develop because the disease process affects both ventricles or because disease of the left heart leads to chronic elevation of the left atrial pressure, pulmonary hypertension and right heart failure.

Symptoms of heart attack may include shortness of breath, especially when lying down, swelling in the feet and ankles or a sudden weight gain. Other symptoms that are sometimes associated with heart failure include: a persistent cough, lack of appetite, weight loss and tachycardia (rapid heart rate). People with heart failure are more likely to have poor quality of life, sexual problems, depression, weight and muscle loss (The National Heart, Lung and Blood Institute, 2011).

Peripheral Vascular Disease

Peripheral Vascular Disease is also known as Peripheral Artery Disease. It is referred to as a condition in which there is reduced circulation of blood to a body part other than the brain or heart. It is caused by a narrowed or blocked blood vessel commonly occurring in the body where a blood vessel subdivides. The main cause is atherosclerosis, which is the build-up of fatty deposits in the arteries. Other causes may include; diabetes, infection, blood vessel defects, blood vessel spasms, smoking, advancing age, overweight, family history, hypertension.

Peripheral vascular disease predominantly affects blood vessels of the legs, kidneys and less commonly, the arms. Symptoms depend on which part of the body is deprived of sufficient blood. Usually, no symptom until the condition is advanced and severe. These symptoms may include: intermittent pain (claudication), worsening pain during exercise, coldness of the affected part, numbness, muscular weakness, blue or purple tinge to the skin.

Peripheral Arterial Disease (PAD) also known as peripheral vascular disease (PVD) is frequently associated with increased cardiovascular morbidity and mortality as a result of underlying pathological process, atherosclerosis, which is systemic in nature. Peripheral arterial disease is considered an independent biomarker of cardiovascular disease. The gold standard in the diagnosis of peripheral arterial disease is Ankle Brachial index (ABI) which is the ratio of Doppler recorded systolic arterial pressure at the ankle usually Dorsalis pedis artery and brachial systolic blood pressure. Values of ABI <0.9 allow the diagnosis of PAD in both symptomatic as well as a symptomatic patients (Khan, Farooqui and Niazi, 2008). The classical symptom of

peripheral arterial disease is the presence of intermittent claudication (IC). Intermittent claudication is defined as exertional calf pain that is not present at rest and relieved within 10 minutes by rest. (Rabia and Khoo, 2007).

The prevalence of peripheral arterial disease worldwide ranges from 3.9–26.2% depending on the population studied. Individuals with peripheral arterial disease have a greater risk of developing cardiac and cerebrovascular events. Even when there is no symptoms, they are 6 times likely to die within 10 years (Hooi, Kester, Stoffers, Rinkers, Knottnerus and VanRee, 2004). The prevalence of peripheral arterial disease in adults attending the general out-patient clinic of a teaching hospital in South-West Nigeria has currently been put at 24.8%, thus prevalence increases by 5 – 10 folds after the fifth decade of life. Also low ankle brachial index was associated with advancing age, diabetes and hypertension (Adeko, Ariba, FAMILONI, Odusan and Osalusi, 2016). In a study in Ogbomoso, South-West, Nigeria, the prevalence of low ankle brachial index and peripheral arterial disease was 44.1% and also increase with advancing age (Oyelade, Olaolorun, Odeigah, Amole and Adediran, 2012).

Classification of Cardiovascular Risk Factors

The current classification of cardiovascular risk factors jointly accepted by the American Heart Association (AHA) and the American College of Cardiology (ACC) include; major independent risk factors, pre-disposing factors, conditional risk factors.

Major Independent Risk Factors: These include cigarette smoking, elevated blood pressure, elevated serum total cholesterol (TC), low density cholesterol (LDL), diabetes mellitus, advancing age.

Cigarette Smoking

Cigarette smoking is the practice of burning tobacco and inhaling the smoke (consisting of particle and gaseous phases). As of 2008 to 2010, tobacco is used by about 3 billion people (about 49% of men and 11% of women) with about 80% of this usage in the form of smoking. After an individual has smoked for some years, the avoidance of withdrawal symptoms and negative reinforcement become the key motivations to continue. It is the most consumed and used substance among people across all age groups (Centers for Disease Control and Prevention, 2014). Moronkola and Akinterinwa (2003) reported that smoking is a health problem inducing habit that many people still indulge in. It serves as a precursor to various diseases that place a lot

of challenges on the fragile health care systems in the developing countries. Smoking is associated with health risky behaviours such as bullying, alcoholism, cultism and prostitution. The harmful effects of smoking do not end with the users alone but also affect those around them

The presence of nicotine in tobacco helps in the release of noradrenaline from adrenergic fibres and persistent stimulation of the sympathetic nervous system has accounted for elevation of cardiovascular outcome in smokers. Smoking contributes 5 million deaths globally each year and this sober statistics is expected to double by 2020 (Mackay and Ericksen, 2002). The effect of smoking is caused through a host of pathways, including stiffening of the vascular beds, promoting insulin resistance and inflammation and betting plaque and thrombus formation which are associated with vascular diseases (Ambrose and Barua, 2004).

Elevated Serum Cholesterol (TC)

This is also known as hypercholesterolemia referring to as levels of cholesterol in the blood that are higher than normal. It increases the risk of heart disease. Elevated levels of circulating cholesterol cause deposits to form inside blood vessels. When the deposits become sufficiently large, they block blood vessels and decrease the flow of blood. Abnormalities in plasma lipoprotein and derangement in lipid metabolism rank as the most firmly established and best understood risk factors for atherosclerosis.

Total serum cholesterol over 200 mg/dl, especially when it is over 240 mg/dl and coupled with LDL-cholesterol over 130 or 160 mg/dl are significant and invariably lead to improper clearance of chylomicrons and triglycerides from the blood, reduces LDL uptake by the liver, limits synthesis of HDL or enables blood clotting (Wardlaw, 2002).

Low Serum Cholesterol (LDL)

This is a soft, wax-like substance found in all parts of the body. Cholesterols are made of fat called lipids. They cannot dissolve in the blood. It is transported through the bloodstream by carriers called lipoproteins (made of fat and proteins). Low cholesterol is considered the bad cholesterol because it contributes to plaque, a thick, hard deposit that can block arteries and make them less flexible.

Deposition of cholesterol from circulating chylomicrons contributes to atherosclerosis. The High Density Lipoprotein (HDL) cholesterol is the faction of cholesterol that appears to protect against coronary heart disease (CHD). However, low serum HDL cholesterol

contributes to the development of cardiovascular diseases when diets consisting primarily of saturated fats are taken (Gordon, Wardlaw and Kassel, 2002).

Age

Age is a non-modifiable risk factor for cardiovascular disease and is more prevalent in adults over the age of 65 years than in younger adults. This was reported in a study carried out among older adults (65 years and above) and young adults (45 and below 60 years). Result revealed 38% versus 18%. It concluded that the older a person is, the higher the development of cardiovascular disease (Wang, Lee, Fabsitz, Devereux, Best and Welty, 2006). Aging is associated with a progressive decline in numerous physiological processes, leading to an increased risk of health complications and disease. By delivering oxygenated blood to all tissues in the body, the health of the cardiovascular system is vital for health of every tissue and longevity of the organism as a whole. An increase in arterial stiffness leads to compensatory mechanisms by the myocardium causing hypertrophy and fibroblast proliferation resulting in decreased cardiac output and increase in fibrotic tissue (Lakatta and Levy, 2003) The older an individual is, the greater the risk of heart disease and stroke. Once males reach the age of 45 years, their risk for heart diseases increases. In females, cardiovascular risk increases at age 55 or after menopause. With advancing age, people typically accumulate increasing amounts of coronary atherosclerosis which becomes risk factors for future coronary events (Sowers, Epstein and Frohlick, 2004).

Pre-disposing factors of cardiovascular disease

The pre-disposing factors of cardiovascular disease include obesity, abdominal obesity, physical inactivity, family history of premature coronary heart disease, ethnic characteristics and psychosocial factors. These factors are those that worsen the independent risk factors.

Obesity

Obesity is the accumulation of body fat. Obesity means having too much body fat. It means a person's weight is greater than what is considered healthy for his or her weight. It occurs when there is intake of more calories than the body can utilize. Obesity is a condition characterized by excessive accumulation of body fat and increased body weight. It is defined as a body mass index (BMI) above 30 and also basal metabolic rate is associated with increased risk of cardiovascular disease in the body (Ritchie and Connel, 2007).

Obesity is generally viewed as a pandemic with conceivably grievous outcomes for human health. The prevalence of obesity has increased three-fold within the last 20 years and continues to rise. In developing countries, it is at alarmingly high rate in many urban communities. Obesity has adverse effects on both mortality and morbidity. The lowest mortality rates are often seen in individuals with Basal Metabolic Rate (BMI) of 18.5-24. Data from population studies such as that in Framingham, USA, showed that for individuals aged between 30 and 42 years, the risk of death increases by 1% per annum for each 0.5kg increase in weight. The result is that obesity reduces life expectancy by 7.1 years in men and 5.8 years in women among non-smokers. Coronary heart disease is the major cause of death but cancer rates are also increased in the overweight especially colo-rectal cancer in males and cancer of the gall bladder, biliary tract, breast, endometrium and cervix in females (Hanlon, Byers, Walker and Summerton, 2006).

Denke, Sempos and Grundy (2004) asserted that obesity especially fat accumulation in the waist is a chief contributor to the increase in low density lipoprotein (LDL) Cholesterol seen in adults. The distribution of body fat is known to be a more independent and potent predictor of morbidity and mortality. Ritchie and Connel (2007) submitted that obesity is associated with diseases such as hypertension, diabetes and metabolic syndrome. It further leads to insulin resistance in many people, creating a diabetes-like risk, left ventricular hypertrophy, cardiac dilatation and hypertension is three times more common in the obese population.

Abdominal Obesity

Abdominal Obesity means excessive fat build up in the abdomen. It is also known as abdominal adiposity. Accumulation of fat results from a discrepancy between energy consumption and expenditure over and above that which can be compensated for by hypothalamic regulation of basal metabolic rate (BMR) (Hanlon, Byers, Walker and Summerton, 2006). It is a condition in which there is excessive fat in the visceral, trunk and abdominal organs in the body. The visceral fat is located inside the peritoneal cavity, packed in between the internal organs and torso, as opposed to subcutaneous fat which is found underneath the skin, and intramuscular fat which is found interspersed in skeletal muscle. The connection of abdominal adiposity with these metabolic disturbances may be due to the enlarged visceral fat deposit discharging bio-active substances including free fatty acids and

pro-inflammatory mediators into the portal and systemic circulation resulting in hyperinsulinaemia (Ritchie and Connel,2007; Calabro and Yeh,2008).

There is strong association between abdominal obesity and cardiovascular disease development. Ford, Giles and Dietz (2002) claimed that the presence of abdominal obesity is highly associated with the development of insulin resistance than is, the body weight or Body Mass Index (BMI), hence measurement of waist circumference is recommended for diagnosis of the metabolic syndrome. For some complication of obesity, the distribution rather than the absolute amount of excess adipose tissue appears to be important. Increased intra-abdominal fat causes central (abdominal, visceral, android or apple-shaped) obesity which contrasts with subcutaneous fat accumulation causing generalized (pear-shaped) obesity. The former is more common in men and is more closely associated with type 2 diabetes, the metabolic syndrome and cardiovascular disease. The key difference between these deposits of fat probably lies in their vascular anatomy with intra-abdominal fat draining into the portal vein and hence directly to the liver. Thus, many factors which are released from adipose tissue including free- fatty acids may be at higher concentration in the liver inducing and promoting cardiovascular events and diabetes (Hanlon, Byers, Walker and Summerton, 2006).

Physical Inactivity

Physical inactivity is a major risk factor in the development of cardiovascular disease. Various studies including Framingham Heart Study have reported that physical inactivity leads to accumulation of pro-inflammatory effect of C-reactive protein by induction of cellular adhesion molecule on endothelial nitric oxide (NO) synthesis production which is associated with atherosclerotic process (Wardham, Albanese and Roberts, 2004). Physical inactivity increases the risk of heart disease and stroke by 50% (World Heart Federation, 2013). It is considered to be an important lifestyle choice that supports the development and progression of cardiovascular disease. It is characterized by weight gain, muscle bulk loss and most often fatigue. Physical inactivity doubles the risk of coronary heart disease and is a major risk factor for stroke. Regular exercise (brisk walking, cycling or swimming for 20 minutes, two or three times a week) appears to have a protective effect which may be related to increased HDL cholesterol, lower blood pressure, reduced blood clotting, and collateral vessel development. There is strong observational evidence that moderate to high levels of physical activity reduce

the risk of coronary heart disease and stroke(relative risk reduction 30- 50 %)(Bloomfield, Bradbury Grubb and Newby,2006).

Family History of Premature Coronary Heart Disease

A family history of heart disease is associated with a higher risk of coronary artery disease especially when it is a first degree blood relation. Myers, Kiely and Cupples (2000) asserted that family history of premature coronary heart disease impacts incremental risk at any level of risk factors. It is an independent risk factor that modifies the intensity of Low Density Lipoprotein (LDL) lowering therapy.

Ethnic Characteristics

Ethnic characteristics are related to disease risk especially cardiovascular disease development. World Heart Federation (2013) reported that the absolute risk varies among different populations independently of the major risk factors. The absolute risk among South Asians (Indians and Pakistanis) living in Western society appears to be about twice that of whites, even when the two populations were matched for major risk factors. It accounted for 37% of all African-American deaths claiming over 100,000 lives annually.

Psychosocial Factors

Psychosocial factors are closely associated with progression of cardiovascular disease. King (2007) asserted that personality and socio-economic factors such as hostility, depressions are contributory to the development of cardiovascular diseases.

Conditional Risk Factors

The conditional risk factors of cardiovascular diseases include; Elevated Serum triglycerides, small Low Density Lipoprotein particles (LDL), Elevated Serum Homocysteine, Elevated Serum Lipoprotein, Prothrombotic factors (example, fibrinogen), inflammatory markers (example, c-reactive protein).

Elevated Serum Triglycerides (TG)

Elevated level of serum triglycerides contributes significantly to the development of atherosclerosis which is affected by age, gender and heredity. This substantially blocks the clearance of chylomicrons and triglycerides from the blood, reduces LDL uptakes by the liver,

limits synthesis of HDL, or enhances blood clotting (Ishola 2008; Ogunbode, Ladipo, Ajayi and Fatiregun, 2011).

Small Low Density Lipoprotein Particles (LDL)

Elevated level of Low Density Lipoprotein particles (LDL-C) contributes to the development of cardiovascular diseases which tend to be smaller and dense and thus more atherogenic which correlates with a high incidence of Coronary Heart Disease (CHD) in some studies (Ugwuja, Ogbonna, Nwibo and Onimawo, 2013).

Elevated Serum Homocysteine

Abnormal homocysteine levels contribute to atherosclerosis by direct toxic effect that damage the cell lining the inside of the arteries, interference with clotting factors, oxidation of low density lipoproteins. This condition is however prone to the development of severe cardiovascular diseases.

Elevated Serum Lipoprotein

Elevated Serum Lipoprotein is an independent risk factor for cardiovascular event. Lipoprotein is a molecule composed of the protein portion of low density lipoprotein that is capable of causing cardiovascular diseases. It leads to atherosclerosis and increased blood clotting consisting of Low Density Lipoprotein (LDL) with a large protein attached (Wardlaw, 2002).

Prothrombotic Factors

Prothrombotic factor such as fibrinogen is correlated with a higher coronary heart disease incidence. Serum fibrinogen is a component of the blood that plays a central role in the clotting process. The level of fibrinogen is an independent cardiovascular factor. Elevated fibrinogen levels promote a thrombotic diathesis. Fibrinogen levels rise with age, hence it is not a risk factor that can be modified (Womack, Negelkirk and Coughlin, 2003).

Inflammatory Markers

C-reactive protein (CRP) is promising as a risk predictor. It is a marker of inflammatory process. Measurements of CRP may be helpful in estimating in individuals risk for developing cardiovascular disease and determining treatment. It is a test that measures a protein that is made in the liver in response to inflammation in the body which helps in detecting

cardiovascular disease risk and this correlates with the Framingham risk score (Albert, Glynn and Ridker, 2003).

Risk Factors and development of heart diseases

High blood pressure (Hypertension)

Blood pressure is the exertion of force or pressure against the walls of the blood vessels as blood passes through. High blood pressure is defined as sustained elevation blood pressure measured on two or more different occasions with systolic pressure equal or greater than 140mmHg and diastolic pressure equal or greater than 90mmHg. (JNCVII, 2007; Mlunde, 2007). The force of blood pushing up against the blood vessels becomes harder and higher, causing high blood pressure. High blood pressure is a powerful, consistent and independent risk factor for the development of cardiovascular diseases. It is determined by the amount of resistance to blood flow in the arteries. The more blood, the higher the blood pressure. It is established that the deposition of fatty plaques in the blood vessels is significant which in turn narrows and reduces blood flow to the tissues and body organ (Wardlaw and Kassel, 2002).

Systemic blood flow is critically dependent upon vascular resistance, which varies with the fourth power of the radius of the resistance vessel. Thus, small changes in caliber have a marked influence on blood flow. Coronary blood vessels receive sympathetic and parasympathetic innervation. Stimulation of α -adrenoreceptors cause vasoconstriction while stimulation of β -adrenoreceptors causes vasodilatation. Healthy coronary endothelium releases nitric oxide which promotes vasodilatation, but if the endothelium is damaged by atheroma, endothelium-dependent vasodilatation may be impaired. However, as a result of vascular regulation, an atheromatous narrowing in a coronary artery does not limit blood flow even during exercise, until the cross-sectional area of the vessel is reduced by at least 70% (Bloomfield, Bradbury, Grubb and Newby, 2006).

Hypertension, which is asymptomatic (without symptoms), is usually attributed to severe health problems such as congestive heart failure, renal failure, stroke, cognitive decline, dementia and even death (Hansson, Kilander and Ohrvall, 2000).

Distinction is often drawn between primary or essential, and secondary hypertension. The primary hypertension is the most common type and over 90% of hypertension cases fall within this category while primary hypertension is deep-rooted in genetic, socio-economic and

environmental factors. Secondary hypertension may be due to drugs, alcohol, obesity, pregnancy, renal, endocrine and so on (Mlunde, 2007).

Community based studies have demonstrated that hypertension may contribute to the development of heart failure in as many as 50-60% of patients. In patients with hypertension, the risk of heart failure is increased by two-fold in men and by three-fold in women. However, uncontrolled and prolonged elevation of blood pressure can lead to a variety of changes in the myocardial structure, coronary vasculature and conduction system of the heart. Generally, the direct or indirect effects of elevated blood pressure may lead to diseases of the heart (Fuster and Kelly, 2015).

Diet

In recent years, global dietary patterns have shifted in nearly every nation of the world. Dietary composition of fatty acids (cholesterol and saturated fats) and the transition to a more energy dense diet have contributed to the development of cardiovascular events. It is now evident that dietary habits influence diverse cardio-metabolic risk factors including not only obesity and low density lipoprotein(LDL) cholesterol, but also blood pressure, glucose-insulin homeostasis, lipoprotein concentration and oxidative stress and so on (Parikh, Michael, McDaniel, Dominique, Miller, Sorrentino, Vickichan, Roger and Sperling, 2005).

Dietary patterns represent the overall combination of foods habitually consumed, which together produce synergistic health effects. Evidence- informed beneficial diet patterns share several key characteristics. These include more minimally processed foods such as fruits, nuts, vegetables, legumes, whole grains which are often times higher in fibre, vitamins, anti-oxidants and minerals (Mozaffarian, 2016).

Most cholesterol are found occurring only in foods of animal origin and they are synthesized by the liver. Studies have shown that increasing dietary cholesterol may reduce synthesis. Cholesterol is a major structural component of cell membranes and is especially abundant in nerve and brain tissue. Complete absorption of dietary lipids takes about 6-10 hours. So, chylomicrons should not be detectable in plasma after a 12-hour fast. Intestinal cholesterol derived from the diet and biliary excretion is also absorbed in chylomicrons. The main dietary determinant of plasma cholesterol is intake of saturated (and trans-unsaturated) fatty acids, which reduce the expression of receptors that remove cholesterol from the circulation. Also, excessive intakes of carbohydrate, fats or alcohol may each contribute to

increased plasma triglycerides by different mechanisms (Field, Burnett, Sullivan and Stewart, 2006).

Obesity

Obesity is a risk factor that contributes to the development of cardiovascular disease. World-wide, at least 2.8 million people die yearly as a result of obesity (WHO, 2009). Studies have shown that underlying insulin resistance play a major role in assisting and co-existing with a variety of cardiovascular risk factors. The accumulated fat in the waist and body remain a chief contributor to the increase in Low Density Lipoprotein (LDL) cholesterol as they are deposited as 'atheroma plaques' thereby causing narrowing and blockages of the blood vessels.

One of the two distinct genetic mechanisms involved in obesity is caused by the infrequent presence of certain genes, which produce rare syndromes associated with significant obesity. However, obesity is much more commonly mediated by the presence of other 'susceptibility' genes. More than 41 such genetic sites have been identified and in their presence, obesity will develop only if there is a favourable environment (5, 6). These genes control different processes, such as regulation of fat distribution, metabolic rate, response to exercise and diet, control of feeding and food preferences, etc. However, the striking rise in the incidence of obesity, which has happened in last few decades, is not because of changes in the genetic background of the human race, since these changes take thousands of years to evolve. This 'epidemic' is mainly caused by rapid lifestyle changes involving eating habits and exercise (Grundy, Brewer and Cleeman, 2004).

The adipose tissue has a resting blood flow of 2-3l/100g/min, but can increase up to 10-fold; this occurs usually after food intake. However, with increasing obesity, the perfusion per unit mass decreases. It falls from 2.36ml/min to 1.53ml/min when the percentage of fat increases from 20% to 36% of the body weight and so, the cardiac output is not directly proportional to the total fat. The increased cardiac output in obese people is to meet the metabolic demand of the adipose tissue and is achieved mainly through an increase in stroke volume. The left ventricular chamber dilates to accommodate the increased venous return and in turn, develops an eccentric type of hypertrophy (enlargement) to keep the wall stress normal. The left atrium also enlarges in obese individuals and is usually caused by the increased blood volume and venous return. Later, other factors like left ventricular hypertrophy and diastolic

dysfunction may also be responsible for increased left atrial size (Collis, Devereux and Roman, 2001).

Obesity is associated with alterations in haemodynamics. An increase in oxygen demand produced by excess adipose tissue requires an increase in cardiac output as well as in blood volume. Therefore, obese individuals have an increase in blood volume, stroke volume and cardiac output (Parikh et al, 2005).

Cigarette smoking

Cigarette smoking whether first-hand, second-hand or chewing of tobacco has been strongly associated with development of cardiovascular diseases. Smoking induces peripheral endothelial dysfunction which is the basis of all cardiovascular disorders (Cifti, 2013). The British Heart Foundation (2014) asserted that smoking damages the lining of the arteries causing a build-up of fatty deposits which later narrow the blood vessels. However, the carbon monoxide in tobacco smoke reduces the amount of oxygen in the blood. Also, the nicotine in cigarettes stimulates the body to produce adrenaline which causes palpitations and raises blood pressure. Smoking aids blood clotting which may lead to stroke and heart attack.

W.H.O (2008) reported that more than 1 billion people worldwide smoke tobacco and that tobacco use currently kills more than 5 million people every year. It is the single greatest preventable cause of death. The use of tobacco continues to grow in developing countries due to steady population growth, adoption of western lifestyles, emancipation of women, aggressive multi-billion dollar marketing and advertising strategies. Cigarette smoking among American Indian youths at early age posed a great problem and they are more likely to smoke more than other racial groups.

Alcohol

Alcohol is referred to as a drug, substance, beverage and a group of organic chemical compounds produced since the Neolithic Era from hunter-gatherer people to nation states (Arnold 2005). It is unequivocally associated with the development of cardiovascular disease. American Heart Foundation (2014) asserted that alcohol causes constriction of the blood vessels by increasing the contractile force of the heart leading to damage of the myocardium and lining of the blood vessels. The effect of alcohol on heart is complex. With some people, even mild alcohol use carries major risks. At the same moderate alcohol has been shown to confer health benefits and lower all-cause mortality. Moronkola (2003) explained that alcohol interferes with

the brains communication pathways, the disruptions can change mood and behaviour of individuals by making it harder to think clearly and move with co-ordination. Roberts and

Robinson (2007) submitted that alcohol in carbonated beverages is absorbed faster into the bloodstream than alcohol in non-carbonated drinks. Excessive and binge drinking increase such risks as alcoholism, obesity, stroke, suicide, accidents, breast cancer, hypertension, heart failure and heart attack. It can also raise the levels of fats in the blood. National Institute on Alcohol Abuse and Alcoholism (2014) asserted that alcoholism is known to potentiate the insulin response of the human body to glucose by converting consumed carbohydrates into fat and thereby suppress carbohydrate and fat oxidation. The cellular immunity particularly antigen-specific immune response is impaired by both acute and chronic alcoholic use as T-lymphocyte functions can be directly affected by ethanol. It is a potent modulator of the immune system. The ethyl alcohol or ethanol is an intoxicating ingredient found in beer, wine and liquor. It is a central nervous system depressant that is rapidly absorbed from the stomach and small intestine into the blood stream.

Stress

Smith, Limon, Gallo and Ngu (2006) stated that cardiovascular responses to stressful stimuli have been implicated in the development of cardiovascular disease. In the same vein, psychosocial domains are related to morbidity and mortality due to cardiovascular disease. These are negative emotional states, including depressing, anger, hostility, anxiety chronic and acute and psychosocial stressors, social ties, social support, social conflict which have been significantly associated with increased risk of cardiovascular morbidity and mortality (Everson-Rose and Lewis, 2005). Moronkola (2003) explained that stress is common among elites, professionals, business executives and as such, it is part of life as nobody throughout life is free from it and what matters is how one copes with it. Also some perceived stress as malady, disturbance in the body homeostasis, general or acute enough to result to body responses such as respiratory, metabolic and circulatory reactions. However, there are healthy and unhealthy ways to prevent stress. The healthy ways are the wholesome ways which include; placing problems in proper perspective, sharing problems with confidants, accepting one's limitation. While unhealthy ways to stress involve excessive consumption of alcohol, smoking, overeating,

crying out excessively and shifting of blame. In all if stress is well managed, it brings joy, happiness and avoidance of health problems.

King (2007) asserted that stress causes disease by a number of imbalances on different levels with an excess of negative emotions (chronic anger, anxiety, sadness) and a lack of countering positive experiences. This is translated in our brains and bodies to the cellular level, where stress stimulates over activity of a cascade of chemical messengers in our nervous system, endocrine organs and immune system.

Physical Inactivity

Physical activity is a key determinant of energy expenditure and is fundamental to energy balance and weight control. It is estimated that approximately 35% of coronary disease mortality is due to physical inactivity. This has a major economic impact through loss of income and productivity when the disabling disease result (Prasad and Das, 2009). Many studies including Framingham heart study demonstrated that physical inactivity conferred an increased risk for Coronary heart disease. Physical inactivity leads to an accumulation of pro-inflammatory effect of C-reactive protein by induction of cellular adhesion of molecule on endothelial nitric oxide (No) synthesis and production which is associated with atherosclerotic process (Wardham, Albanese and Roberts, 2004). Lack of exercise contributes to the development of heart disease and is associated with high blood pressure and obesity. There is strong observational evidence that moderate to high levels of physical activity reduce the risk of coronary heart disease and stroke with relative risk reduction of 30-50%. Regular exercise of at least 30 minutes of moderate intensity most days of the week combined with other measures can help reduce heart disease (Kelley and Kelley, 2000; Moronkola, 2003).

