CARDIOVASCULAR RISK FACTORS IN SELECTED MEDIA PERSONNEL AT A STATE-OWNED MEDIA HOUSE IN GREATER ACCRA

BY

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DECLARATION

I, Renee Taylor, declare that this work is the report of the research I undertook at the Department of Dietetics, School of Allied Health Sciences, University of Ghana, towards the MSc award and that to the best of my knowledge, it contains no material which has been accepted for the award of any other degree of this University, except where due acknowledgements have been made in the text.

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ABSTRACT

Background: Cardiovascular disease (CVD) is the number one cause of death globally: more people die annually from CVDs than from any other cause. An estimated 17.3 million people died from CVDs in 2008, representing 30% of all global deaths. In Africa, CVDs are the main non-communicable disease and account for 9.2% of total deaths in the region. In Accra, CVDs increased from being the 10th most frequent cause of death in 1966, to the number 1 cause of death for the years 1991 and 2001. Hypertensive heart disease accounted for 18% of CVDs recorded at the National Cardiothoracic Center (NCTC). Studies have shown a link between certain occupational exposures and CVDs. The lifestyle behaviours of media workers in Ghana may predispose them to the risk of CVDs, due to the nature of their work (high stress levels, poor eating habits, less sleep and shift work, etc).

Aim: To assess cardiovascular risk factors among selected media personnel at the Headquarters of the Ghana Broadcasting Corporation, Accra, between the ages of 20 and 65, living and working in Accra.

Method: The study was a cross-sectional study which involved 72 media personnel. Questionnaires were administered to assess socio-demographic factors, brief medical history, diet history, physical activity, smoking and alcohol status. Anthropometric and blood pressure measurements were also taken. About 5ml of fasting blood was taken by trained phlebotomists for analysis of fasting plasma glucose, serum triglycerides, total cholesterol, low density lipoprotein (LDL) cholesterol and high density lipoprotein (HDL) cholesterol. Serum and plasma from blood samples were analysed at the Diabetes Research and Chronic Disease Reference Laboratory, University of Ghana Medical School.

Results: Most of the media workers (56.9%) ate averagely two main meals daily and about a third (30.6%) of the workers had snacks in between meals. Almost half of them bought meals from outside five times weekly whilst only a few were physically active (12.5%). Prevalence of CV risk factors such as obesity/overweight, diabetes, hypertension and high cholesterol were 55.6%, 4.2%, 12.5% and 54.2% respectively. There was no significant correlation between carbohydrate and fat intake and selected lipids.

Conclusion: The study revealed that certain lifestyle behaviours among the media workers, such as snacking between meals, high frequency of buying meals outside, sedentary lifestyle and low dietary fibre intake could predispose them to acquiring CVDs. Modifiable cardiovascular risk factors such as overweight/obesity, dyslipidemia and hypertension are present among the media workers in Accra. Lifestyle modifications can therefore improve their cardiovascular health.

DEDICATION

I dedicate this work to my fiancé, Lawrence Opare-Otoo, for inspiring me to carry out this study and supporting me all the way through.

A special feeling of gratitude goes to my parents, siblings for their love, encouragement and sacrifice.

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LIST OF ABBREVIATIONS

AHA	American Heart Association
BMI	body mass index
BP	blood pressure
CHD	coronary heart disease
CV	cardiovascular
CVDs	cardiovascular diseases
DASH	Dietary Approaches to Stop Hypertension
DHA	docosahexaenoic acid
EPA	eicosapentaenoic acid
MUFA	Monounsaturated fatty acid
FAO	Food and Agriculture Organization
FPG	fasting plasma glucose
SBP	systolic blood pressure
DBP	diastolic blood pressure
Kg	kilogram
LDL cholesterol	low density lipoprotein cholesterol
HDL cholesterol	high-density lipoprotein cholesterol
MI	myocardial infarction
mmHg	millimetre of mercury
mmol	millimole
NCD	non- communicable diseases
PUFAs	polyunsaturated fatty acids
SFA	saturated fatty acids

T2DM	type II diabetes mellitus
TG	triglycerides
USA	United States of America
WC	waist circumference
WHO	World Health Organization
WHR	waist to hip ratio

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Africa is now faced with the double burden of disease as it has to battle with communicable diseases and the rising challenge of non - communicable diseases such as cardiovascular diseases (CVDs) (Mbewu & Mbanya, 2006). There has been a dramatic increase in cardiovascular diseases. These diseases have become a leading cause of morbidity and mortality in sub-Saharan Africa (BeLue et al., 2009). According to the world health report, CVDs accounted for 9.2% of all deaths in the African region (Guillbert, 2003). In 2001, circulatory diseases were one of the leading causes of death as stated by the births and deaths registry (de-Graft Aikins, 2007).

The prevalence of non-communicable diseases and their risk factors has increased over time and contributes significantly to Ghana's disease burden. Conditions like hypertension, stroke and diabetes affect the young and old, urban and rural, and wealthy and poor communities (de-Graft Aikins, 2007). According to Agyei-Mensah (2004), CVD was the leading cause of death in 1991 and 2001.

The major risk factors for CVD include high blood pressure, high concentrations of cholesterol in the blood, diabetes, unhealthy diet, being overweight or obese, physical inactivity and tobacco use (World Health Organization Report, 2002). In terms of attributable deaths, the leading CVD risk factor is raised blood pressure (to which 13% of global deaths is attributed), followed by tobacco use (9%), raised blood glucose (6%), physical inactivity (6%), overweight and obesity (5%) (World Heart Federation, 2011). Five of these risk factors are closely related to diet and physical activity. Most of these risk factors are preventable through lifestyle/behavioural changes such as dietary modifications (Willett et al., 2006). There are some programmes like the

National Policy for the Prevention and Control of Chronic Non-Communicable Diseases in Ghana but there is very limited awareness on health of the population.

Three key factors were identified by Agyei-Mensah and de-Graft Aikins (2010) as influencing the epidemiological transition in Accra. These are urbanisation, urban poverty and globalisation. They reported that the underlying causes of Accra's epidemiological transition were unlikely to change soon. As rural–urban migration continues to rise, the population of Accra also grows, and globalization processes continue to intensify. The nation's health sector, like that of many African countries, is also ill-equipped to deal with the double burden of disease.

Several risk factors such as age, geographic considerations, genetic, socio-economic, ethnicity, dietary, occupational, and nutritional status are involved in the aetiology of hypertension. Among them, occupation is one of the important causes of hypertension. Emergency responders or protective service workers (e.g., fire fighters, police officers) especially, had the second highest prevalence of hypertension (26%) among occupational groups; however they had some of the lowest levels of awareness (51%), treatment (79%), and control (48%) (Davila et al., 2012). Findings from the INTERSTROKE study reported that ten risk factors were associated with 90% of the risk of stroke. The study concluded that specific interventions that reduce blood pressure, smoking and promote physical activity and healthy diets could significantly reduce the burden of stroke.

Being obese has also been significantly associated with job strain. A study of US chemical operators in 1990 by Green and Johnson showed that even after controlling for sociodemographic factors, workers who were exposed to higher levels of job strain smoked more when compared to those in lower job strain roles. There is, therefore, some evidence that job strain impacts on the likelihood of development of CVD through changes in blood pressure and other cardiac risk factors.

The term “media personnel” refers to anyone who works with the mass media i.e. radio, music, film, television and print. A journalist, according to a 1975 draft United Nations convention, “is defined as any correspondent, reporter, photographer, and their technical film, radio and television assistants who are ordinarily engaged in any of these activities as their principal occupation”. Most journalists in Ghana are affiliated to media houses that run on a 24-hour basis and therefore run shifts. Shift workers generally are known to have a higher prevalence for overweight than non-shift workers (Karlsson et al., 2001). This is due to their irregular meal times, increased consumption of high caloric snacks/fast foods, cigarette-smoking and drinking of coffee to release stress, a common behaviour of shift workers. A study done by Mensah (2013) on fire-fighters who engage in shift work indicated that 35.4% of the workers were overweight than non-shift workers. There was also a relatively high prevalence of dyslipidemia (high total cholesterol i.e. ≥ 6.24 mmol/l = 59.1 % and high low density lipoprotein (LDL) i.e. ≥ 4.2mmol/l = 52%) among the shift workers which indicates a risk of developing CVDs.

1.2 PROBLEM STATEMENT

The lifestyle behaviours of media workers predispose them to the risk of acquiring CVDs. This is due to the nature of their work. Media personnel sit for long hours behind their computers and consoles in the bid to get information and entertain their viewers and listeners. They tend to work extra hours, staying up late at night to meet deadlines and are constantly in search of news-worthy information. They are usually perceived to be under high stress and are sometimes exposed to violence and abuse. Unfortunately, some of these media personnel sometimes lose their lives as a result of ill-health.

Research carried out by Fawad et al., (2010) in the district of Peshawar Pakistan, indicated that cardiovascular disease risk factors like obesity, smoking, sedentary lifestyle, hypercholesterolemia and hypertension were prevalent among the journalists working in that district. They observed among 150 journalists that 36% were current smokers whiles only 26% took regular exercise. The mean body mass index was also 25.68 kg/m^2. In Ghana however, no research has been done on the effects of lifestyle behaviours and the risk of CVDs among media workers/journalists. The number of Ghanaian journalists who are at risk of premature CVD morbidity and mortality is therefore unknown. To the best of our knowledge there is no published research on diet and cardiovascular risk factors among media personnel in Ghana.

1.3 SIGNIFICANCE OF STUDY

There is currently scanty information on the prevalence of CVDs among journalists and the related factors; hence, an opportunity exists here to enhance the health of journalists. Identifying the risk factors associated with media personnel will result in the establishment of measures to improve their cardiovascular (CV) health.

Baseline data on the prevalence of CV risk factors in journalists in Accra may help inform the planning of a pilot lifestyle and behaviour intervention study to reduce CV risk factors and CVDs. Creation of awareness and education on healthier lifestyle behaviours can also be undertaken.

1.4 HYPOTHESIS

Lifestyle behaviours of media personnel in Accra have no impact on their risk of CVDs.

1.5 AIM

This study aimed at determining the effect of lifestyle behaviours on the risk of CVDs among media personnel in Accra.

1.5.1 Specific Objectives

The specific objectives will be:

1. To measure the anthropometric indices:

(a) Body Mass Index using height and weight, percent body fat, visceral fat, WHR using waist and hip circumference.

2. To assess diet history using a 24-hour recall and lifestyle behaviours using a validated questionnaire

3. To measure the concentrations of Fasting Plasma Glucose, Serum Triglyceride, HDL- and LDL-cholesterol, total cholesterol and blood pressure.

4. To determine the prevalence of CV risk factors

5. To determine the relationship between selected nutrient intake (fat, carbohydrates) and biochemical concentrations (lipid profile).

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

Cardiovascular disease (CVD) is the name for the group of disorders of heart and blood vessels. They include hypertension (high blood pressure), coronary heart disease (heart attack), cerebrovascular disease (stroke), peripheral vascular disease and heart failure (WHO, 2015a).

There are two types of CVDs (WHF, 2015a). These are CVDs due to atherosclerosis and others. CVDs due to atherosclerosis are cerebrovascular disease (e.g. stroke and cerebral vascular disease), ischemic heart disease (e.g. angina, heart attack and coronary heart disease) and hypertensive heart disease (e.g. aneurysm and peripheral arterial disease). The other CVDs are rheumatic heart disease (e.g. valvular heart disease), inflammatory heart disease (e.g. cardiomyopathy, pericardial disease, and others (congenital heart disease, cardiac arrythmias, and heart failure).

2.1.1 Global Trend, Prevalence and Mortality

CVDs are one of the four major non- communicable diseases (NCD) that are causing mortality in the world (Figure 2.1). NCDs are often associated with older age groups, but research shows that 16 million of all deaths attributed to NCDs occur before the age of 70. In 2008, an estimated 17.3 million people died from CVDs, representing 30% of all global deaths. Of these deaths, an estimated 7.3 million were due to coronary heart disease and 6.2 million were due to stroke. It has been projected that by 2030, almost 23.6 million people will die from CVDs (WHO, 2015b). Increasingly, the populations affected are those in low- and middle-income countries (LMIC) (Figure 2.2), where 80% of these deaths occur, usually at younger ages than in higher income countries, and where the human and financial resources to address them are most limited. CVDs have also been shown to occur almost equally in men and women (WHO, 2015b).

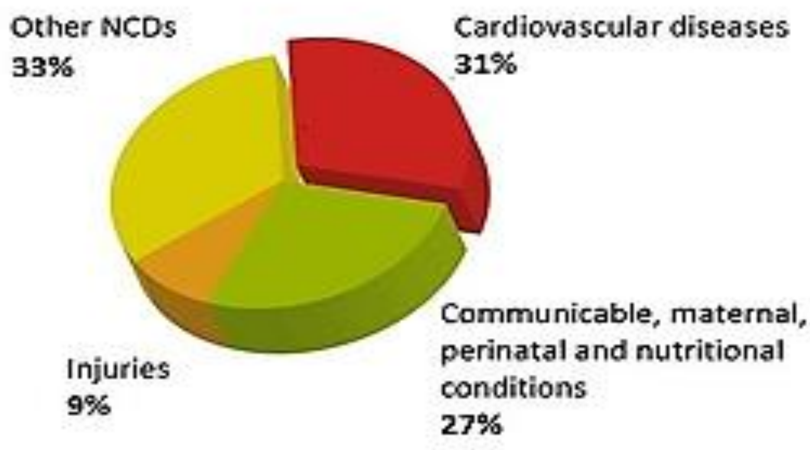

Figure 2.1: Distribution of major causes of death including CVDs

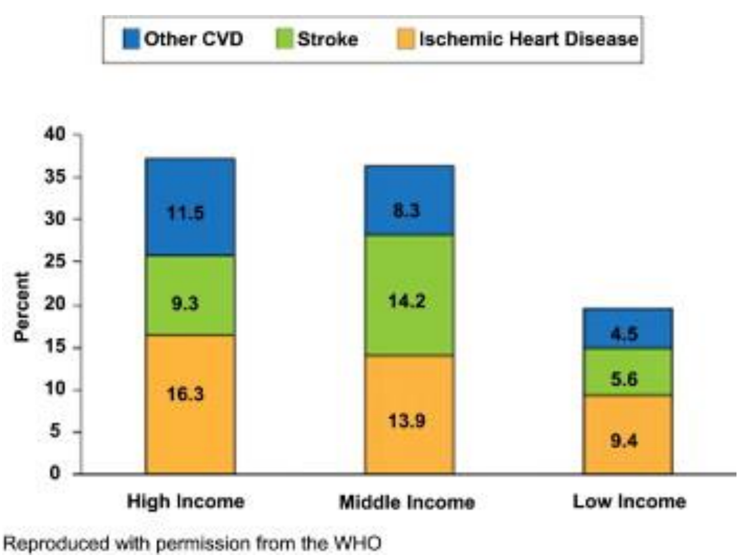

Figure 2.2: Proportion of deaths due to CVDs by country income level

2.2 RISK FACTORS OF CARDIOVASCULAR DISEASES

The concept of risk factors for CVD was first introduced in an article from the Framingham Heart Study in 1961 linking the presence of specific antecedent conditions (e.g. elevated cholesterol, hypertension, diabetes mellitus and tobacco use) to future CVD. Total CVD risk is defined as the probability of an individual experiencing a CVD event (e.g. myocardial infarction or stroke) over a given period of time, for example 10 years (WHO, 2007). The risk factors for CVD can be classified into two categories, modifiable and non-modifiable. The modifiable risk factors are physical inactivity, tobacco use, unhealthy diet, obesity and overweight, abnormal cholesterol/lipids, raised blood pressure and hypertension. The non-modifiable risk factors include age, race/ethnicity, gender and family history (WHF, 2015b). The majority of CVD is caused by risk factors that can be controlled, treated or modified (WHF, 2012). For both men and women at all ages, there are considerable health benefits in stopping smoking, reducing cholesterol and blood pressure, eating a healthy diet and increasing physical activity (King, 2002).