Prevention of heart disease

Cardiovascular disease has multiple aetiology with a number of potentially modifiable risk factors which have been thoroughly dealt with in the course of this study and has proved consistent risk factors in every population globally. Effective health education in terms of cardiovascular education is necessary for the control of cardiovascular diseases and the need to deal with risk factors for the benefit of reducing its scourge is equally important. The core strategy is to target incidence reduction as the key to cardiovascular control through the

prevention of risk factors, prompt, sustained and effective treatment once they develop. Cardiovascular disease however has proven to be a continuum challenge in our environment hence the need for prevention through lifestyle modifications.

W.H.O (2011) recommended that a population salt intake of less than 5 grams (equivalent of a teaspoon) per person/day has a significant effect on blood pressure. It further reported that elimination of transfat and replacement of saturated with poly unsaturated vegetable oils lowers coronary heart disease risk. Also, a healthy diet with adequate consumption of fruit and vegetables help to contribute to a healthy body weight, a desirable lipid profile and blood pressure. There is need to caution on intake of high-energy foods such as processed foods that are high in fats and sugars which promote obesity and overweight.

Insufficient physical activity should be avoided as this can be observed in increased automation of work and use of vehicles for transportation. Therefore, individuals with Body Mass Index (BMI) more than 30kg/m^2 , central obesity of waist circumference 102 cm for men and 88cm for women should make exercise a life-style. The exercises include, brisk walking, jogging, swimming, cycling in order to reduce weight and improve health as a whole.

In the same vein, Ignarro, Balestrier and Napoli (2007) submitted as part of preventive measures of cardiovascular disease, individuals should limit alcohol consumption to the daily recommended limits (men 2 standard units, women 1 standard unit) per day as this may reduce risk by 30%. Efforts should be geared towards tobacco cessation and avoidance of second hand smoke. Individuals should strive to handle or manage emotional stress as it arises because it is very significant in the development of cardiovascular disease.

The Scottish Guidelines (2007) submitted that primary prevention of cardiovascular disease should include, a family centred approach to proactive efforts to reduce or eliminate the risk factors. Also, the continuing message is adoption of healthy life habits which remains the corner stone of primary prevention such as, the avoidance of tobacco (including second hand smoke), healthy dietary patterns, weight control and regular, appropriate exercise.

Lowering Cholesterol with Therapeutic Lifestyle Changes (TLC)

Food Items	Servings
<p>Breads/Cereals/Grains Select whole grain breads, cereals and pasta brown rice, oatmeal, potatoes, low fat whole grain crackers. One serving is equal to one slice or approximately ½ cup</p>	<p>6 or more servings a day. Adjust to caloric needs</p>
<p>Vegetables/Dry Beans Fresh, frozen or canned-without added fat, sauce or salt. One serving is equal to ½ cup vegetables and beans or 1 cup dark, leafy greens</p>	<p>3 – 5 serving a day</p>
<p>Fruits Fresh frozen, canned, dried-without added sugar. One serving is equal to 1 piece, 1 handful or ½ cup canned</p>	<p>2 – 4 servings a day</p>
<p>Dairy Products Fat free or 1% milk or yogurt One serving is equal to 1 cup milk or yogurt</p>	<p>2 -3 servings a day fat free or low fat (for example, 1% milk)</p>
<p>Eggs Use 2 whites or ¼ cup egg substitute in place of 1 yolk</p>	<p>2 or fewer yolks per week – including yolks in baked goods and in cooked or processed foods</p>
<p>Meat/Poultry/Fish Poultry without skin and fish are lower in saturated fat. Trim any fat from meat and remove skin from poultry before cooking. Strictly limit organ meats such as brain, liver, kidneys. Eat shrimps only occasionally</p>	<p>5 or less ounces a day</p>
<p>Fats/Oils Nuts are high in calories and fat, but have mostly unsaturated fat. Nuts can be eaten in moderation (be sure amount you eat fits your calorie intake). Unsaturated vegetable oils that are high in unsaturated fat include canola, corn, olive, soybean, soft or liquid margarines choose products that are labelled “low saturated fat” which equals 1gram of saturated fat per serving</p>	<p>Amount depends on daily caloric level</p>
<p>Diet Options</p> <ul style="list-style-type: none"> • Stanol/sterol – containing food products specially labelled margarines, orange juice, snack bars and other food items. • Soluble fiber: barley, oats, apples, bananas, berries, citrus fruits, pears plums, carrots. 	

Source: U. S. Department of Health and Human Service, National Institutes of Health, National Heart, Lung and Blood Institute, 2005.

Cardiovascular/Heart Risk Factors Control

To control the risk factors for developing heart disease the following changes is recommended:

- i. Stop smoking
- ii. Maintain or achieve a healthy body weight eat less saturated fat, trans fat and cholesterol and more vegetables, fruits, whole grains and fish
- iii. Lower your blood pressure
- iv. Find a way to manage your stress
- v. Exercise regularly
- vi. Keep your blood sugar under control
- vii. Normalize your blood lipids (HDL, LDL and triglycerides)
- viii. Get enough rest
- ix. Visit your doctor regularly
- x. Regularly take your medications as prescribed by your physician
- xi. Do not stop taking prescribed medications without discussing it with your doctor).

Source: U. S. Department of Health and Human Service, National Institutes of Health, National Heart, Lung and Blood Institute, 2005.

Health Education Programmes and their Impact on Human Lives

Several studies have been conducted on health education programmes that have great impact on human lives and also empowered people to make informed decisions about their health. In a project involving designing, implementing and evaluating impacts of an educational programme for promoting HIV/AIDS preventive behaviours and practices among young women of reproductive ages. Focus group discussions and questionnaires were used to assess respondents' HIV/AIDS knowledge, attitudes, beliefs and practices. However, an intervention was then implemented and the result showed significant increases in sensitization of participants to HIV/AIDS transmission and self-perception of risks, as well as resolve to adopt preventive behaviour (Uwakwe, 2001). Also, Falade (2015), reported the effects of bibliotherapy and lecture-discussion methods on undergraduates' knowledge and attitudes towards cervical cancer at-risk behaviour in faith-based universities in south western Nigeria. At eight weeks intervention programme, the experimental group scored higher than the control group. The study concluded that participants in the experimental group had better understanding when compared

with those in the control group. Therefore, using bibliotherapy and lecture –discussion methods improved participants knowledge and attitude towards cervical cancer at-risk behaviour.

Adamu, Abiola and Ibrahim (2012), reported the effect of health education on knowledge and attitude among female teachers in the uptake of free papsmear in Birnin-Kebbi, northern Nigeria. The intervention programme revealed significant improvement in knowledge from 25.5% to 57% in the experimental group and 18% in the control group respectively. However, despite the increase in the knowledge, the study concluded that there was poor attitude towards uptake of free pap smear among the participants with reasons such as dislike for pap smear and seeing the test as unnecessary. Mounir, Mahdy and Fatohy (2003) reported significant effect of reproductive health education programme among female University students in Egypt. The study revealed there was significant difference in mean scores of knowledge and attitude towards reproductive health in the experimental group as compared to the control group.

Sanusi (2002) reported the impact of health education intervention programme on awareness of and attitude to organ donation and transplantation among University of Maiduguri students. Simple random sampling technique was used to select six hundred and seventy participants into experimental and control groups after four weeks intervention health education programme. The study concluded that health education intervention programme had a significant impact on participants' awareness and attitude in the experimental than those in the control group. The study therefore recommended that health education intervention programme on organ donation and transplantation be made popular by health educators through support from government and donor agencies to create and increase people's awareness and stimulate positive attitude towards organ donation and transplantation.

Palmer and Mcknney (2011) reported significant effect of health education cancer screening programme among African Americans. It further reported that participants were willing to quit smoking and as well had improved attitude and practice towards tobacco cessation. Ellision, Jandorf, Villagra, Winkel and Dattamel (2011) reported improved knowledge and practice towards colo-rectal cancer screening health programme among Hispanic women. The study revealed improvement from 58% to 72% in knowledge, attitude and practice. Yao, Cheng, Hu and Chen (2013) reported significant effect of hand washing health programme among Chinese adults. They further reported that there was improvement in their attitudes and

practices towards hand washing and barriers such as level of education and knowledge of hand hygiene were resolved during the health education sessions.

The study conducted by Gil-Guillen, Hermida, Pita-Fernandez, Palazon-Bru, Lopez-Pineda and Navarro (2015) reported a cardiovascular educational intervention for primary care professionals (General Practitioners and Nurses) in Spain to improve their clinical awareness and application of new evidenced-based knowledge. The study concluded that the educational programme had a beneficial effect as the rates of change were greater in the intervention group and this improved cardiovascular risk factors screening significantly among primary health care professionals.

Huang, Chen, Yu, Chen and Lin (2002) in a study conducted among a group of elderly Chinese residents in Nepal community on health promotion programme. The study concluded that the education programmes were effective in improving elderly health promotion knowledge and there was significant effect on health behaviours among the participants aged 65-69 years, who were married, lived with family members and had higher education levels. Awosan, Ibrahim, Makusidi, Essien and Adeniyi (2013) reported among school teachers in Sokoto State Nigeria an educational programme in intervention and control groups. The finding of the study revealed a statistical significant difference between teachers pretest and posttest knowledge which indicated that the intervention succeeded in improving the knowledge of teachers.

Similarly, Kirk-Gardner and Steven (2003) concluded that a community-based education programme on knowledge of heart health promotion improved knowledge and reduced risk behaviours among healthy adults over a short time period. Findings of Yao, Cheng, Hu and Chen (2013) revealed improved knowledge and practice towards colo-rectal cancer screening and practice towards colo-rectal cancer screening after health educational intervention was conducted among Hispanic women with significant improvement from 48% to 72%. Also, study by Zuckerman, Theiss, Taggart, Horowitz, Sheridan and Walter (2007) concluded that intervention programme on cardiovascular risk factors had significant impact among school children. The study revealed significant changes in health knowledge, attitude towards smoking and overall decrease in blood pressure. Jubril, Saleh, Afolayan, Morisola, Umar and Abiola (2016) conducted a study on impact of health education intervention and utilization of postnatal-care services among women in Edu Local Government Area, Kwara-State, Nigeria. The study

revealed improvement from scores of 98.2% for the experimental group against 68.9% post intervention means scores in the control group.

Abd-El-Aziz, Ola, and Ibrahim (2009) conducted a study on impact of a health education intervention programme on breast cancer among women in a semi-urban area in Alexandria, Egypt. The study concluded that brief health education programme was highly significant 48% to 92% in improving knowledge from pre-intervention to post-intervention. Kwang, Mahayudin, Yien, Abdulkarim, Teik and Shan (2014) in a study conducted among pre-university students in Malaysia on effect of an educational intervention on knowledge of human papillomavirus vaccination. After intervention, the participants' knowledge in the intervention group increased from 8.8% to 25.5% on HPV vaccination, also female students mean scores increased more than male students. Anetor, Ogundele and Oyewole (2012) reported effectiveness of nutrition education of eight weeks duration among undergraduate students in South West Nigeria. The study revealed that experimental group performed better than control group (61.5% versus 56.6%). They concluded that the educational programme positively modulate the participants' eating behaviour.

Influence of age on knowledge, attitude and heart disease at-risk Behaviour

Aging is an important risk factor in the development of cardiovascular (heart) disease. Aging is associated with changes in the mechanical and structured properties of the vascular wall, which leads to the loss of arterial elasticity and reduced arterial compliance and may subsequently lead to coronary artery disease (WHO, 2009). Bridget (2010) asserted that age increases the risk of cardiovascular disease and the risk of stroke doubles every decade after age 55.

Further studies established that in most populations, the serum cholesterol level increases as age increases. In men, this increase levels off around age 45 to 50 years. In women, the increase continues sharply until age 60 to 65 years. It is the main clinical determinant of large artery stiffness. Central arteries stiffen progressively with age, whereas peripheral muscular arteries change little with age. Arterial stiffening with aging is accompanied by an elevation in systolic blood pressure (BP) and pulse pressure (PP) (Medis, Puska and Norrving 2011). Deeks, Lombard, Michelmore and Teede (2009) reported in their study that health behaviour and beliefs relating to responsibility for health and future health requirements are strongly associated with

both gender and age in fighting against lifestyle related and chronic disease. The study further revealed that gender significantly influenced information seeking behaviour men were not as interested as women in diabetes, osteoporosis, eye condition, obesity among Australians. Bots, Peters and Woodward (2017) concluded in their study that higher mortality rates occurred in older ages among men more than women in their assessment of the effect of aging between stroke and coronary disease mortality.

Influence of gender on knowledge, attitude and behaviour towards cardiovascular disease

Cardiovascular knowledge, attitude and behaviour have been reported to be influenced by gender. Many studies have reported the effect of gender in the development of heart diseases. Aubert (2002) reported significant effect of gender on cardiovascular health knowledge and behaviour and further reported that females have significantly better knowledge and practice than men. Kolo and Chijioke (2009) reported significant effect of gender on attitude and behaviour towards heart diseases. They further reported that females tend to manifest improved attitudes and behaviours than males. The possible explanation for gender difference may likely reflect that male and female differ in their roles. Also, inherent attention seeking characteristics in response to ill-health that is found in women. Lorraine, Pederson and Hemsing (2009) reported significant effect of gender literacy on attitude and practice towards CVD. The study further reported lack of formal education was commonly found among women and strongly associated with poor attitude and practice than men.

World Heart Federation (2013) affirmed that overall, men have a higher risk of heart disease than women. Women may not be diagnosed as early, often delayed or missed as stress, fatigue or indigestion and not treated as aggressively as men. The difference in women may be due to the arteries that are smaller and the way the plaque develops in the arteries is different from men and symptoms are more subtle. Brown, Maahs, Bishop, Snell-Bergeon and Wadwa (2016) in a study on effect of cardiovascular risk education programme on adolescent students with type I diabetes. The study revealed that cardiovascular risk was worse with adolescent girls with type I diabetes when compared to non-diabetic girls and boy. Molle-Leimkuhler (2007) reported in his study that incidence of depression increased more in women with low socio-economic status which eventually predispose them to high risk cardiovascular disease. Young, Haskell, Taylor and Fortmann (1996) concluded in their study that community educational

programme improved the adult physical activities in central California. Also there was significant physical activity measures in men than women.

Empirical studies on knowledge, attitude and heart disease at-risk behaviour

Knowledge relating to human existence equips people with adequate information. Knowledge is the representation of facts and concepts that are organized for future use. Gbepwi (2004) defined knowledge as information, skill and understanding acquired through experience or education. Health knowledge according to Famuyiwa (2006) is very important due to the fact that a person who is well informed about his health will likely do those things that will promote his health or seek urgent advice when his health is likely to be in jeopardy. Therefore, knowledge of cardiovascular risk factors is essential for individuals to make informed decisions about engaging in or continuing certain attitude and behaviours that may promote healthy heart condition.

Adequate knowledge of cardiovascular disease has tendency of improving healthy lifestyles and correcting those risky lifestyles which may ultimately inform their health seeking behaviours. Studies conducted by Holiman, Olsson and Ek (2006); Alma-Roijer, Fridlund, Stagmo and Erhardt (2006) asserted that knowledge of cardiovascular risk factors significantly improved adherence to advice on lifestyle changes. Hislop, Teh, Low, Tu, Li and Taylor (2008) reported high knowledge of cardiovascular disease among Chinese Canadian immigrants after health education programme with resultant improvement in their attitudes and behaviours. Abinav, Umesh and Alexandra (2013) reported low knowledge of CVD among women in Nepal community which was associated with poor knowledge, attitudes and behaviours resulting to increased burden of cardiovascular diseases. Oladapo, Salako, Sadiq and Falase (2013) reported lack of knowledge of CVD and poor heart health among men and women in Ibadan which were strongly associated with incidence of cardiovascular diseases.

Attitude deals with predisposition or tendency to respond positively or negatively towards a certain idea, object, persons or events. Consequently, studies reveal that there are relationship between attitude and health behaviour. Kendra (2013) asserted that attitude is learned through experience and observation which may influence behaviour. Cardiovascular health attitude is the disposition to improved positive health in order to reduce or prevent heart

diseases. Robinson, Fox and Grandy (2009) reported significant association between positive health attitudes and healthy behaviours in individuals with CVD.

Risk behaviour is an action carried out by an individual that may result in a bad consequence. Rosal, Taubman and Findler (2005) established that risky health behaviour is strongly associated with CVDs and mortality. Heart disease risk behaviour however refers to actions or lifestyle choices that can increase risk for heart disease such as the modifiable risk factors. To some extent, these risk behaviours exert a strong influence on health. Farlex Partner Medical Dictionary (2012) defined health behaviour as combination of knowledge, attitude and practices that together contribute to motivate the actions we take regarding health.

Further studies reported that health risk behaviour contribute to the leading causes of morbidity and mortality among adults and youths, often are established during childhood and adolescence, extend into adulthood and are interrelated and preventable. Hence, behaviour can be improved upon through community education that increases knowledge and attitude which are culturally tailored to meet the needs of the people by adopting simplifying strategy and such that allows individuals to consider the information given is necessary, accurate and appropriate health information that enhances increased self-efficacy. For behavioural change to occur, an individual must be aware of the potential negative consequences of his or her actions which are health-compromising behaviours (Duberstein, Bogges and Williams, 2000; Centers for Disease Control and Prevention, 2011) However, cardiovascular education that will be carried out may help to prevent those lifestyle behaviours which may lead to CVD development in order to improve and promote better quality of life. Taggart, Horowitz, Sheridan and walter (2007) concluded that intervention programme on cardiovascular risk factors had significant impact among school children. The study revealed significant changes in health knowledge, attitude towards smoking and overall decrease in blood pressure. Jeemon, Prabhakaran, Goenka, Ramakrishnan, Huffman and Reddy (2012) reported an intervention programme on risk reduction conducted among Indian industrial workers, revealed significant effect in the intervention group in the biochemical analysis while the control group continued to record high blood pressure. Prabhakaran (2009) conducted a study among industrial workers in India on behaviours at various levels after an intervention. There was significant improvement in knowledge, attitude and improved behaviour at individual level, interpersonal level and environment population level. Also, the study concluded that there was reduction in smoking tobacco, more consumption of fruits and

lower consumption salt in the intervention group. Study by Cappuccio, Kerry, Micah, Plange-Rhule and Eastwood (2006) on effect of educational programme among semi-rural and rural participants in Ghana to reduce salt intake and blood pressure for a period of three to six months. The study concluded that a significant reduction and consistent fall in urinary sodium excretion resulted into fall in systolic blood pressure. Voogdt-Pruis, Beusmans, Gorgels, Kester and Vanree (2010) conducted a study on effectiveness of educational intervention programme on cardiovascular risk management among nurses and General Practitioners (GPs) in Netherlands. The study revealed a significant decrease in the mean level of risk factors observed among practice nurses compared to the General Practitioners' group. The study concluded that practice Nurses are achieving results, equal to or better than GPs for the management of cardiovascular risk factors.

Prevalence of heart disease risk factors in Nigeria

The prevalence of cardiovascular (heart) risk factors is fast emerging among men and women, young and old. Studies have reported the increase of CVDs in different parts of the country. Recent studies from different parts of Nigeria have reported values within the range of 18.2% to 30% of medical admissions of which hypertension was recorded as commonest form of cardiovascular disorder in adult (Kolo, Jibrin, Sanya, Alkali, Peter and Moronkola, 2009). Also, Oladapo, Salako, Sadiq, Soyinka and Falase (2013) reported the prevalence of cardiovascular risk factors such as hypertension, physical inactivity, smoking and alcohol intake among men and women in a community in Ibadan, Oyo State, South West Nigeria.

Odugbemi, Onajole and Osibogun (2012) reported prevalence of cardiovascular risk factors among traders aged 35 – 55 years in an urban market in Lagos, South West Nigeria. The study revealed hypertension (34.8%) obesity (12.3%) physical inactivity (92%) cigarette smoking in males (17.5%) females (0.3%) and overweight (39.9%) respectively. Ordinioha (2013) reported burden of cardiovascular risk factors among lecturers in a medical school in Port-Harcourt, South-South Nigeria and concluded that 60% of the lecturers were overweight and 22% were obese.

The incidence of cardiovascular disease risk factors was also reported among civil servants in Abakaliki and adults in Enugu, South-East Nigeria with prevalence rate of 68% in association of dyslipidaemia with obesity and hypertension affecting more men than women. The

studies suggested that early detection, improved care as well as secondary prevention programmes at the community level is recommended in order to reduce complications and need for hospital admissions(Oguanobi, Ejim, Onwubere, Ike, Anisiuba, Ikeh and Aneke, 2010; Ogbonna, Nwibo and Onimawo, 2013). Similarly, Mohammed (2012) reported prevalence of CVD risk factors among servicemen aged 30 – 60 years in the Nigerian Armed Forces while Adedoyin and Adesoye (2005) reported higher incidence of CVD risk factors among men (52.6%) female (47.4%) in North Western Nigeria. The study concluded that the steady increase may be due to problem of accessibility to good and qualitative health care delivery system, malfunctioning of primary healthcare in our communities and seemingly high apathy among North Westerners towards orthodox medicine.

Kadiri (2001) reported prevalence of cardiovascular risk factors especially hypertension, as serious health challenges to health professionals in the developing countries, especially Nigeria. Amazingly, he noted that less than one-third of people with hypertension in Nigeria undergo medications while less than one-third of those undergoing treatment have their problem being absolutely managed. The study concluded that the inability to adequately manage hypertension can be attributed to inadequate knowledge about the risk factors and associated complications.

Abdullahi and Amzat (2011) established that knowledge of cardiovascular risk factor significantly influence awareness of complications of heart disease. The study reported that majority of members of staff in the University of Ibadan demonstrated a relatively high level of knowledge about the complications associated with hypertension, but knowledge about the risk factors and attitude towards the illness was still low. About 90% of the respondents considered hypertension a very serious health problem yet, a number of them adopted a lifestyle contradicting their perception about it. The study concluded that on-job screening and educative programmes are fundamental ways to improve knowledge about hypertension at the workplace.

Also, studies by Ansa, Oyo-Ita and Essien (2007); Iyalomhe and Iyalomhe (2010); Katibi Olarinoye and Kuranga (2010) all reported steady increase in the incidence of CVD risk factors in various communities in Nigeria. It is understandable that epidemics of cardiovascular disease have insidiously established themselves in our environment. Hence, there is urgent need to improve the knowledge, attitude and behaviour of the people towards its occurrence and prevention in order to stem the tide. Oluyombo and Babatunde (2015) reported among semi-

urban dwellers in Ekiti State prevalence of cardiovascular risk factors. The study concluded that the prevalence of hypertension, diabetes, generalized and abdominal obesity was 47.2%, 6.8%, 8.5% and 32.0% with only 48.9% receiving treatment. Hence, the study recommended urgent need for more public health attention and reinforcement of primary preventive strategies. Similarly, Erhun, olayiwola, Agbani and Omotoso (2005) reported prevalence of hypertension among adults 21 years and above, both male and female in a University in South West Nigeria. The finding revealed increase in hypertension with age across the groups, age group 31-40 years showing the least prevalence.

Appraisal of Reviewed Literature

This chapter presents the review of related literature under the following broad headings namely; conceptual framework, theoretical framework, conceptual, theoretical and empirical review. Consequently, a conceptual framework was developed in order to have a direction for the study. The framework was developed to explain the interactions between the independent variable (cardiovascular education), moderating variables (age and gender) and dependent variable (knowledge, attitude and heart disease at-risk behaviour).

Similarly, External parallel process model and Health belief model were adopted to have a strong theoretical base for the study. Related concepts were also reviewed for the purpose of providing support for the study. In relation to this, health education was described as a process that informs, motivates and help individuals to adopt healthy practices. It is any combination of planned learning experiences based on sound theories that provide individuals, groups and communities the opportunity to acquire information and skills needed to make quality health decisions (Moronkola, 2012; Joint Committee of Health Education and Promotion, 2001). It was documented that Cardiovascular Education is a planned programme that is very effective in bringing about sound knowledge, improved attitude and desirable long lasting behavioural change. Hence, disease morbidity and mortality could be greatly reduced in the society by preventing the risk factors such as avoiding the intake of fatty foods, smoking, alcohol, stressful situations and a host of others. These risk factors were documented to be potent, independent and measurable characteristics that are usually associated with increased disease frequency and development (Ogah and Rayner, 2013).

Also, the American Heart Association (AHA) and American College of Cardiology (ACC) recognized these risk factors as; major independent risk factors, pre-disposing risk factors and conditional risk factors which are identified as controllable and non-controllable factors (Lloyd-Jones, Adams and Brown, 2010). Preventive measures towards cardiovascular disease were also reviewed and documented which emphasized on reduction of salt intake, active participation in regular moderate exercises, cessation of intake of alcohol, cigarette smoking, avoidance of fatty foods (cholesterol). These risk factors are mainly preventable through lifestyle modifications and choices.

Among other areas that were reviewed are the impact of Cardiovascular Education on human lives which reported significant increase in people's awareness motivation and adoption of preventive and healthy behaviour. The influence of age and gender on knowledge, attitude and heart disease at risk behaviour were also reviewed. Empirical studies revealed inconsistency in the relationship between age, knowledge and attitude towards heart disease; while some of the reviewed literature established a strong link between age and attitude towards heart disease. Some studies documented that aging associated with changes in the mechanical and structured properties of the vascular wall are more prominent among older adults due to physiological changes. While other studies submitted that younger ones now tend to be vulnerable as a result of improved social and economic conditions that are associated with lifestyle changes (Booths, Peters and Woodward, 2017; Wang, Lee, Fabsitz, Devereux, Best and Waltzy, 2006; Domiquez et al, 2006).

The review of literature also established inconsistency in the relationship between gender, knowledge, attitude and heart disease at-risk behaviour. Gender factor in relation to cardiovascular disease on knowledge, attitude and behaviour in many studies revealed that, men have tendency to manifest good knowledge, but poor attitude and behaviour towards heart disease; while some studies revealed that, women had positive heart knowledge, attitude and behaviour due to differences in roles and responsibilities performed (Kolo and Chijioke, 2009). Some of the literature reviewed also confirmed that many professionals including teachers still manifest these risk factors such as obesity, high blood pressure, physical inactivity, alcohol intake and so on. Some of the reviewed literature relate this to effect of urbanization, poor knowledge of the risk factors, poor attitude and behaviour towards the development of heart

diseases (Abdullahi and Amzat, 2011; Katibi Olarinoye and Kuranga, 2010, Iyalomhe and Iyalomhe, 2010). In order to stem the rate of cardiovascular diseases, researchers recommended effective Cardiovascular Education that promotes healthy lifestyle choices and good behavioural outcome.

CHAPTER THREE METHODOLOGY

This study determined the effects of cardiovascular education knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State. To achieve this, the following methods and procedures were adopted.

1. Research design
2. Population
3. Sample and Sampling Technique
4. Research Instrument
5. Validity of the Instrument
6. Reliability of the Instrument
7. Field-testing of the Instrument
8. Ethical Consideration
9. Procedure for Data Collection
10. Procedure for Data Analysis

Research Design

The pretest-posttest control group quasi experimental design using 2x3x2 factorial matrix was adopted. The design was adopted because the participants for the study were already in two existing groups. This afforded the researcher the opportunity to compare the participants in the experimental and control groups, and also for the purpose of examining the difference in their measured outcome as a result of the intervention in the study. Also this design allowed the researcher to attribute any changes in the post-test only to the effect of the intervention given.

The research design is schematically illustrated as follows:

O₁ X₁ O₃ Experimental group

O₂ X₂ O₄ Control group

O₁ and O₂ represent pretest observations for the experimental and control groups respectively.

O₃ and O₄, represent posttest observations for the experimental and control groups respectively.

X₁ represents cardiovascular education in experimental group

X₂ represents sexually transmitted infection education in control group

This study employed the use of a 2x3x2 factorial matrix. The treatment at two levels; experimental and control groups. Age at three levels (20-29 years, 30-39 years, 40 years and

above); while gender was at two levels (male and female). This matrix is represented on Table 1 below.

Table 3.1: 2 x 3 x 2. Factorial matrix

Treatment	Age	Gender
Cardiovascular Education	20-29 years	Male
	30-39 years	
	40 years and above	Female
Sexually Transmitted Infections Education (Control)	20-29 years	Male
	30-39 years	
	40 years and above	Female

Population

The population for this study comprised of all public secondary school teachers in Ibadan Metropolis, Oyo State. Ibadan Metropolis comprises of five Local Government Areas namely: Ibadan North, Ibadan North East, Ibadan North West, Ibadan South East and Ibadan South West Local Government Areas.

Table 3.2: Population Distribution of Public Secondary School Teachers in Local Government Areas in Ibadan Metropolis

S/N	Name of local government areas	No. of Public Secondary Schools	No. of Teachers
1.	Ibadan North Local Government Area	86	1,529
2.	Ibadan North East Local Government Area	64	1,053
3.	Ibadan North West Local Government Area	26	386
4.	Ibadan South East Local Government Area	66	1,150
5.	Ibadan South West Local Government Area	61	1,100
	Total	303	5,218

Sample and Sampling Techniques

The multistage sampling technique was adopted, a total of 200 participants were involved in the study. The process of the sampling procedure is highlighted in the steps presented below:

Stage 1- Simple Random Sampling technique of using fish bowl without replacement method was used to choose two (2) Local Governments out of five (5) Local Government Areas that made up Ibadan Metropolis (Ibadan North and South-West).

Stage 2- Simple random sampling technique was used to place the two selected Local Government Areas into experimental and control group.

Stage 3- Systematic sampling technique was used to select twenty (20) schools from the selected Local Government Areas according to TESCOM list of schools.

Stage 4- Five (5) teachers (volunteers) were used from each of the selected schools.

Table 3.3: Distribution of participants

S/N	Name of LGAs	No. of Schools	No. of Teachers	No of selected schools	No of selected teachers from each of the schools	Selection through voluntarism
1.	Ibadan North	86	1,529	20	5	100
2.	South West	61	1,100	20	5	100
Total						200

Inclusion and Exclusion Criteria

The study included Public Secondary School teachers that voluntarily signed the informed consent forms in the selected Local Government Areas;

1. who are either male or female teachers;
2. who have had at least 2 years of teaching experience and above; with minimum age of twenty years and above.

Research Instruments

The following research instruments were used for the study:

1. Self-developed Manual on Cardiovascular disease risk factors:

The manual was used as a training guide for the experimental group, outlining step by step procedures. The Manual guide was validated by experts review in line with the variables under study (See Appendix III).

2. Self- developed Questionnaire:

In order to examine the effect of cardiovascular education on Knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State, a self-developed questionnaire of three (3) sub-sets was developed. These are explained as follows:

Knowledge, Attitude and Heart Disease At-Risk Behaviour Questionnaire (KAHDABQ)

The questionnaire consists of Knowledge of Heart Disease Scale (KHDS), Attitude Towards Heart Disease At-Risk Behaviour Scale (ATHDARBS) and Heart Disease At-Risk Behaviour Scale (HDARBS). The questionnaire was divided into four sections. Section A covered socio-demographic characteristics of the respondents, sections B, C and D were used to elicit information in line with the tested variables in the hypotheses and research questions. The items in the questionnaire were developed based on review of concepts and empirical studies on cardiovascular disease. The instrument was validated through expert review, which helped to remove ambiguities and item construction problems.

The items of the questionnaire were developed based on the initial exploratory discussion with people that share similar characteristics with the actual study population. In the first stage, ninety two (92) items were generated based on the exploratory survey discussion after which the questionnaire was presented to professional Health Educators and an expert in psychometrics. The items were later reduced to sixty one (61). The implication is that the instrument was validated through expert review. This in turn helped to remove ambiguities and item construction problems. This instrument was then subjected to exploratory factor analysis. A Kaiser-Meyer-Olkin (KMO) of 0.64, 0.61 and 0.60 were obtained for KHDS, ATHDARBS and HDARBS respectively; which met up with the benchmark of 0.60. This indicates that the sample size of each of the scales is adequate for the conduct of factor analysis. The test of sphericity of each of

the scales was statistically significant which support the factorability of the correlation matrix as the p-value stands at 0.007 and 0.000 respectively.

The sections of the questionnaire are explained as follows:

Section A: This was used to obtain information on socio-demographic characteristics of the respondents. Five items were generated and was responded to by the respondents. The items include sex, years of teaching experience, age, do you check your blood pressure and how often?

Section B: Knowledge of Heart Disease Scale (KHDS)

Knowledge of Heart Disease Scale (KHDS) was used to elicit information from respondents on meaning, aetiology, signs and symptoms as well as risk factors of cardiovascular diseases. Twenty (20) items were generated and reacted to by the respondents during the pre-testing of the instrument. The data generated were then subjected to factor analysis, with 0.60 as criterion for retention of items. The result of the analysis showed that fifteen (15) items met 0.60 criterion, thus the items were retained, while the items that did not meet with the criterion were restructured. Examples of the retained items include: “cardiovascular disease occurs in adults; stroke is a cardiovascular disease”. Each response was scored on a Yes and No format; Yes= 2, No=1. A cronbach alpha method was used to test the internal consistency of KHDS and it yielded a reliability of 0.83.

Section C: Attitude Towards Heart Disease At-Risk Behaviour Scale (ATHDARBS)

This scale was used to obtain information from respondents on their attitude towards diet, obesity, alcohol, smoking, blood pressure, physical inactivity and stress as risk factors of heart disease. Twenty one (21) items were generated and reacted to by the respondents during the pre-testing of the instrument. The data generated were then subjected to factor analysis, with 0.60 as criterion for retention of items. The result of the analysis showed that eighteen (18) items met 0.60 criterion, hence the items were retained; the three (3) that had 0.5 were restructured. Examples of the retained items include: “alcohol intake refreshes the soul and the body; those who drink alcohol are sociable”. Each response was scored on a 4-point modified Likert format of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) with allotment of points in the following order; SA = 4, A=3, D=2, SD =1. A cronbach alpha method was used to test the internal consistency of ATHDS and it yielded a reliability of 0.79.

Section D: Heart Disease At-Risk Behaviour Scale (HDARBS)

Heart Disease At-Risk Behaviour Scale (HDABS) was used to elicit information from respondents on behaviours that can predispose to heart disease. Initially, twenty four (24) items were generated and reacted to by the respondents during the pre-testing of the instrument. The result of the analysis showed that twenty (20) items met 0.60 criterion; hence the items that met 0.60 were retained; while the four (4) items that were too low with the values less than 0.3 were expunged. Each response was scored on a 4-point modified Likert format of Very High Degree (VHD), High Degree (HD), Low Degree (LD) and Very Low Degree (VLD) with allotment of

points in the following order; VHD = 4, HD =3, LD=2, VLD =1. A cronbach alpha method was used to test the internal consistency of HDARBS and it yielded a reliability of 0.91.

Validity of the Instrument

Validity is the most important characteristics of a good measuring instrument. Kitzinger (2002) asserted that validity refers to the appropriateness, meaningfulness and usefulness of the instrument in measuring what it is designed to measure. To ensure this, a draft of the questionnaire was presented to the researcher's supervisor, other experts in the Department of Human Kinetics and Health Education, cardiologists as well as experts from other related fields within the University of Ibadan, Nigeria for content and construct validity of the instruments. Their comments, criticism, suggestions and modifications of the instrument were carefully studied and effected to improve the quality of the instrument.

Reliability of the Instrument

To determine the reliability of the instrument, validated version of the questionnaire was administered to twenty(20) public secondary school teachers in Egbeda Local Government Area who were not within the study area but possess the same characteristics with the study population. The result was later subjected to Cronbach Alpha to determine the reliability coefficient. Knowledge of Heart Disease Scale (KHDS) yielded a reliability of 0.83, Attitude Towards Heart Disease At-Risk Behaviour Scale (ATHDARBS) had 0.79, while Heart Disease At-Risk Behaviour Scale (HDARBS) yielded a reliability of 0.91. In addition, the Knowledge, Attitude and Heart Disease At-Risk Behaviour Questionnaire yielded a reliability of 0.80.

Ethical Consideration

Ethical approval for the study was obtained from College of Medicine, Ethics Committee University of Ibadan (Registration Number UI/UCHEC/NHREC/05/01/2008a) and Ministry of Health, Oyo State (Ref. No AD13/479) in conjunction with Collaborative Institutional Training Initiative (CITI PROGRAM). The researcher presented copies of the research protocol, the consent forms, other participants information and letter of introduction from the Head of Department of Human Kinetics and Health Education, University of Ibadan to the chairmen; College of Medicine Ethics Committee, University of Ibadan and Oyo State Research Ethical Committee, consequent upon which it was reviewed and given full approval.

Procedure for Data Collection

The researcher collected letter of introduction from the Head, Department of Human Kinetics and Health Education, University of Ibadan. This was presented to the Chairman, Ministry of Education, Teaching Service Commission (TESCOM), Heads of the Schools (Principals) in the selected areas for introduction and necessary information to facilitate access to the participants.

Prior to the commencement of the study, ten professional health educators were trained as research assistants so as to get them acquainted with the training guide in line with what the research has set to achieve. Their roles were clearly explained. The training of both the experimental and control groups were done at different locations. Experimental group was at Anglican Commercial Grammar School, Oritamefa, Total Garden Ibadan while the control group was at Government College Apata, Ibadan respectively. The experimental group consisted of participants from Ibadan North (100 participants). The control group consisted of participants from Ibadan South West (100 participants). The purpose of the study was explained to the participants in the experimental and control groups. The researcher and research assistants also registered the participants in the experimental and control groups by getting their contact addresses and phone numbers. Only those who indicated willingness to participate and duly filled and signed the consent form were selected to participate in the programme.

Pre-test instrument was administered to the participants in both experimental and control groups at their different locations before commencement of the intervention and these were collected through the help of research assistants. The experimental group was exposed to eight weeks cardiovascular education programme, while the control group was given a placebo on (training on Sexually Transmitted Infections education [STI]). The programme ran concurrently once a week and duration per session was one hour. Every Thursday, 8.30-9.30am (experimental group) while every Friday, 8.30-9.30am (control group). Post-test was administered at the end of the programme to the participants in the experimental and control groups.

Treatment Procedure for participants in Experimental group

The group was taken through cardiovascular education. The intervention lasted for eight weeks. Summary is as follows:

SESSION ONE

Topic: General Orientation and Administration of Pre-test instrument.

Objectives of the session:

1. To state the purpose of the meetings
2. To explain the procedures to follow by trainers.
3. To administer the pre-test instrument on the participants.

Activity:

Step 1: The researcher welcomed the participants

The participants were allowed to introduce themselves to ensure familiarization among them.

Step 2: The researcher stated and explained in clear terms the purpose, objectives and benefits of the training. Day, duration (number of contacts) time and number of hours for each contact, venue for the interaction and relevant information were discussed with the participants.

Step 3: Participants were told to be punctual, have regular attendance, cooperative and participate during discussions.

Step 4: The researcher thereafter administered the pre-test on the participants with the help of trained research assistants. Same were collected on the spot.

Closing Remarks.

1. The participants were commended for agreeing to participate in the programme.
2. The participants were reminded of the time and venue for the next session.

3. The researcher appreciated the participants and served snacks to them at the close of the session.

SESSION TWO

Topic: Cardiovascular Disease (definition, concept and symptoms)

Objectives: At the end of this session, the participants should be able to:

1. Explain what a cardiovascular disease is
2. List the symptoms of cardiovascular disease

Activity

Step 1: The researcher welcomed the participants

Step 2: The topic for the week was introduced and explained

Step 3: The researcher asked questions to evaluate the topic taught and made corrections where necessary.

Closing Remarks:

1. The participants were commended for attending the programme
2. They were reminded of the time and venue for the next session.
3. The researcher appreciated the participants and served them snacks at the end of the session.

SESSION THREE

Topic: Types and classification of cardiovascular diseases

Objectives: At the end of the session, the participants should be able to:

1. List the types of cardiovascular diseases.
2. Classify cardiovascular diseases.

Activity

Step 1: The session commenced with an overview of previous session

Step 2: The researcher introduced and explained the topic for the week

Step 3: The researcher asked questions to evaluate the topic taught and correct where necessary

Closing Remarks:

1. The researcher commended the participants for their co-operation and attendance
2. They were reminded of the time and venue for the next session.
3. The researcher appreciated the participants and served them snacks at the end of the session.

SESSION FOUR

Topic: Risk factors and development of cardiovascular disease (alcohol, smoking)

Objectives: At the end of the session the participants should be able to:

1. Define cardiovascular risk factors
2. Mention alcohol and smoking as cardiovascular risk factors
3. Explain the effects of alcohol and smoking on the heart

Activity

Step 1: The researcher welcomed the participants

Step 2: The topic for the week was introduced and explained

Step 3: The researcher asked questions to evaluate the topic taught and made corrections where necessary.

Closing Remarks:

1. The participants were commended for attending the session
2. They were reminded of the time and venue for the next session
3. The researcher thanked the participants and served them snacks at the end of the session.

SESSION FIVE

Topic: Risk factors and development of cardiovascular disease (Diet and Stress)

Objectives: At the end of the session the participants should be able to:

1. List diet and stress as cardiovascular risk factors
2. Explain the effects of diet and stress on the heart

Activity

Step 1: The researcher welcomed the participants

Step 2: The topic for the week was introduced and explained

Step 3: The researcher asked questions to evaluate the topic taught and made corrections where necessary.

Closing Remarks:

1. The participants were commended for attending the session.
2. They were reminded of the time and venue for the next session.
3. The researcher thanked the participants and served them snacks at the end of the session.

SESSION SIX

Topic: Risk factors and development of cardiovascular disease (hypertension and obesity)

Objectives: At the end of the session the participants should be able to:

1. Mention hypertension and obesity as cardiovascular risk factors
2. Explain the effects of hypertension and obesity on the heart

Activity

Step 1: The researcher welcomed the participants

Step 2: The topic for the week was introduced and explained.

Step 3: The researcher asked questions to evaluate the topic taught and made corrections where necessary.

Closing Remarks:

1. The participants were commended for their attendance
2. They were reminded of the time and venue for the next session.
3. The researcher thanked the participants and served them snacks at the end of the session.

SESSION SEVEN**Topic: Cardiovascular risk factor (inactivity) and preventive measures****Objectives: At the end of the session the participants should be able to:**

1. List physical inactivity as cardiovascular risk factor
2. Explain the effect of physical inactivity on the heart
3. Mention four preventive measures against cardiovascular disease

Activity

Step 1: The researcher welcomed the participants.

Step 2: The topic for the week was introduced and explained

Step 3: The researcher asked questions to evaluate the topic taught and made correction where necessary

Closing Remarks:

1. The participants were commended for attending the session
2. They were reminded of the time and venue for the next session.
3. The researcher thanked the participants and served them snacks at the end of the session.

SESSION EIGHT

Topic: Review of Previous Sessions and Administration of Post-test Instrument

Objectives: At the end of the session participants should be able to:

1. Summarize what they had learnt from the training programme
2. Discuss what they need to do to have healthy heart
3. Express their willingness to embrace and improve on heart healthy behaviour

Activity

Step 1:The participants were welcomed

Step 2:Questions were asked on all topics taught to know how participants had understood the contents of the training package.

Step 3:Post-test instrument was administered on the participants. Same collected on the spot with the help of trained research assistants.

Closing Remarks:

1. The participants were commended for giving their time and cooperation throughout the programme
2. The researcher thanked the participants and served them snacks at the end of the session.
3. The participants were bided good bye.

TRAINING PROGRAMME FOR PARTICIPANTS IN EXPERIMENTAL GROUP

Training Objective	Topic(s)/Content	Audience	Wk/Day/Time
At the end of this session participants will be able to <ul style="list-style-type: none"> • Familiarise with each other • Fill the questionnaire 	<ul style="list-style-type: none"> • Pre-test administration 	All participants in Experimental Group	Week 1, 1 hour Thursday 8.30-9.30am
At the end of this session, participants will be able to: <ul style="list-style-type: none"> • Define cardiovascular disease • Identify the symptoms of CVD 	<ul style="list-style-type: none"> • Module 1 containing concept and symptoms of cardiovascular disease. 	All participants in Experimental Group	Week 2, 1 hour Thursday 8.30-9.30am
At the end of this session, participants will be able to: <ul style="list-style-type: none"> • List the types of CVDs • Classify the CVD risk factors 	Module 2 containing Types of cardiovascular Diseases and classification of cardiovascular diseases.	All participants in Experimental Group	Week 3, 1 hour Thursday 8.30-9.30am
At the end of this session, participants will be able to: <ul style="list-style-type: none"> • Identify smoking and alcohol as risk factors of cardiovascular disease. 	Module 3 containing risk factors of CVD e.g. smoking, Alcohol and development of CVD	All participants in Experimental Group	Week 4, 1 hour Thursday 8.30-9.30am
At the end of this session, participants will be able to: <ul style="list-style-type: none"> • Identify diet and stress as risk factors of cardiovascular diseases. 	Module 4 containing cardiovascular risk-factors e.g. Diet, Stress and development of CVD	All participants in Experimental Group	Week 5, 1 hour Thursday 8.30-9.30am
At the end of this session, participants will be able to: <ul style="list-style-type: none"> • Identify hypertension and obesity as risk factors of cardiovascular disease 	<ul style="list-style-type: none"> • Module 5 containing cardiovascular risk factors e.g. blood pressure, obesity physical inactivity and development of CVD 	Participants in Experimental Group	Week 6, 1 hour Thursday 8.30-9.30am
At the end of this session, participants will be able to: <ul style="list-style-type: none"> • Mention the preventive measure risk factors of CVD 	<ul style="list-style-type: none"> • Module 6 containing prevention of cardiovascular risk-factors • Cardiovascular risk factors e.g physical inactivity and development of CVD 	All participants in Experimental Group	Week 7, 1 hour Thursday 8.30-9.30am
At the end of this session, participants will be able to: <ul style="list-style-type: none"> • Fill the questionnaire (Post-test) 	<ul style="list-style-type: none"> • Post-test administration 	All participants in Experimental Group	Week 8, 1 hour Thursday 8.30-9.30am

Treatment Procedure for Participants in Control Group (Sexually Transmitted Infections Education (STIs))

The placebo treatment lasted for eight weeks. Summary of the treatment package is as follows:

SESSION ONE

Topic: General Orientation and Administration of Pre-test Instrument

Objectives of the session are as follows:

1. To state the purpose of the meeting
2. To explain the procedures to follow by trainers and participants
3. To administer the pre-test instrument on the participants

Activity

Step 1: The researcher welcomed the participants. The participants were allowed to introduce themselves to ensure familiarization among them.

Step 2: The researcher stated and explained in clear terms the purpose, objectives and benefits of the training Day, duration (number of contacts), time and hours for each contact, venue and relevant information were discussed with the participants.

Step 3: Participants were given the pre-test instrument to fill. Same were be collected on the spot with the help of research assistants.

Closing Remarks:

1. The participants were commended for attending the programme
2. They were reminded of the time and venue for the next session
3. The researcher thanked the participants and served them snacks at the end of the session.

SESSION TWO

Topic: Sexually Transmitted Infections (STIs), definition, causes and factors influencing the spread.

Objectives: At the end of the session, participants should be able to:

1. Define sexually transmitted infections (STIs)
2. Mention four causes of sexually transmitted infections
3. List three general factors influencing STIs.

Activity

Step 1: The researcher welcomed the participants

Step 2: The researcher introduced the topic and explained to the participants.

Step 3: The researcher asked questions to evaluate the topic taught and made necessary corrections

Closing Remarks:

1. The researcher commended the participants for attending the session
2. The participants were reminded of the time, venue for the next meeting
3. The researcher thanked the participants and served them snacks at the end of the session.

SESSION THREE

Topic: Behavioural and social factors influencing spread of sexually transmitted infections.

Objectives: At the end of the session, participants should be able to:

1. Mention three behaviour factors of STIs
2. Explain three social factors of STIs

Activity

Step 1: The researcher welcomed the participants

Step 2: The participants were asked questions on previous topic

Step 3: The researcher introduced the topic and explained to the participants

Step 4: The participants were asked questions to evaluate the topic taught and made necessary corrections

Closing Remarks:

1. The researcher commended the participants for attending the session
2. The participants were reminded of the and venue for next meeting
3. The researcher thanked the participants and served them snacks at the end of the session.

SESSION FOUR

Topic: Personal risky behaviours influencing STIs

Objectives: At the end of the session, participants should be able to

1. List two vulnerable groups prone to STIs
2. Mention two personal risky behaviours of STIs

Activity

Step 1: The researcher welcomed the participants

Step 2: The researcher asked questions on the previous topic

Step 3: The researcher introduced the topic and explained to the participants.

Step 4: The participants were able allowed to ask questions and necessary corrections were made.

Closing Remarks:

1. The researcher commended the participants for attending the session
2. The participants were reminded of the time, venue for the next meeting
3. The researcher thanked the participants and served them snacks at the end of the session.

SESSION FIVE

Topic: Complications of Sexually Transmitted Infections

Objectives: At the end of the session, participants should be able to:

1. Mention five complications of STIs

Activity

Step 1:The researcher welcomed the participants

Step 2:The researcher asked questions on the previous topic

Step 3:The researcher introduced the topic and explained to the participants.

Step 4:The researcher asked questions to evaluate the topic taught and made necessary corrections

Closing Remarks:

1. The researcher commended the participants for attending the session
2. The researcher reminded participants of time and venue for next meeting
3. The researcher thanked the participants and served them snacks at the end of the session.

SESSION SIX

Topic: Difficulties in controlling the spread of STIs

Objectives: At the end of the session, participants should be able to:

1. Mention six difficulties in controlling the spread of STIs.

Activity

Step 1:The researcher welcomed the participants

Step 2:The researcher reviewed the previous topic

Step 3 The researcher introduced the topic and explained to the participants

Step 4:The researcher asked questions to evaluate the topic taught and made necessary correction

Closing Remarks:

1. The researcher commended the participants for attending the session
2. The researcher reminded the participants of time and venue for the next session
3. The researcher thanked the participants and served them snacks at the end of the session.

SESSION SEVEN

Topic: Prevention of STIs.

Objectives: At the end of the session, participants should be able to:

1. Mention four different ways in preventing STIs

Activity

Step 1:The researcher welcomed the participants

Step 2:The researcher asked questions on the previous topic

Step 3:The researcher introduced the topic and explained to the participants

Step 4:The participants were asked questions to evaluate the topic taught and necessary corrections were made.

Closing Remarks:

1. The researcher commended the participants for attending the session
2. The researcher reminded the participants of time and venue for the next session
3. The researcher thanked the participants and served them snacks at the end of the session.

SESSION EIGHT

Topic: Review of Previous Session and Administration of Post-test Instrument

Objectives: At the end of the session, participants should be able to:

1. Summarize what they had learnt from the training
2. Learn from their past mistakes
3. Express their willingness to embrace healthy lifestyle.

Activity

Step 1: The researcher welcomed the participants

Step 2: The researcher reviewed all the sessions done by asking questions and allowing contributions from participants

Step 3: The researcher encouraged the participants to set goals in achieving healthy attitudinal behaviours

Step 4: The researcher encouraged the participants to fill the post test instrument. Same were collected on the spot.

Closing Remarks:

1. The researcher commended the participants for giving their time and their cooperation during the programme
2. The researcher encouraged participants to utilize what they have learnt in the course of the programme
3. The researcher thanked the participants and served them snacks at the end of the session.

Procedure for Data Analysis

Completed copies of the questionnaire were collected, coded and analyzed using descriptive statistics of frequency counts and percentages to describe the demographic information of the participants. Inferential statistics of Multivariate Analysis of Covariance (MANCOVA) were used to test all the hypotheses at 0.05 level of significance.

CHAPTER FOUR

RESULTS AND DISCUSSION OF FINDINGS

This chapter focuses on results and discussion of findings. The results as well as discussion of findings are presented on socio-demographic characteristics of the participants, research questions and hypotheses. These are therefore stated as follows:

Socio-Demographic Characteristics of the Participants:

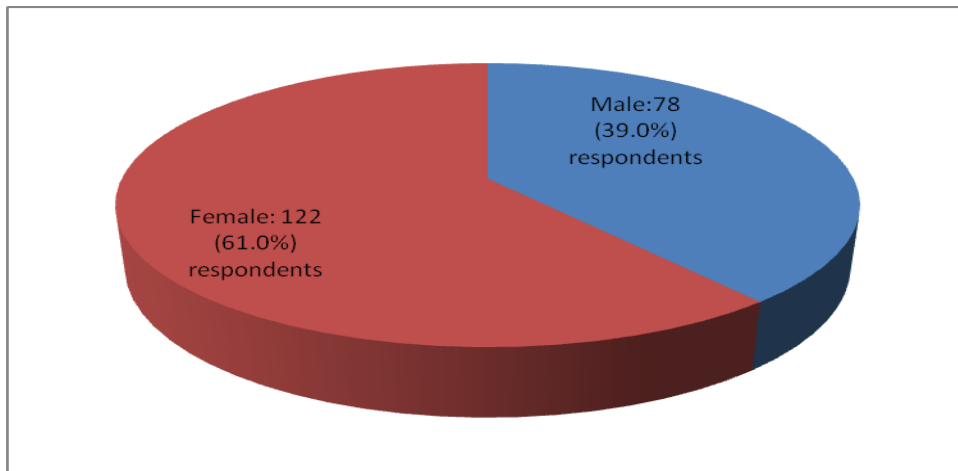


Figure 4.1: Pie chart illustrating sex of the respondents

Table 4.1 shows that 78 (39.0%) of the respondents were male, while 122 (61.0%) were female. This means that most of the respondents were female.