2.2.1 MODIFIABLE RISK FACTORS

2.2.1.1 Diet

Diet plays a critical role in the development and prevention of cardiovascular diseases. According to World Heart Federation (2015c) intake of meals low in saturated fat and rich in fruits and vegetables leads to a 73% reduction in the risk of new cardiac events as compared to diets rich in saturated fat and low in fruits and vegetables (WHF, 2015c). Diets rich in saturated fat have been known to cause 31% of coronary heart disease and 11% of stroke worldwide (WHF, 2015b). Saturated and trans fat raise cholesterol levels in the blood which leads to atherosclerosis. Also diets which have more than 37% of total calories as fat increase the risk of having CVDs even if the fat is unsaturated (WHF, 2015d). High sodium intake has been established as a risk factor for hypertension. It is estimated that a reduction in one's dietary intake of sodium by 1g and salt by 3g will lead to a decrease of 50% of people needing treatment for hypertension, and a 22% drop in deaths related to stroke and 16% of deaths related to Coronary Heart Disease (WHF, 2015c).

2.2.1.1.1 Fruits, vegetables and cereals

According to the World Heart Federation (2015d), eating a diet high in fresh fruits and vegetables protects against heart disease and stroke. Low intake of fruits and vegetables accounts for about 20% of cardiovascular disease worldwide. Many constituents and functional aspects of fruits and vegetables may be responsible for their apparent protective effects on the development of diabetes and CVDs. Among these the fibre potassium, folate and antioxidant properties of fruits and vegetables, along with their low glycaemic load and potential to aid in weight management are likely to contribute most to their effects on their risks of CVDs and diabetes. Other components of fruits and vegetables such as minerals and phytochemicals may also play a role in the prevention of chronic diseases (Bazzano, 2004).

Fruits, vegetables and wholegrain cereals which are major sources of fibre have been shown to delay the absorption of carbohydrates after a meal and thereby decrease the insulinemic response to dietary carbohydrates (Anderson et al., 1995). Studies have shown that higher levels of insulin may promote dyslipidemia, hypertension, abnormalities in blood clotting and atherosclerosis (Reaven, 1995). Dietary fibre which tends to delay hunger and reduce energy intake, also plays a role in weight management and prevents obesity as it increases satiety (Burton-Freeman, 2000).

2.2.1.1.2 Dietary fats

Dietary fats and oils are important components in diets because they are high in energy (9 kilocalories per gram) and provide essential fatty acids. They are broken down in the body to release glycerol and free fatty acids. The glycerol can be converted to glucose by the liver and used as a source of energy (Mahan et al., 2012). Dietary fats provide the medium for the absorption of fat-soluble vitamins; are a primary contributor to the palatability of food; and are crucial to proper development and survival during the early stages of life-embryonic development and early growth after birth on through infancy and childhood (WHO, 2008).

The main types of fat in food are saturated fatty acid (SFA) and unsaturated fatty acid (USFA). Unsaturated fat is further classified into mono unsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA). Other types of fat are cholesterol and trans fats (FAO, 2013). Some types of fats e.g. saturated fatty acids and trans fatty acids, have been shown to increase the risk of CVDs whilst others such as the MUFAs and the PUFAs have been shown to reduce its risk (USDA, 2011).

Saturated fatty acids are found in animal products whiles trans fatty acids are oils that have been hydrogenated into semi-hard fats. A diet high in SFAs and TFAs leads to high levels of cholesterol which in turn causes abnormal blood lipid levels. Research has shown that abnormal blood lipid (fat) levels have a strong correlation with the risk of coronary artery disease, heart attack and coronary death (WHF, 2015).

There are two main sources of dietary trans fatty acids (trans fat). Naturally occurring trans fat is found in small amounts in the fatty parts of meat and dairy products. Artificial trans fat comes from foods that contain partially hydrogenated oil and is formed when hydrogen is added to liquid oil turning it into solid fat. It is mostly used by food manufacturers in food products due to it being inexpensive and its ability to increase the food's shelf life, stability, and texture (CDC, 2010). Scientific evidence shows that trans fatty acid consumption has unique adverse effects on serum lipids, including increasing low-density lipoprotein (LDL) cholesterol, lowering high-density lipoprotein (HDL) cholesterol, increasing lipoprotein(a), increasing ApoB levels, and decreasing ApoA1 levels (FAO, 2010).

Saturated fats are typically solid at room temperature and are primarily found in animal fats. Certain plant oils such as cocoa butter, palm and coconut oils are also sources of saturated fats (AHA, 2015 and CDC, 2010). According to the Food and Agriculture Organisation (2010), individual SFAs have different effects on the concentration of plasma lipoprotein cholesterol fractions. For example, lauric, myristic and palmitic acids increase LDL cholesterol whereas stearic has no effect. There is also convincing evidence that replacing SFA with PUFA decreases the risk of CHD.

Unsaturated fats such as polyunsaturated and monounsaturated are beneficial for heart health. They are present in fish, nuts, seeds and vegetables (WHF, 2015). There are two types of polyunsaturated fats, namely omega-6 (n-6) polyunsaturated fats and omega-3 (n-3) polyunsaturated fats. The n-6 polyunsaturated fats provide linoleic acid whiles the n-3 polyunsaturated fats provide alpha linolenic acid. These are essential fatty acids that the human body cannot synthesize (CDC, 2012). There is convincing evidence that replacing SFA (C12:0–C16:0) with MUFA reduces LDL cholesterol concentration and total/HDL cholesterol ratio (Mensink et al., 2003). There is also evidence from experimental studies that replacing SFA and trans fats with n-3 and n-6 PUFA decreases the risk of CHD (Woodside & Kromhout, 2005). The recommended range (ADMR) for PUFA is 6–11 percent of the total energy requirements (FAO, 2010). Saturated fats and trans fat intake should be limited to less than 7% and 1% of total daily calories, respectively while MUFA should be 15%. Dietary cholesterol should be limited to less than 300 mg /day for most people (AHA, 2012).

A study comparing the fatty acid, diet and body indices of type 2 diabetic American Whites and Blacks and Ghanaians, found that the Ghanaian non-diabetics consumed a significant higher amount of fat (86±14g) than their Black American counterparts (67±28g) (Banini et al., 2003). In 2014, Appiah et al. also found that the mean % fat intake of women of high educational level in Kumasi, was significantly higher (31.3±9.8%) than those with low (26.2±10.6%) and middle (25.8±9.2%) educational levels. There is no data on fat intake among journalists.

2.2.1.1.3 Sodium and potassium intake

Sodium and potassium are essential for normal growth and body functions. These minerals are involved in regulating blood pressure, controlling fluid balance and maintaining the right conditions for muscle and nerve functions (EUFIC, 2006). According to He et al. (2005), there is increasing evidence that a high salt intake has direct harmful effects on the cardiovascular system (e.g. it increases the mass of left ventricular wall, stiffens conduit arteries, and thickens and narrows resistance arteries, independent of and additive to the effect of salt on blood pressure). On the other hand, evidence from randomized controlled trials (RCTs) show that dietary potassium attenuates these effects showing a linkage to reduction in stroke rates and cardiovascular disease risk (Aaron & Sanders, 2013).

2.2.1.1.3.1 Sodium

Sodium is found naturally in a variety of foods, such as milk, meat and shellfish. It is often found in high amounts in processed foods such as breads, crackers, processed meats, cured fish and meat and snack foods (WHO, 2014). High amounts of sodium are also found in many condiments (e.g. soy, bouillon cubes and fish sauces). Thus, diets which are high in processed foods and low in fresh fruits and vegetables are often high in sodium (Webster et al., 2010 and CDC, 2011). Increased sodium consumption is associated with increased blood pressure, whereas lower sodium consumption appears to decrease blood pressure in adults. A number of recent high-quality systematic reviews of randomized controlled trials (RCTs) have concluded that decreased sodium intake relative to usual or higher intake results in lowered blood pressure in adults with or without hypertension (WHO, 2012). It has been estimated that a universal reduction in dietary intake of sodium by about 1g of sodium a day (about 3g of salt) would lead to a 50% reduction in the number of people needing treatment for hypertension. The same decrease would lead to a 22% drop in the number of deaths resulting from strokes and a 16% fall in the number of deaths from coronary heart disease (WHF, 2015a).

A review concerning advice to reduce sodium consumption concluded that intensive behaviour-change interventions targeting decreasing sodium intake successfully reduced blood pressure in adults with or without hypertension (Hooper, Bartlett, Davey & Ebrahim, 2004). However, the reductions in sodium intake and in blood pressure were modest, and the authors concluded that environmental changes (e.g. reduction of sodium in processed foods) would facilitate a greater reduction in sodium consumption and, therefore, have a greater impact on blood pressure. From age 2 and above, the recommended daily salt intake should be less than 2,300 milligrams (mg). For some groups of people such as people over 51 years, African Americans and people with hypertension, diabetes or chronic kidney disease, sodium intake should be further limited to 1,500 mg per day (CDC, 2015). In Ghana, it is typical to find the use of salt in cooking and at table. Consumption of salted fish and meat is regular, especially in the rural communities, and high salt-containing "seasonings" are also frequently used in cooking (Kerry et al., 2005). The first community intervention study of salt reduction performed in sub-Saharan Africa was carried out in Ejisu-Juabeng and Kumasi districts of the Ashanti region among 12 villages (6 intervention groups and 6 control groups). After 6 months of intervention, there was a mean decrease of 2.54 mmHg (range, 1.45–6.54) observed in systolic blood pressure and a mean decrease of 3.95 mmHg (range, 0.78–7.11) in diastolic blood pressure in the intervention group when compared to the control (Cappuccio et al., 2006).

2.2.1.1.3.1 Potassium

Reduced potassium consumption has been associated with hypertension and cardiovascular diseases, and appropriate consumption levels could be protective against these conditions. This may be due to potassium's ability to increase sodium excretion and the vasoactive effects of potassium on blood vessels (EUFIC, 2006). A recent meta-analysis including 11 cohort studies reported an inverse association between potassium intake and risk of stroke. Also, two meta-analyses of trials comparing increased potassium to lower potassium intake found that increased potassium intake lowers blood pressure (Larsson, 2011).

Potassium is commonly found in a variety of unrefined foods, especially fruits and vegetables such as bananas, oranges, avocado pear, cabbage, dried beans and potatoes. Food processing decreases the amount of potassium in many food products. Diets that are also high in processed foods and low in fresh fruits and vegetables are often lacking in potassium (Webster, Dunford & Neal, 2010). For example, the Dietary Approaches to Stop Hypertension (DASH) meal plan which includes whole grains, poultry, fish, fruit, vegetables and nuts, and has low amounts of fats, red meats, sweets, and sugared beverages is effective in lowering blood pressure in African Americans (Funk et al., 2008). Women consistently have lower levels of potassium intake than men, but both groups most often have intakes below current recommendations of 3,510 mg per day (WHO, 2012). A study carried out on male adult miners in Obuasi in 2010, found that the mean potassium intakes of both hypertensive and non-hypertensive miners were 540.5±556.9 mg and 59.2±72 mg respectively, which were below the recommended intakes (Afoakwah and Owusu, 2011).

2.2.1.1 Abnormal blood lipid level

Abnormal blood lipid levels, that is high total cholesterol, high levels of triglycerides, high levels of low-density lipoprotein or low levels of high-density lipoprotein (HDL) cholesterol, are risk factors of cardiovascular disease (WHF, 2015). A higher risk is indicated mainly by high levels of LDL cholesterol, but also an increased ratio between LDL (or total) cholesterol and HDL cholesterol. This ratio is suggested to be a better marker for CVD risk than LDL alone (Mensink, Zock, Kester & Katan, 2003).

According to United States National Cholesterol Education Program (NCEP) (2001), blood total cholesterol ≥ 5.18mmol/L, high density lipoprotein less than 1.04mmol/L, triglycerides level ≥ 1.70mmol/L and low density lipoprotein ≥ 3.36mmol/L are risk factors for coronary heart disease. In India, a study carried out by Vengamma (2012) among journalists and their family members (n=90), showed that 19 participants (21%) had high serum cholesterol (> 239 mg/dL), 14 (16%) had high serum triglycerides (> 199 mg/dL) and 43 (48%) had low HDL levels.

In Kumasi, dyslipidemia was found to be common among hospital patients. Almost half of the patients (45%) had serum total cholesterol concentration >5.17 mmol/L and 26% had also serum triglyceride concentration >1.69 mmol/L. High-density lipoprotein (HDL)-cholesterol dyslipidemia (HDL <1.03 mmol/L) was found in 30.5% of the patients, and low-density lipoprotein (LDL)-cholesterol dyslipidemia (LDL>2.58 mmol/L) in 72% (Eghan & Acheampong, 2003).

2.2.1.2 Physical inactivity

According to WHO (2015) physical activity is defined as any bodily movement produced by skeletal muscles that require energy expenditure. It has been identified as the fourth leading risk factor for global mortality causing an estimated 3.2 million deaths globally. Physical activity is different from exercise in that exercise, which is a subcategory of physical activity, is planned, structured, repetitive, and aims to improve or maintain one or more components of physical fitness (WHO, 2015). Physical activity helps in weight control, reduces blood pressure levels of hypertensives, improves blood lipid levels and blood glucose levels in people who are overweight (WHF, 2011). It also helps reduce one's risk for metabolic syndrome, type 2 diabetes and some cancers, whilst improving health and mood (CDC, 2015). In 2008, 31% of adults (men 28% and women 34%) 15 years and above were found to be insufficiently physically active (WHO, 2011). Physical inactivity is increasing in many countries and has major implications for cancers, along with other non-communicable diseases (NCDs) such as cardiovascular diseases and diabetes. In low- and middle-income countries, physical inactivity is associated with 2.6 million deaths per year, over 670, 000 premature deaths (people aged under 60 years) and around 30% of diabetes and ischaemic heart disease burden (WHO, 2011).

The global reduction in physical activity has been attributed to increase in urbanization and mechanization (WHF, 2015). Rapid progress of civilization almost completely deprives of the opportunity to movement and physical effort. It eliminates from the everyday work various forms of physical activity and simple physical effort, leaving mainly monotonous activities that unevenly load the individual parts and systems of the human body. This phenomenon pertains mainly to the office workers e.g. bank officials or people employed in civil/local administration (Biernat, Tomaszewski & Milde, 2010).

According to the *2008 Physical Activity Guidelines for Americans*, an adult needs to do two types of physical activity each week to improve his/her health status–aerobic and muscle-strengthening (CDC, 2008). Aerobic activity moves large muscles, such as those in the arms and legs and makes your heart beat faster and breathe harder than usual. Examples include running, swimming, walking, biking and dancing. It is also called endurance activity. Regular aerobic activity makes your heart and lungs stronger and able to work better over time (NHLBI, 2015). Muscle-strengthening activities, which include pushups and sit-ups, lifting weights, climbing stairs, etc, improve the strength, power, and endurance of muscles (NHLBI, 2015). There are also bone-strengthening activities that help make the bones strong and stretching activities that improve flexibility and the ability to fully move the joints. Running, walking, jumping rope, and lifting weights are examples of bone-strengthening activities (NHLBI, 2015). Examples of stretching/flexibility exercises are neck, shoulder, thigh and upper body stretches (NIH, 2015).