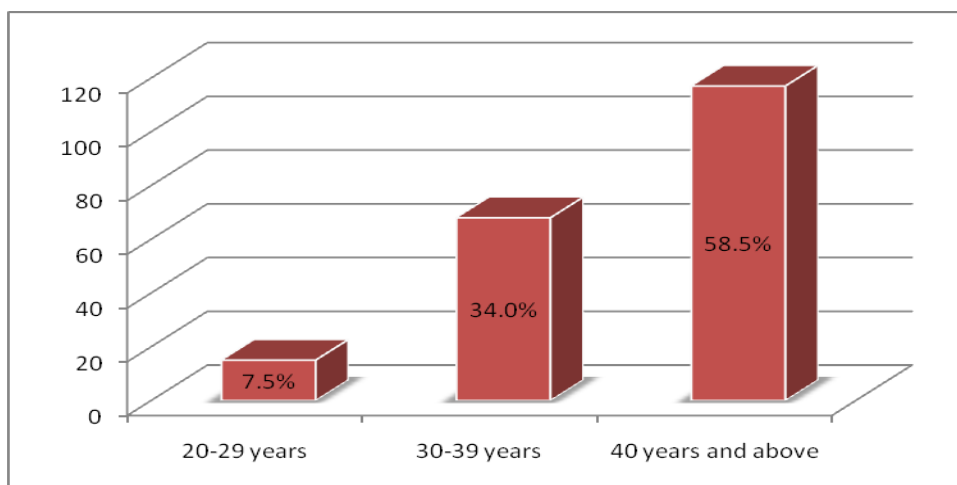


Figure 4.2: Bar chart illustrating age of the respondents

In addition, the chart reveals that 15 (7.5%) respondents were in the age range of 20-29 years, 68 (34.0%) were between 30-39; while 117 (58.5%) were above 40 years. It means that majority of the respondents were 40 years and above.

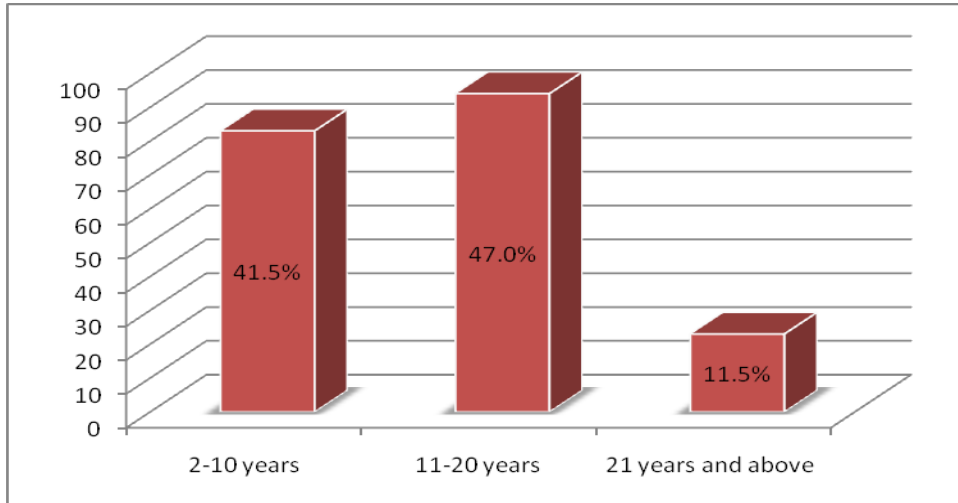


Figure 4.3: Bar chart illustrating years of teaching experience of the respondents

Also, 83 (41.5%) respondents had 2-10 years teaching experience, 94 (47.0%) had 11-20 years, while 23 (11.5%) had over 21 years teaching experience. This means that most of the respondents had 11-20 years teaching experience.

Research Questions

The following research questions were answered:

Research Question 1: What is the knowledge of secondary school teachers in Ibadan on heart disease?

Table 4.1: Analysis on knowledge of heart disease

S/n	Statement	Response	
		Yes	No
1	Cardiovascular disease involves the heart and blood vessels	173 86.5%	27 13.5%
2	Cardiovascular disease occurs in adults	42 21.0%	158 79.0%
3	Cardiovascular disease is common in children	17 8.5%	183 91.5%
4	Cardiovascular disease is caused by infection	75 37.5%	125 62.5%
5	Cardiovascular disease affects other parts of the body	106 53.0%	94 47.0%
6	One of the symptom of cardiovascular disease is headache	106 53.0%	94 47.0%
7	Stroke is a cardiovascular disease	115 57.5%	85 42.5%
8	Hypertension is a cardiovascular disease	45 22.5%	155 77.5%
9	Risk of cardiovascular disease is higher in men than women	67 33.5%	133 66.5%
10	Risk of cardiovascular disease is higher in menopausal women than pre-menopausal women	71 35.5%	129 64.5%
11	Smoking can cause cardiovascular disease	127 63.5%	73 36.5%
12	Alcohol consumption may lead to cardiovascular disease	130 65.0%	70 35.0%
13	Stress causes cardiovascular disease	130 65.0%	70 35.0%
14	Obesity can cause cardiovascular disease	130 65.0%	70 35.0%
15	Diet can cause cardiovascular disease	105 52.5%	95 47.5%
16	Physical inactivity may lead to cardiovascular disease	93 46.5%	107 53.5%
17	Chest pain is associated with cardiovascular disease	114 57.0%	86 43.0%
18	Pain in the legs relieved by rest is associated with cardiovascular disease	90 45.0%	110 55.0%
19	Cardiovascular disease is hereditary	70 35.0%	130 65.0%
20	Cardiovascular disease cannot be cured	105 52.5%	95 47.5%
Total		1,911 (47.8%)	2,089 (52.2%)

Table 4.2 shows that 173 (86.5%) respondents indicated that cardiovascular disease involves the heart and blood vessels, while 27 (13.5%) did not. In addition, 42 (21.0%) respondents affirmed that cardiovascular disease occurs only in adults, while 158 (79.0%) did not. Besides, 17 (8.5%) respondents acknowledged that cardiovascular disease is common in children, while 183 (91.5%) did not. Moreover, 75 (37.5%) respondents indicated that cardiovascular disease is caused by infection, while 125 (62.5%) did not. Furthermore, 106 (53.0%) affirmed that cardiovascular disease affects other parts of the body, while 94 (47.0%) did not. In addition, 106 (53.0%) respondents acknowledged that one of the symptom of cardiovascular disease is headache, 94 (47.0%) disagreed. Also, 115 (57.5%) respondents indicated that stroke is a strong symptom of cardiovascular disease, while 85 (42.5%) did not. Besides, 45 (22.5%) respondents indicated that hypertension is not a cardiovascular disease, while 155 (77.5%) did not.

It was further shown that 67 (33.5%) respondents acknowledged that risk of cardiovascular disease is higher in men than women, while 133 (66.5%) respondents disagreed. Also, 71 (35.5%) respondents agreed that risk of cardiovascular disease is higher in pre-menopausal women than menopausal women, while 129 (64.5%) did not. Moreover, 127 (63.5%) respondents affirmed that smoking can cause cardiovascular disease, while 73 (36.5%) did not. Besides, 130 (65.0%) respondents reacted that alcohol consumption may lead Cardiovascular disease, while 70 (35.0%) did not. Also, 130 (65.0%) respondents indicated that stress causes cardiovascular disease, while 70 (35.0%) did not. Furthermore, 130 (65.0%) respondents acknowledged that obesity can cause cardiovascular disease, while 70 (35.0%) did not. Moreover, 105 (52.5%) respondents reacted that diet can cause cardiovascular disease, while 95 (47.5%) did not. Also, 93 (46.5%) respondents indicated that physical inactivity may lead to cardiovascular disease, while 107 (53.5%) did not.

Table 4.2 further reveals that 114 (57.0%) respondents indicated that chest pain is associated with cardiovascular disease, 86 (43.0%) did not. In addition, 90 (45.0%) respondents reacted that pain in the legs relieved by rest in associated with Cardiovascular disease, 110 (55.0%) did not. Moreover, 70 (35.0%) affirmed that cardiovascular disease is hereditary, while 130 (65.0%) did not. Also, 105 (52.5%) respondents indicated that cardiovascular disease can be cured, while 95 (47.5%) did not. Based on the responses, it was revealed that some respondents (47.8%) had knowledge about meaning, signs, symptoms as well as risk factors of cardiovascular diseases, while most of the respondents (52.2%) did not. It could therefore be inferred that, secondary school teachers in Ibadan had low knowledge of heart disease.

Research Question 2: What is the attitude of secondary school teachers in Ibadan towards heart disease at-risk behaviour?

Table 4.2: Analysis on attitude towards heart disease at-risk behaviour

S/n	Statement	Response					
		SA	A	D	SD	Mean	SD
1	I don't feel bothered when I hear about heart disease	51 25.5%	107 53.5%	30 15.0%	12 6.0%	3.06	.84
2	Those who are smoking are justified	63 31.5%	84 42.0%	34 17.0%	19 9.5%	2.98	.99
3	My schedules at work and home do not give less time for me to exercise	67 33.5%	76 38.0%	33 16.5%	24 12.0%	2.89	1.07
4	Taking few sticks of cigarette is advisable when one is under stress	57 28.5%	71 35.5%	43 21.5%	29 14.5%	2.81	1.05
5	Engaging in exercise is too burden some	29 14.5%	88 44.0%	42 21.0%	41 20.5%	2.44	.99
6	Checking ones blood pressure demonstrate less faith in God	20 10.0%	98 49.0%	42 21.0%	40 20.0%	2.35	.92
7	Meals are better off with coca-cola, fanta, e.t.c than with water	34 17.0%	58 29.0%	75 37.5%	33 16.5%	2.31	.94
8	I will stop taking alcohol, if it will reduce my risk of heart disease	26 13.0%	54 27.0%	83 41.5%	37 18.5%	2.26	.88
9	I will stop smoking if it will reduce my risk of heart disease	17 8.5%	72 36.0%	75 37.5%	36 18.0%	2.26	.89
10	I often find it difficult to socialize due to pressure of my work	15 7.5%	85 42.5%	59 29.5%	41 20.5%	2.25	.88
11	I cannot leave friends who smoke for any reason	14 7.0%	74 37.0%	64 32.0%	48 24.0%	2.23	.91
12	I hardly find time to rest until late in the night	13 6.5%	81 40.5%	64 32.0%	42 21.0%	2.22	.89
13	I don't have time to check my blood pressure	24 12.0%	65 32.5%	67 33.5%	44 22.0%	2.21	.93
14	I will engage in physical exercise if it will reduce my risk of heart disease	27 13.5%	56 28.0%	65 32.5%	52 26.0%	2.20	.95
15	Alcohol intake refreshes the soul and body	20 10.0%	56 28.0%	84 42.0%	40 20.0%	2.15	.86
16	Those who drink alcohol are sociable	16 8.0%	59 29.5%	80 40.0%	45 22.5%	2.15	.87
17	Alcohol consumption has less health implication than noise being made against it	15 7.5%	62 31.0%	86 43.0%	37 18.5%	2.14	.81
18	Sweetness of meat should be considered before its health consequences	22 11.0%	62 31.0%	76 38.0%	40 20.0%	2.13	.88
19	I hardly fall sick hence I do not see any need to check my blood pressure	18 9.0%	68 34.0%	54 27.0%	60 30.0%	2.13	.93
20	Taking snacks is often times better than meals	12 6.0%	50 25.0%	70 35.0%	68 34.0%	2.02	.89
21	I prefer to eat meat than fish	16 8.0%	40 20.0%	75 37.5%	69 34.5%	1.99	.90
Total						Weighted Mean= 2.34 Criterion= 2.5	

Table 4.3 shows that 158 (79.0%) respondents agreed that they don't feel bothered when they hear about heart disease, while 42 (21.0%) disagreed. In addition, 147 (73.5%) respondents agreed that those who are smoking are justified, while 53 (26.5%) disagreed. Moreover, 143 (71.5%) respondents agreed that their schedules at work and home did not give less time for them to exercise, while 57 (28.5%) disagreed. Furthermore, 128 (64.0%) respondents agreed that taking few sticks of cigarette is advisable when one is under stress, 72 (26.0%) disagreed. Also,

117 (58.5%) respondents agreed that engaging in exercise is too burdensome, while 83 (41.5%) respondents disagreed. Besides, 118 (59.0%) respondents agreed that checking ones blood pressure demonstrate less faith in God, while 82 (41.0%) disagreed. Furthermore, 92 (46.0%) respondents agreed that meals are better off with coca-cola, fanta, and so on than with water. Also, 80 (40.0%) respondents agreed that they will stop taking alcohol if it will reduce their risk of heart disease, 120 (60.0%) disagreed.

It was further shown in the table that 89 (44.5%) respondents agreed that they will stop making it reduce their risk of heart disease, while 111 (55.5%) disagreed. In addition, 100 (50.0%) respondents agreed that they often find it difficult to socialize due to pressure of their work. Besides, 88 (44.0%) respondents agreed that they cannot leave friends who smoke for any reason, while 112 (56.0%) disagreed. In addition, 94 (47.0%) respondents agreed that they hardly find time to rest until late in the night, while 106 (53.0%) disagreed. Moreover, 89 (44.5%) respondents agreed that they don't have time to check my blood pressure, while 111 (55.5%) disagreed. Furthermore, 83 (41.5%) respondents agreed that they will engage in physical exercise if it will reduce their risk of heart disease, while 117 (58.5%) disagreed. Also, 76 (38.0%) respondents agreed that alcohol intake refreshes the soul and body, while 83 (41.5%) disagreed.

Table 4.3 further reveals that 75 (37.5%) respondents agreed that those who drink alcohol are sociable, while 125 (62.5%) disagreed. In addition, 77 (38.5%) respondents agreed that alcohol consumption has less health implication than noise being made against it, while 123 (61.5%) disagreed. Moreover, 84 (42.0%) respondents agreed that sweetness of meat should be considered before its health consequences, while 116 (58.0%) disagreed. Besides, 86 (43.0%) respondents agreed that they hardly fall sick hence, they do not see any need to check their blood pressure, 114 (57.0%) disagreed. In the same vein, 62 (31.0%) respondents agreed that taking snacks is often times better than meals, while 138 (69.0%) disagreed. Also, 56 (28.0%) respondents agreed that they prefer to eat meat than fish, while 144 (72.0%) disagreed. The weighted mean value of 2.34 is lower than the criterion of 2.50; hence, it could be inferred that secondary school teachers in Ibadan had negative attitude towards heart disease at-risk behaviour.

Research Question 3: What is the heart disease at-risk behaviour of secondary school teachers in Ibadan?

Table 4.3: Analysis on heart disease at-risk behaviour

S/n	Statement	VLD	LD	HD	VHD	Mean	SD
1	Always working most of the time	20 10.0%	38 19.0%	84 42.0%	58 29.0%	2.83	.95
2	Consumption of fried food	18 9.0%	61 30.0%	82 41.0%	39 19.5%	2.54	.96
3	Working till I feel tired	37 18.5%	37 18.5%	85 42.5%	41 20.5%	2.52	1.02
4	Eating meals late at night	35 17.5%	38 19.0%	92 46.0%	35 17.5%	2.51	1.01
5	Check blood pressure	47 23.5%	39 19.5%	73 36.5%	41 20.5%	2.47	1.00
6	exercising once a week	35 17.5%	54 27.0%	74 37.0%	37 18.5%	2.45	1.02
7	Consumption of food with salt to taste well	26 13.0%	59 29.5%	91 45.5%	24 12.0%	2.41	.92
8	Taking sugary drinks	49 24.5%	46 23.0%	63 31.5%	42 21.0%	2.37	1.07
9	Use vehicles to go short distance	60 30.0%	31 15.5%	67 33.5%	42 21.0%	2.35	1.13
10	Always having deadlines to meet	44 22.0%	44 22.0%	86 43.0%	26 13.0%	2.33	.99
11	Having frequent headaches	68 34.0%	35 17.5%	63 31.5%	34 17.0%	2.25	1.10
12	Working till I have headache	54 27.0%	42 21.0%	75 37.5%	29 14.5%	2.17	1.04
13	Engaging in sleepless night activities	77 38.5%	36 18.0%	50 25.5%	37 18.5%	2.11	1.13
14	Use drugs to stay awake at night	95 47.5%	23 11.5%	55 27.5%	27 13.5%	1.99	1.11
15	Taking alcohol regularly	99 49.5%	12 6.0%	64 32.0%	25 12.5%	1.97	1.12
16	Drinking alcohol at home	96 48.0%	23 11.5%	54 27.0%	27 13.5%	1.88	1.10
17	Staying near smokers	100 50.0%	19 9.5%	61 30.5%	20 10.0%	1.88	1.09
18	Drinking alcohol to relax	100 50.0%	18 9.0%	54 27.0%	28 14.0%	1.86	1.13
19	Smoking pipe	106 53.0%	11 5.5%	53 26.5%	30 15.0%	1.86	1.16
20	Smoking cigarette	111 55.5%	5 2.5%	59 29.5%	25 12.5%	1.85	1.16
Sub total						Weighted Mean= 2.23 Criterion= 2.5	

As indicated in table 4.3, 142 (71.0%) respondents had high degree of working most of the time, while 58 (29.0%) did that at a low degree. In addition, 79 (39.0%) consume fried food at high degree, while 121 (61.0%) did not. Besides, 74 (37.0%) respondents worked till they feel tired at high degree, while 126 (63.0%) did not. Moreover, 75 (36.5%) respondents had high degree of eating meals late at night, 127 (63.5%) did not. Also, 86 (43.0%) respondents indicated high degree of checking blood pressure, while 114 (57.0%) did not. The table further shows that 89 (44.4%) had high degree of exercising once a week, while 111 (55.5%) respondents did not. In addition, 85 (42.5%) respondents had high degree of consuming food with salt to taste, 115 (57.5%) did not. Besides, 95 (47.5%) respondents take sugary drinks at high degree, while 105 (52.5%) did not. Moreover, 91 (45.5%) respondents had high degree of using vehicles to go short distance, while 109 (54.5%) did not. Also, 88 (44.0%) respondents had high degree of having deadlines to meet, 112 (56.0%) did not.

Table 4.3 further reveals that 103 (51.5%) respondents had high degree of having frequent headache, while 97 (48.5%) did not. In addition, 96 (48.0%) respondents had high degree of working till they have headache, 104 (52.0%) did not. Moreover, 113 (56.5%) respondents had high degree of engaging in sleepless night activities, while 87 (44.0%) did not. Besides, 118 (59.0%) respondents had high degree of using drugs to stay awake at night, while 82 (41.0%) did not. Also, 111 (55.5%) respondents had high degree of taking alcohol regularly, while 89 (44.5%) respondents did not. It was further shown in table 4.3 that, 119 (59.5%) respondents had high degree of drinking alcohol at home, 81 (40.5%) did not. In addition, 119 (59.5%) respondents had high degree of staying near smokers, while 81 (40.5%) did not. Moreover, 118 (59.0%) respondents had high degree of drinking alcohol to relax, while 82 (41.0%) did not. Besides, 117 (58.5%) respondents smoke pipe at high degree, while 83 (41.5%) did not. Also, 116 (58.0%) respondents smoke cigarette at high degree, while 84 (42.0%) respondents did not. The weighted mean value of 2.23 is lower than the criterion of 2.50; hence, it could be inferred that the heart disease at-risk behaviour of secondary school teachers in Ibadan was not encouraging.

Research Question 4: How often do secondary school teachers in Ibadan check their blood pressure?

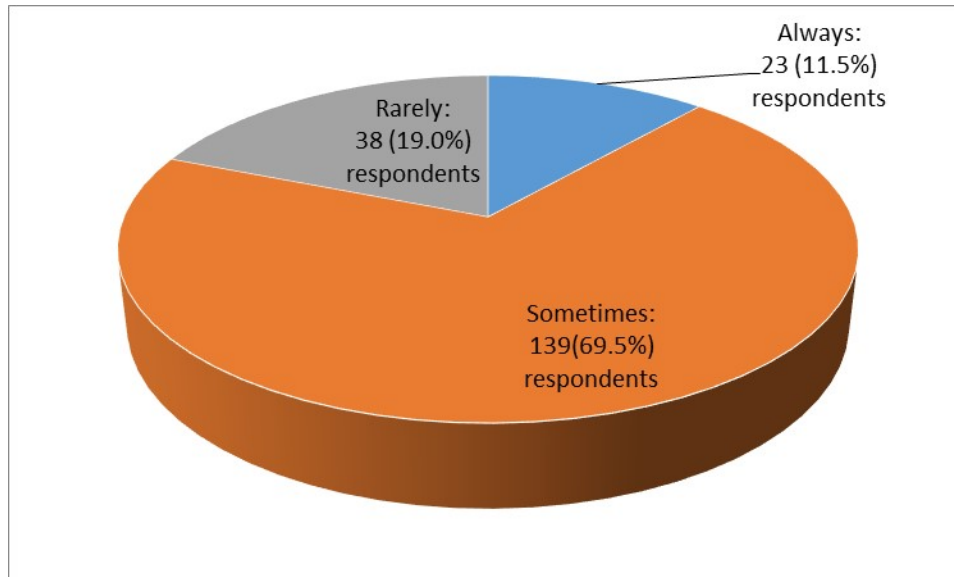


Figure 4.4: Pie chart illustrating how often blood pressure is checked

Fig. 4.4 in addition, 23 (11.5%) respondents affirmed that they always check their blood pressure, 139(69.5%) sometimes check their blood pressure, while 38(19.0%) rarely check their blood pressure. It implies that most of the respondents sometimes check their blood pressure. This means that secondary school teachers check their blood pressure occasionally.

Hypotheses

The following hypotheses were tested in the study:

Hypothesis 1(a): There is no significant main effect of treatment on knowledge of heart disease among secondary school teachers in Ibadan.

Table 4.4: Summary of result showing the pre-post effects of treatment, age and gender on knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State

Source	Dependent Variable	Type III Sum of Squares	DF	Mean Square	F	Sig.	Eta Squared.
Corrected Model	Posttest Knowledge	9.388.662	14	670.619	8.432	.000	.390
	Posttest Attitude	19384.007	14	1384.572	4.577	.000	.257
	Posttest Behaviour	27643.503	14	1974.536	8.084	.000	.380
Pretest Knowledge	Posttest Knowledge	1398.252	1	1398.252	17.581	.000	.087
	Posttest Attitude	6233.789	1	6233.789	20.607	.000	.100
	Posttest Behaviour	756.928	1	756.928	3.099	.080	.016
Pretest Attitude	Posttest Knowledge	1700.191	1	1700.191	21.378	.000	.104
	Posttest Attitude	8392.781	1	8392.781	27.744	.000	.130
	Posttest Behaviour	4.969	1	4.969	.020	.887	.000.
Pretest Behaviour	Posttest Knowledge	318.153	1	318.153	4.000	.047	.021
	Posttest Attitude	1698.979	1	1698.979	5.616	.019	.029
	Posttest Behaviour	12472.749	1	12472.749	51.064	.000	.216
Treatment	Posttest Knowledge	3841.938	1	3841.938	48.308	.000	.207
	Posttest Attitude	1759.678	1	1759.678	5.817	.017	.030
	Posttest Behaviour	1300.611	1	1300.611	5.325	.022	.028
Age	Posttest Knowledge	251.046	2	251.046	1.578	.209	.017
	Posttest Attitude	148.594	2	148.594	.246	.782	.003
	Posttest Behaviour	314.438	2	314.438	.644	.527	.007
Gender	Posttest Knowledge	11.388	1	11.388	.143	.706	.001
	Posttest Attitude	342.359	1	342.359	1.132	.289	.006
	Posttest Behaviour	116.145	1	116.145	.476	.491	.003
Treatment x Age	Posttest Knowledge	173.665	2	173.665	1.092	.338	.012
	Posttest Attitude	537.103	2	537.103	.888	.413	.010
	Posttest Behaviour	1939.639	2	1939.639	3.970	.020	.041
Treatment x Gender	Posttest Knowledge	110.019	1	110.019	1.383	.241	.007
	Posttest Attitude	118.019	1	118.019	.390	.533	.002
	Posttest Behaviour	86.316	1	83.316	.341	.560	.002
Age x Gender	Posttest Knowledge	157.422	2	152.422	.990	.374	.011
	Posttest Attitude	623.460	2	623.460	1.030	.359	.011
	Posttest Behaviour	224.128	2	224.128	.459	.633	.005
Treatment x Age x Gender	Posttest Knowledge	207.469	2	207.469	1.304	.274	.014
	Posttest Attitude	1.385	2	1.385	.002	.998	.000
	Posttest Behaviour	1941.191	2	1941.191	3.974	.020	.041
Error	Posttest Knowledge	14713.018	185	14713.018			
	Posttest Attitude	55964.713	185	55964.713			
	Posttest Behaviour	45187.777	185	45187.777			
Total	Posttest Knowledge	24101.680	199	674814.000			
	Posttest Attitude	75348.720	199	935496.000			
	Posttest Behaviour	72831.280	199	985702.000			

As shown in table 4.4, there was a significant main effect of treatment on knowledge of heart disease of secondary school teachers in Ibadan ($F_{(1,185)} = 48.308, p < 0.05, \eta^2 = 0.207$); hence, the hypothesis was rejected. This implies that the treatment contributed significantly to the variation in participants' scores on knowledge of heart disease of secondary school teachers in Ibadan, Oyo State. The eta square value of 0.207 showed that the treatment had a contribution of 20.7% to participants' knowledge of heart disease.

Table 4.4a: Estimated marginal means of participants' knowledge of heart disease by treatment

Dependent Variable	Treatment Group	Mean	Std. Error
Knowledge	Experimental	62.545	1.263
	Control	48.642	1.512

Table 4.4a shows that participants exposed to Cardiovascular Education (treatment group) had higher posttest mean score ($\bar{x} = 62.545$) on knowledge of heart disease than the participants in the control group with posttest mean score of 48.642. This means that participants exposed to Cardiovascular Education (treatment group) performed better than those in the control group. It implies that Cardiovascular Education is an effective programme that can increase knowledge on heart disease.

Hypothesis 1(b): There is no significant main effect of treatment on attitude towards heart disease among secondary school teachers in Ibadan.

Table 4.4 shows that there was a significant main effect of treatment on attitude towards heart disease among secondary school teachers in Ibadan ($F_{(1,185)} = 5.817, p < 0.05, \eta^2 = 0.030$); hence, the hypothesis was rejected. This implies that the treatment contributed significantly to the variation in participants' scores on attitude towards heart disease of secondary school teachers in Ibadan. The eta square value of 0.030 showed that the treatment had a contribution of about 3% to participants' attitude towards heart disease.

Table 4.4b: Estimated marginal means of participants' attitude towards heart disease by treatment

Dependent Variable	Treatment Group	Mean	Std. Error
Attitude	Experimental	69.485	2.463
	Control	60.077	2.949

Table 4.4b shows that participants exposed to Cardiovascular Education (treatment group) had higher posttest mean score (\bar{x} =69.485) on attitude towards heart disease than the participants in the control group with posttest mean score of 60.077. This means that participants exposed to Cardiovascular Education (treatment group) performed better than those in the control group. It implies that Cardiovascular Education is an effective programme that can bring about positive attitude towards heart disease.

Hypothesis 1(c): There is no significant main effect of treatment on heart disease at-risk behaviour of secondary school teachers in Ibadan.

As shown in table 4.4, there was a significant main effect of treatment on heart disease at-risk behaviours of secondary school teachers in Ibadan ($F_{(1,185)}= 5.325, p<0.05, \eta^2=0.028$); hence, the hypothesis was rejected. This implies that the treatment contributed significantly to the variation in participants' scores on heart disease at-risk behaviour of secondary school teachers in Ibadan. The eta square value of 0.028 showed that the treatment had a contribution of about 2.8% to participants' heart disease at-risk behaviour.