2.2.1.3 Hypertension

According to the World health Organization (2009), hypertension is one of the most leading causes of premature death in the world. It has estimated that 1.56 billion adults will be living with elevated blood pressure by the year 2025. Hypertension has been known to be the single most important risk factor for stroke and causes about 50% of ischemic stroke and increases the risk of haemorrhagic stroke. People who develop elevated blood pressure before age 50 are more likely to develop CVDs (WHF, 2015). The prevalence of hypertension is highest in the African Region at 46% of adults aged 25 and above, while the lowest prevalence at 35% is found in the Americas (Figure 2.3) (WHO, 2011 NCD report). Hypertension has ranked as the fifth commonest newly diagnosed outpatient disease for about two decades in Ghana. In the Greater Accra Region and some other regions for example, it has on some occasions ranked second (Bosu, 2013). Results from surveys conducted in and around Accra suggest that the prevalence of hypertension has increased from about 25%-28% in the 1976-1998 period to about 37%-45% in 2002-2006 (Bosu, 2010). A major public health problem that is not well acknowledged is that the majority of those with hypertension (up to 70%) are unaware of their condition and adequate control is disturbingly low (Bosu, 2010 and Amoah, 2003). Out of 362 subjects studied in four rural Ga districts in Ghana, the prevalence of hypertension was 25.4%. Of those with hypertension, only 32.3% (n=30) had prior knowledge of their condition, and less than half of these (n=12) were on treatment. Of those on treatment 16.7% were well controlled (blood pressure < or = 140/90 mm Hg) (Addo et. al., 2006).

In the Peshawar Heart study in Pakistan, hypertension was found to be prevalent among journalists working in that district. The results indicated that 20% (n=31) of the journalists had a systolic BP of >140mmHg and a diastolic BP > 90mmHg was noted among 14 % (n=21) of them.

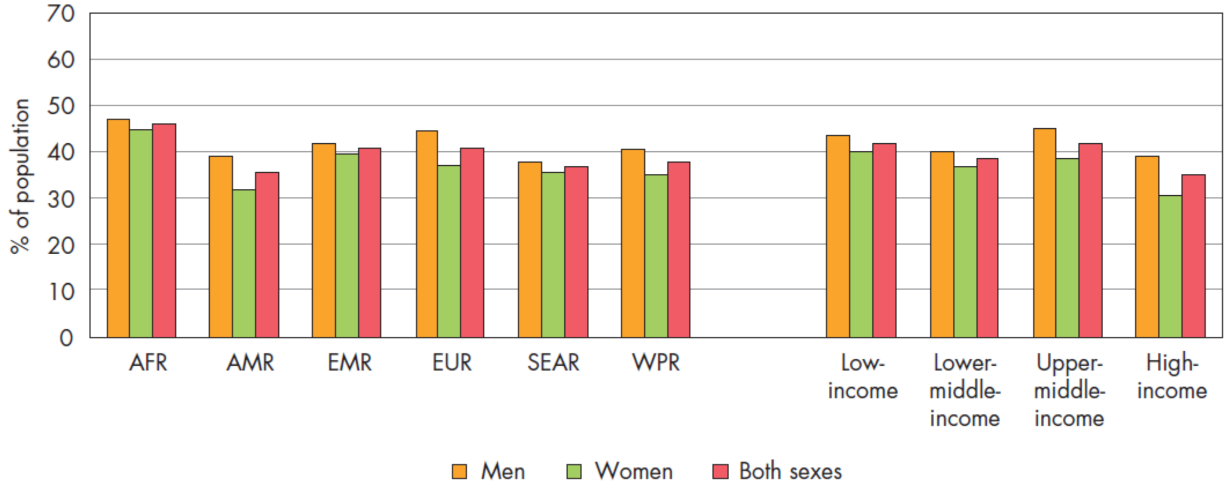

Figure 2.3: Age-standardized prevalence of raised blood pressure in adults aged 25+ years, by WHO Region and World Bank income group, comparable estimates, 2008.

2.2.1.4 Overweight/Obesity

A body mass index (BMI) of 25 kg/m^2 and above is considered overweight whilst a BMI of 30 kg/m^2 and above is considered obese. Being overweight may predispose one to develop hypertension, diabetes and atherosclerosis and hence increase the risk of acquiring cardiovascular disease. Prospective epidemiological studies have shown an association between overweight/obesity and CV morbidity, CVD mortality and total mortality (McGee, 2012; Ajani et al., 2004). Obesity is strongly related to major cardiovascular risk factors, such as hypertension, glucose intolerance, type 2 diabetes, and dyslipidaemia (Hu, Tuomilehto, Silventoinen, Barengo & Jousilahti, 2004; Haslam & James, 2005). To attain optimal health, the average BMI for adult populations should be in the range of 21–23 kg/m^2, while the goal for individuals should be to maintain a BMI in the range between 18.5–24.9 kg/m^2 (WHO, 2011 NCD report). The occurrence of elevated BMI increases with income level of countries, up to upper-middle-income levels. The prevalence of overweight in high-income and upper-middle income countries was more than double that of low- and lower-middle-income countries. For obesity, the difference more than triples, i.e. 7% obesity for both males and females in LMICs, to 24% in upper middle- income countries (WHO, 2011 NCD report). Obesity which is closely linked to diet and physical inactivity, results when there is an imbalance between energy intake in the diet and energy expenditure. Regular physical activity can prevent obesity by increasing the expended energy (WHO, 2011). Regular consumption of caloric-dense foods, such as processed foods that are high in fats and sugars, promotes obesity compared to low caloric foods (WHO, 2007). Overweight and obesity cause adverse metabolic effects on blood pressure, cholesterol, triglycerides and insulin resistance. With an increasing BMI also comes an increased risk of coronary heart disease, ischaemic stroke and type 2 diabetes mellitus (WHO, 2000).

2.2.1.5 Diabetes

Impaired glucose tolerance and impaired fasting glycaemia are risk categories for the development of diabetes and cardiovascular disease in the future (Hodge et al., 2004). Diabetes is the leading cause of renal failure in many populations in both developed and developing countries. It is also one of the leading causes of visual impairment and blindness in developed countries and also the cause of more than half of all non-traumatic amputations (Sheth et al., 1999; Laaksonen et al., 2003). People with diabetes have two to four chances of developing CVDs compared to those who do not (WHF, 2015). This is as a result of other risk factors of CVDs such as hypertension, abnormal blood lipid level and obesity which frequently occur in diabetics. Among diabetics, atherosclerosis is more severe and occurs at a younger age. Prevalence of diabetes in adults (20-79 years) in Ghana was 1.9% as at 2015 (International Diabetes Federation). In Nigeria, studies conducted in Port Harcourt reported prevalence of diabetes mellitus to be 6.8% (Siminialaye et al, 2008). According to Bosu (2013), about 150,000 newly diagnosed outpatient cases of diabetes and 70,000 cases are re-ported in Ghana each year.

2.2.1.6 Smoking

According to the *Global Status Report on Non-Communicable Diseases* (2010), almost 6 million people die from tobacco use each year, both from direct tobacco use and second-hand smoke. It is believed that by 2020, this number will increase to 7.5 million, accounting for 10% of all deaths. Smoking is estimated to cause about 71% of lung cancer, 42% of chronic respiratory disease and nearly 10% of cardiovascular disease. An estimation of 10% of cardiovascular disease has been attributed to smoking and is the second leading cause of CVDs after high blood pressure (WHO, 2009). Almost 6 million people die from tobacco use or exposure to tobacco smoke worldwide every year (Oberg et al., 2011). According to Baghaei et al. (2010), cigarette smokers are 2–4 times more likely to develop heart disease than non-smokers. Sub-Saharan Africa has been suggested to have the lowest tobacco consumption rates and tobacco-related deaths in the world (Salojee, 2010). Current trends of tobacco consumption however imply that it could be similar to the pattern of tobacco-related diseases as the rest of the world (Steyn and Damasceno, 2008). In 2006, a study conducted by Addo et al. (2009) found the prevalence rate of smoking among civil service workers in Accra to be 6.1% (95% CI: 4.8-8.9) and 0.3% (95% CI: 0.006-1.4) in men and women respectively. These findings were extremely lower than previous studies done by the same authors in 1976.

2.2.1.7 Alcohol intake

Excessive alcohol intake is a risk factor for diseases such as hypertension, acute myocardial infarction and cardiac arrhythmias (WHO, 2011). In 2004, harmful use of alcohol was responsible for 3.8% of deaths worldwide and more than half of these deaths were due to CVDs, cancer and liver cirrhosis. An estimated 4.5% of the global burden of disease (measured in DALY) was due to alcohol abuse (WHO, 2009). The link between alcohol intake and CHD is in two ways- the level and pattern of intake (WHO, 2011). According to WHO (2011), there exists a direct relationship between higher levels of alcohol intake and the pattern of binge drinking (i.e. ≥ 60 g of alcohol per day) with the risk of CVD. However , there is also evidence in some populations that suggests that light to moderate (≤ 1 drink or 15 g alcohol a day for women and ≤ 2 drinks or 30 g alcohol a day for men) intake of alcohol may reduce the risk of CVD (Brien et al., 2011). Alcohol consumption was found to increase HDL cholesterol levels in a dose-response manner (Brien et al., 2011). A survey of Ghanaians aged 25 years and above from Accra (total sample size n = 4733; males n = 1857 and females n = 2875) found that 44.5% of the total sample do not drink alcohol. Of these, 40% were males whilst 47.5% were females

(Amoah et al., 2002). Also, the 2003 World Health Survey (total sample size n = 1943; males n = 1085 and females n = 858), found that the mean value (in grams) of pure alcohol consumed per day among drinkers was 10.6 for males and 5.0 for females (Ustun et al., 2003).

2.2.1.8 Occupation

It has been established that certain occupational exposures will exacerbate or even cause CVD. Between 2001 and 2002, a study of self-reported work related illness in the UK showed that 2.3 million workers felt that they had an illness that was caused by or made worse by their work, resulting in about 33 million working days lost. This resulted in huge losses to the industries where these people worked (Jones et al., 2002). The issue of heart disease and occupation is therefore very important since it affects individuals, industries, health service resource and the resources of a nation (Price, 2004). In the Civil Servants Study of Accra in 2006, 19% of those with hypertension had severe (Grade 3) hypertension and 48% of those examined had evidence of organ damage (Addo et al., 2008; 2009). In 2010, a study conducted on 150 journalists in Peshawar, Pakistan, indicated that 30% (n=46) had CVDs.

2.2.1.8.1 Long working hours

According to the ILO, any work schedule above 40 hours a week is considered working long hours. In Japan where working long hours is quite common, Hayashi et al. (1996) recorded higher blood pressure in a group of white-collar workers who worked more than 60 hours overtime monthly as compared to those who worked less than 30 hours overtime per month. A recent Japanese study also showed a two-fold increase in risk for weekly work hours greater than 60 compared to less than or equal to 40 hours weekly (Liu and Tanaka, 2002). They also observed that having 5 hours or less sleep daily and frequent lack of sleep were also associated with 2-3 fold increased risk of CVDs. The impact of overtime on health may be greater for workers in stressful jobs and shift workers.

2.2.1.8.2 Job Stress

According to Segerstrom and O'Connor (2012), there is accumulated evidence to suggest that stress affects health directly, not only by impacting autonomic and neuroendocrine responses, but also indirectly, by changing habitual and non-habitual health behaviours. Over the years, researchers have successfully explored its links with many of the leading causes of death in the world (e.g. ischaemic heart disease, stroke, HIV/AIDS, diabetes mellitus, etc.). Acute stress has been shown to reduce blood flow to the heart, cause irregular heart beat and increases the likelihood of blood clotting and these can initiate the development of CVDs. Living a stressful life usually results in poor eating habits and smoking and hence increases one's risk of getting CVDs (WHF, 2012f). With the advancement of technology, occupational physical activity has generally decreased, and jobs may have more psychologic rather than physiologic stress Pereira et al., 1998). In a study of journalists working in a newsroom, it was revealed that journalists who are frequently exposed to violent images are at risk of emotional trauma (Feinstein et al., 2014). Also journalists who interview trauma victims, in fact, may themselves be exposed to and experience what experts call vicarious or secondary trauma. Photo and video editors may be traumatized from handling one grisly image after another. News managers on every level may be traumatized from the stress of helping to manage the risks facing their reporters and photojournalists, especially in the wake of injury or fatal loss (Feinstein et al., 2012). The results of Feinstein and colleagues' study supports the hypothesis that reported that job strain (job dissatisfaction, depression, psychosomatic symptoms) and burnout is significantly higher in jobs that combine high workload demands with low decision latitude. Other job characteristics (job insecurity, physical exertion, social support, hazard exposure) were also associated with strain and burnout (Landsbergis, 2006). The INTERHEART study indicated that the effects of stress on Acute Myocardial Infarction (AMI) were similar in men and women, in people of all ages, and in all geographic regions of the world studied. Neuroendocrine response to these stresses involves increase in secretion of glucocorticoids and catecholamines from the adrenal gland and the activation of the sympathetic nervous system. The chronic activation of this stress system may in turn cause suppression of the gonadal, growth hormone and thyroid axes (Tsatsoulis & Fountoulakis, 2006). Such metabolic disturbances may lead to the clinical expression of a number of co-morbidities including central obesity, hypertension, dyslipidemia which are CV risk factors.

2.2.1.8.3 Shift system

The International Labour Organization (1990) defines shift work as "a method of organization of working time in which workers succeed one another at the workplace so that the establishment can operate longer than the hours of work of individual workers at different daily and night hours". Shift work can be categorized into two groups i.e. a fixed shift system or a rotating one. Under a fixed shift system, working time may be structured in two or three shifts (the early, late and/ or night shifts) whilst under a rotating shift system, workers might be assigned to varying work shifts regularly over time (ILO, 2004). According to Zimberg et al. (2012), shift work represents a considerable contingent workforce in developing countries and studies have shown that overweight and obesity are more prevalent in shift workers than day workers. Also, shift work has been linked with a higher tendency for the development of many metabolic disorders, such as insulin resistance, diabetes, dyslipidemias and metabolic syndrome. Recent data have shown that the main factors related to such problems are less sleep time, desynchronization of circadian rhythm and alteration of environmental aspects (Zimberg et al., 2012). Figure 2.4 shows the link between shift work and disease.