Table 4.4c: Estimated marginal means of participants' heart disease at-risk behaviour by treatment

Dependent Variable	Treatment Group	Mean	Std. Error
At-risk Behaviour	Experimental	71.088	2.214
	Control	62.999	2.649

Table 4.4c shows that participants exposed to Cardiovascular Education (treatment group) had higher posttest mean score ($\bar{x}=71.088$) on heart disease at-risk behaviours than the participants in the control group with posttest mean score of 62.999. This means that participants exposed to Cardiovascular Education (treatment group) performed better than those in the control group. It implies that Cardiovascular Education is an effective programme that can bring about positive heart disease at-risk behaviour.

Hypothesis 2(a): There is no significant main effect of age on knowledge of heart disease among secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant main effect of age on knowledge of heart disease among secondary school teachers in Ibadan ($F_{(2,185)}= 1.578, p>0.05, \eta^2=0.017$); hence, the hypothesis was accepted. This implies that age had no significant contribution to the variation in participants' scores on knowledge of heart disease. The eta square value of 0.017 showed that age had a contribution of about 1.7% to participants' knowledge of heart disease.

Table 4.5a: Estimated marginal means of participants' knowledge of heart disease by age

Dependent Variable	Age	Mean	Std. Error
Knowledge	20 -29 years	52.667	2.554
	30-39 years	56.699	1.116
	40 years and above	57.415	.835

Table 4.5a shows that participants that are over 40 years of age had highest posttest mean score ($\bar{x}=57.415$) on knowledge of heart disease, followed by those between the age range 30-39 years with posttest mean score of 56.699, while the participants who are between 20-29 years had the least posttest mean score ($\bar{x}=52.667$). This implies that participants that are over 40 years of age experience had better knowledge of heart disease than other groups.

Hypothesis 2(b): There is no significant main effect of age on attitude towards heart disease among secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant main effect of age on attitude towards heart disease among secondary school teachers in Ibadan ($F_{(2,185)}= .246, p>0.05, \eta^2=0.003$); hence, the hypothesis was accepted. This implies that age had no significant contribution to the

variation in participants' scores on attitude towards heart disease. The eta square value of 0.003 showed that age had a contribution of about 0.3% to participants' attitude towards heart disease.

Table 4.5b: Estimated marginal means of participants' attitude towards heart disease by age

Dependent Variable	Age	Mean	Std. Error
Attitude	20 -29 years	64.240	4.982
	30-39 years	64.141	2.177
	40 years and above	65.962	1.629

Table 4.5b shows that participants that are over 40 years of age had highest posttest mean score (\bar{x} =65.962) on attitude towards heart disease, followed by those between the age range 20-29 years with posttest mean score of 64.240, while the participants who are between 30-39 years had the least posttest mean score (\bar{x} =64.141). This implies that participants that are over 40 years of age experience had better attitude towards heart disease than other groups.

Hypothesis 2(c): There is no significant main effect of age on heart disease at-risk behaviour of secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant main effect of age on heart disease at-risk behaviour of secondary school teachers in Ibadan ($F_{(2,185)} = .644, p > 0.05, \eta^2 = 0.007$); hence, the hypothesis was accepted. This implies that age had no significant contribution to the variation in participants' scores on heart disease at-risk behaviour. The eta square value of 0.007 showed that age had a contribution of about 0.7% to participants' heart disease at-risk behaviour.

Table 4.5c: Estimated marginal means of participants' heart disease at-risk behaviour by age

Dependent Variable	Age	Mean	Std. Error
At-Risk Behaviour	20 -29 years	65.898	4.477
	30-39 years	68.958	1.956
	40 years and above	66.275	1.464

Table 4.5c shows that participants that are 30-39 years had highest posttest mean score (\bar{x} =68.958) on heart disease at-risk behaviour, followed by those that are over 40 years of age with posttest mean score of 66.275, while the participants who are between 20-29 years had the least posttest mean score (\bar{x} =65.898). This implies that participants that are in the age range of 30-39 engage more in heart disease at-risk behaviour than other groups.

Hypothesis 3(a): There is no significant main effect of gender on knowledge of heart disease among secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant main effect of gender on knowledge of heart disease among secondary school teachers in Ibadan ($F_{(1,185)}= 11.388, p>0.05, \eta^2=0.001$); hence, the hypothesis was accepted. This implies that gender had no significant contribution to the variation in participants' scores on knowledge of heart disease. The eta square value of 0.001 showed that gender had a contribution of about 1.0% to participants' knowledge of heart disease.

Table 4.6a: Estimated marginal means of participants' knowledge of heart disease by gender

Dependent Variable	Gender	Mean	Std. Error
Knowledge	Male	52.223	1.527
	Female	55.964	1.211

Table 4.6a shows that female participants had higher posttest mean score (\bar{x} =55.964) on knowledge of heart disease, while male participants had posttest mean score of 52.223. This implies that female participants had better knowledge of heart disease than their male counterparts.

Hypothesis 3(b): There is no significant main effect of gender on attitude towards heart disease among secondary school teachers in Ibadan.

As indicated in table 4.4, there was no significant main effect of gender on attitude towards heart disease among secondary school teachers in Ibadan ($F_{(1,185)}= 1.132, p>0.05, \eta^2=0.006$); hence, the hypothesis was accepted. This implies that age had no significant contribution to the variation in participants' scores on knowledge of heart disease. The eta square

value of 0.006 showed that gender had a contribution of about 0.6% to participants' attitude towards heart disease.

Table 4.6b: Estimated marginal means of participants' attitude towards heart disease by gender

Dependent Variable	Gender	Mean	Std. Error
Posttest Attitude	Male	62.750	2.978
	Female	66.812	2.362

Table 4.6b shows that female participants had higher posttest mean score (\bar{x} =66.812) on attitude towards heart disease, while male participants had posttest mean score of 62.750. This implies that female participants had better attitude towards heart disease than their male counterparts.

Hypothesis 3(c): There is no significant main effect of gender on heart disease at-risk behaviour of secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant main effect of gender on heart disease at-risk behaviour of secondary school teachers in Ibadan ($F_{(1,185)} = .476, p > 0.05, \eta^2 = 0.003$); hence, the hypothesis was accepted. This implies that gender had no significant contribution to the variation in participants' scores on heart disease at-risk behaviour. The eta square value of 0.003 showed that gender had a contribution of about 0.3% to participants' heart disease at-risk behaviours.

Table 4.6c: Estimated marginal means of participants' heart disease at-risk behaviour by gender

Dependent Variable	Gender	Mean	Std. Error
At-risk behaviours	Male	65.861	2.676
	Female	68.227	2.123

Table 4.6c shows that female participants had higher posttest mean score (\bar{x} =68.227) on heart disease at-risk behaviour, while male participants had posttest mean score of 65.861. This implies that female participants had better heart disease at-risk behaviour than their male counterparts.

Hypothesis 4(a): There is no significant interaction effect of treatment and age on knowledge of heart disease among secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant interaction effect of treatment and age on knowledge of heart disease among secondary school teachers in Ibadan ($F_{(2,185)}= 1.092, p>0.05, \eta^2=0.012$); hence, the hypothesis was accepted. This implies that interaction effect of treatment and age had no significant contribution to the variation in participants' scores on knowledge of heart disease. The eta square value of 0.012 showed that interaction effect of treatment and age had a combined contribution of about 1.2% to participants' knowledge of heart disease.

Table 4.7a: Estimated marginal means of participants' knowledge of heart disease by treatment and age

Dependent Variable	Treatment Group	Age	Mean	Std. Error
Knowledge	Experimental	20 -29 years	61.651	3.107
		30-39 years	63.233	1.753
		40 years and above	62.750	1.150
	Control	20 -29 years	43.683	4.079
		30-39 years	50.165	1.436
		40 years and above	52.079	1.261

Table 4.7a shows that participants in the treatment group that were between 30-39 years had the highest posttest mean score (\bar{x} =63.233) in knowledge of heart disease, than participants that are over 40 years with a mean score of 62.750 and those in the age range of 20-29 years with a mean score of 61.651. This shows that participants in treatment group that are between 30-39 years had the best performance in knowledge of heart disease than the participants that are over 40 years those in the age range of 20-29 years respectively.

In the control group, the participants that are over 40 years obtained the highest mean score (\bar{x} =52.079) over participants that are in the age range of 30-39 years with a mean score of

50.165; and those that are between 20 -29 years with a mean score of 43.683. The overall comparison shows that participants between 30-39 years in treatment group had the highest mean, followed by participants that are over 40 years in the same group. This means that participants between 30-39 years had the best performance in knowledge of heart disease over their counterparts and the participants in control group.

Hypothesis 4(b): There is no significant interaction effect of treatment and age on attitude towards heart disease among secondary school teachers in Ibadan.

Table 4.6 reveals that there was no significant interaction effect of treatment and age on attitude towards heart disease among secondary school teachers in Ibadan ($F_{(2,185)}=.888, p>0.05, \eta^2=0.010$); hence, the hypothesis was accepted. This implies that interaction effect of treatment and age had no significant contribution to the variation in participants' scores on attitude towards heart disease among secondary school teachers in Ibadan. The eta square value of 0.010 showed that interaction effect of treatment and age had a combined contribution of about 1.0% to participants' attitude towards heart disease.

Table 4.7b: Estimated marginal means of participants' attitude towards heart disease by treatment and age

Dependent Variable	Treatment Group	Age	Mean	Std. Error
Attitude	Experimental	20 -29 years	73.271	6.059
		30-39 years	67.196	3.419
		40 years and above	67.990	2.242
	Control	20 -29 years	55.209	7.956
		30-39 years	61.086	2.801
		40 years and above	63.935	2.459

Table 4.7b shows that participants in the treatment group that are between 20-29 years had the highest posttest mean score ($\bar{x}=73.271$) in attitude towards heart disease, than participants that are over 40 years with a mean score of 67.990 and those in the age range of 30-39 years with a mean score of 67.196. This shows that participants in treatment group that are between 20-29 years had the best attitude towards heart disease than the participants that are over 40 years and those in the age range of 30-39 years respectively.

In the control group, the participants that were over 40 years obtained the highest mean score (\bar{x} =63.935) over participants that were in the age range of 30-39 years with a mean score of 61.086; and those that are between 20-29 years with a mean score of 55.209. The overall comparison shows that participants between 20-29 years in treatment group had the highest mean, followed by participants that are over 40 years in the same group. This means that participants between 20-29 years had the best performance in attitude towards heart disease over their counterparts and the participants in control group.

Hypothesis 4(c): There is no significant interaction effect of treatment and age on heart disease at-risk behaviour of secondary school teachers in Ibadan.

Table 4.4 reveals that there was a significant interaction effect of treatment and age on heart disease at-risk behaviour of secondary school teachers in Ibadan ($F_{(2,185)}=3.970$, $p<0.05$, $\eta^2=0.041$); hence, the hypothesis was rejected. This implies that interaction effect of treatment and age had significant contribution to the variation in participants' scores on heart disease at-risk behaviour of secondary school teachers in Ibadan. The eta square value of 0.041 showed that interaction effect of treatment and age had a combined contribution of about 4.1% to participants' heart disease at-risk behaviour.

Table 4.7c: Estimated marginal means of participants' heart disease at-risk behaviour by treatment and age

Dependent Variable	Treatment Group	Age	Mean	Std. Error
At-Risk Behaviour	Experimental	20 -29 years	66.731	5.445
		30-39 years	71.481	3.072
		40 years and above	75.053	2.015
	Control	20 -29 years	65.065	7.149
		30-39 years	66.436	2.517
		40 years and above	57.497	53.137

Table 4.7c shows that participants in the treatment group that are over 40 years had the highest posttest mean score (\bar{x} =75.053) in heart disease at-risk behaviour, than participants that are between 30-39 years with a mean score of 71.481 and those in the age range of 20-29 years with a mean score of 66.731. This shows that participants in treatment group that are over 40

years had the best performance in heart disease at-risk behaviour than the participants that are between 30-39 years and those in the age range of 20-29 years respectively.

In the control group, the participants that are in the age range of 30-39 years obtained the highest mean score (\bar{x} =66.436) over participants that are in the age range of 20-29 years with a mean score of 65.065; and those that were over 40 years with a mean score of 57.497. The overall comparison shows that participants that were over 40 years in the treatment group had the highest mean, followed by participants that were between 30-39 years in the same group. This means that participants that are over 40 years in the treatment group had engaged in heart disease at-risk behaviour over their counterparts and the participants in control group.

Hypothesis 5(a): There is no significant interaction effect of treatment and gender on knowledge of heart disease among secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant interaction effect of treatment and gender on knowledge of heart disease among secondary school teachers in Ibadan ($F_{(1,185)}= 1.383$, $p>0.05$, $\eta^2=0.007$); hence, the hypothesis was accepted. This implies that interaction effect of treatment and gender had no significant contribution to the variation in participants' scores on knowledge of heart disease. The eta square value of 0.007 showed that interaction effect of treatment and gender had a combined contribution of about 0.7% to participants' knowledge of heart disease.

Table 4.8a: Estimated marginal means of participants' knowledge of heart disease by treatment and gender

Dependent Variable	Treatment Group	Gender	Mean	Std. Error
Knowledge	Experimental	Male	63.329	1.990
		Female	61.760	1.529
	Control	Male	47.117	2.316
		Female	50.167	1.947

Table 4.8a shows that male participants in the treatment group had higher posttest mean score (\bar{x} =63.329), while female participants had a mean score of 61.760. This shows that male participants in treatment group had the better performance in knowledge of heart disease than

their female counterparts. In the control group, female participants had higher posttest mean score (\bar{x} =50.167), while male participants had a mean score of 47.117. This shows that female participants in control group had the better performance in knowledge of heart disease than their male counterparts. The overall comparison shows that male participants in the treatment group had the highest mean, followed by female participants in the same group. This means that male participants in the treatment group had the best performance in knowledge of heart disease over their female counterparts and the participants in control group.

Hypothesis 5(b): There is no significant interaction effect of treatment and gender on attitude towards heart disease among secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant interaction effect of treatment and gender on attitude towards heart disease among secondary school teachers in Ibadan ($F_{(1,185)}=.390$, $p>0.05$, $\eta^2=0.002$); hence, the hypothesis was accepted. This implies that interaction effect of treatment and gender had no significant contribution to the variation in participants' scores on attitude towards heart disease. The eta square value of 0.002 showed that interaction effect of treatment and gender had a combined contribution of about 0.2% to participants' attitude towards heart disease.

Table 4.8b: Estimated marginal means of participants' attitude towards heart disease by treatment and gender

Dependent Variable	Treatment Group	Gender	Mean	Std. Error
Attitude	Experimental	Male	68.650	3.882
		Female	70.321	2.982
	Control	Male	56.849	4.517
		Female	63.304	3.796

Table 4.8b shows that female participants in the treatment group had higher posttest mean score (\bar{x} =70.321), while male participants had a mean score of 68.650. This shows that female participants in treatment group had better attitude towards heart disease than their male counterparts. In the control group, female participants had higher posttest mean score (\bar{x} =63.304), while male participants had a mean score of 56.849. This shows that female participants in control group had better performance in attitude towards heart disease than their

male counterparts. The overall comparison shows that female participants in the treatment group had the highest mean, followed by male participants in the same group. This means that female participants in the treatment group had the best performance in attitude towards heart disease over their male counterparts and the participants in control group.

Hypothesis 5(c): There is no significant interaction effect of treatment and gender on heart disease at-risk behaviour of secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant interaction effect of treatment and gender on heart disease at-risk behaviour of secondary school teachers in Ibadan ($F_{(1,185)}=.341, p>0.05, \eta^2=0.002$); hence, the hypothesis was accepted. This implies that interaction effect of treatment and gender had no significant contribution to the variation in participants' scores on heart disease at-risk behaviour of secondary school teachers in Ibadan. The eta square value of 0.002 showed that interaction effect of treatment and gender had a combined contribution of about 0.2% to participants' heart disease at-risk behaviour.

Table 4.8c: Estimated marginal means of participants' heart disease at-risk behaviour by treatment and gender

Dependent Variable	Treatment Group	Gender	Mean	Std. Error
At-Risk Behaviour	Experimental	Male	68.900	3.488
		Female	73.276	2.680
	Control	Male	62.821	4.059
		Female	63.177	3.411

Table 4.8c shows that female participants in the treatment group had higher posttest mean score ($\bar{x}=73.276$), while male participants had a mean score of 68.900. This shows that female participants in treatment group had better performance in heart disease at-risk behaviour than their male counterparts. In the control group, female participants had higher posttest mean score ($\bar{x}=63.177$), while male participants had a mean score of 62.821. This shows that female participants in control group had better performance in heart disease at-risk behaviour than their male counterparts. The overall comparison shows that female participants in the treatment group had the highest mean, followed by male participants in the same group. This means that female

participants in the treatment group had the best performance in heart disease at-risk behaviour over their male counterparts and the participants in control group.

Hypothesis 6(a): There is no significant interaction effect of age and gender on knowledge of heart disease among secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant interaction effect of age and gender on knowledge of heart disease among secondary school teachers in Ibadan ($F_{(2,185)} = .990, p > 0.05, \eta^2 = 0.011$); hence, the hypothesis was accepted. This implies that interaction effect of age and gender had no significant contribution to the variation in participants' scores on knowledge of heart disease. The eta square value of 0.011 showed that interaction effect of age and gender had a combined contribution of about 1.1% to participants' knowledge of heart disease.

Table 4.9a: Estimated marginal means of participants' knowledge of heart disease by age and gender

Dependent Variable	Age	Gender	Mean	Std. Error
Knowledge	20 -29 years	Male	50.189	4.091
	30-39 years		57.963	1.618
	40 years and above		57.517	1.228
	20 -29 years	Female	55.145	3.089
	30-39 years		55.435	1.536
	40 years and above		57.312	1.136

Table 4.9a shows that male participants who are in the age range of 30-39 years had the highest posttest mean score ($\bar{x} = 57.963$) than male participants that are over 40 years with a mean score of 57.517 and those in the age range of 20-29 years with a mean score of 50.189. This means that male participants who are in the age range of 30-39 years had the best performance in knowledge of heart disease than other male participants with diverse age groups. In addition, the female participants who are over 40 years had the highest posttest mean score ($\bar{x} = 57.312$) than female participants in the age range of 30-39 years and those between 20-29 years. This means that female participants who are over 40 years had the best performance in knowledge of heart disease than other female participants with diverse age groups. The overall comparison shows that male participants who are in the age range of 30-39 years had the highest

posttest mean, followed by male that are over 40 years. This means that male participants with 30-39 years had the best performance in knowledge of heart disease than other participants with diverse age groups as well as their female counterparts.

Hypothesis 6(b): There is no significant interaction effect of age and gender on attitude towards heart disease among secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant interaction effect of age and gender on attitude towards heart disease among secondary school teachers in Ibadan ($F_{(2,185)}=1.030, p>0.05, \eta^2=0.011$); hence, the hypothesis was accepted. This implies that interaction effect of age and gender had no significant contribution to the variation in participants' scores on attitude towards heart disease. The eta square value of 0.011 showed that interaction effect of age and gender had a combined contribution of about 1.1% to participants' attitude towards heart disease.

Table 4.9b: Estimated marginal means of participants' attitude towards heart disease by age and gender

Dependent Variable	Age	Gender	Mean	Std. Error
Attitude	20 -29 years	Male	58.192	7.978
	30-39 years		65.371	3.156
	40 years and above		64.686	2.396
	20 -29 years	Female	70.288	6.019
	30-39 years		62.910	2.996
	40 years and above		67.239	2.216

Table 4.9b shows that male participants who are in the age range of 30-39 years had the highest posttest mean score ($\bar{x}=65.371$) than male participants that are over 40 years with a mean score of 64.686 and those in the age range of 20-29 years with a mean score of 58.192. This means that male participants who are in the age range of 30-39 years had the best performance in attitude towards heart disease than other male participants with diverse age groups.

In addition, the female participants who are in the age range of 20-29 years had the highest posttest mean score ($\bar{x}=70.288$) than female participants who are over 40 years with a

mean score of 67.239 and those between 30-39 years with a mean score of 62.910. This means that female participants who are in the age range of 20-29 years had the best performance in attitude towards heart disease than other female participants with diverse age groups. The overall comparison shows that female participants who are in the age range of 20-29 years had the highest posttest mean, followed by female that are over 40 years. This means that female participants with 20-29 years had the best performance in attitude towards heart disease than other participants with diverse age groups as well as their male counterparts.

Hypothesis 6(c): There is no significant interaction effect of age and gender on heart disease at-risk behaviour of secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant interaction effect of age and gender on heart disease at-risk behaviour of secondary school teachers in Ibadan ($F_{(2,185)}=.459, p>0.05, \eta^2=0.005$); hence, the hypothesis was accepted. This implies that interaction effect of age and gender had no significant contribution to the variation in participants' scores on heart disease at-risk behaviour of secondary school teachers in Ibadan. The eta square value of 0.005 showed that interaction effect of age and gender had a combined contribution of about 0.5% to participants' heart disease at-risk behaviour.

Table 4.9c: Estimated marginal means of participants' heart disease at-risk behaviour by age and gender

Dependent Variable	Age	Gender	Mean	Std. Error
At-Risk Behaviour	20 -29 years	Male	65.723	7.169
	30-39 years		66.147	2.836
	40 years and above		65.712	2.153
	20 -29 years	Female	66.073	5.408
	30-39 years		71.770	2.692
	40 years and above		66.838	1.991

Table 4.9c shows that male participants who are in the age range of 30-39 years had the highest posttest mean score ($\bar{x}=66.147$) than male participants that are in the age range of 20-29 years with a mean score of 65.723; and those that are over 40 years with a mean score of 65.712.

This means that male participants who are in the age range of 30-39 years had the best performance in heart disease at-risk behaviour than other male participants with diverse age groups.

In addition, the female participants who are in the age range of 30-39 years had the highest posttest mean score ($\bar{x} = 71.770$) than female participants who are over 40 years with a mean score of 66.838 and those between 20-29 years with a mean score of 66.073. This means that female participants who are in the age range of 30-39 years had the best performance in heart disease at-risk behaviour than other female participants with diverse age groups. The overall comparison shows that female participants who are in the age range of 30-39 years had the highest posttest mean, followed by female that are over 40 years. This means that female participants with 30-39 years had the best performance in heart disease at-risk behaviour than other participants with diverse age groups as well as their male counterparts.

Hypothesis 7(a): There is no significant interaction effect of treatment, age and gender on knowledge of heart disease among secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant interaction effect of treatment, age and gender on knowledge of heart disease among secondary school teachers in Ibadan ($F_{(2,185)} = 1.304, p > 0.05, \eta^2 = 0.014$); hence, the hypothesis was accepted. This implies that interaction effect of treatment, age and gender had no significant contribution to the variation in participants' scores on knowledge of heart disease. The eta square value of 0.014 showed that interaction effect of treatment, age and gender had a combined contribution of about 0.1% to participants' knowledge of heart disease.

Table 4.10a: Estimated marginal means of participants' knowledge of heart disease by treatment, age and gender

Dependent Variable	Treatment	Age	Gender	Mean	Std. Error
Knowledge	Experimental	20 -29 years	Male	59.332	5.195
		30-39 years		65.114	2.414
		40 years and above		65.541	1.575
		20 -29 years	Female	63.970	3.400
		30-39 years		61.351	2.506
		40 years and above		59.960	1.646
	Control	20 -29 years	Male	41.046	6.318
		30-39 years		50.812	2.171
		40 years and above		49.492	1.914
		20 -29 years	Female	46.319	5.193
		30-39 years		49.518	1.859
		40 years and above		54.665	1.621

Table 4.10a shows that male participants in the treatment group who are over 40 years had the highest posttest mean score (\bar{x} =65.541) than participants that are in the age range of 30-39 years with a mean score of 65.114; and those that are between 20 -29 years a mean score of 59.332. This means that male participants in the treatment group who are over 40 years had the best performance in knowledge of heart disease than other male participants in treatment group with diverse age category. The table further reveals that female participants in the treatment group who are in the age range of 20-29 years had the highest posttest mean score (\bar{x} =63.970) than participants that are in the age range of 30-39 with a mean score of 61.351; and those that are over 40 years. This means that female participants in the treatment group who are in the age range of 20-29 years had the best performance in knowledge of heart disease than other female participants in treatment group with diverse age category.

The table further reveals that male participants in the control group who are in the age of 30-39 years had the highest posttest mean score (\bar{x} =50.812) than participants that are over 40 years with a mean score of 49.492; and those that are between 20 -29 years a mean score of 41.046. This means that male participants in the control group who are in the age of 30-39 years

had the best performance in knowledge of heart disease than other female participants in treatment group with diverse age category. The table also reveals that female participants in the control group who are over 40 years had the highest posttest mean score ($\bar{x}=54.665$) than participants that are in the age range of 30-39 with a mean score of 49.518; and those that are between 20-29 years with a mean score of 46.319. This means that female participants in the control group who are over 40 years had the best performance in knowledge of heart disease than other female participants in control group with diverse age category.

The overall comparison shows that male participants in the treatment group who are over 40 years had the highest mean, followed by male participants between 30-39 years the same treatment group. This means that male participants in the treatment group who are over 40 years had the best performance in knowledge of heart disease than their male and female counterparts with diverse age categories in both treatment and control group.

Hypothesis 7(b): There is no significant interaction effect of age and gender on attitude towards heart disease among secondary school teachers in Ibadan.

Table 4.4 reveals that there was no significant interaction effect of age and gender on attitude towards heart disease among secondary school teachers in Ibadan ($F_{(2,185)}=.002, p>0.05, \eta^2=0.000$); hence, the hypothesis was accepted. This implies that interaction effect of age and gender had no significant contribution to the variation in participants' scores on attitude towards heart disease. The eta square value of 0.000 showed that interaction effect of age and gender had a combined contribution of 0.0% to participants' attitude towards heart disease.

Table 4.10b: Estimated marginal means of participants' attitude towards heart disease by treatment, age and gender

Dependent Variable	Treatment	Age	Gender	Mean	Std. Error
Attitude	Experimental	20 -29 years	Male	68.439	10.132
		30-39 years		69.704	4.708
		40 years and above		67.807	3.072
		20 -29 years	Female	78.103	6.631
		30-39 years		66.307	3.161
		40 years and above		68.172	3.210
	Control	20 -29 years	Male	47.945	12.321
		30-39 years		61.038	4.235
		40 years and above		61.564	3.733
		20 -29 years	Female	62.472	10.128
		30-39 years		61.133	3.625
		40 years and above		64.687	4.887

Table 4.10b shows that male participants in the treatment group who are in the age range of 30-39 years had the highest posttest mean score (\bar{x} =69.704) than participants that are in the age range of 20-29 years with a mean score of 68.439; and those that are over 40 years with a mean score of 67.807. This means that male participants in the treatment group who are in the age range of 30-39 years had the best performance in attitude towards heart disease than other male participants in treatment group with diverse age categories. The table further reveals that female participants in the treatment group who are in the age range of 20-29 years had the highest posttest mean score (\bar{x} =78.103) than participants that are over 40 years with a mean score of 68.172; and those that are in the age range of 30-39 with a mean score of 66.307. This means that female participants in the treatment group who are in the age range of 20-29 years had the best performance in attitude towards heart disease than other female participants in treatment group with diverse age categories.

The table further reveals that male participants in the control group who are over 40 years had the highest posttest mean score (\bar{x} =61.564) than participants that are in the age of 30-39

years with a mean score of 61.038; and those that are between 20-29 years a mean score of 47.945. This means that male participants in the control group who are over 40 years had the best performance in attitude towards heart disease than other male participants in control group with diverse age categories.

The table also reveals that female participants in the control group who are over 40 years had the highest posttest mean score ($\bar{x} = 64.687$) than participants that are in the age range of 20-29 with a mean score of 62.472; and those that are between 20-29 years with a mean score of 61.133. This means that female participants in the control group who are over 40 years had the best performance in attitude towards heart disease than other female participants in control group with diverse age categories. The overall comparison shows that female participants in the treatment group who are in the age range of 20-29 years had the highest mean, followed by male participants between 30-39 years the same treatment group. This means that female participants in the treatment group who are between 20-29 years had the best performance in knowledge of heart disease than their male and female counterparts with diverse age categories in both treatment and control group.

Hypothesis 7(c): There is no significant interaction effect of treatment, age and gender on heart disease at-risk behaviour of secondary school teachers in Ibadan.

Table 4.4 reveals that there was a significant interaction effect of treatment, age and gender on heart disease at-risk behaviour of secondary school teachers in Ibadan ($F_{(2,185)}=3.974, p<0.05, \eta^2=0.041$); hence, the hypothesis was rejected. This implies that interaction effect of treatment, age and gender had a significant contribution to the variation in participants' scores on heart disease at-risk behaviour of secondary school teachers in Ibadan. The eta square value of 0.041 showed that interaction effect of treatment, age and gender had a combined contribution of about 0.4% to participants' heart disease at-risk behaviour.

Table 4.10c: Estimated marginal means of participants' at-risk behaviour by treatment, age and gender

Dependent Variable	Treatment	Age	Gender	Mean	Std. Error
At-Risk Behaviour	Experimental	20 -29 years	Male	73.200	3.257
		30-39 years		72.622	4.231
		40 years and above		71.875	2.760
		20 -29 years	Female	71.259	5.959
		30-39 years		70.340	4.391
		40 years and above		78.230	2.884
	Control	20 -29 years	Male	69.244	11.072
		30-39 years		59.671	3.806
		40 years and above		59.548	3.354
		20 -29 years	Female	60.887	9.100
		30-39 years		62.203	9.104
		40 years and above		55.445	2.840

Table 4.10c shows that male participants in the treatment group who are in the age range of 20-29 years had the highest posttest mean score (\bar{x} =73.200) than participants that are in the age range of 30-39 years with a mean score of 72.622; and those that are over 40 years with a mean score of 71.875. This means that male participants in the treatment group who are in the age range of 20-29 years had the best performance in heart disease at-risk behaviour than other male participants in treatment group with diverse age categories. The table further reveals that female participants in the treatment group who are over 40 years had the highest posttest mean score (\bar{x} =78.230) than participants in the age range of 20-29 years with a mean score of 71.259 and those that are in the age range of 30-39 with a mean score of 70.340. This means that female participants in the treatment group who are over 40 years had the best performance in heart disease at-risk behaviour than other female participants in treatment group with diverse age categories.

The table further reveals that male participants in the control group who are in the age range of 20-29 years had the highest posttest mean score (\bar{x} =69.244) than participants that are in the age of 30-39 years with a mean score of 59.671; and those that are over 40 years. This means

that male participants in the control group who are in the age range of 20-29 years had the best performance in heart disease at-risk behaviour than other male participants in control group with diverse age categories. The table also reveals that female participants in the control group who are in the age range of 30-39 years had the highest posttest mean score ($\bar{x}=62.203$) than participants that are in the age range of 20-29 with a mean score of 60.887; and those that are over 40 years with a mean score of 55.445. This means that female participants in the control group who are in the age range of 30-39 years had the best performance in heart disease at-risk behaviour than other female participants in control group with diverse age categories. The overall comparison shows that female participants in the treatment group who are over 40 years had the highest mean, followed by male participants between 20-29 years in the same treatment group. This means that female participants in the treatment group who are over 40 years had the best performance in heart disease at-risk behaviour than their male and female counterparts with diverse age categories in both treatment and control group.

Summary of Findings

- 1a. Treatment had significant effect on knowledge of heart disease among secondary school teachers. Participants exposed to cardiovascular education had the highest posttest mean score than those in the control group. Furthermore, 20.7% of the total variance in participant knowledge contributed to the influence of treatment.
- 1b. Treatment had significant effect on attitude towards heart disease among secondary school teachers. Participant exposed to cardiovascular education had the highest posttest mean score than those in the control group. Furthermore, 3.0% of the total variance in participants' attitude contributed to the influence of treatment.
- 1c. Treatment had significant effect on heart disease at-risk behaviour of secondary school teachers. Participants exposed to cardiovascular education had the highest posttest mean score than those in the control group. Furthermore, 2.8% of the total variance in participants' at-risk behaviour contributed to the influence of treatment.

- 2a. Age had no significant effect on knowledge of heart disease among secondary school teachers. However, 1.7% of the total variance in participants' knowledge contributed to the influence of age.
- 2b. Age had no significant effect on attitude towards heart disease among secondary school teachers. However, 0.3% of the total variance in participants' attitude contributed to the influence of age.
- 2c. Age had no significant effect on heart disease at risk behaviour of secondary school teachers. However, 0.7% of the total variance in participants at risk behaviour contributed to the influence of age.
- 3a. Gender had no significant effect on knowledge of heart disease among secondary school teachers. However, 0.1% of the total variance in participants' knowledge contributed to the influence of gender.
- 3b. Gender had no significant effect on attitude towards heart disease among secondary school teachers. However, 0.6% of the total variance in participants' attitude contributed to the influence of gender.
- 3c. Gender had no significant effect on heart disease at-risk behaviour of secondary school teachers. However, 0.3% of the total variance in participants' at-risk behaviour contributed to the influence of gender.
- 4a. The interaction effect of treatment and age had no significant effect on knowledge of heart disease among secondary school teachers. However, 1.2% of the total variance in participants' knowledge contributed to the influence of treatment and age.
- 4b. The interaction effect of treatment and age had no significant effect on attitude towards heart disease among secondary school teachers. However, 1.0% of the total variance in participants' attitude contributed to the influence of treatment and age.
- 4c. The interaction effect of treatment and age had significant effect on heart disease at risk behaviour of secondary school teachers. However, 4.1% of the total variance in participants' at-risk behaviour contributed to the influence of treatment and age.

- 5a. The interaction effect of treatment and gender had no significant effect on knowledge of heart disease among secondary school teachers. However, 0.7% of the total variance in participants' knowledge contributed to the influence of treatment and gender.
- 5b. The interaction effect of treatment and gender had no significant effect on attitude towards heart disease among secondary school teachers. However, 0.2% of the total variance in participants' attitude contributed to the influence of treatment and gender.
- 5c. The interaction effect of treatment and gender had no significant effect on heart disease at risk behaviour of secondary school teachers. However, 0.2% of the total variance in participants' at risk behaviour contributed to the influence of treatment and gender.
- 6a. The interaction effect of age and gender had no significant effect on knowledge of heart disease among secondary school teachers. However, 1.1% of the total variance in participants' knowledge contributed to the influence of age and gender.
- 6b. The interaction effect of age and gender had no significant effect on attitude towards heart disease among secondary school teachers. However, 1.1% of the total variance in participants' knowledge contributed to the influence of age and gender.
- 6c. The interaction effect of age and gender had no significant effect on heart disease at-risk behaviour of secondary school teachers. However, 0.5% of the total variance in participants at risk behaviour contributed to the influence of age and gender.
- 7a. The interaction effect of treatment, age and gender had no significant effect on knowledge of heart disease among secondary school teachers. However, 1.4% of the total variance in participants' knowledge contributed to the combined effect of treatment, age and gender.
- 7b. The interaction effect of treatment, age and gender had no significant effect on attitude towards heart disease among secondary school teachers. However, 0.0% of the total variance in participants' attitude contributed to the combined effect of treatment, age and gender.

- 7c. The interaction effect of treatment, age and gender had significant effect on heart disease at-risk behaviour of secondary school teachers. However, 4.1% of the total variance in participants' at risk behaviour contributed to the combined effect of treatment, age and gender.

Discussions of Findings

The finding of this study showed that there is significant main effect of treatment (cardiovascular education) on knowledge, attitude and heart disease at risk behaviour of secondary school teachers in Ibadan, Oyo State. This is in line with the findings of Awosan, Ibrahim Makusidi, Essien and Adeniji (2013) who concluded that there is a statistical significant difference between teachers pretest and posttest scores from 47% to 91% in the intervention group. The participants in treatment group (cardiovascular education) recorded increase in knowledge of symptoms and signs, risk factors and prevention of cardiovascular diseases at post-intervention, but such a uniform pattern was not observed among the control group participants. Cardiovascular education made significant impact in improving teachers' knowledge, attitude and modulate their behaviour. The study suggests that behavioural change communication and health promotion activities to enhance smoking cessation regular moderate exercises, healthy diet and reduce alcohol use, should be put in place in homes and workplaces. This also corroborated the finding of Gil-Guillen, Hermida, Pita-Fernandez, Palazon-Bru, Lopez-Pineda and Navarro (2014) whose result showed that there is a statistically significant improvement after exposure to educational programme in primary health care professionals' knowledge, particularly in the rates of recording or cardiovascular risk factors such as cholesterol, basal blood glucose, smoking, alcohol microalbuminuria, abdominal circumference and a host of others.

The result is in consonance with the view of Anetor, Ogundele and Oyewole (2012) who concluded that nutrition education is effective and had significant effect in modulating eating habits among undergraduate students in South West Nigeria. Yao, Cheng, Hu and Chen (2013) revealed in their study that after health educational intervention regarding colo-rectal cancer screening is effective in significantly increasing knowledge and practice towards cancer prevention. In their study, Hispanic womens' knowledge increased from 48% to 72% due to their intervention. Also, this is in line with the finding of Kirk-Gardner and Steven (2003) who

concluded that there was a significant improvement in knowledge and reduced risk behaviours among healthy adults after exposure to educational programme on heart health promotion. Previous studies by Hislop, The, Low, Tu, Li and Taylor (2008); Holiman, Olsson and Ek (2006); Erhun, Olayiwola, Agbani and Omotoso (2005); Huang, Chen, Yu, Chen and Lin (2002) have also found improved compliance and adherence to lifestyle changes after educational programmes. Face to face educational intervention was clearly useful in improving knowledge, forming the right attitude and also helps individuals to make informed decisions.

Also, the findings of Bush, Zuckerman, Theiss, Taggart, Horowitz, Sheridan and Walter (2007) revealed that intervention programme on cardiovascular risk factors among school children had significant impact in their systolic and diastolic blood pressure HDL cholesterol, fitness and smoking habits. The study concluded that significant changes found for health knowledge increased by 65%, and blood pressure reduction was strongly associated with decreased ponderosity. This is also in line with the view of Jeemon, Prabhakaran, Goenka, Ramakrishnan, Huffman and Reddy (2012) who concluded that a risk reduction programme significantly reduced cardiovascular disease risk burden among Indian Industrial Workers. They further stated that participants in the intervention group recorded decreased blood pressure while the control group continued to record high blood pressure.

This tallied also with the finding of Prabhakaran (2009) which showed that educational programme led to significant improvement in knowledge, attitude and positive general behaviour among industrial workers in India. The intervention focused on behaviours at individual level, interpersonal level and environmental population level. In the intervention sites, there was a significant reduction of fruits and lower smoking, more physical activity, more consumption of fruits and lower consumption of salt. The study concluded that there was a significant decline in weight, waist size, blood pressure, fasting glucose and cholesterol at intervention sites.

The result of this study is also supported by Cappuccio, Kerry, Micah, Plange-Rhule and Eastwood (2006) in a study on effect of educational programme among semi-rural and rural participants in Ghana to reduce salt intake and blood pressure. After intervention programme, at both three and six months, there was a consistent and significant relationship between fall in urinary sodium and fall in systolic blood pressure (A 50mmol per day lower urinary sodium was associated with a fall in systolic blood pressure 1.0 and 3.2 mmHg at three months, while

between 0.1 and 2.6mmHg was noted at six months). The study suggests that community based strategies of health promotion for the management of chronic disease through lifestyle changes in sub-saharan Africa should be considered. In another study by Voogdt-Pruis, Beusmans, Goegels, Kester and Van Ree (2010) on effectiveness of educational programme on cardiovascular risk management among nurses and general practitioners (GPs) in Netherlands. A significant decrease in the mean level of risk factors was observed in the practice nurse group compared to the general practitioners group. The study concluded that nurses results, were equal to or better than GPs in the management of cardiovascular risk factors.

The present study is unique as it has been proven to be effective in bringing about improvement and increase in knowledge, attitude and positive behavioural outcomes among the study participants. The effectiveness of the intervention in improving knowledge, attitude and heart disease at-risk behaviour is in agreement with a number of studies from several countries like the United States (Zeinomar and Moleshi, 2013; Young et al, 1996), Spain (Gil-Guillen, Herminda, Pita-Fernandez, Palazon-Bru, Lopez-Pineda and Navarro, 2015), Australia (Deeks et al, 2009), Egypt (Abd-el-Aziz, Ola and Ibrahim, 2009) as well as Ghana (Cappuccio, Kerry, Micah, Plange-Rhule and Eastwood, 2006). Conversely, the findings of Burusic, Karabegovic, Baric and Lidija (2015); Abinav, Umesh and Alexandria (2013) in their studies conducted among students in Croatia and Semi-Urban community residents in Nepal revealed that after interventions, the pretest-posttest scores remained low. Similarly, Dodd, Turnbull, Mcphee, Deussen, Grivell and Robinson (2014) reported in their study that educational intervention was not significant in improving maternal and infant health among overweight/obese women in Australia, both in experimental and control groups.

The finding of this study showed that there was no significant main effect of age on knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State. This implies that age of teachers did not influence their post intervention knowledge, attitude and heart disease at risk behaviour. Although, the study recorded no significant effect of age, the mean score was found to be higher with females than males. However, a significant improvement was recorded when age was taken along with treatment. This may be due to the fact that teachers irrespective of their age, will continue to strive to improve on their knowledge and health status in order to live a productive life. This is in line with the view of Drenowatz,

Wartha, Brandstetter and Steinacker (2013) that there was no significant difference on age of the students, while using teacher-centred, school-based intervention to assess their knowledge, attitude and health behaviour toward cardiovascular risk reduction.

This is also in consonance with Booth, Kapral, Fung and Tu (2006) who concluded that age was not significant among younger men and women with diabetic illness and transition to a high risk category both in relative and absolute terms compared to non-diabetic men and women. However, this outcome contradicts the findings of Negussie and Chepngeno (2005) who reported that maternal age was found to be a strong predictor of health care seeking behaviour among older care givers in Nairobi regarding their children. Older women tend to be more caring and full of experience than young mothers.

The finding of this study showed that there was no significant main effect of gender on knowledge, attitude and heart disease at risk behaviour of secondary school teachers in Ibadan, Oyo State. It is clear from the mean score that females had higher mean score than their male counterparts on knowledge, attitude and heart disease at-risk behaviour. This implies that females had more knowledge, better attitude and improved heart disease at risk behaviour. The reason for this could be due to the fact that females tend to be conscious of their health. Arulogun and Adefioye (2010) who found out that women tend to have more knowledge (61.3%) about issues relating to reproductive and sexual health than their male counterpart (45%). Similar to this, is the view of Moller-Leimkuhler (2007) who concluded that females tend to be more disposed to depression and higher risk of cardiovascular diseases when associated with low economic status, as compared with males.

Conversely, Al-Maskari (2007) reported in a study on HIV/AIDS knowledge, attitude and educational needs among Arab University students that gender remained a factor to consider in reproductive issues. The study concluded that males scored higher on knowledge, have better attitude and behaviour when compared to female participants. This also tallied with the view of Bots, Peters and Woodward (2017) who concluded that coronary mortality was higher in men than in women throughout adulthood, but the magnitude varied by age. Young, Haskell. Taylor and Fortmann (1996) whose report concluded that community health education on physical activity had significant effect on knowledge attitude and behaviour among men in Central California when compared to women.

The finding of this study showed that the interaction effect of treatment, age and gender on knowledge and attitude was not significant, but was significant on heart disease at risk behaviour of secondary school teachers in Ibadan, Oyo State. This is in line with the view of Ssewamala, Ismayilova, Mckay, Sperber, Bannon and Alicea (2010) who concluded in their study that intervention had significant effect on sexual risk taking behaviour among AIDS – orphaned adolescent youth in Uganda. Age was not significant, but benefitted females more than males. This also tallied with Stavrianopoulos (2016) who concluded that intervention on Nurses-led telephone programme on the quality of life among patients with heart failure in Greece had no significant effect on age and gender, but improved their behavioural outcomes. This is also in line with the view of Cheng, Hu and Chen (2013) who reported significant improvement after educational programme on handwashing practices among Chinese adults.

The study concluded that age and gender were not significant on participants' knowledge, attitude and practice. This is also tallied with Adamu, Abiola and Ibrahim (2012) who concluded that age was not significant among female teachers in the uptake of free papsmear, but the educational programme improved knowledge, attitude and practice of those in the intervention group than the control group. Sanusi (2002) concluded that despite the significant effect of health education intervention programme on awareness of and attitude towards organ donation and transplantation among students, age and gender were not significant cutting across the age divide of the participants and also both female and male. It is sufficient to say that age and gender do mutually co-exist and predict cardiovascular at risk behaviour among individuals. Positive behavioural change has become the hallmark of intervention programme for effectiveness.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents the summary, conclusion and recommendations which were drawn based on the result of the findings. The contributions to knowledge as well as suggestions for further studies were made based on the identified limitations in the study.

Summary

The study examined the effects of cardiovascular education on knowledge, attitude and heart disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State, Nigeria. The study was carried out using pretest-posttest control group quasi experimental research design using 2x3x2 factorial matrix. Two hundred participants were selected as sample for the study; using multistage sampling procedures that involve purposive, simple random and volunteerism. The participants were placed in two groups: experimental and control groups. Participants in the treatment group were exposed to eight weeks training using the manual developed by the researcher. Data were collected before and after the intervention programme using self-developed questionnaire. Data was analysed using both descriptive and inferential statistics. The descriptive statistics used were frequency count, simple percentage, bar and pie chart, while Analysis of Covariance (ANCOVA) was the inferential statistics used to determine the main as well as the interaction effects of the independent, dependent and moderating variables.

The study provided answers to four research questions and tested seven hypotheses each with three sub-variables, making it twenty one sub variables. Five of the sub variables were rejected while the remaining sixteen were accepted. The result of the study showed that cardiovascular education was very effective on knowledge, attitude and heart disease at-risk behaviour. The result also showed that age and gender had no significant effects on knowledge, attitude and heart disease at- risk behaviour of participants in the study. There was a significant interaction of treatment and age on heart disease at-risk behaviour, but not on knowledge and attitude. However, the result showed that the interaction effect of treatment, age and gender was significant on heart disease at-risk behaviour but not on knowledge and attitude.

Conclusion

Based on the findings of this study, it was concluded that cardiovascular education was very effective on knowledge, attitude and heart disease at-risk behaviour of those who participated in the study. Also age had no significant effect on knowledge, attitude and heart disease at-risk behaviour. Gender had no significant effect on knowledge, attitude and heart disease at-risk behaviour. Cardiovascular education and age had significant interaction effect on heart disease at-risk behaviour, but not on knowledge and attitude. It was also concluded that the cardiovascular education, when considered together with age and gender had effect on heart disease at-risk behaviour, but not so on secondary school teachers' knowledge and attitude towards heart disease.

Recommendations

Based on the findings of this study and the conclusion the following recommendations were made:

1. There is the need for health educators and public health officials to provide cardiovascular education for secondary school teachers in form of seminars so as to improve their knowledge, attitude and heart disease at-risk behaviour for healthy life that can guarantee productivity and reduction in mortality and morbidity
2. Cardiovascular education involving secondary school teachers should be intensified among both young and older secondary school teachers as adequate information about the attitude and behaviour that modulate heart disease would invariably be passed down to the growing population under them. This is because heart related diseases do not only affect old people.
3. Opportunities must be provided for secondary school teachers for recreational and keep fit programme so as reduce physical inactivity among them.
4. Teachers must as opinion leaders to students, non-teaching staff and community members set good example in term of heart friendly lifestyle choices.

5. Pre-employment and in-service health screening should be carried out for secondary school teachers for proper monitoring of their cardiovascular health and ensuring adequate treatment when necessary. This would encourage high productivity, quality of life and living a fulfilled life.

Contribution to Knowledge

This present work has added to the increasing body of knowledge aiming to stem the scourge of cardiovascular disease by health education in the following ways:

1. The study established that cardiovascular education is an effective programme in bringing about improvement in knowledge, attitude and heart disease at-risk behaviour.
2. It particularly established the insufficient knowledge in cardiovascular disease in a middle class population in secondary school teachers in an urban Nigeria community.
3. It also showed that cardiovascular health intervention is able to positively alter the heart at-risk behaviour when vigorously pursued.
4. It provides a tested and proven cardiovascular manual that can be deployed to achieve positive at-risk behaviour.

Suggestion for Further Studies

1. This study was carried out among secondary school teachers only; further studies could be conducted among primary school teachers, lecturers in tertiary institutions, non-teaching staff in educational institutions.
2. Drug compliance among hypertensive teachers and factors associated with it among secondary school teachers can also be studied with a view of reducing prevalence of stroke in the society.

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APPENDIX I
DEPARTMENT OF HUMAN KINETICS AND HEALTH EDUCATION
UNIVERSITY OF IBADAN, NIGERIA

Questionnaire on Effects of Cardiovascular Education on Knowledge, Attitude and Heart Disease At-Risk Behaviour of Secondary School Teachers in Ibadan, Oyo State

Dear Respondent,

I am a Ph.D student in Health Education in the above named department and institution. This questionnaire is designed to examine knowledge, attitude and disease at-risk behaviour of secondary school teachers in Ibadan, Oyo State.

Your responses shall be highly appreciated and treated confidentially. Please, note that data collected is for academic purpose only and. Please fill each item appropriately as it applies to you. Kindly know that your participation is voluntary and the outcome of this study may influence government and relevant stakeholders take interest in health and general welfare of teachers.

Thank you.

Yours sincerely,

Familoni I.F. (Researcher)

SECTION A: Demographic Information

Instruction: Please tick (✓) in the column as it applies to you in each of the following items:

1. Sex: (1) Male () (2) Female ()
2. Years of teaching experience: (1)1-10 years () (2) 11-20 years () (3) 21years and above ()
3. Age: (1) 20-29 year () (2) 30-39 () (3) 40 years and above ()
4. Do you check your blood pressure (1) Yes () (2) No ()
5. If yes, how often do you check your blood pressure?
 - (1) Always [once in 3 months] ()
 - (2) Sometimes [once in a year] ()
 - (3) Rarely [once in 3 years] ()

SECTION B

Knowledge of Cardiovascular Disease Scale (KCDS)

Answer “Yes” or “No” to the following statements

S/n	Items	Yes	No
1	Cardiovascular disease involves the heart and blood vessels		
2	Cardiovascular disease occurs in adults		
3	Cardiovascular disease is common in children		
4	Cardiovascular disease is caused by infection		
5	Cardiovascular disease affects other parts of the body		
6	One of the symptom of cardiovascular disease is headache		
7	Stroke is a cardiovascular disease		
8	Hypertension is a cardiovascular disease		
9	Risk of cardiovascular disease is higher in men than women		
10	Risk of cardiovascular disease is higher in menopausal women than pre-menopausal women		
11	Smoking can cause cardiovascular disease		
12	Alcohol consumption may lead to cardiovascular disease		
13	Stress causes cardiovascular disease		
14	Obesity can cause Cardiovascular disease		
15	Diet can cause Cardiovascular disease		
16	Physical inactivity may lead to cardiovascular disease		
17	Chest pain is associated with cardiovascular disease		
18	Pain in the legs relieved by rest is associated with cardiovascular disease		
19	Cardiovascular disease is hereditary		
20	Cardiovascular disease cannot be cured		

SECTION C

Attitude Towards Heart Disease At-Risk Behaviour Scale (ATHDARBS)

Instruction: Please tick (✓) in the appropriate column the one that best describe your answer in the following statements.

Key: 4 – Strongly Agreed (SA), 3 – Agree (A),

2 – Strongly Disagree (SD) 1 – Disagree (D)

S/n	Item	4	3	2	1
1	I don't feel bothered when I hear about heart disease				
2	Those who are smoking are justified				
3	My schedules at work and home do not give less time for me to exercise				
4	Taking few sticks of cigarette is advisable when one is under stress				
5	Engaging in exercise is too burden some				
6	Checking ones blood pressure demonstrate less faith in God				
7	Meals are better off with coca-cola, fanta, e.t.c than with water				
8	I will stop taking alcohol, if it will reduce my risk of heart disease				
9	I will stop smoking if it will reduce my risk of heart disease				
10	I often find it difficult to socialize due to pressure of my work				
11	I cannot leave friends who smoke for any reason				
12	I hardly find time to rest until late in the night				
13	I don't have time to check my blood pressure				
14	I will engage in physical exercise if it will reduce my risk of heart disease				
15	Alcohol intake refreshes the soul and body				
16	Those who drink alcohol are sociable				
17	Alcohol consumption has less health implication than noise being made against it				
18	Sweetness of meat should be considered before its health consequences				
19	I hardly fall sick, hence I do not see any need to check my blood pressure				
20	Taking snacks is often times better than meals				
21	I prefer to eat meat than fish				

SECTION D

Heart Disease At-Risk Behaviour Scale (HDARBS)

INSTRUCTION: Please tick (✓) in the appropriate column, the one that best describe degree to which you engage in the following action within the past one year.

Key: 4 – Very High Degree (VHD), 3 – High Degree (HD),
2 – Low Degree (LG), 1 – Very Low Degree (VLD)

S/N		VHD	HD	LD	VLD
1	Always working most of the time				
2	Consumption of fried food				
3	Working till I feel tired				
4	Eating meals late at night				
5	Check blood pressure				
6	Exercising once a week				
7	Consumption of food with salt to taste well				
8	Taking sugary drinks				
9	Use vehicles to go short distance				
10	Always having deadlines to meet				
11	Having frequent headaches				
12	Working till I have headache				
13	Engaging in sleepless night activities				
14	Use drugs to stay awake at night				
15	Taking alcohol regularly				
16	Drinking alcohol at home				
17	Staying near smokers				
18	Drinking alcohol to relax				
19	Smoking pipe				
20	Smoking cigarette				

Appendix II

CARDIOVASCULAR EDUCATION MANUAL

Purpose of the Intervention

The purpose of the Cardiovascular education programme is to bring about improvement in knowledge, attitude and behaviour among public secondary school teachers in Ibadan, Oyo State, Nigeria.

Objective of the Intervention

By the end of the eight weeks cardiovascular education, it is expected that public secondary school teachers in Ibadan will be able to:

1. Identify risk factors of cardiovascular diseases
2. Have better attitude towards cardiovascular disease risk factors
3. Make cardiovascular health as priority in life.