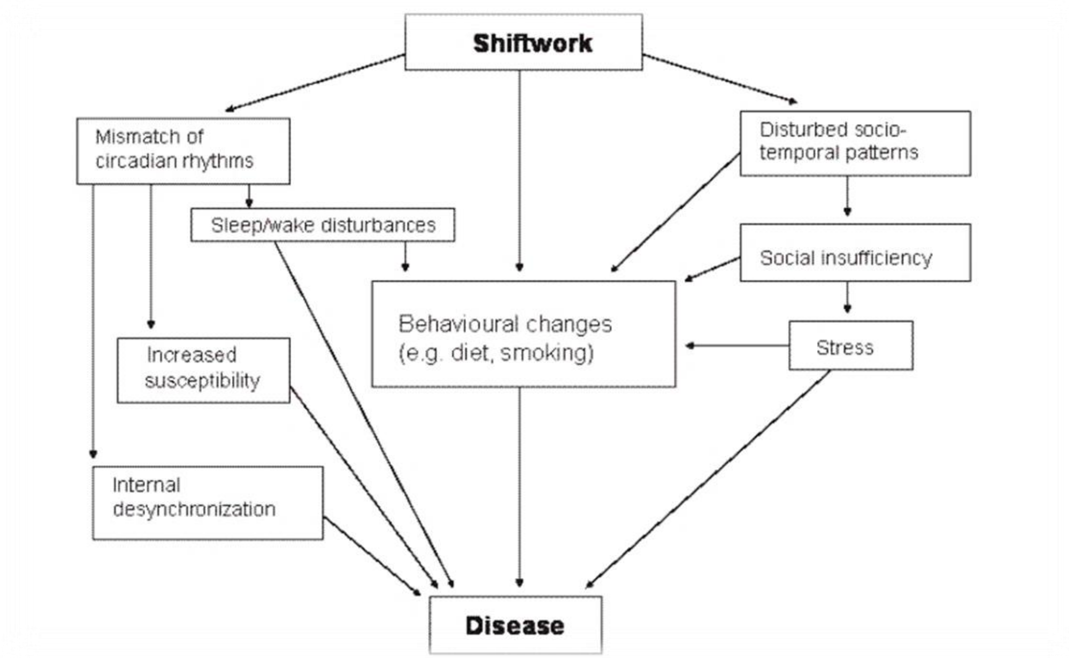

Figure 2.4: Link between shiftwork and disease

2.2.2 NON-MODIFIABLE RISK FACTORS

2.2.2.1 Age and Gender

Premature death is a major consideration when evaluating the impact of NCDs on a given population, with approximately 44% of all NCD deaths occurring before the age of 70. In low- and middle income countries, a higher proportion (48%) of all NCD deaths are estimated to occur in people under the age of 70, compared with high-income countries (26%). The difference is even more marked for NCD deaths in younger age ranges: in low- and middle-income countries, 29% of NCD deaths occur among people under the age of 60, compared to 13% in high-income countries (WHO, 2011).

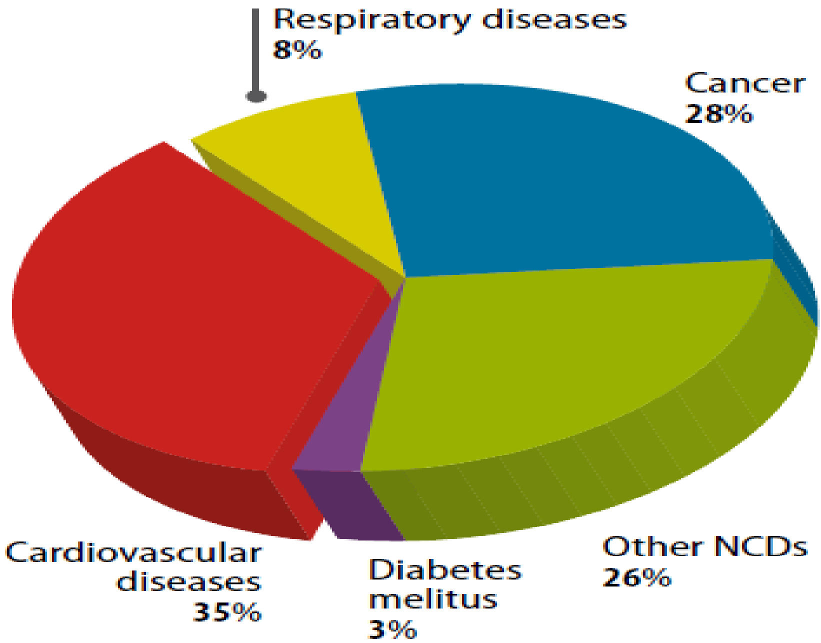

Figure 2.5: Distribution of global NCD by cause of death for less than 60 year old persons, both sexes

There is an evident pattern of population growth and improved longevity in many parts of the world, resulting in increasing numbers of older people. With increasing population age, it is projected that annual NCD deaths will rise significantly to about 52 million in 2030; whiles annual cardiovascular disease mortality would increase by 6 million in the next 20 years. Low- and middle-income countries (LMICs, NCDs will be responsible for three times as many disability adjusted life years (DALYs) and nearly five times as many deaths as communicable diseases, maternal, perinatal and nutritional conditions combined, by 2030 (WHO, 2004; 2008).

The average age at which a first heart attack occurs is 64.5 for men and 70.3 for women (AHA, 2009). The number of sudden cardiac deaths among people aged between 15 and 34 however, has increased, and in 70% of these deaths Coronary Heart Disease is the underlying cause (CDC, 2004). Also, there are associated changes in endothelial control of vascular relaxation and in the elasticity of the arteries with increasing age.

Males tend to develop CVDs at a faster rate than females, though the differences between the sexes tend to decline after women reach menopause. The difference has been explained to be due to the protective effect of estrogen. Thus, after menopause, the risk of development of clinically significant CVDs among women increases greatly in the absence of oestrogen therapy (Nelms et al., 2010). There is however a different school of thought stating that death rates from CVD are approximately the same among men and women 60 years and older. Since older women outnumber older men, CVD actually kills a greater number of older women each year (WHO, 2003). Many women also do not recognize the warning signs or symptoms of heart disease, which may be milder than those exhibited by men (AHA, 2013).

The lifetime risk of development of ischemic heart disease after the age of 40 is reported to be one in two for men and one in three for women (Barnard, 2005). A world Health report from 2002 indicates a similar trend among men and women in two African sub-regions (WHO, 2007) (Table 1). Total CVD risk depends on an individual's particular risk factor profile, gender and age. Total CVD risk is higher for older men with several risk factors than for younger women with few risk factors. The total risk of developing cardiovascular disease is determined by the synergistic effect of cardiovascular risk factors, which commonly coexist. An individual with several mildly raised risk factors may be at a higher total risk of CVD than someone with just one elevated risk factor (WHO, 2007).

Table 1: The percentage of the population, by age and sex, with a ten-year CVD risk of 30% or more, in 2 African sub-regions

WHO SUBREGION	MEN Age group (years)				WOMEN Age group (years)			
	<50	50–59	60–69	70+	<50	50–59	60–69	70+
African Region: D	0.32%	1.98%	11.15%	13.30%	0.04%	1.10%	8.78%	24.45%
African Region: E	1.26%	1.87%	4.05%	3.84%	0.37%	1.34%	2.43%	3.93%

The countries included in each sub-region are listed in Appendix I.

2.2.2.2 Family history

Heart diseases tend to cluster in families hence, family medical history offers essential information for identifying risk in individuals. Obtaining such information can capture the effects and interactions of shared genetic, behavioral, lifestyle and environmental factors that lead to chronic disease in a family (CDC, 2015). Having a family history of premature cardiovascular disease (cardiovascular disease in a first-degree relative before the age of 55 years for men and 65 years for women) may pose a higher risk of developing that disease than an individual without such a family member (WHO, 2007; CDC, 2014).

2.2.2.3 Ethnicity/Race

In general, race emphasizes the geographic region of origin of a person’s ancestry whiles ethnicity takes into consideration cultural tradition, common history, religion, and often a shared genetic heritage (Burchard et al., 2002; 2004). Also people of similar geographic ancestry share similar mutations in their genes (Collins, 2004) and hence prone to similar diseases of genetic origin. Race and ethnic background are strongly correlated with socioeconomic status. An individual's socioeconomic status is also a strong predictor of access to and quality of health care and education, which, in turn, may be associated with differences in the occurrence of diseases and the outcomes of those diseases (Smedley et al., 2002). According to the American Heart Association (2015), statistics show that African-Americans face higher risks for high blood pressure, diabetes and stroke. There is also evidence that indicates that 1 in 4 Hispanics will suffer from high blood pressure, and nearly half will have high blood cholesterol. The prevalence of hypertension is high among people of African origin compared to Whites regardless of their BMI (Ridker et al., 1997). In 2009, CVD caused the deaths of 46,334 black males and 48,070 black females (AHA, 2013).

The Nurses' Health Study among 78,000 U.S. women, observed patterns of weight gain and diabetes development to see if there were any differences by ethnic group (Shai et al., 2006). All women were healthy at the start of the study. However after 20 years, researchers found that at the same BMI, blacks had higher risks of diabetes than whites, but to a lesser degree when compared to Asians and whites.

CHAPTER THREE

3.0 STUDY DESIGN AND METHODS

3.1 STUDY DESIGN

The research design was a cross sectional study involving quantitative methods. Convenience sampling was used in selecting the subjects.

3.2 STUDY SITE

The study site was the Ghana Broadcasting Corporation (GBC) in Accra. Ghana Broadcasting Corporation is one of the national media houses of Ghana, with branches in all the ten regions of the country. It includes television stations such as GTV, GTV Sports Plus and radio stations like Uniiq FM.

3.3 STUDY PARTICIPANTS

The participants recruited for the study were media workers at GBC, Accra. This included broadcast journalists from the television and radio rooms, photojournalists, video journalists and the technical crew.

3.3.1 Inclusion criteria

Full-time media workers between the ages of 20 and 60 years, and residing in Accra were recruited into the study.

3.3.2 Exclusion criteria

Pregnant women and lactating mothers were not involved in the study.

3.4 SAMPLE SIZE

The sample size was calculated as follows:

$$N = \underline{(Z)^2 \times (P)\,[1- P]}$$

$(E)^2$

N (sample size)

Z (z-score associated with the confidence level of 95%) = 1.96

P (prevalence rate of diabetes within the population) = 0.06

E (allowable error) = 0.06

$= (1.96)^2 (0.06)(0.94) / 0.06$

= 60 ≈ 80 participants to allow for drop-outs

For correction for a finite population: New sample size= N/ [1+ (N-1)/ population]

Number of media workers at GBC Accra = 816

New sample size= 80/[1+(80-1)/816]

= 72.9 + 20% drop out =87 participants

3.5 PRETEST

The pretesting of the questionnaire was carried out at the Ghana Journalists Association Press Centre, Accra, using ten journalists (five males and five females).

3.6 PROCEDURE FOR DATA COLLECTION

The members of the media house were met and the purpose and nature of the study were explained to them. Volunteers after giving their consent to participate were recruited for the study. On the day of the study, the consented subjects had their blood samples taken after they had been reminded to fast the previous day via text or a phone call. Their anthropometric and blood pressure measurements were also taken. Pre-tested questionnaires were then administered to the subjects by the principal investigator and research assistants who had been trained prior to recruitment of participants.. Information collected included demographic characteristics, socio-economic status, meal patterns, previous medical history and lifestyle risk factors (Smoking, Alcohol, Physical activity and Dietary intake).

3.6.1 Dietary assessment

Food intake was assessed using a repeated three-day (two weekdays and one weekend) 24-hour recall of usual food intake of all meals and snacks. Questions to verify intake included portion sizes and food preparation techniques. Food models and household measurements were used to aid in portion size estimation.

3.6.2 Anthropometric measurement

Anthropometric measurements used in this study included height, weight, body mass index (BMI), waist-to-hip ratio percentage of body fat and visceral fat. The measurements were compared to reference standards to assess risk for various diseases. The BMI was then calculated by dividing the body weight (kilograms) by the square of the height (meters). Classification of BMI into categories was based on the World Health Organization criteria (2012) for adults.

3.6.2.1 Weight

Weight was measured with an Omron body composition analyser BF508 (Milton Keynes, United Kingdom) to the nearest 0.1kg in light clothing with subjects standing erect. Participants were asked to remove shoes, jackets and other heavy objects before standing on the scale. The visceral and body fats were also analyzed using the same body composition analyzer.

3.6.2.2 Height

Height was measured with a portable Seca stadiometer (Hamburg, Germany) to the nearest 0.1 centimeter. Subjects were asked to stand upright on a base plate without shoes with their head and back straight, feet together and heels touching the back of the plate. The head plate was lowered to touch the top of the head and the height was noted.

3.6.2.3 Waist-to-Hip Ratio

Waist circumference was measured with a non-stretchable tailor's tape measure to the nearest 0.1cm at the approximate midpoint between the lower margin of the last palpable rib and the top of the iliac crest (WHO, 2008b). The hip circumference was measured at the largest horizontal circumference around the hips with a non-stretchable tailor's tape measure to the nearest 0.1cm. Waist-to-hip ratio (WHR) was calculated by dividing the waist circumference by the hip circumference. All measurements were taken with participants dressed in light clothing. The WHO cut-offs were used in the classification. The determination of body fat composition and visceral fat were done using a body composition analyser.

3.6.2.4 Blood pressure measurement

Blood pressure was measured using an Omron 705 CP oscillometric monitor (Matsusaka, Japan) in a quiet area after the subject had rested, at least for 5 minutes. Three measurements were taken at one minute's intervals in the right arm with participants sitting upright. The arm was relaxed on a hold-up at a height approximately at the heart level and participants were asked to sit quietly. These precautions were observed to minimize measurement errors and to reduce bias of a single measurement. The average of the last 2 readings was used for the analysis.

3.7 BIOCHEMICAL MEASUREMENTS

3.7.1 Blood Collection and Handling

After 8-12 hours overnight fast, 5ml of blood sample was taken from the antecubital vein aliquoted into fluoride tubes (2 ml) for fasting glucose and into gel separator tubes (3ml) for total cholesterol, HDL, LDL and TG. Blood samples were taken from participants before 9:00 hours in the morning. The blood samples were kept in a cool box prior to centrifugation within 15 minutes of blood draw. They were centrifuged for 15 minutes at 2500 rpm and both plasma and serum aliquots were pipetted into plastic Eppendorf tubes. Samples were stored at -89ºC until the time of analysis.

3.7.2 Fasting Plasma Glucose and Lipid Profile (Triglycerides, HDL, LDL and total cholesterol) assay

Plasma glucose and lipids were measured using the Mindray BS 400 Chemistry Analyzer (Guangdong, China) according to the manufacturer's instructions. The analyser is fully automated and uses absorbance photometry in measuring the results.

3.8 ANALYSIS

The data was analyzed using Statistical Package for Social Sciences (SPSS) version 20.0. Means and standard deviation of continuous variables were determined and categorical data were summarized as frequency and percentages. Pearson's correlation coefficient was used to determine the effect of lifestyle behaviours on the risk of CVDs. MICRODIET nutritional analysis software version 3.1 was used for the nutrient analysis. P values ≤ 0.05 were considered significant. Graphical representations of data in the form of bar charts were also created.

3.9 ETHICS

The study conformed to the guidelines in the Helsinki Declaration on Human Experimentation (2013). Ethical approval was obtained from the Ethics and Protocol Review board of the School of Biomedical and Allied Health Sciences for the study. The subjects were given an informed consent form to read and sign before being recruited for the study. This explained the purpose and the nature of the study. Information collected on subjects was kept confidential.

3.10 DISSEMINATION OF RESULTS

Upon completion of the study, bound copies of the entire work were submitted to GBC, the School of Graduate Studies and the Department of Dietetics of University of Ghana. The results will also be published in a peer review journal.

CHAPTER FOUR

4.0 RESULTS

A total of 72 respondents, 50 (69.4%) males and 22 females (30.6%) females, were recruited for the study. The respondents were between the ages of 23 and 59 years and their mean age was 41±11 years. The demographic characteristics of the study participants are shown in table 4.1. There were no significant differences in age and marital status between the males and females. Almost half (41.7%) of the respondents were within the age group 20-35, followed by those over 46 years (36.1%). The majority of study participants (72%) were married. The number of years that the respondents had worked at GBC varied. A greater proportion of them 46 (63.8%) had worked between 0-14 years whiles an equal number 13 (18.1%) had worked between 15-25 years and above 25 years. Thirty-two (44.4%) of the total respondents were shift-worker and the most number of years worked as a shift worker was 0-9 years, with 22 (69%) belonging to this category.

Table 4.1: DEMOGRAPHIC CHARACTERISTICS OF POPULATION STUDY

	MALE n (%)	FEMALE n (%)	*p*	ALL n (%)
Gender	50 (69.4)	22 (30.6)		72 (100)
Age (years)				
20-45	33 (66)	13 (59.1)		46 (63.9)
≥ 46	17 (34)	9 (40.9)		26 (36.1)
All	50 (100)	22 (100)	0.58	72 (100)
Marital Status				
Married	37 (74)	15 (68.2)		52 (72.2)
Single	13 (26)	6 (27.3)		19 (26.4)
Divorced	0 (0)	1 (4.5)		1 (1.4)
All	50 (100)	22 (100)	0.79	72 (100)
No. of years worked as media personnel				
0-14 years	34 (68)	12 (54.5)		46 (63.8)
15-25 years	8 (16)	5 (22.7)		13 (18.1)
Over 25 years	8 (16)	5 (22.7)		13 (18.1)
All	50 (100)	22 (100)	0.32	72 (100)
Shift workers	26 (52)	6 (27.3)		32 (44.4)
Non-shift workers	24 (48)	16 (72.7)		40 (55.6)
All	50 (100)	22 (100)	0.05	72 (100)
Number of years on shift duty				
0-9 years	18 (56.25)	4 (12.5)		22 (68.75)
Over 10 years	4 (12.5)	2 (6.25)		6 (18.75)
No response	4 (12.5)	0 (0)		4 (12.5)
All	26 (81.25)	6 (18.75)	0.14	32 (100)

4.1 BLOOD PRESSURE AND ANTHROPOMETRIC MEASUREMENTS

Table 4.2 shows the blood pressure and anthropometric measurements of the study participants. There was a significant difference between the BMI and percentage body fat of the males and females. The females were observed to be much heavier than the males. Figure 4.1 shows the BMI categories of the male and female participants. The females generally weighed more than the males. About a third (36.4%) of them were in the obese Class I category (BMI 30-34.9 kg/m^2). Half of the males were in the normal weight category (BMI 18.5-24.9 kg/m^2) with only 2% being underweight (BMI < 18.5 kg/m^2).

Table 4.2: MEAN (±SD) CLINICAL CHARACTERISTICS OF THE STUDY POPULATION

	MALE (n=50)	FEMALE (n=22)	*p*	ALL (n=72)
SBP (mmHg)	123 ± 18	125 ±16	0.69	123 ± 17
DBP (mmHg)	81 ± 15	81 ± 12	0.98	81 ± 14
BMI (kg/m^2)	24.6 ± 3.8	28.7 ± 4.8	0.00	25.84 ± 4.52
Visceral fat	8.6 ± 4.4	7.7 ± 2.5	0.36	8.25 ± 3.90
% Body fat	21.4 ± 7.1	40.5 ± 7.4	0.00	27.33 ± 11.53
WC (cm)	90 ± 12	91 ± 13	0.10	90 ± 12
WHR	0.88 ± 0.07	0.85 ± 0.07	0.09	0.87± 0.07

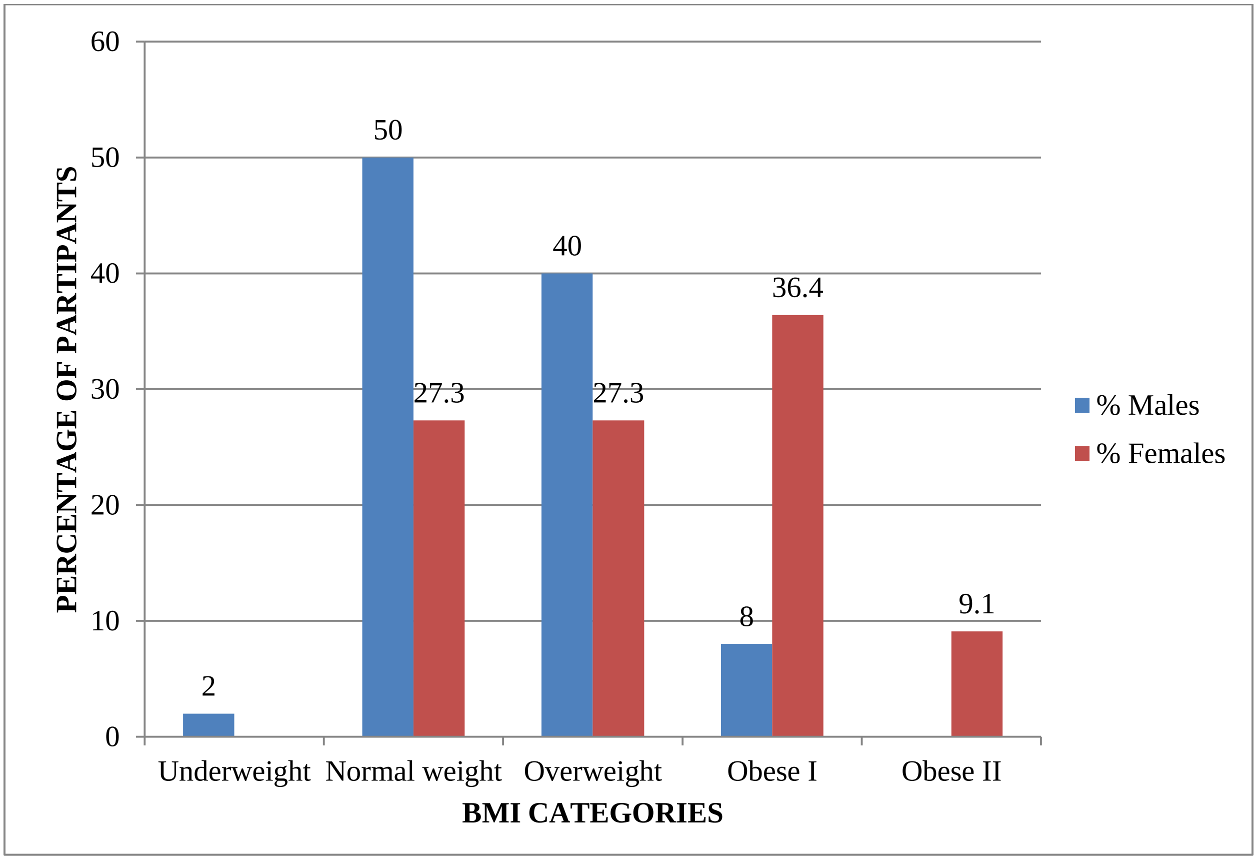

Figure 4.1: BMI distribution of study participants

4.2 MEAL PATTERNS OF STUDY PARTICIPANTS

The meal patterns of the study subjects are shown in Table 4.3. Breakfast, lunch and supper were considered as main meals. The majority of the participants on average consumed two main meals a day. No significant differences were observed in the number of meals eaten in a day between genders. However, a significantly higher proportion of the females reported that they always snacked in between meals.

Table 4.3: MEAL PATTERNS OF STUDY PARTICIPANTS

	MALE (n=50)	FEMALE (n=22)	*p*	ALL (n=72)
No. of meals a day				
1	1 (2)	1 (4.55)		2 (2.8)
2	29 (58)	12 (54.55)		41 (56.9)
3	20 (40)	9 (40.9)		29 (40.3)
All	50 (100)	22 (100)	0.91	72 (100)
Types of meals bought from outside				
Breakfast	27 (54)	14 (63.6)		41 (56.9)
Lunch	40 (80)	14 (63.6)		54 (75)
Supper	10 (20)	2 (9.1)		12 (16.7)
Snacks	18 (36)	10 (45.5)		28 (38.9)
None	1 (2)	0 (0)	0.58	1 (1.4)
Frequency of buying meals outside weekly				
Never/Occasional	8 (16)	2 (9.1)		10 (13.9)
Once-Twice	4 (8)	2 (9.1)		6 (8.3)
3-4 times	6 (12)	4 (18.2)		10 (13.9)
5 times	20 (40)	12 (54.5)		32 (44.4)
Always	12 (24)	2 (9.1)		14 (19.4)
All	50 (100)	22 (100)	0.19	72 (100)
Snacking between meals				
Never	11 (22)	0 (0)		11 (15.3)
Sometimes	34 (68)	0 (0)		34 (47.2)
Often	4 (8)	1 (4.5)		5 (6.9)
Always	1 (2)	21 (95.5)		22 (30.6)
All	50 (100)	22 (100)	0.01	72 (100)

4.3 LIFESTYLE CHARACTERISTICS

Table 4.4 shows the lifestyle characteristics (smoking, alcohol and physical activity levels) among the participants. Majority of them did not drink alcohol. Also, a greater number of the study participants reported they did not smoke. However, a small fraction (5.6%) said they were passive smokers. There were no significant differences between the groups with regards to the lifestyle parameters.

Table 4.4: LIFESTYLE CHARACTERISTICS OF STUDY POPULATION

	MALE n (%)	FEMALE n (%)	*p*	ALL n (%)
Alcohol Intake				
Yes	22 (44)	9 (40.9)		31 (43.1)
No	28 (56)	13 (59.1)	0.81	41 (56.9)
Smoking Behaviour				
Non-smoker	47 (94)	21 (95.5)		68 (94.4)
Active smoker	0 (0)	0 (0)		0 (0)
Passive smoker	3 (6)	1 (4.5)		4 (5.6)
All	50 (100)	22 (100)	0.81	72 (100)
Leisure time Physical Activity				
Always	8 (16)	1 (4.5)		9 (12.5)
Often	11 (22)	3 (13.6)		14 (19.4)
Sometimes	18 (36)	11 (50)		29 (40.3)
Never	13 (26)	7 (31.8)		20 (27.8)
All	50 (100)	22 (100)	0.27	72 (100)

4.4 NUTRIENT INTAKE

4.4.1 Energy and Macronutrients

Table 4.5 shows the average amounts of energy and macronutrients consumed by the participants. Significant differences were observed in the mean total energy intake, carbohydrates and dietary fibre between the males and females. The males generally had higher intakes than the females.

4.4.2 Micronutrient Intake

Table 4.6 shows the average amounts of micronutrients consumed by the study participants. Among micronutrients, only the intake of phosphorus was significantly different among the groups. The intakes of the various micronutrients were however higher in the males than the females.

Table 4.58: MEAN DAILY INTAKE OF MACRONUTRIENTS AMONG PARTICIPANTS

Macronutrients	Male (n=50) Mean ± SD	Female (n=22) Mean ± SD	*p*	All (n=72) Mean ± SD
Energy (Kcal)	1809 ± 978	1302 ± 280	0.02	1654 ± 859
CHO (g)	274.8 ± 177.8	182.5 ± 47.7	0.02	246.6 ± 156
% Energy intake	57 ± 9	53 ± 8	0.72	55 ± 4
Dietary fibre	14.68 ± 8.82	10.06 ± 5.47	0.03	13.27 ± 8.19
Protein (g)	69.61 ± 44.14	51.50 ± 15.92	0.07	64.08 ± 38.61
% Energy intake	15 ± 4	31 ± 7	0.85	16 ± 9
Fats (g)	55.8 ± 28	45.6 ± 15.6	0.11	52.7 ± 25.2
% Energy intake	28 ± 8	16 ± 4	0.81	29 ± 8
- Cholesterol	60.1 ± 75	68.2 ± 57.6	0.13	65.6 ± 69.8
- SFA	2.9 ± 3.9	3.5 ± 2.7	0.54	3.1 ± 3.4

Table 4.6: DAILY MICRONUTRIENT INTAKE AMONG STUDY PARTICIPANTS

Micronutrients	Male	Female	*p*	All
	Range ± SD	Range ± SD		Range ± SD
Sodium (mg)	3151 ± 794	1408 ± 437	0.38	3151 ± 705
Potassium (mg)	14424 ± 2017	1034 ± 277	0.52	14424 ± 1687
Magnesium (mg)	1623.89 ± 234.40	183.25 ± 40.89	0.51	1623.89 ± 196.60
Calcium (mg)	2182 ± 458	1353 ± 274	0.15	2182 ± 414
Phosphorus (mg)	4576 ± 821	1086 ± 216	0.05	4576 ± 712
Zinc (mg)	35.38 ± 6.26	9.99 ± 2.68	0.08	35.38 ± 5.52

4.5 BIOCHEMICAL ANALYSIS

Mean fasting plasma glucose (FPG), total cholesterol (Tc), triglyceride (TG), HDL- and LDL-cholesterol of the study subjects are shown in table 4.7. There were no statistical significant differences between the respondents with regards to Tc, TG, LDL-cholesterol, and FPG. Though the females had significantly higher HDL cholesterol than the males, both were within the average level of risk category (Males=1.0-1.3 mmol/l, Females= 1.3-1.5 mmol/l).