Modality of the Intervention

The intervention programme shall be for:

1. A period of eight weeks
2. Public secondary school teachers in Ibadan, Oyo State
3. 1 hour, once a week

Outline of the Programme

1. Pretest of participants' knowledge, attitude and heart disease at-risk behaviour.
2. Cardiovascular education sessions for a period of eight weeks for the treatment group.
3. Conventional lecture sessions for a period of eight weeks for the control group.
4. Posttest of participants' knowledge, attitude and heart disease at-risk behaviour.

Topics to be considered for the Cardiovascular Education

1. Concept of cardiovascular disease
2. Types of cardiovascular diseases
3. Classification of cardiovascular risk factors
4. Modifiable risk factors and development of cardiovascular disease
5. Preventive measures of cardiovascular disease.

Appendix III

CARDIOVASCULAR EDUCATION TRAINING PACKAGE

Week I Topic: General Orientation and Administration of Pre-test Instrument

Objectives of the session are the following:

- i. To state the purpose of the programme.
- ii. To explain the steps to follow by the trainers and the participants.
- iii. To administer the Pre-test instrument on the participants.

Step 1

The researcher will welcome the participants. Solicit for their co-operation, punctuality, regular attendance and allow them to interact for few minutes to ensure familiarization among the participants.

Step 2

The researcher will state and explain in clear terms the purpose, objectives and benefits of the training, day, duration (no of contacts), time and number of hours for each contact.

Step 3

Administration of a pre-test. Participants will be encouraged to fill the questionnaire with all sincerity. Same will be collected on the spot.

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

Week II Topic: Cardiovascular disease (definition, concept and symptoms)

Objectives: At the end of the session the participants will be able to;

- i. Define cardiovascular disease.
- ii. List the symptoms of cardiovascular disease.

Step 1

Welcome the participants and make them interact for few minutes.

Step 2

The topic for the week will be introduced (concept of cardiovascular disease)

Concept of cardiovascular diseases

Cardiovascular diseases (CVDs) are a group of non-communicable diseases. They are the leading causes of death and disability among men and women worldwide. It accounted for 17.5 million deaths and 30% of global mortality. They are the diseases of the heart and blood vessels. It cuts across all ages and develops over a long period of time. Diseases affecting the heart and blood vessels could be due to various causes such as heredity, infection, malformations during developmental stages, vascular origin and so on. They are also capable of affecting other parts of the body, when not properly managed. The occurrence of cardiovascular disease is higher in men than women between the age range of 65-75 years.

Step 3 – Symptoms of cardiovascular diseases

Cardiovascular diseases are usually symptomless which may go unnoticed for several years. In later years, individuals may suffer the following symptoms such as; headache, tiredness, chest pain, leg pains that is relieved by rest, palpitations, discomfort, indigestion etc. Although each type of cardiovascular disease typically has different symptoms, many have similar signs which should not be ignored, but reported for medical attention.

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

Week III Topic: Types and classification of cardiovascular diseases

Objectives: At the end of the session, the participants will be able to;

- i. List the types of cardiovascular diseases.
- ii. Classify cardiovascular diseases.

Step 1

Participants will be welcomed. They will be allowed to ask questions from previous topics. The new topic will be introduced.

Step 2 Types of cardiovascular diseases

There are numerous types of cardiovascular diseases. For the purpose of this study, these include: hypertension, stroke, myocardial infarction, coronary heart disease, heart failure, and peripheral vascular disease.

Hypertension

Hypertension also called high blood pressure is a chronic disease affecting both men and women. It is a condition in which there is persistent increase in contraction and relaxation of the heart muscle that pumps blood through the blood vessels to the rest of the body. This is between the range of 130 – 150 and above for the systolic pressure and 90 – 110 and above for the diastolic pressure. There are two types of hypertension namely; essential and secondary.

Stroke

Stroke is a disease condition of the brain which is also referred to as cerebro-vascular accident .It is a condition in which the blood flow to the brain is reduced or stopped. This may be due to the blood supply in the brain that is blocked or ruptured when the blood pressure is high. It is a medical emergency and a silent killer. The symptoms of stroke often occur suddenly without any warning. It is characterized by confusion, inability to speak, numbness of the face, arm, leg particularly on one side of the body.

Myocardial Infarction

Myocardial Infarction is a cardiovascular disease also known as heart attack. It is a condition in which there is an abrupt cessation in the heart blood flow following the occlusion of the coronary artery leading to irreversible heart muscle death. It is a life threatening condition. In some cases, there may be no symptoms, but some may present with chest pain, faintness, dizziness, shortness of breath. The commonest causes of myocardial infarction are due to atherosclerosis (accumulation of fatty acids in the blood vessels), congenital malformation and high blood pressure.

Coronary heart disease:

Coronary heart disease is also known as Ischaemic heart disease. It is a condition in which the heart could not pump oxygenated blood to the body due to accumulation of fatty deposits in the arteries. It is the leading cause of death worldwide. It affects individuals at any age, with more males than females. It is characterized by reduced blood supply to the heart muscles.

Heart Failure:

Heart failure is a disease of the heart in which the heart pumping power is weak. It is frequently caused by a defect in the contracting muscles of the heart. Other causes may be due to infection, anaemia, hypertension, diet etc. Individuals with heart failure are more likely to have poor quality of life, sexual problems, depression, weight and muscle loss.

Peripheral Vascular Disease

This is also known as Peripheral Artery Disease. It is referred to as a condition in which there is reduced circulation of blood to a body part other than brain or heart. It is caused by blocked blood vessel due to build-up of fatty deposits. This condition may affect the legs, kidneys and less commonly, the arms.

Step 3 – Classification of Cardiovascular disease risk factors.

Cardiovascular disease risk factors are classified into three groups such as: major independent risk factors, pre-disposing risk factors and conditional risk factors.

1. Major risk factors: cigarette smoking, hypertension, elevated serum total cholesterol, low density cholesterol diabetes mellitus, advancing age.
2. Pre-disposing risk factors: Obesity, abdominal obesity, physical inactivity, family history of premature coronary heart disease, ethnic characteristics and psychosocial factors.
3. Conditional risk factors: Elevated serum triglycerides, small low density Lipoproteins, Elevated serum Homocysteine, Prothrombotic factors and Inflammatory markers.

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

WEEK IV Topic: Risk factors and development of cardiovascular disease (alcohol, smoking)

Objectives: At the end of the session the participants will be able to;

- i. Define cardiovascular risk factor.
- ii. Identify two cardiovascular risk factors.
- iii. Explain the effects of alcohol and smoking on the heart.

Step 1

The participants will be welcomed. Participants are allowed to interact for few minutes.

Step 2 – Participants will be allowed to ask questions from the previous topic.

Step 3

Participants will be introduced to the topic of the day.

Cardiovascular risk factors (Smoking and Alcohol)

Smoking is the inhalation of nicotine substance into lungs. It is a preventable cause of death and accounts for 5 million deaths globally each year. Major composition of tobacco smoking among 4,000 chemicals include: nicotine, carbon dioxide, irritants and carcinogens. These are very injurious to the body cells.

Types of smokers:

1. First hand smokers
2. Second hand smokers

Effect of smoking on the heart

When smoking, there is stiffening of the blood vessels thus promoting inflammation and plaque, thrombus formation which are strongly associated with vascular diseases. This is developed in the body cells over a long period of time causing cardiovascular events.

Complications that may arise from smoking:

- i. Hypertension
- ii. Stroke
- iii. Cancer of the lungs
- iv. Heart Attack.

Prevention of smoking:

1. Quitting smoking is important
2. Avoid areas where they smoke
3. Avoid peer pressure

Step 4: Alcohol

Alcohol is a drug, substance, beverage that is widely used or abused. It is a group of organic chemical compounds.

Types of Alcohol: Wine, Beer, Cider and Spirits

They are made from different types of ingredients or raw materials and are products of fermentation.

Effect on the heart: Alcohol consumption when it is absorbed in the body causes constriction of the blood vessels by increasing the contractile force of the heart causing damage to the myocardium and lining of the blood vessels.

Alcohol acts on the several chemicals in the body such as epinephrine, norepinephrine, magnesium calcium which are key components in cardiac function and vascular tone.

Complications that may arise from alcohol include:

- i. Aggravation of spread of HIV/AIDS disease
- ii. Social miscreants
- iii. Loss of libido
- iv. Cirrhosis of the liver
- v. Cancer of the liver

Alcohol cessation include:-

- i. Avoid alcohol drinks
- ii. Avoid peer pressure
- iii. Avoid staying around alcoholics

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

WEEK V Topic: Risk factors (diet and stress) and development of cardiovascular disease

Objectives: At the end of the session the participants will be able to;

- i. List two cardiovascular risk factors.
- ii. Explain the effects of diet and stress on the heart.

Step 1

Participants will be welcomed. They will be allowed to interact for few minutes.

Step 2

Participants will be allowed to ask questions from the previous topic.

Step 3

Participants will be introduced to the topic of the day. Cardiovascular disease risk factors (diet and stress).

Diet

Diet is a kind of food that a person eats. A special course of food to which one restricts oneself either to lose weight or for medical reasons. It is the food we eat for the growth and development of the body. Diet can also refer to the food and drink a person consumes daily and the mental and physical circumstances connected to eating.

However, diet consisting of saturated fats are injurious to the body and capable of deposition in the blood vessels. This occurs over a long period. The fatty deposits are referred to as cholesterol in the blood.

Diet and the heart:

The deposition of fats in the diet after consumption causes reduction in the arterial wall of the blood vessels thus leading to narrowing of the lumen. As a result, pressure in the arteries tend to increase and lead to high blood pressure. Continuous high pressure may damage the heart as well.

Sources of saturated fats include; red meat, internal organ meats, canned foods, shear butter, red palm oil, Types of cholesterol include: high density cholesterol which is good cholesterol while low density cholesterol is the bad cholesterol which cause damage to the blood vessels

Complications that may arise from fatty diet include:-

- i. Hypertension
- ii. Stroke
- iii. Heart Attack
- iv. Renal Challenges
- v. Myocardial Infarction

Stress:- Stress is a normal part of life, but if left unmanaged, this can lead to emotional, psychological and even physical problems. It is a state of mental or emotional strain or tension resulting from adverse or very demanding circumstances.

Causes of stress:-

- i. Physical change
- ii. Emotional change

Common warning signs of stress are; physical changes, dizziness, general aches, pains, headaches, indigestion, muscle tension and difficulty in sleeping.

Mental signs (constant worry, difficulty in making decisions, forgetfulness, in ability to concentrate.

Emotional signs (anger, anxiety, crying, depression, mood swing)

Behavioural signs (Bossiness, critical attitude of others, frequent job changes, increased use of alcohol).

Effect of stress on the heart:-Stress exposes the body to unhealthy persistently elevated levels of stress hormones such as adrenaline and cortisol which increase the breathing and heart rate. With persistent stress, this may lead to damage, reduction in blood flow to the heart. There is risk of blood clotting effect which may lead to heart attack.

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

WEEK VI Topic: Risk factors and development of cardiovascular disease (hypertension and obesity)

Objectives: At the end of the session the participants will be able to;

- i. Mention two cardiovascular risk factors.
- ii. Explain the effects of hypertension and obesity on the heart.

Step 1

Participants will be welcomed. They will be allowed to interact for few minutes.

Step 2

Participants will be allowed to ask questions from the previous topic.

Step 3

Participants will be introduced to the topic of the day.

Cardiovascular disease risk factors (Blood pressure, Obesity)

Blood pressure is referred to as exertion (contraction) of the blood vessels as blood is pumped from the heart to the rest of the body. Elevated blood pressure is referred to as hypertension. The normal blood pressure is between 90-120/60-80 millimetres of mercury (mmHg) Range between 30-150 and above/90-110 above is referred to as high blood pressure. Hypertension is one of the most important cause of premature death worldwide. The single biggest risk factor for stroke and heart attacks.

Causes of hypertension – Exact cause is unknown. There are pre-disposing factors such as; Aging, stress, obesity, alcoholism, smoking, lack of exercise, genetic susceptibility.

Symptoms:-Usually no symptom until later stage such as severe headache, fatigue, chest pain, problem with vision and so on.

Effect on the heart:-With persistent high blood pressure there is damage to the walls of the blood vessels to the heart and rest of the body. This may result in stroke and other cardiovascular events.

Prevention:-Quitting smoking, eating healthy diet, reduction in salt intake, regular exercise, avoid alcohol.

Obesity – This is a condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health leading to reduced life expectancy. Obesity occurs when the Body Mass Index (BMI) exceeds 30kg/m^2

Body Mass Index (BMI) is a measurement obtained by dividing the weight in kilogrammes by the square of height in metres.

Causes of obesity:- excessive food energy intake, genetic susceptibility, lack of exercise.

Pre-disposing factors are:-Endocrine disorders, some medications, pregnancy, environmental pollutants interfere with lipid metabolism.

Effect on the heart:-Increase in body fat alters the body's response to insulin causing insulin resistance. The adipose tissue in the stomach produces leptin (hormone) that is responsible for regulating appetite, food intake and fat storage in the body. Fats are deposited in the lining of the blood vessels which causes damage and reduction of blood supply.

Classification of obesity:-There are three classes:

- i. Class I obesity (BMI 30.0 – 34.9)
- ii. Class II obesity (BMI 35.0 – 39.9)
- iii. Class III obesity (BMI > 40.0)

Preventive measures:-These include: dieting by reducing consumption of energy dense foods.

- i. Increasing the intake of dietary fibres
- ii. Physical exercise that is regular and consistent.

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

WEEK VII Topic: Cardiovascular risk factor (Physical Inactivity) and Preventive measures

Objectives: At the end of the session the participants will be able to;

- i. List one cardiovascular risk factor.
- ii. Explain effect of physical inactivity on the heart.
- iii. Mention four preventive measures of cardiovascular disease.

Step 1

Participants will be welcomed. They will be allowed to interact for few minutes.

Step 2

Participants will be allowed to ask questions from the previous topic.

Step 3

Participants will be introduced to the topic of the day.

Physical Inactivity and Preventive Measures of Cardiovascular disease

Physical Inactivity:-This is defined as activity less than five times 30 minutes of moderate activity per week or less than three times 20 minutes of vigorous activity per week.

It is the fourth leading risk factor for mortality and associated with a higher prevalence of chronic diseases.

Effect on the heart: It leads to accumulation of some body chemicals which affect the endothelial lining of the blood vessels causing stiffness and deposition of which increases the work of the heart.

Causes of physical inactivity:-lifestyle activities, nature of work, automobile use and industrialization.

Prevention of physical inactivity:-Positive attitude to change, exercise, periodic medical screening.

Prevention of cardiovascular diseases

Cardiovascular diseases are chronic illnesses that mostly can be prevented. Such preventive measures are:

- i. Avoiding diet consisting of saturated fat.
- ii. Eating moderately especially healthy diet.
- iii. Reduce salt intake to less than 5 mg per day.
- iv. Participate in regular physical exercises.
- v. Avoid smoking
- vi. Avoid alcohol.
- vii. Reduce stress.
- viii. Intake of fruits and vegetables
- ix. Maintain good body weight.

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

WEEK VIII

Review of Previous Sessions and Administration of Post-test Instrument

Objectives: At the end of the session, participants will be able to:

- i. Summarize what they had learnt from the training programme.
- ii. Express their willingness to continue to improve on healthy heart behaviours.

Step 1:

Participants will be welcomed. They will be allowed to interact for few minutes.

Step 2

Participants will be allowed to ask questions from the previous topics. They will be reminded of the posttest to be filled.

Step 3

Post-test questionnaire will be given to the participants to fill. Same will be collected on the spot.

Step 4

Participants will be appreciated for their co-operation. Refreshment will be served. Participants are dismissed.

Appendix IV

TRAINING PACKAGE FOR CONTROL GROUP ON SEXUALLY TRANSMITTED INFECTIONS (STI)

WEEK I

Step 1

Participants will be welcomed. Allow few minutes for interaction and solicit for their support and punctuality throughout the programme.

Step 2

The researcher will state and explain in clear terms the purpose, objectives and benefits of the training. The day, duration, time and number of hours for each contact.

Step 3

Participants will be given the pre-test questionnaire to fill. Same will be collected on the spot.

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

WEEK II

Step 1

Participants will be welcomed and allowed to interact for few minutes.

Step 2

The topic for the week will be introduced (Sexually Transmitted Infections).

Definition

Sexually Transmitted Infections are also referred to as Sexually Transmitted Diseases (STD) or Venereal Diseases (VD). It is capable of being transmitted between individuals through sexual behavior such as vaginal, oral and anal sex. Other routes include intravenous drug needles, blood, childbirth and breastfeeding. Studies have shown that about 5 million people were newly infected with HIV and 42 million were living with HIV/AIDS.

Step 3 – Causes of Sexually Transmitted Infections

1. Bacterial infection:- Chlamydia, Gonorrhoea, Syphilis.
2. Fungal Infection:- Candidiasis (yeast infection)
3. Viral infection:- Hepatitis B, Herpes simplex, HIV, HPV that causes cervical, anal, penile, vulva cancers and genital warts.
4. Parasite infection:- Scabies
5. Protozoal Infection:- Trichomoniasis

Step 4 – Factors influencing the spread of STIs

General Factors include the following:-

1. Age: Young women because the cervical mucosa is immature and more vulnerable.
2. Gender: Females are more vulnerable and the vaginal lining are sensitive.
3. Immune status:- If the Immune status is low this encourages transmission of infections.

Step 5

Participants will be encouraged to ask questions.

Step 6

Closing Remark

- i. Participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

WEEK III

Step I

Participants will be welcomed and allowed to interact for few minutes.

Step 2

Participants will be encouraged to ask questions on the previous sub-topics.

Step 3

Topic of the week will be introduced.

Behavioural Factors or risky behaviours of STIs. These behavioural factors are in form of personal sexual behaviour which include:

1. Changing sexual partners frequently
2. Having more than one sexual partners
3. Having sex with casual partners or clients of sex workers.
4. Having unprotected penetrative sex where either partner has an infection.
5. Having previous STI in the last year with no change in sexual behaviour.

Social Factors Influencing the Spread of STIs

1. Culture: - In most cultures, women have little power over sexual practices and choices.
2. Economic power: - Women are usually economically dependent on their male partners, hence more likely to tolerate men's risky behavior.
3. Sexual violence tends to be more directed towards women by men. As such, women may not be able to discuss STI with their sex partners.
4. Early marriage:- In some tribes, the girl-child is married off to an adult male at a very young age thus exposing her to infections.
5. Also, there is permissive attitude of allowing to have more than one sexual partner.

Step 4

Participants will be encouraged to ask questions.

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

WEEK IV

Step 1

Participants will be welcomed and allowed to interact for few minutes.

Step 2

Participant will be asked questions on the previous subtopics.

Step 3

Topic for the week will be introduced.

Personal risky behaviours influencing STIs

- (a) Skin-piercing: - This is the use of unsterile equipment and needles in circumcision, tattoos scarifications, barbing, etc.
- (b) Use of alcohol or other drugs before or during sexual performance. This may diminish the perception of risk.

Vulnerable groups: - These are groups of people who are prone to develop STIs.

- (a) Sexually active teenage girls (14 – 19 years)
- (b) Sex workers and their clients.
- (c) Women with multiple sex partners. These are women whose jobs separate them from their regular sex partners for long periods of time.

Step 4

Participants are encouraged to ask questions.

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

WEEK V

Step 1

Participants will be welcomed and allowed to interact for few minutes.

Step 2

Participants will be asked questions on the previous topic.

Step 3

Topic for the week will be introduced.

Complications of STIs

Complications arise from infected persons who are not treated in a timely and effective way. The most serious ones affect the women and newborn babies.

1. Cervical cancer
2. Pelvic Inflammatory Disease (PID)
3. Chronic pelvic pain
4. Fetal wastage

5. Ectopic pregnancy
6. Related maternal mortality
7. Infertility from Chlamydial and Gonorrhoea infections
8. Blindness

Step 4

Participants will be encouraged to ask questions.

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

WEEK VI

Step 1

Participants will be welcomed and allowed to interact for few minutes.

Step 2

Participants will be asked questions on the previous topic.

Step 3

Topic for the week will be introduced.

Difficulty in controlling the Spread of STIs

1. Too expensive health services
2. Too little education
3. Lack of effective drugs in health centres.
4. Asymptomatic infected women (70 – 80%) will not seek treatment.
5. Reluctance to seek health care due to ignorance, embarrassment or guilt.
6. Misinformation
7. Alternated health care, for instance seeking traditional healers.
8. Reluctance to follow safe sex practices e.g. lack of knowledge of safe sex or dislike of use of condoms
9. Social stigma attached to STIs
10. Failure to take the full prescribed course of treatment for STI.

Step 4

Participants will be encouraged to ask questions.

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

WEEK VII

Step 1

Participants will be welcomed and allowed to interact for few minutes.

Step 2

Participants will be asked questions on the previous topic.

Step 3

Topic for the week will be introduced.

Prevention of STIs

- (a) Safer sexual behaviour
 - i. Absence from sexual activity
 - ii. Delaying the age of sexual activity
 - iii. Lifelong mutual monogamy
- (b) Safer sexual activities

Step 4

Participants will be encouraged to ask questions

Closing Remark

- i. The participants will be commended for giving their time.
- ii. They will be reminded of the time and venue for the next session.
- iii. The researcher appreciates the participants and serve some snacks to end the session.

WEEK VIII

Step 1

Participants will be welcomed and allowed to interact for few minutes. They will be reminded of the post-test.

Step 2

Administration of the post-test will be done. Participants will be encouraged to fill the questionnaire with utmost sincerity. Same will be collected after completion.

Closing Remark

- i. The participants will be commended for support throughout the programme.
- ii. The researcher appreciates the participants and serve some snacks to end the programme.

Appendix V

INFORMED CONSENT FORM

I, _____ (please write full names) voluntarily give my consent to serve as a participant in the study titled:

**EFFECTS OF CARDIOVASCULAR EDUCATION ON KNOWLEDGE, ATTITUDE
AND HEART DISEASE AT-RISK BEHAVIOUR OF TEACHERS IN IBADAN,
OYO STATE, NIGERIA**

I have received a satisfactory explanation of the general purpose and process of this study. It is my understanding that my participation in this study is voluntary and I may terminate my participation in this study at any time and that any data obtained will be held confidential. I am aware that the researcher has to report to her supervisor and that all data collected will be accessible to the supervisor as well.

Signature of participant _____

Date _____

Appendix VI

LIST OF SCHOOLS FOR EXPERIMENTAL GROUP (IBNLGA)

1. Abadina (Jnr) College III, U.I., Ibadan.
2. Anglican Commercial Grammar School Oritamefa, Ibadan.
3. Bashorun/Ojoo (Jnr) High School Bashorun, Ibadan.
4. Chesire (Snr) High School, Ijokodo, Ibadan.
5. Community (Jnr) High School, Agbowo/Bodija, Ibadan.
6. Ebenezer African Church Grammar School, Inalende, Ibadan.
7. Humani Alaga (Jnr) High School III, Sango, Ibadan.
8. Ijokodo High School (Jnr) II, Ijokodo, Ibadan.
9. Ikolaba Grammar School (Jnr) III, Total Garden, Ibadan.
10. Ikolaba High School (Jnr) II, Ikolaba, Ibadan.
11. Immanuel College High School (Jnr) I, Ibadan.
12. Islamic High School (Jnr) I, Bashorun, Ibadan.
13. Methodist Grammar School (Jnr) I, Bodija, Ibadan.
14. Mount Olivet Grammar School (Jnr) I Bodija, Ibadan.
15. Oba-Akinbiyi II High School (Snr) Mokola, Ibadan.
16. Oba Akinyele Memorial High School (Jnr) I Bashorun, Ibadan.
17. Polytechnic High School (Jnr) II Ijokodo, Ibadan.
18. St. Gabriel's Commercial School (Jnr) II, Mokola, Ibadan.
19. St. Louis Grammar School (Jnr) II Mokola, Ibadan.
20. United Secondary School (Snr) I, Ijokodo, Ibadan.

APPENDIX VII

LIST OF SCHOOLS FOR CONTROL GROUP (IBSWLGA)

1. Adifase school (Jnr) II, Apata, Ibadan.
2. African Church School (Jnr) II, Apata, Ibadan.
3. A.U.D. High school (Jnr) II, Ibadan.
4. Apata Community School (Jnr) II, Ibadan.
5. Baptist Grammar School, Idi-Ishin, Ibadan.
6. Baptist Secondary School, (Jnr) I, Ibadan.
7. Bashorun Ogunmola High School (Jnr), Ibadan.
8. Elewura Community Grammar School (Snr), Ibadan.
9. Community Grammar School (Snr), Ring Road, Ibadan.
10. IMG Grammar School (Snr), Ibadan.
11. Odo-Ona Girls Grammar School (Snr), Ibadan.
12. Oke-Ado High School (Jnr), Oke Ado, Ibadan.
13. Oke-Bola Comprehensive High School (Jnr) II, Ibadan.
14. Oluyole Estate High School (Jnr) II, Ibadan.
15. Oluyole High School (Snr), Ibadan.
16. Our Lady of Apostles High School (Snr), Odo Ona, Ibadan.
17. Peoples Girls Grammar School (Snr), Molete, Ibadan.
18. St. Theresa's College (Snr) I, Ibadan.
19. St. Theresa's College (Jnr) II, Ibadan.
20. Ibadan Boys High School (Jnr) II, Oke Bola, Ibadan.