Table 4.7: BIOCHEMICAL PARAMETERS OF STUDY POPULATION

	MALES (n=50)	FEMALES (n=22)=22)	*p*	ALL (n=72)
Total cholesterol (mmol/l)	**5.23 ± 1.20**	**5.74 ± 1.45**	**0.13**	**0.87± 0.07**
LDL cholesterol (mmol/l)	**3.31 ± 0.92**	**3.55 ± 1.12**	**0.33**	**3.38 ± 0.99**
HDL cholesterol (mmol/l)	**1.13 ± 0.38**	**1.33 ± 0.28**	**0.03**	**1.19 ± 0.36**
Triglycerides (mmol/l)	**1.38 ± 0.97**	**0.99 ± 0.53**	**0.08**	**1.26 ± 0.87**
Fasting Plasma Glucose (mmol/l)	**4.6 ± 1.1**	**4.5 ± 0.4**	**0.69**	**4.5 ± 0.9**

4.6 MEDICAL HISTORY OF STUDY PARTICIPANTS

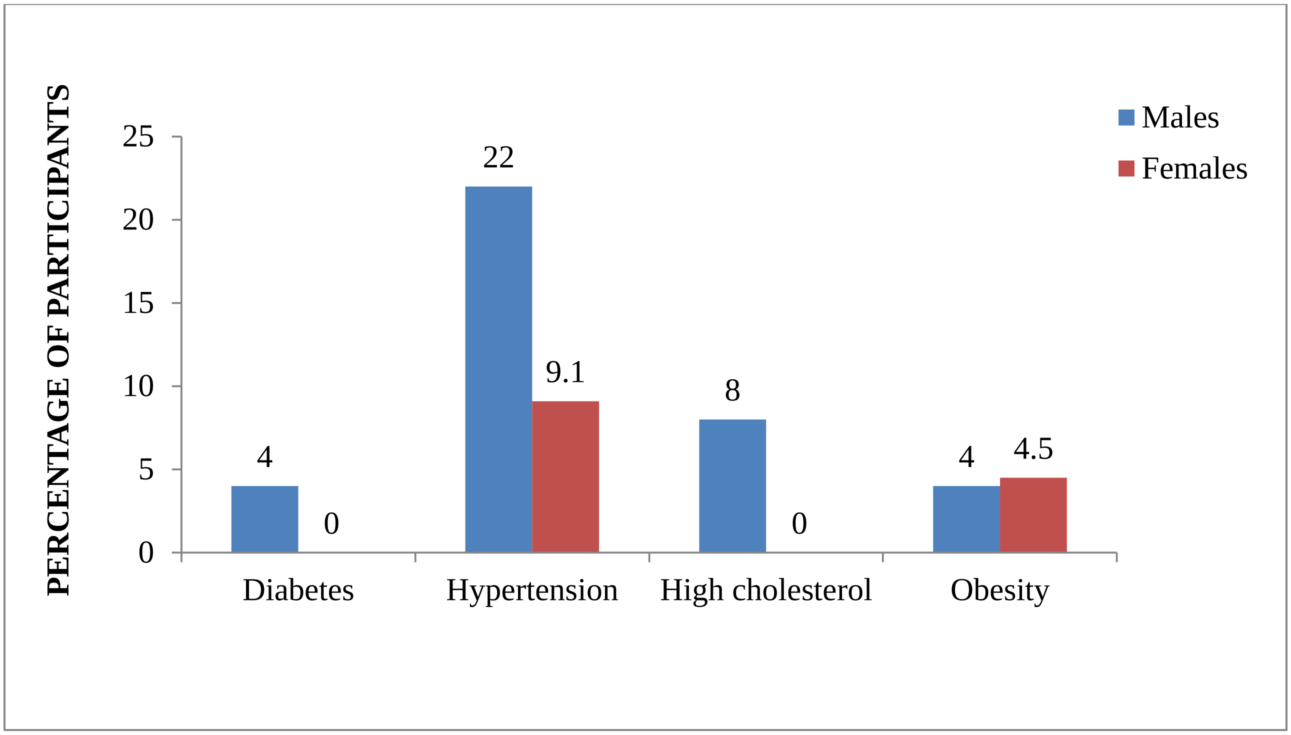

Figure 4.2 Distribution of chronic disease condition among study participants

4.7 CARDIOVASCULAR RISK FACTORS

4.7.1 OVERWEIGHT AND OBESITY

In reference to figure 4.1, there was a significant difference in BMI between the two groups. The females had a very high prevalence for overweight and obesity (72.8%).

4.7.2 HYPERTENSION

There was no significant difference (*p*=0.57) found in relation to the prevalence of hypertension between the males and females. However, the prevalence of hypertension in the study population was 12.5%.

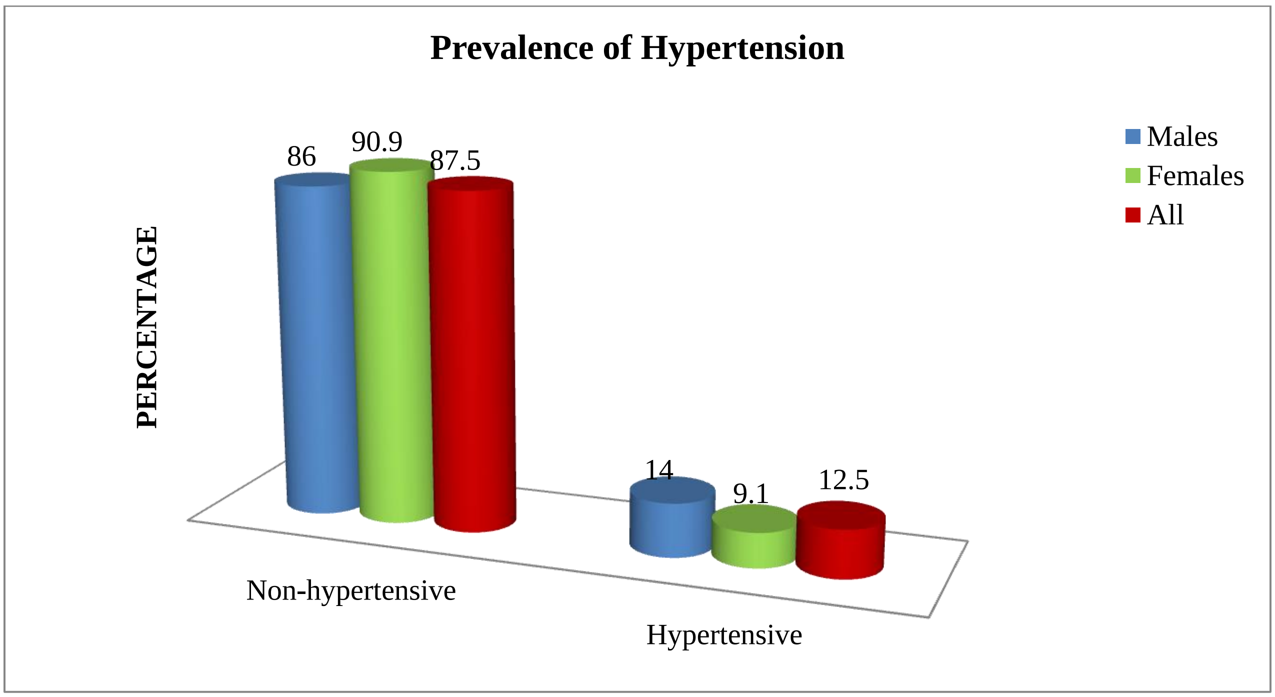

Figure 4.3: Prevalence of Hypertension among the study population

4.7.3 DIABETES

No significant difference (*p*=0.25) was observed between the males and the females. The prevalence of diabetes among the population was however 4.2%.

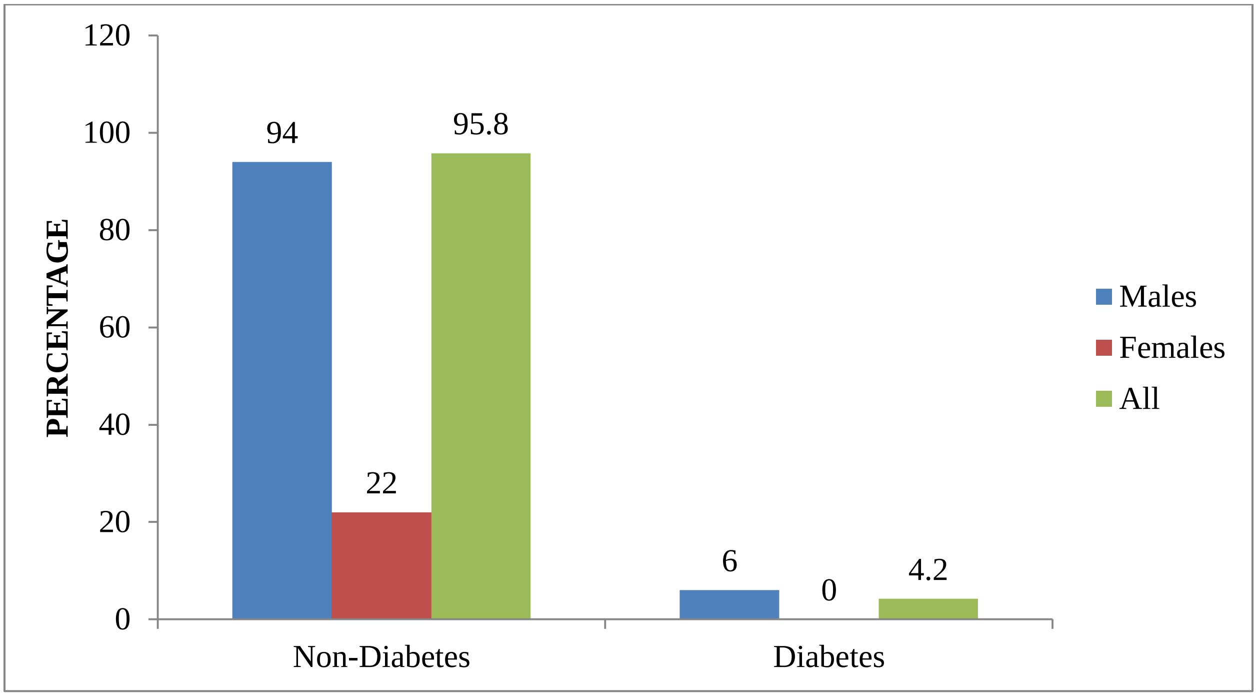

Figure 4.4: Prevalence of Diabetes among the study population

4.7.4 LIPID PROFILE

There were no significant differences in the various lipid parameters among the males and females. The prevalence of high cholesterol, triglyceride, HDL and LDL cholesterol levels were 54.2%, 25%, 27.8% and 41.7% respectively. The prevalence of dyslipidemia was 58.3%.

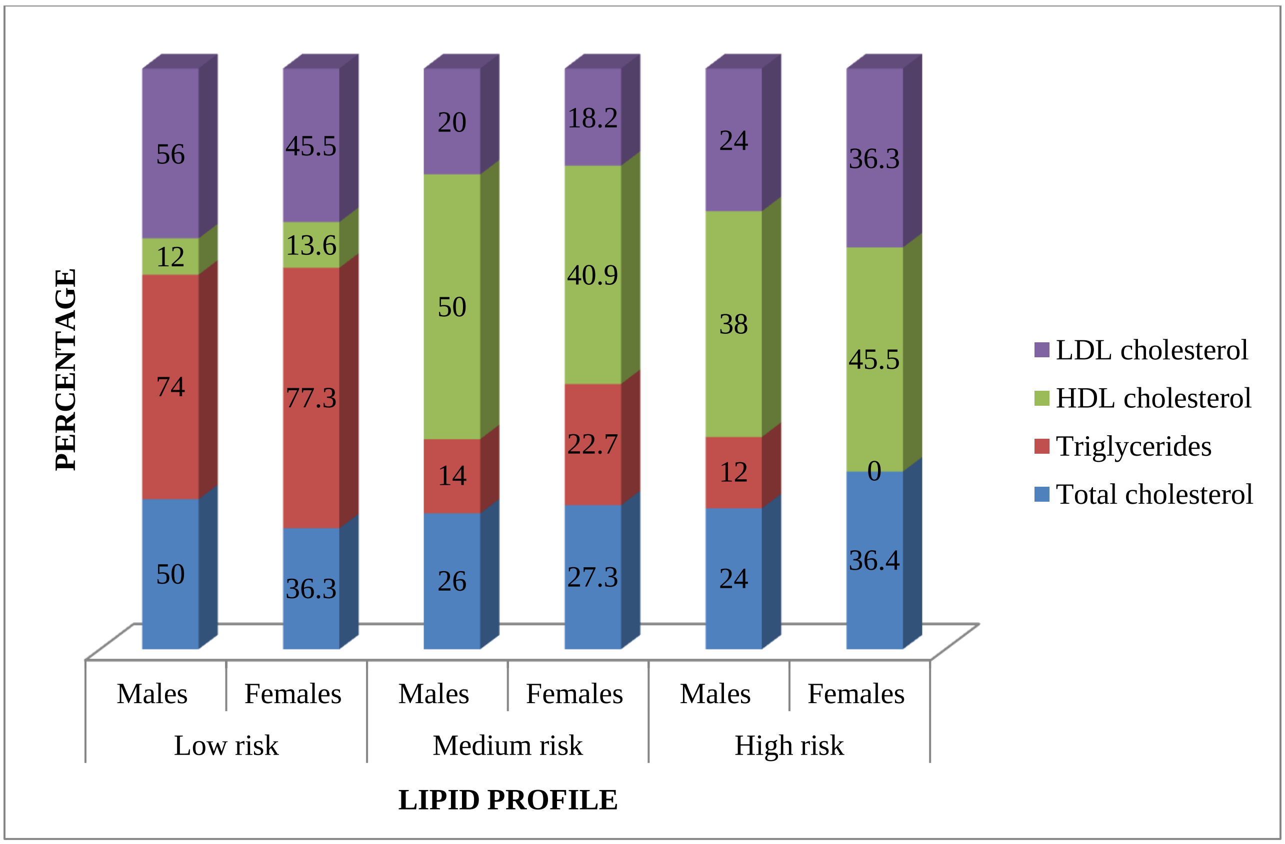

Figure 4.5: Lipid profile of the participants

CHAPTER FIVE

5.0 DISCUSSION

In Ghana, no research has been done on the effects of lifestyle behaviours and the risk of CVDs among media personnel. The number of Ghanaian journalists who are at risk of premature CVD morbidity and mortality is therefore unknown. The study therefore examined the CV risk factors among selected media personnel in Accra.

5.1 ANTHROPOMETRY AND BLOOD PRESSURE

The study showed that 36.1% of the workers were overweight whilst 18.7% were obese. This was close to the findings of Fawad and colleagues (2010) on journalists in Pakistan in which 28% of them were found to be overweight. Majority of the Ghanaian journalists were overweight probably due to their low physical activity levels. Only about 32% of them reported that they were involved in some form of exercise on a regular basis. Physical activity has been shown to help in maintaining healthy weight, blood pressure, blood lipid levels and in proper functioning of clotting factors and blood vessels (WHF, 2012e). A nationwide survey in Ghana carried out on 5000 adults found the prevalence of obesity to be 5.5% and higher among females 7.4% compared to males 2.8% (Biritwum R, Gyapong J, & Mensah, 2005). The increase in body weight could also be attributed to their age group. The mean age of the participants was 41±11 years. Research by Amoah (2003) among adults aged 25 years and above in urban and rural Accra, showed that the overall crude prevalence of overweight and obesity was 23.4 and 14.1% respectively. A study in the UK found a changing trend in age-related overweight and obesity, in that younger people were prone to overweight/obesity than older people (Johnson et al., 2015). It has also been shown that there is an increase in body weight till middle age which can be attributed to the accumulation of fat with age (Silver *et al.*, 1993). The female workers had higher BMI and percentage body fat compared to the males. According to WHO (2008), 35% of all adults above 20 years were overweight, with 35% of that population being women. Women generally tend to have more body fat than men. Both genders however had normal visceral fat levels. The mean WHR indicated a low risk of disease for the males according to WHO classification. For the women however, it indicated a high risk of disease. This is in contrast to findings by Fawad et al., who found journalists in Pakistan to have a WHR of 0.91 ± 0.03. Research findings show that people with "pear-shaped" bodies i.e. those who carry more weight around the hips have less health risks compared to those with "apple-shaped" bodies (with more weight around the waist). Again, in women, waist–hip ratio appears to be a stronger independent risk factor in relation to disease than BMI (Lapidus et al., 1984).

The mean SBP and DBP were not statistically different between genders. The mean readings were however in the prehypertension category (SBP of 120-139 mmHg or DBP of 80-89 mmHg), according to AHA (2015). Prehypertension should not be ignored as people with such conditions are more likely to have at least one other risk factor for CVD than people who are normotensive, hence the need for early detection and management (Greenland et al., 2004). About 36% of the participants had prehypertension and 12.5% had hypertension. This is probably due to the high stress associated with journalism and their shift work. These findings agreed with a study carried out on emergency responders in Bengal, India which found their mean BP to be in the prehypertensive category and a prevalence of 42.9% among the study population (Mallik et al., 2014). Prehypertensives are also at a greater risk of developing hypertension (Greenland et al., 2004). Out of 362 subjects studied in four rural Ga districts in Ghana, the prevalence of hypertension was 25.4% (Addo et al., 2006). This is quite higher than was observed from the media workers. With the current prevalence of prehypertension in the study population, it is likely that the prevalence of hypertension among them will rise with time.