Appendix VIII

List of Public Secondary Schools in Ibadan Metropolis, Ibadan, Oyo State

S/N	LOCAL GOVERNMENT: IBADAN NORTH
✓ 1	Abadina (Snr.) College, U.I., Ibadan
✓ 2	Abadina (Jnr.) College I, U.I., Ibadan
✓ 3	Abadina (Jnr.) College II, U.I., Ibadan
✓ 4	Abadina (Jnr.) College III, U.I., Ibadan
✓ 5	Agbowo High School, U.I., Ibadan
✓ 6	Anglican Commercial (Snr.) Gramm. Schl. Oritamefa
✓ 7	Anglican Commercial (Snr.) Gramm. Schl II
✓ 8	Anglican Comm. (Jnr.) Gramm. Schl I, Oritamefa
✓ 9	Anglican Comm. (Jnr.) Gramm. Schl. II, Oritamefa
✓ 10	Anglican Comm. (Jnr.) Gramm. Schl III, Oritamefa
✓ 11	Bashorun/Ojoo (Jnr.) High School, Basorun, Ibadan
✓ 12	Bashorun/Ojoo (Jnr.) High School, Basorun, Ibadan
✓ 13	Bishop Onabanjo (Snr.) High School, Bodija, Ibadan
✓ 14	Bishop Onabanjo (Jnr.) High School, Bodija, Ibadan
✓ 15	Bishop Onabanjo (Jnr.) High School II, Bodija, Ibadan
✓ 16	Cheshire (Snr.) High School, Ijokodo
✓ 17	Cheshire (Jnr.) High School I, Ijokodo, Ibadan
✓ 18	Cheshire (Jnr.) High School II, Ijokodo, Ibadan
✓ 19	Community (Snr.) High School, Agbowo/Bodija
✓ 20	Community (Jnr.) High School I, Agbowo/Bodija
✓ 21	Community (Jnr.) High School II, Agbowo/Bodija
✓ 22	Community (Snr.) Grammar School, Mokola
✓ 23	Community (Jnr.) Grammar School, Mokola
✓ 24	Ebenezer African Church Grammar School, Nalende
✓ 25	Humani Alaga (Snr.) High school I, Sango, Ibadan
✓ 26	Humani Alaga (Jnr.) High school I, Sango, Ibadan
✓ 27	Humani Alaga (Jnr.) High school II, Sango, Ibadan
✓ 28	Humani Alaga (Jnr.) High School III, Sango, Ibadan
✓ 29	Ibadan North Govt. Secondary School, Mokola
✓ 30	Ijokodo High School (Snr.), Ijokodo
✓ 31	Ijokodo High School (Jnr.) I, Ijokodo
✓ 32	Ijokodo High School (Jnr.) II, Ijokodo
✓ 33	Ikolaba Grammar School (Snr.), G.R.A., Ibadan
✓ 34	Ikolaba Grammar School (Jnr.) I, G.R.A., Ibadan
✓ 35	Ikolaba Grammar School (Jnr.) II, G.R.A. Ibadan
✓ 36	Ikolaba Grammar School (Jnr.) III, Total Garden, Ib.
✓ 37	Ikolaba High School (Snr.) I, Ikolaba
✓ 38	Ikolaba High School (Snr.) II, Ikolaba
✓ 39	Ikolaba High School (Jnr.) I, Ikolaba
✓ 40	Ikolaba High School (Jnr.) II, Ikolaba
✓ 41	Ikolaba High School (Jnr.) III, Ikolaba
✓ 42	Immanuel College High School (Snr.) I, Ibadan
✓ 43	Immanuel College High School (Snr.) II, Ibadan
✓ 44	Immanuel College High School (Jnr.) I, Ibadan
✓ 45	Immanuel College High School (Jnr.) II, Ibadan
✓ 46	Immanuel College High School (Jnr.) III, Ibadan
✓ 47	Islamic High School (Snr.), Bashorun
✓ 48	Islamic High School (Jnr.) I, Bashorun
✓ 49	Islamic High School (Jnr.) II, Bashorun
✓ 50	Islamic High School (Jnr.) III, Bashorun

✓	51	Methodist (N5) Grammar School, NTA RD., Agodi
✓	52	Methodist Grammar School (Snr.), Bodija, Ibadan
✓	53	Methodist Grammar School (Jnr.) I, Bodija, Ibadan
✓	54	Methodist Grammar School (Jnr.) II, Bodija, Ibadan
✓	55	Mount Olivet Grammar School (Snr.), Bodija, Ibadan
✓	56	Mount Olivet Grammar School (Jnr.) I, Bodija, Ibadan
	57	Mount Olivet Grammar School (Jnr.) II, Bodija, Ibadan
✓	58	Mount Olivet Grammar School (Jnr.) III, Bodija, Ib.
✓	59	Nawir-Deen, High School I, Nalende, Ibadan
✓	60	Nawir-Deen, High School II, Nalende, Ibadan
✓	61	Oba-Akinbiyi High School (Snr.) I, Mokola, Ibadan
	62	Oba-Akinbiyi I High School (Jnr.) I, Mokola, Ibadan
✓	63	Oba-Akinbiyi I High School (Jnr.) II, Mokola, Ibadan
✓	64	Oba-Akinbiyi II High School (Snr.), Mokola, Ibadan
✓	65	Oba-Akinbiyi II High School (Jnr.) I, Mokola, Ibadan
✓	66	Oba-Akinbiyi II High School (Jnr.) II, Mokola, Ibadan
✓	67	Oba-Akinyele Memorial High School (Snr.), Bashorun
✓	68	Oba-Akinyele Memorial High Schl. (Jnr.) I, Bashorun
✓	69	Oba-Akinyele Memorial High Schl. (Jnr.) II, Bashorun
✓	70	Polytechnic High School (Snr.), Ijokodo, Ibadan
	71	Polytechnic High School (Jnr.) I, Ijokodo, Ibadan
	72	Polytechnic High School (Jnr.) II, Ijokodo, Ibadan
	73	Polytechnic High School (Jnr.) III, Ijokodo, Ibadan
✓	74	St. Gabriel's Comm. Grammar Schl. (Snr.) Mokola
✓	75	St. Gabriel's Comm. Grammar Schl. (Jnr.) I Mokola
✓	76	St. Gabriel's Comm. Grammar Schl. (Jnr.) II, Mokola
✓	77	St. Gabriel's Comm. Grammar Schl. (Jnr.) III, Mokola
✓	78	St. Louis Grammar School (Snr.), Mokola
✓	79	St. Louis Grammar School (Jnr.) I, Mokola
✓	80	St. Louis Grammar School (Jnr.) II, Mokola
✓	81	St. Patrick's Grammar School (Snr.), Basorun
✓	82	St. Patrick's Grammar School (Jnr.) I, Basorun
✓	83	St. Patrick's Grammar School (Jnr.) II, Basorun
✓	84	United Secondary School (Snr.) I, Ijokodo, Ibadan
✓	85	United Secondary School (Jnr.) I, Ijokodo, Ibadan
✓	86	United Secondary School (Jnr.) II, Ijokodo, Ibadan
		Total

S/N	LOCAL GOVERNMENT: IBADAN NORTH WEST
✓ 1	Army Barracks Gramm. School Letmauck
✓ 2	Oba Abass (Snr.), Alesinloye
✓ 3	Oba Abass (Jnr.) I, Alesinloye
✓ 4	Oba Abass (Jnr.) II, Alesinloye
✓ 5	Anwal-UL-Islam Gramm. School (Spr.)
✓ 6	Anwal-UL-Islam Gramm. School (Jnr.) I
✓ 7	Anwal-UL-Islam Gramm. School (Jnr.) II
✓ 8	Eleyele Sec. School (Spr.)
✓ 9	Eleyele Sec. School (Jnr.) I
✓ 10	Eleyele Sec. School (Jnr.) II
✓ 11	Eleyele High School (Snr.) I
✓ 12	Eleyele High School (Snr.) II
✓ 13	Eleyele High School (Jnr.) I
✓ 14	Eleyele High School (Jnr.) II
✓ 15	Eleyele High School (Jnr.) III
✓ 16	Jericho High School (Snr.)
✓ 17	Jericho High School (Jnr.) I
✓ 18	Jericho High School (Jnr.) II
✓ 19	Urban Day Gramm. School (Snr.), Jericho
✓ 20	Urban Day Gramm. School (Jnr.) I, Jericho
✓ 21	Urban Day Gramm. School (Jnr.) II, Jericho
✓ 22	Onireke High School (Snr.)
✓ 23	Onireke High School (Jnr.) I
✓ 24	Onireke High School (Jnr.) II
✓ 25	Ansar-UL-Deen High School
✓ 26	Sacred Heart Gram. School, Ode-Oloo
	Total

S/N	LOCAL GOVERNMENT: IBADAN NORTH EAST
✓ 1	Adelagun (Jnr.) Comp. High School
✓ 2	Army Barracks (Snr.) School 1
✓ 3	Army Barracks (Jnr.) School 1
✓ 4	Army Barracks (Jnr.) School II
✓ 5	Army Barracks (Jnr.) School III
✓ 6	Ayekale Comm. Sec. School
✓ 7	Basorun (Snr.) High School
✓ 8	Basorun (Jnr.) High School I
✓ 9	Basorun (Jnr.) High School II
✓ 10	Christ The King Sec. School
✓ 11	F. O. A. (Jnr.) Grammar School
✓ 12	Holy Trinity (Snr.) School
✓ 13	Holy Trinity (Jnr.) School I
✓ 14	Holy Trinity (Jnr.) School II
✓ 15	I. M. G. Grammar School, Agodi
✓ 16	I. M. S., Agugu
✓ 17	I. M. S., Gbelekale, Ile - Aperin
✓ 18	Lagelu (Snr.) Grammar School I
✓ 19	Lagelu Grammar (Snr.) School III
✓ 20	Lagelu Senior School IV
✓ 21	Lagelu (Snr.) Grammar School V
✓ 22	Lagelu Comp. High School
✓ 23	Lagelu (Jnr.) School I
✓ 24	Lagelu (Jnr.) School II
✓ 25	Lagelu (Jnr.) School III
✓ 26	Lagelu (Jnr.) School IV
✓ 27	Lagelu (Jnr.) School V
✓ 28	Loyola College (Snr.) School I
✓ 29	Loyola College (Snr.) School II
✓ 30	Loyola College (Jnr.) School I
✓ 31	Loyola College (Jnr.) School II
✓ 32	Loyola College (Jnr.) School III
✓ 33	Methodist Model Grammar School, Agodi
✓ 34	Mufulahun (Snr.) School
✓ 35	Mufulahun (Jnr.) School I
✓ 36	Mufulahun (Jnr.) School II
✓ 37	Mufulahun (Jnr.) School III
✓ 38	Mufulahun (jnr.) School IV
✓ 39	Oke-Badan (Snr.) School
✓ 40	Oke-Badan (Jnr.) School I
✓ 41	Oke-Badan (Jnr.) School II
✓ 42	Oke-Badan (Jnr.) School III
✓ 43	Olubadan (Snr.) School I
✓ 44	Olubadan (Snr.) School II
✓ 45	Olubadan (Snr.) School III
✓ 46	Olubadan (Jnr.) School I
✓ 47	Olubadan (Jnr.) School II
✓ 48	Olubadan (Jnr.) School III
✓ 49	Oluyoro (Jnr.) Girls Grammar School
✓ 50	Queens of Apostle (Snr.) School I

✓	51	Queens of Apostles (Snr.) School II
✓	52	Queens (Jnr.) School I
✓	53	Queens (Jnr.) School II
✓	54	Queens (Jnr.) School III
✓	55	Ratibi College, Oluyoro
✓	56	Renascent (Snr.) School I
✓	57	Renascent (Snr.) School II
✓	58	Renascent (Jnr.) School I
✓	59	Renascent (Jnr.) School II
✓	60	Renascent (Jnr.) School III
✓	61	United (Snr.) School, Agugu
✓	62	United (Jnr.) School I, Agugu
✓	63	United (Jnr.) School II, Agugu
	64	United (Jnr.) School III, Agugu
		Total

S/N	LOCAL GOVERNMENT: IBADAN SOUTH EAST
1	Anglican Grammar School (Jnr.), Molete
2	Anglican Grammar School (Snr.), Molete
3	Adekile Goodwill Gramm. School (Jnr.) I
4	Adekile Goodwill Gramm. School (Jnr.) II
5	Adekile Goodwill Grammar School (Snr.)
6	Aperin Boys High School (Jnr.) I
7	Aperin Boys High School (Jnr.) II
8	Aperin Boys High School (Mixed) Jnr. II
9	Aperin Boys High School (Snr.)
10	Eleta High School (Jnr.) I
11	Eleta High School (Jnr.) II
12	Eleta High School (Snr.)
13	Aperin Oniyere Comm. Grammar Schl. (Jnr.) I
14	Aperin Oniyere Comm. Grammar Schl. (Jnr.) II
15	Aperin Oniyere Comm. Grammar Schl. (Snr.)
16	Eyini High School (Jnr.) I
17	Eyini High School (Jnr.) II
18	Eyini High School (Jnr.) III
19	Eyini High School (Snr.)
20	Adelagun Mem. Grammar Schl. (Jnr.) I
21	Adelagun Mem. Grammar Schl. (Jnr.) II
22	Adelagun Mem. Grammar School (Jnr.) III
23	Adelagun Mem. Grammar Schl. (Snr.) I
24	Adelagun Mem. Grammar Schl. (Snr.) II
25	Yejide Girls Grammar School (Jnr.) I
26	Yejide Girls Grammar School (Jnr.) II
27	Yejide Girls Grammar School (Jnr.) III
28	Yejide Girls Grammar School (Snr.) I
29	Yejide Girls Grammar School (Snr.) II
30	Methodist Grammar School (Jnr.) I
31	Methodist Grammar School (Jnr.) II
32	Methodist Grammar School (Snr.)
33	St. Davids Grammar School (Jnr.) I
34	St. David's Grammar Schl. (Jnr.) II
35	St. Davids Grammar School (Snr.)
36	St. Lukes College (Jnr.) I
37	St. Lukes College (Jnr.) II
38	St. Lukes College (Jnr.) III
39	St. Lukes College (Jnr.) IV, Ibuko
40	St. Lukes College (Snr.) I
41	St. Lukes College (Snr.) II
42	Ibadan City Academy (Jnr.) I
43	Ibadan City Academy (Jnr.) II
44	Ibadan City Academy (Jnr.) III
45	Ibadan City Academy (Snr.)
46	Community Grammar Schl. (Jnr.) I, Kudeti
47	Community Grammar Schl. (Jnr.) II, Kudeti
48	Community Grammar Schl. (Jnr.) III, Kudeti
49	Community Grammar Schl. (Snr.), Kudeti
50	Ibadan Grammar Schl. (Jnr.) I

✓	51	Ibadan Grammar Schl. (Jnr.) II
✓	52	Ibadan Grammar Schl. (Jnr.) III
✓	53	Ibadan Grammar School (Snr.) I
✓	54	Ibadan Grammar School (Snr.) II
✓	55	St. Anne's Schl. (Jnr.) I
✓	56	St. Anne's Schl. (Jnr.) II
✓	57	St. Anne's Schl. (Jnr.) III
✓	58	St. Anne's Schl. (Snr.) I
✓	59	St. Anne's Schl. (Snr.) II
✓	60	C.A.C. Grammar School (Jnr.) I
✓	61	C.A.C. Grammar School (Jnr.) II
✓	62	C.A.C. Grammar Schl. (Jnr.) IV
✓	63	C.A.C. Grammar Schl. (Snr.) I
✓	64	C.A.C. Grammar Schl. (Snr.) II
✓	65	Olubi Mem. Grammar School (Jnr.) I
✓	66	Olubi Mem. Grammar School (Snr.)
		Total

S/N	LOCAL GOVERNMENT: IBADAN SOUTH WEST
1	Adifase School (Snr.)
2	Adifase School (Jnr.) I
3	Adifase School (Jnr.) II
4	African Church School (Snr.)
5	African Church School (Jnr.) I
6	African Church School (Jnr.) II
7	A.U.D. High School (Snr.)
8	A.U.D. High School (Jnr.) I
9	A.U.D. High School (Jnr.) II
10	Apata Community School (Snr.)
11	Apata Community School (Jnr.) I
12	Apata Community School (Jnr.) II
13	Apata Grammar School (Snr.)
14	Apata Grammar School (Jnr.)
15	Baptist Grammar School, Idi-Ishin
16	Baptist Secondary School (Snr.) I,
17	Baptist Secondary School (Snr.) II,
18	Baptist Secondary School (Jnr.) I
19	Baptist Secondary School (Jnr.) II
20	Basorun Ogunmola High School (Snr.)
21	Basorun Ogunmola High School (Jnr.)
22	Celestial Church High School (Snr.)
23	Celestial Church High School (Jnr.)
24	Elewura Community Grammar Schl. (Snr.)
25	Elewura Community Grammar Schl. (Jnr.) I
26	Elewura Community Grammar Schl. (Jnr.) II
27	Community Grammar School(Snr.), Ring Road
28	Community Grammar School(Jnr.), Ring Road
29	Gbekuba Community Grammar School
30	I.M.G. Grammar School (Snr.)
31	I.M.G. Grammar School (Jnr.) I
32	I.M.G Grammar School (Jnr.) II
33	Odo-Ona Girls Grammar School (Snr.)
34	Odo-Ona Girls Grammar School (Jnr.)
35	Oke-Ado High School (Snr.)
36	Oke-Ado High School (Jnr.)
37	Oke-Bola Comprehensive High School (Snr.)
38	Oke-Bola Comprehensive High School (Jnr.) I
39	Oke-Bola Comp. High School (Jnr.) II
40	Oluyole Estate High School (Snr.)
41	Oluyole Estate High School (Jnr.) I
42	Oluyole Estate High School (Jnr.) II
43	Oluyole Extension High Schl. (Snr. & Jnr. I)
44	Oluyole Extension High Schl. (Jnr.) II
45	Oluyole High School (Snr.)
46	Oluyole High School (Jnr.) I
47	Oluyole High School (Jnr.) II
48	Our Lady of Apostles High School (Snr.)
49	O.L.A. High School (Jnr.) I
50	O.L.A. High School (Jnr.) II

✓	51	Peoples Girls Grammar Schl. (Snr.)
✓	52	Peoples Girls Grammar Schl. (Jnr.) I
✓	53	Peoples Girls Grammar School (Jnr.) II
✓	54	St. Teresa's College (Snr.) I
✓	55	St. Teresa's College (Snr.) II
✓	56	St. Teresa's College (Jnr.) I
✓	57	St. Teresa's College (Jnr.) II
✓	58	Ibadan Boys High School (Snr.)
✓	59	Ibadan Boys High School (Jnr.) I
✓	60	Ibadan Boys High School (Jnr.) II
✓	61	Urban Day Grammar School, Ring Road.
		Total

Appendix IX



Figure (1): Intervention Venue at Anglican Commercial Grammar School Total Garden Oritamefa, Ibadan.



Figure (2) : Researcher and a research assistant supervising participants during Pre-test at Anglican Commercial Grammar School Total Garden, Ibadan.



Figure (3): Participants during the pre-test administration and a research assistant collecting on the spot



Figure (4) A facilitator during cardiovascular education for the participants at Anglican Commercial Grammar School Total Garden Oritamefa, Ibadan.



Figure (5): Cross session of participants listening with full attention during cardiovascular education session at Anglican Commercial Grammar School Total garden Oritamefa, Ibadan.



Figure (6): Another cross section of participants during cardiovascular education at Anglican Commercial Grammar School Total Garden Oritamefa, Ibadan.



Figure (7): Cross section of participants during the post-test at Anglican Commercial Grammar School Total Garden Oritamefa, Ibadan.



Figure (8): Cross section of participants during the post-test at Anglican Commercial Grammar School Total Garden Oritamefa, Ibadan.



Figure (9): The researcher and research assistants at Anglican Commercial Grammar School Total Garden Oritamefa, Ibadan.



Figure (10): The supervisor, a cardiologist in the middle, research assistants and some school principals at the end of the training at Anglican Commercial Grammar School Total Garden Oritamefa, Ibadan.



Figure (11): Group photograph at the end of the training at Anglican Commercial Grammar School Total Garden Oritamefa, Ibadan.



Figure (12): Venue of the Control Group at Government College Apata, Ibadan.



Figure (13): Cross section of some participants at Government College Apata, Ibadan.



Figure (14): A participant asking question during session at Government College Apata, Ibadan.



Figure (15): Cross section of some participants at Government College Apata, Ibadan.



Figure (16): A participant asking question during session at Government College Apata, Ibadan.

APPENDIX X

UNIVERSITY OF IBADAN, IBADAN, NIGERIA

DEPARTMENT OF HUMAN KINETICS AND HEALTH EDUCATION



Head of Department
Prof. Michael Adeniyi Ajayi
NCE (Ife), B.Ed, (Benin), M.Ed., Ph.D (Ibadan)
Sports Psychology & Leisure Studies

E-mail: Michael.ajayi952@gmail.com
08023424905

Our Ref:.....
Your Ref :

Date.. 26-11-2015

NO STATE ETHICAL
COMMITTEE
SECRETARIAT
IBADAN

Dear Sir,

PERMISSION TO COLLECT DATA/INFORMATION/CARRY EXPERIMENT

The bearer FAMILONI Idowu.F with matric no: 140349 is a
Ph.D student in the Department of Human Kinetics and Health Education,
University of Ibadan, Ibadan.

He/She needs to collect data/information/carry out experiment in your Department/Unit for
his/her/ Project/Course work.

Kindly allow him/her all necessary assistance required.

Thank you.

Prof. M.A. Ajayi
Head of Department
DEPARTMENT OF HUMAN KINETICS & HEALTH EDUCATION
FACULTY OF EDUCATION
UNIVERSITY OF IBADAN

DEPARTMENT OF HUMAN KINETICS & HEALTH EDUCATION
FACULTY OF EDUCATION
UNIVERSITY OF IBADAN

- 1. O. O. Olatunji (Health Education/Promotion)
- 2. A. M. Adeniyi (Health Education/Promotion & Curriculum Studies)
- 3. B.O. Asagba (Organisation & Administration of Sports)
- 4. J.F. Babalola (Exercise Physiology)
- 5. A.O. Abass (Exercise Physiology)

Readers

- Dr. E.O. Morakinyo (Organisation & Administration of Sports)
- Dr. O.A. Adegbesan (Sports Psychology)
- Dr. A.O. Fajolu (Sports Psychology)
- Dr. Francisca C. Anyanwu (Health Education)

APPENDIX XI

UNIVERSITY OF IBADAN, IBADAN, NIGERIA DEPARTMENT OF HUMAN KINETICS AND HEALTH EDUCATION

Head of Department
PROF. Michael Adeniyi Ajayi
NCE (Ife), B.Ed. (Benin), M.Ed., Ph.D. (Ibadan)
Sports Psychology & Leisure Studies



E-mail: michael.ajayi952@gmail.com

Tel: 08023424905

Our Ref: _____

Your Ref: _____

Date _____

5th January, 2016

The Chairman,
UI/UCH Ethics Committee,
IAMRAT, College of Medicine,
University of Ibadan,
Ibadan, Nigeria.

Dear Sir,

Letter of Attestation for FAMILONI, Idowu Funmilayo (Matric No: 140349)

The above named person is a PhD student in the Department of Human Kinetics and Health Education, who is currently working on PhD research work titled:

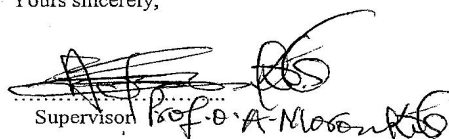
“Effects of Cardiovascular Education on Knowledge, Attitude and Heart Disease At - Risk Behaviour of Secondary School Teachers in Ibadan Oyo State”.

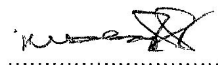
She needs to have ethical review of her protocol.

It will be appreciated if she can be given all necessary assistance and approval.

Thanks for your anticipated cooperation.

Yours sincerely,


Supervisor Prof. O.A. Morakinyo


Head of Department
5th Jan 2016

Other Professors

1. B.O. Ogundele (Health Education/ Promotion)
2. O.A. Morankola (Health Education/ Promotion & Curriculum Studies)
3. B.O. Asagba (Organisation & Administration of Sports)
4. J.F. Babalola (Exercise Physiology)
5. A.O. Abass (Exercise Physiology)

Readers

1. Dr. E.O. Morakinyo (Organisation & Administration of Sports)
2. Dr. O.A. Adegbesan (Sports Psychology)
3. Dr. A.O. Fadoju (Sports Psychology)
4. Dr. Francisca Anyanwu (Health Education)

APPENDIX XII



INSTITUTE FOR ADVANCED MEDICAL RESEARCH AND TRAINING (IAMRAT)

College of Medicine, University of Ibadan, Ibadan, Nigeria.



Director: **Prof. Catherine O. Falade**, MBBS (Ib), M.Sc, FMCP, FWACP

Tel: 0803 326 4593, 0802 360 9151

e-mail: cfalade@comui.edu.ng lillyfunke@yahoo.com

UI/UCH EC Registration Number: **NHREC/05/01/2008a**

NOTICE OF FULL APPROVAL AFTER FULL COMMITTEE REVIEW

Re: Effect of Cardiovascular Education on Knowledge, Attitude and Heart Disease at Risk Behaviour of Secondary School Teachers in Ibadan, Oyo State, Nigeria

UI/UCH Ethics Committee assigned number: UI/EC/16/0019

Name of Principal Investigator: **Idowu Funmilayo Familoni**

Address of Principal Investigator: Department of Human Kinetics & Health Education,
Faculty of Education
University of Ibadan, Ibadan

Date of receipt of valid application: 19/01/2016

Date of meeting when final determination on ethical approval was made: N/A

This is to inform you that the research described in the submitted protocol, the consent forms, and other participant information materials have been reviewed and *given full approval by the UI/UCH Ethics Committee.*

This approval dates from **22/04/2016 to 21/04/2017**. If there is delay in starting the research, please inform the UI/UCH Ethics Committee so that the dates of approval can be adjusted accordingly. Note that no participant accrual or activity related to this research may be conducted outside of these dates. *All informed consent forms used in this study must carry the UI/UCH EC assigned number and duration of UI/UCH EC approval of the study.* It is expected that you submit your annual report as well as an annual request for the project renewal to the UI/UCH EC early in order to obtain renewal of your approval to avoid disruption of your research.

The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the Code including ensuring that all adverse events are reported promptly to the UI/UCH EC. No changes are permitted in the research without prior approval by the UI/UCH EC except in circumstances outlined in the Code. The UI/UCH EC reserves the right to conduct compliance visit to your research site without previous notification.



Professor Catherine O. Falade

Director, IAMRAT

Chairperson, UI/UCH Ethics Committee

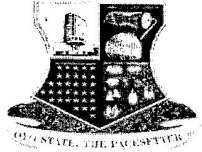
E-mail: uiuchec@gmail.com

Research Units ◊ Genetics & Bioethics ◊ Malaria ◊ Environmental Sciences ◊ Epidemiology Research & Service
◊ Behavioural & Social Sciences ◊ Pharmaceutical Sciences ◊ Cancer Research & Services ◊ HIV/AIDS

APPENDIX XIII

TELEGRAMS.....

TELEPHONE.....



MINISTRY OF HEALTH
DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION
PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No.

All communications should be addressed to
the Honorable Commissioner quoting

Our Ref. No. AD 13/ 479/ _____

January, 2016


The Principal Investigator,
Department of Human Kinetics and Health Education,
Faculty of Education,
University of Ibadan,
Ibadan.

Attention: Familoni Funmilayo

**ETHICAL APPROVAL FOR THE IMPLEMENTATION
OF YOUR RESEARCH PROPOSAL IN OYO STATE**

This is to acknowledge that your Research Proposal titled: "Effect of Cardiovascular Education on Knowledge, Attitude and heart Disease at Risk Behavior of Secondary School Teachers in Ibadan Oyo State Nigeria" has been reviewed by the Oyo State Review Ethical Committees.

2. The committee has noted your compliance. In the light of this, I am pleased to convey to you the full approval by the committee for the implementation of the Research Proposal in Oyo State, Nigeria.
3. Please note that the National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations, in line with this, the Committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of findings as this will help in policy making in the health sector.
4. Wishing you all the best.


(Dr) Abbas Gbolahan
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethical Review Committee

APPENDIX XIV



MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
QUALITY ASSURANCE DEPARTMENT
IBADAN, OYO STATE OF NIGERIA

P.M.B. 5014
Secretariat, Ibadan

Your Ref. _____

Our Ref. **INS. 75T/148** _____

19th Dec., 16

Mrs. I. F. Familoni,

i/c Department of Human, Kinetic & Health Education,
University of Ibadan,
Ibadan.

RE: PERMISSION TO CARRY OUT A RESEARCH WORK IN SECONDARY SCHOOLS IN
IBADAN NORTH AND IBADAN SOUTH WEST LOCAL GOVERNMENT AREAS OF OYO
STATE

I wish to acknowledge the receipt of your letter to carry out research work in
selected public secondary schools in Oyo State.

2. I am pleased to convey to you the approval of the Honourable Commissioner
for Education, Science & Technology to carry out the research work.
3. You are to feed the Ministry back with a copy of the result and conclusion of
your findings.
4. Thank you.

A handwritten signature in cursive script, appearing to read "Atere".
A. B. Atere (Mrs.)

Director Quality Assurance Department.