Job stress and shift work have also been linked to diseases (Tsatsoulis & Fountoulakis, 2006; Zimberg et al., 2012). The prevalence of hypertension among the males was slightly higher (14%) than the females (9.1%). Regardless of their ethnicity or race, men have been shown to have higher blood pressure than women through much of their life (Sandberg & Ji, 2012).

5.2 MEAL PATTERNS

Most of the participants ate two main meals a day. The National Institute on Aging Intramural Research Program (2008), in USA, found that eating one large meal a day, rather than three increases insulin resistance and glucose intolerance and these are key features of type 2 diabetes. However, collectively, their findings suggest that meal skipping or intermittent caloric restricted diets can result in health benefits such as improved glucose regulation, but only if there is an overall reduction in energy intake (Carlson et al., 2008). Again, about a third of the participants said they took snacks in between their meals, hence the reason why they took two main meals daily. The busy natures of their schedules encourage snacking, as these journalists are usually on the move or are stationed in their workplace. The women's snack intake was significantly higher than that of the men. Snacking is usually associated with a nutrient–dense diet. Intake of high caloric dense foods has the potential to displace nutrient-dense foods (Murphy & Johnson, 2003) and hence result in weight gain. This may possibly explain the high prevalence of overweight and obesity among the women.

Out of the three main meals, lunch was mostly bought from outside by both men and women. This was consistent with the study by Mensah (2013) which found that 48% of fire fighters in Accra bought their lunch outside. Almost half of the participants reported buying food from outside five days in a week. It is reported that eating breakfast or supper away from home on a frequent basis may increase the risk of obesity (Ma et al., 2003). Food choices when eating out are usually higher in energy content which results in excessive energy intakes, and hence an increased risk of obesity and CVDs. Findings also indicate that individuals usually do not compensate for their less nutritious food-away-from-home choices by making healthier food choices at home (Todd *et al.,* 2010). However, eating out can be healthy and affordable if cautiously selected (You et al., 2009).

5.3 LIFESTYLE PARAMETERS AND PHYSICAL ACTIVITY

Alcohol consumption in this study was low. A survey of Ghanaians aged 25 years and above from Accra found that 44.5% of the total sample do not drink alcohol. Of these, 40% were males whilst 47.5% were females (Amoah et al., 2002). Pereira et al. (1998) conducted a study on the occupational status and CVD risk factors in Mauritius and found that skilled workers of both sexes had lower alcohol intakes than the unskilled workers. This is a plausible explanation for the relatively low levels of alcohol among the participants since they are journalists. The low intake of alcohol could also be due to the higher proportion of married participants in this present study. It has been shown that both men and women are likely to consume less alcohol when married (Hajema et al., 1997; Jonas et al., 2000). Again, a relatively low smoking status was recorded from this study. Almost all the participants did not smoke, with only about 6% indicating that they were passive smokers. There are generally a small proportion of smokers in Ghana and those who smoke are not heavy smokers (Pobee, Larbi, & Kpodonu, 1984). Addo et al. (2009) found the prevalence of smoking among civil service workers to be quite low. The prevalence among men was 6.1% and 0.3% among women. However, passive smoking (generally defined as living with someone who smokes) is associated with an increase in risk of coronary heart disease risk of 25-30% (Whincup et al., 2004).

Inverse association between physical activity and risk of developing CHD or CVDs is present in both men and women (Shiroma, 2010). The physical activity levels of the study population were very low. Only 9% were involved in some form of physical activity 4-5 times a week. This could be attributed to their busy schedules, hence very little time for exercise. A third (36.1%) of the journalists stated that they were mostly sedentary and about a quarter of the entire population were active at work. The prevalence of obesity and overweight could therefore be a reflection of their low physical activity levels. Even though some forms of aerobic activities were performed by their organization every fortnight, most of them did not participate in it. A policy that encourages more participation to utilize this avenue will improve their CV health. A 24-month intervention programme which compared planned and lifestyle physical activity showed that both were effective in improving physical activity, cardiorespiratory health, and blood pressure significantly. Both groups showed significantly reduced SBP, DBP and percentage body fat (Dunn *et al.*, 1999).

5.4 NUTRIENT INTAKE

5.4.1 Energy and Macronutrient intake

The male participants had a significantly higher energy intake when compared to the females. Men generally have higher energy intakes due to their large body frames and muscle mass. The total energy intakes of both groups were below the recommended daily allowance for adults. The average allowance for men of reference size i.e. 77 kg is 2,300 kcal for men and 1,900 kcal for women (Recommended Dietary Allowances, 1989). These low total energy intake levels observed may be the result of taking averagely two main meals daily. Another plausible explanation could be under-reporting of their intakes. Since alcohol contributes 7kcal energy, it is likely that those who drank alcohol may have higher energy intakes than is reflected in the study which can contribute to weight gain if physical activity is low.

The various macronutrients (carbohydrate, protein and fat) contribute to an individual's total dietary intake. The Australian National Health and Medical Research Council states that for a specific intake, increasing the proportion of one macronutrient necessarily involves decreasing the proportion of one or more of the other macronutrients. The population nutrient intake goals set by WHO and FAO estimate total carbohydrate, protein and fat intake as 55-75%, 10-15% and 15-30% respectively. Even though the intakes of the participants were quite low, the required percentage energy contribution of the various macronutrients was met, therefore implying that their meals were generally balanced. The women however, had protein intakes that were double the recommended intakes. High protein diets, especially of animal sources, have been associated with an increase in fat intake. This could also account for the high percentage body fat and BMI of the women and contribute to an increase in total and LDL-cholesterol levels. Also, random reports have suggested that low carbohydrate-high protein diets can increase the risk of cardiovascular disease (Lagiou et al., 2012).

There was also a significant difference in the dietary fibre intakes between genders. The men had higher dietary intakes than the women even though both had lower intakes than the recommended daily intakes of 25-30g daily. This was not in contrast to findings of a study conducted on adult male miners in Obuasi to assess their dietary intake, body composition and blood pressure. Their mean dietary fibre intake was 20.7±12.2g, also lower than the recommended intakes. The low daily intake of the media workers could account for the low fibre intakes. Water soluble fibre has been shown to reduce both total and LDL-cholesterol without affecting HDL-cholesterol levels (Reaven, 1995). Dietary fibre has been associated with delayed hunger and reduction in energy intake, also plays a role in weight management and prevents obesity as it increases satiety (Ludwig et al., 1999). This association was observed as there is a high rate of snacking between meals among the study population leading to the high prevalence of overweight and obesity.

5.4.2 Micronutrients

A decreased intake in micronutrients poses a significantly higher risk of coronary heart disease (CHD), stroke, heart failure (HF) and all-cause mortality based on new data presented by the World Congress of Cardiology in Beijing, China (WHF, 2010).

The mean intakes of sodium, potassium, magnesium and calcium were below the daily recommendations. Generally, as dietary salt intake increases, blood pressure also increases (Hodge, English, O'Dea, & Giles, 2004)(Eilat-Adar, Sinai, Yosefy, & Henkin, 2013). Trials on sodium reduction have also shown positive effects on both non-hypertensives and hypertensives (He and MacGregor, 2002, 2004). The intakes of sodium among the study participants were extremely lower than the recommended intake of 2.4g a day (USDHHS, 2005). This may be attributed to the methodology used in this study in assessing their sodium intakes. Population sodium intake is estimated more accurately by urine biomarker data than reported food intakes as it captures all sources of sodium intakes such as food, salt added at table, etc. (CDC, 2004). Reduced potassium consumption has been associated with hypertension and CVDs and appropriate consumption levels would be protective against these conditions. The low dietary potassium could indicate hypokalemia. A link has also been shown between low levels of magnesium which tends to increase potassium excretion. This association was evident in this study as dietary magnesium levels were also lower than the recommended daily amounts. These findings are in agreement with research carried out by Osei (2013) which sought to determine the risk of CVD among middle-aged keep fit club and non-keep fit club members in Accra. A meta-analysis study reported that increasing calcium intakes is associated with decreased mortality risk at low to moderate intakes but not associated with low risk of mortality at high intakes (Wang et al., 2014).

The mean intake of phosphate was however higher than the recommended intakes of 700 milligrams per day, whiles the mean intake of zinc was within normal intakes for the women but slightly lower for the men. Though the evidence linking excess dietary phosphorus with adverse CV outcomes has been weak, it remains uncertain whether this is because phosphorus consumption truly has a minimal impact on CV health or because prior studies have failed to adequately assess phosphorus intake (Gutiérrez, 2013). Assessment of dietary phosphorus intake in free-living adults is hampered by the lack of dietary instruments specifically designed to capture phosphorus in foods in all its forms, especially inorganic sources from phosphorus-based food additive (Gutiérrez, 2013). Zinc deficiency is associated with various chronic pathogeneses, including vascular diseases (McClain, Morris & Hennig, 1995). Its supplementation protects vascular system from oxidative damage (Jenner et al., 2007).

5.5 BIOCHEMICAL PARAMETERS

5.5.1 Lipid profile

The mean concentrations of lipids among the journalists were similar to findings from a study in Kumasi to determine lipid disorders among hospital attendants. The mean (± standard deviation) TC was 5.33 (± 1.31) mmol/l, mean TG was1.52 (± 0.81) mmol/l, mean HDL was 1.65 (±0.57) mmol/l and mean LDL was 3.42 (± 1.22) mmol/L (Micah & Nkum, 2012). The TG levels of the media workers were normal according to the National Cholesterol Education Programme-Adult Treatment Panel III (NCEP-ATP III) recommendations. Consuming a high-carbohydrate-low-fat diet (i.e. CHO >55%) tends to increase blood TG levels. This phenomenon is known as carbohydrate-induced hypertriglyceridemia (Parks, 2001). The mean percentage carbohydrate contribution to energy intake of the participants was on the lower limit of 55% whiles that of the fat was close to the upper limit of 30% hence their normal TG levels. However, the mean LDL-cholesterol levels were borderline high. This may be attributed to the high frequency of buying food from outside which is usually dense in total fat, saturated fat, cholesterol and sodium (Lin, 2014). This puts them at an average risk of acquiring CVDs. Aerobic, structured and moderate to high intensity physical activity with consistent frequency is shown to improve lipid levels compared to occupational physical activity (Mayer-Davis et al., 1999), however only a small fraction of the participants met these criteria.

Despite the high prevalence of overweight and obesity among the women, it was unusual to find that their HDL levels were quite high (average risk). This possibly indicates that their overweight status is due to other factors such as genetics and environment and not due to excessive intake of saturated fats. It has however been shown that having raised HDL cholesterol levels does not lower one's risk of acquiring myocardial infarction. Hence, interventions (lifestyle or pharmacological) that raise plasma HDL cholesterol cannot be presumed by itself to lead to a corresponding benefit with respect to risk of myocardial infarction (Voight et al., 2012). Their mean total cholesterol indicated a moderate risk of disease probably due to their low intake of dietary fibre. The prevalence of dyslipidemia found among the participants was 58.3%.

5.5.2 Plasma Glucose

Mean glucose level of the journalists was observed to be in the normal range (i.e. normoglycaemia 3.5mmol/l – 6.0 mmol/l). Due to financial constraints, the 2-hour post prandial test (2HPP) could not be done in addition to the fasting plasma glucose (FPG) though recommended by WHO and International Diabetes Federation. Indeed, a study by Amoah et al. (2002) found that the prevalence rate of diabetes in Accra was 6.3% when the FPG and 2-HPP were used. In this study therefore the high normoglycaemia recorded may not be the true picture among the study population.

5.6 Correlation between fats, carbohydrate and biochemical parameters

There was no significant correlation (p=0.18) between carbohydrate intake and triglyceride levels. Likewise, there were no significant correlations between the fat intakes and HDL- (p=0.56) and LDL-cholesterol levels (p=0.98). These findings could be due to underreporting of food intake that may bias dietary interpretation (Bedard, Shatenstein, & Nadon, 2004) or the relatively small sample size. Also the MICRODIET nutritional analysis software used did not have nutrient composition of certain local foods therefore similar foods were chosen to compensate for it which could have resulted in loss of some nutritional information.

5.6 CONCLUSION

It was observed from the study that the female media workers had a higher BMI and percentage body fat compared to their male counterparts. There was a low prevalence of smoking and alcohol intake among the media workers. There was a relatively high occurrence of overweight/obesity, hypertension, diabetes, dyslipidemia and low physical activity levels which need to be addressed. The presence of these risk factors implies that these media workers are predisposed to acquiring cardiovascular diseases. Lifestyle modifications such as eating a healthy diet, regular physical activity and maintaining a healthy weight can improve their cardiovascular health.

5.7 RECOMMENDATIONS

The study needs to be confirmed using various media houses in Accra and a larger sample size to prevent bias and increase the power of the study. Also, the 2HPP can be included in subsequent studies so as to give a true representation of the prevalence of diabetes among the media personnel. Educating the media workers through avenues such as the GJA, on the importance of good dietary habits and the benefits of physical activity, can help improve their CV health. Furthermore, GBC can increase the frequency of their existing physical activity programme and also encourage participation of staff members.

Finally, since most of the meals eaten by the workers are outside the home, sensitization of the caterers on site with regards to nutrition knowledge and healthy meal preparation can be beneficial to the media workers.

5.8 LIMITATIONS

Dietary assessment methods used in the study may be associated with both under estimation and over estimation of meals. It is possible that the eating habits as reported by the participants were modified to impress the researcher. In addition the MICRODIET nutritional analysis software used did not have nutrient composition of certain local foods; hence similar foods were chosen to compensate for it. Obtaining some information from the media workers proved difficult as they were mostly busy and so had to be completed via phone. The 2HPP test could not be carried out due to financial constraints and limited time available for the study. All these factors can have effects on the final results.

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APPENDICES

APPENDIX I

African Region D: Algeria, Angola, Benin, Burkina Faso, Cameroon, Cape Verde, Chad, Comoros, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Madagascar, Mali, Mauritania, Mauritius, Niger, Nigeria, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Togo

African Region E: Botswana, Burundi, Central African Republic, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Eritrea, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe

APPENDIX II
QUESTIONNAIRE

Participant's Code ………………………. Date ……………………………
Please read the following questions carefully and answer them. (Please tick √)

Demographic data
1. Age:

2. Gender : □Male □Female

3. Marital Status: □Single □Married □Divorced □ Widow/Widower

4. Which of these associations do you belong to?
□ Ghana Journalists Association (GJA)
□Ghana Independent Broadcasters Association

5. Job Title/Area of media work
Eg. Tv, radio, print, photography, etc
…………………………………………………………………

6. How long have you worked as a media personnel?
...............................years……………………..months

7. Over the past 12 months have you been on shift duty? □Yes □No

8. If yes, how long have you been on the shift duty?................................years……………………..months

Personal / Family Medical History (You can tick more than one condition where applicable)

9. Have you been diagnosed by a physician as having any of the following health conditions?
□Hypertension □Diabetes □High Cholesterol □Obesity □None

10. Have any of your family members been diagnosed as having any of these health conditions?
□Hypertension □Diabetes □High Cholesterol □Obesity □Not sure

Lifestyle Habits: Drinking
11. Do you take alcoholic drinks?

□ Yes □No If No (GO TO QUESTION 18)

12. How long have you been taking alcoholic drinks?..........................years.............................months.

13. Which of the following alcoholic drinks do you take (you can tick more than one)
□ Beer / stout (Star, Club, Gulder, Gordon's Spark, Guinness, Castle Milk, etc.)
□ Spirit (whiskey, baileys, cognac, brandy, gin, akpeteshi, etc.)
□ Wine (red or white wine)

14. How often do you drink beer or stout (Star, Club, Gulder, Guinness, Castle Milk etc.)?
□Never
□1 time per month or less
□ 2–3 times per month
□ 1–2 times per week
□ 3–4 times per week
□ 5–6 times per week
□ 1 time per day
□ 2–3 times per day
□ 4–5 times per day
□ 6 or more times per day

15. Each time you drink beer, how much do you usually drink?
Less than a large can or bottle
□ 1 - 2 of large cans or bottles
□ 3 - 4 of large cans or bottles
□ Other (Please Specify) ……………………………………………………………………

16. How often do you drink spirits (whiskey, brandy, cognac, gin, akpeteshi, etc.)?
□Never
□1 time per month or less
□ 2–3 times per month
□ 1–2 times per week
□ 3–4 times per week
□ 5–6 times per week
□ 1 time per day
□ 2–3 times per day
□ 4–5 times per day
□ 6 or more times per day

17. Each time you drink spirit, how much do you usually drink?
□ Less than 1 tot
□ 1 -2 tots
□ 3 - 4 tots
□ Others (Please Specify) ……………………………….

18. How often do you drink wine (red or white wine)?
□Never
□1 time per month or less
□ 2–3 times per month
□ 1–2 times per week
□ 3–4 times per week
□ 5–6 times per week
□ 1 time per day
□ 2–3 times per day
□ 4–5 times per day
□ 6 or more times per day

19. Each time you drink wine, how much do you usually drink?
□ Less than 1(medium) wine glass
□ 1- 2(medium) wine glasses
□ 3-4 (medium) wine glasses
□ Other (Please Specify)…………………………………………….

Lifestyle Habits: Smoking.
20. How will you describe your smoking behaviour?
□Non-smoker □ Former Smoker □ Current Smoker

21. Are you a passive smoker (a non-smoker exposed to smoke most days at home or work)?
□Yes □No

22. As a former smoker, for how long did you smoke?...............years ....months

23. As a current smoker, how long have you been smoking?...............years ....months.

24. As current smoker, how many sticks of cigarette do you smoke in a day?............................

Lifestyle Habits: Physical Activity
Please review your leisure time (when not on duty) activity and answer the following.

Note:
□ Never (less than once a week)
□ Sometimes (once a week)
□ Often (2 – 3 times per week)
□ Always (4 – 5 times per week or more)

25. During leisure time, I watch television/listen to radio, read, or sleep:
□Never □Sometimes □Often □Always

26. During leisure time I do brisk walking, jogging, cycling, swimming or play basketball/football, etc.
□Never □Sometimes □ Often □Always

27. Each time you do any of the above (24), how many minutes do you do it?
□ Less than 15minutes
□ 15-20minutes
□ 21-25minutes
□ 26-30minutes
□ 31-35minutes
□ 36 minutes or more

Please think about your usual workdays and answer the following.
28. At work I sit for long: □ Never □Sometimes □Often □Always
29. At work I stand: □ Never □Sometimes □Often □Always
30. At work I walk around/climb stairs: □ Never □Sometimes □Often □Always
31. At work I get exhausted: □ Never □Sometimes □Often □Always
32. At work I sweat: Never □Sometimes □Often □Always

Health Awareness
33. Do you have any knowledge about cardiovascular diseases?
□ Yes □ No
34. Does your media organisation or association engage members in exercise activities?
□ Yes □ No
35. If yes, how often?
…………………………………………………………………………

Lifestyle Habits: Sleep
36. How many hours of sleep do you have on average per night?
□ Less than 3 hours
□ 3 – 4 hours

□ 5 – 6 hours
□ 7 – 8 hours
□More than 8 hours

37. Do you experience any of the following?
□ Snoring
□ Obstructive sleep (repeated pauses in breathing during sleep)
□ Insomnia (inability to fall asleep or stay asleep as desired)
□ None

Lifestyle Habits: Dietary Habit.
38. How many times do you eat in a day? …………………………………………….

39. How many times do you eat the following meals at home in a week?
Breakfast: □ Once □ Twice □ Thrice □Everyday □ Other (Please Specify)…………………
Lunch: □ Once □ Twice □ Thrice □Everyday □ Other (Please Specify)…………………..
Supper: □ Once □ Twice □ Thrice □Everyday □ Other (Please Specify)…………………

40. How many times do you buy food from outside within a week?..

41. Which of these meals do you usually buy outside? (You can tick more than one)
□ Breakfast □ Lunch □ Supper □ Snacks

42. Where do you usually buy it? (You can tick more than one)
□ Fast food spot □ Street vendors □ Restaurant □ Local chop bar □ Canteen/ cafeteria

43. Do you take snacks in between your meals?
□ Never □ Sometime □ Often □ Always

44. If you do, what snacks do you take regularly?
□ Fruits
□ Pastries (Meat pie, cake, doughnuts, spring rolls)
□ Vegetables Mashed kenkey and groundnut/ milk
□ Plantain chips
□ Roasted plantain and groundnuts
□ Yoghurt/ ice cream
□ Soft Drinks (coke, Fanta, alvaro, sobolo, etc)
□ Others (Please Specify)
……………………………………………………………………………………….

45. How often do you eat fresh fruits?
□ Never
□ 1 time per day
□ 2–3 times per day
□ 4–5 times per day
□ 6 or more times per day
□ 1 time per month or less
□ 2–3 times per month
□ 1–2 times per week
□ 3–4 times per week
□ 5–6 times per week

46. How many cups of coffee do you usually drink a day?
□None
□1 – 2 (250ml) cups daily
□ 3 – 4 (250ml) cups daily
□5 or more (250ml) cups daily

47. How many soft-drinks do you consume on average?
□Less than one (300 ml bottle) per week
□1 – 2 (300ml bottle) per week
□3 – 4 (300ml bottle) per week
□5 or more (300ml bottle) per week

48. How many sachet (500ml) of water do you drink a day?
□Less than 1 sachet
□1-2 sachets
□2-3 sachets
□More than 3 sachets

49. What animal product do you consume regularly?
□Meat (beef, pork, lamb, etc.)
□Fish and seafood
□Game (bush meat)
□ Eggs
□Poultry (chicken, turkey, duck)
□Dairy products (milk, cheese, etc.)

APPENDIX III

DIET HISTORY

24- HOUR FOOD RECALL

WEEKDAY 1

Menu	Food	Handy Measure	Weight (g)
Breakfast	**1.** **2.** **3.** **4.**		
Mid-morning snack	**1.** **2.** **3.**		
Lunch	**1.** **2.** **3.** **4.**		
Mid-afternoon snack	**1.** **2.** **3.**		
Supper	**1.** **2.** **3.** **4.**		
Bedtime snack	**1.** **2.** **3.**		

24- HOUR FOOD RECALL

WEEKDAY 2

Menu	**Food**	**Handy Measure**	**Weight (g)**
Breakfast	1. 2. 3. 4.		
Mid-morning snack	1. 2. 3.		
Lunch	1. 2. 3. 4.		
Mid-afternoon snack	1. 2. 3.		
Supper	1. 2. 3. 4.		
Bedtime snack	1. 2. 3.		

WEEKEND

Menu	Food	Handy Measure	Weight (g)
Breakfast	1. 2. 3. 4.		
Mid-morning snack	1. 2. 3.		
Lunch	1. 2. 3. 4.		
Mid-afternoon snack	1. 2. 3.		
Supper	1. 2. 3. 4.		
Bedtime snack	1. 2. 3.		

APPENDIX IV

ANTHROPOMETRY AND BLOOD PRESSURE MEASUREMENTS

Weight (kg)	**Height (m)**	**BMI (Kg/m^2)**
Waist Circumference (cm)	**Hip Circumference (cm)**	**WHR**

Percentage Body fat	
% Visceral fat	

Blood pressure reading 1	
Blood pressure reading 2	
Blood pressure reading 3	
Average of last 2 readings	

APPENDIX V

CONSENT FORM

DIET AND RISK OF CARDIOVASCULAR DISEASE AMONG MEDIA WORKERS IN ACCRA

Research Approved by Ethical and Protocol Review Committee

SCHOOL OF BIOMEDICAL AND ALLIED HEALTH SCIENCES

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

INTRODUCTION

You are invited to participate in the research "DIET AND RISK OF CARDIOVASCULAR DISEASE AMONG MEDIA WORKERS IN ACCRA". Cardiovascular disease (CVD) is a general term which describes diseases of the heart and blood vessels and its risk factors (e.g. high stress levels, less sleep, poor eating habits) are believed to be common among media workers.

WHO IS CONDUCTING THIS RESEARCH?

The research will be conducted by Renee Taylor, under the supervision of Prof. Albert G. B. Amoah and Dr. Matilda Asante.

WHY THE RESEARCH IS BEING DONE?

Cardiovascular disease (CVD) is the number one cause of death globally: more people die annually from CVDs than from any other cause. Examples of such diseases are hypertension, strokes and heart attacks. Studies have shown a link between certain occupational exposures and CVDs. The lifestyle behaviours of media workers in Ghana predispose them to the risk of CVDs, due to the nature of their work (high stress levels, poor eating habits, less sleep and shift work, etc). The more the number of risk factors, the higher one's chance of acquiring a CVD. Fortunately, some of the risk factors of these CVDs can be prevented through lifestyle modification.

WHAT ARE YOU BEING ASKED TO DO IN THIS RESEARCH?

1. Consent Process:

Before taking part in the research you would be given sufficient information about the research and the procedures involved to enable you decide whether to take part in the research or not; in this regard, you will be given the opportunity and time to ask questions about issues you have with the research or do not fully understand about the research. When you fully understand the nature and procedures involved and you decide to take part in the study, you will be asked to complete and sign the consent form in duplicate; a copy will be given to you to take home for your record.

2. Research procedures: After completing and signing the consent form

a) You will be asked to fast overnight for 8-12 hours (not more or less) and come to the International Press Center at 7 am

b) You will be asked to provide personal information about yourself, such as your name, age, height, weight, lifestyle habits, etc.

c) Your height, weight, waist and hip circumferences and blood pressure will be measured.

d) An amount of blood (5ml) about a teaspoonful will be drawn from the arm or forearm to test for fasting blood sugar and lipid levels.

WHAT ARE THE RISKS IN TAKING PART IN THIS STUDY?

1. You may feel uncomfortable giving information about yourself and family. I will make every effort not to upset or embarrass you by being respectful and sensitive in the way I would ask the questions.

2. As with all blood draws, there is a chance of minor and temporary discomfort snd/bruising, and rarely infection at the site of draw. These risks however are small and not more than you experience when you go to a hospital for blood tests.

3. The total amount of blood draw is quite small and will not affect your health.

IS PARTICIPATION IN THIS STUDY VOLUNTARY?

Participation in this study is entirely voluntary. You are entirely free to decide to participate or not and to withdraw from the study at no time with no penalties.

HOW LONG WILL I HAVE TO STAY AT THE CENTER FOR THE RESEARCH?

You will spend no more than an hour for the entire research.

WILL I RECEIVE ANY PAYMENT FOR PARTICIPATING IN THIS RESEARCH?

No, you will not receive any payment for taking part in the research.

HOW WILL I BENEFIT FROM THIS RESEARCH?

1. There may not be any direct benefits to you

2. You will be given some of your test results for you to know if you are overweight, have diabetes, high blood pressure, etc. You will be advised appropriately and directed to a medical facility to seek further medical attention if we find any anomalies.

HOW WILL THE RESEARCH BENEFIT THE LARGER COMMUNITY?

Information may be obtained from this research that will give us a better understanding of whether media workers are truly at risk of attaining diseases relating to the heart and blood vessels and how their health can be improved.

HOW WILL MY PERSONAL INFORMATION BE PROTECTED?

1. You will be assigned a private identification (ID) number. This ID will be used to identify all information and biological samples obtained in this research and any future studies. Only the researcher and his immediate associates will have access to the ID that links your name.

2. In my report to the University on this, the gathered information will be in a combined form from all the participants of the research, therefore, you cannot be identified as an individual by name.

3. Your information will be kept in secure cabinets and on password-protected computers to prevent unauthorized access to them.

WHAT AM I TO DO IF AFTER EXPLANATIONS ABOUT THE RESEARCH, I STILL DO NOT UNDERSTAND ANY PART OF THE RESEARCH AND WISH TO HAVE FURTHER QUESTIONS AND CONCERNS ADDRESSED?

1. Contact the researcher, Renee Taylor, Tel: 0244 183 392, email: benewaa15@gmail.com at the School of Biomedical and Allied Health Sciences.

2. You may also contact the supervisors of the research, Prof. Albert G. B. Amoah, National Diabetes Management and Research Centre (NDMRC), University of Ghana Medical School (UGMS).

3.Your signature or thumbprint indicates that you have read and understood the information provided above, that you willingly agree to participate, that you may withdraw your consent at any time and discontinue participation without penalty; and that you receive a copy of this form.

Signature…………………………………………..

Date……………………………………………..

In the presence of

……………………………………………………………………………………………………..

Witness' signature…………………………………………………….

Date…………………………………………………

Researcher's signature…………………………………………….

Date…………………………………………………

APPENDIX V

ETHICAL CLEARANCE

UNIVERSITY OF GHANA
SCHOOL OF BIOMEDICAL AND ALLIED HEALTH SCIENCES

14th April, 2015

Ms. Renee Taylor
Dept. of Nutrition & Dietetics,
SBAHS,
Korle Bu.

Dear Ms. Taylor,

ETHICS CLEARANCE

Ethics Identification Number: SBAHS – ET./10 44 38 53/AA/8A/2012-2013.

Following a meeting of the Ethics and Protocol Review Committee of the School of Biomedical and Allied Health Sciences held on Wednesday, 8th April, 2015, I write on behalf of the Committee to approve your research proposal as follows:

TITLE OF RESEARCH PROPOSAL: "CARDIOVASCULAR RISK FACTORS IN SELECTED MEDIA PERSONNEL IN ACCRA"

This approval requires that you submit six-monthly review reports of the protocol to the Committee and a final full review to the Committee on completion of the research. The Committee may observe the procedures and records of the research during and after implementation.

Please note that any significant modification of the research must be submitted to the Committee for review and approval before its implementation.

You are required to report all serious adverse events related to this research to the Committee within seven (7) days verbally and fourteen (14) days in writing.

As part of the review process, it is the Committee's duty to review the ethical aspects of any manuscript that may be produced from this research. You will therefore, be required to furnish the Committee with any manuscript for publication.

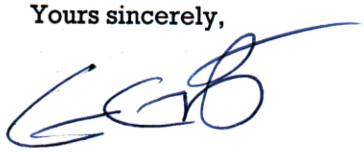
COLLEGE OF HEALTH SCIENCES

P. O. Box KB 143, Korle Bu, Accra, Ghana.
• Telephone: +233 (0) 302 687 975 • Email: sbahs@chs.ug.edu.gh • Website: www.chs.ug.edu.gh

Please always quote the ethical identification number in all future correspondence in relation to this protocol.

Thank you.

Yours sincerely,



Dr. E. Olayemi
(Chairman, Ethics and Protocol Review Committee)

cc Dean
Co-ordinator, Dept. of Nutrition & Dietetics
School Officer