SCHOOL OF PUBLIC HEALTH, COLLEGE OF HEALTH SCIENCES, UNIVERSITY OF GHANA, LEGON

DIETARY HABITS, OBESITY AND ELEVATED BLOOD PRESSURE AMONG WORKERS OF THE COLLEGE OF HEALTH SCIENCES

BY

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DECLARATION

I hereby declare that, except for references to other people's work which has been duly acknowledged, this work is the result of my own original research and that this dissertation has neither in whole or in part been presented elsewhere for another degree

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DEDICATION

I dedicate this work to my husband, Daniel Yeboah Ansong, and my two children, DD and Maame Akua, whose love support and sacrifices have brought me this far.

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LIST OF ABBREVIATIONS

CDCP	Centre for Disease Control and Prevention
CHS	College of Health Sciences
FAO	Food and Agricultural Organization
GHS	Ghana Health Service
HSE	Household Survey for England
NCD	Non Communicable Diseases
NICE	National Institute of Health and Clinical Excellence
NCDP	Non Communicable Disease Program
OPD	Out Patient Department
RHNP	Regenerative Health and Nutrition Program
WHO	World Health Organization
WHR	Waist –to-hip ratio

ABSTRACT

Obesity and elevated blood pressure are important risk factors associated with cardiovascular diseases, type II diabetes and some cancers. These risk factors were in the past associated with affluence and developed countries. However, recent studies have shown their increasing prevalence in developing countries.

Health workers influence behaviour and people who work in health worker training environment are expected to know and practice 'healthy' behaviours. The study therefore sought to describe the dietary habits of workers of the College of Health Sciences (CHS) and to determine nutrition knowledge, levels of obesity and elevated blood pressure among them.

This was a cross sectional study. Participants were selected by a simple random method from among 7 institutions in the CHS. Participants were interviewed using a structured questionnaire that collected information on the socio-demographic characteristics, dietary intake, anthropometric indices and blood pressure.

Overweight and obesity was determined using body mass index (BMI) and waist to hip ratio (WHR). The cutoffs used were: (BMI greater than 25kg/m^2 and BMI of 30kg/m^2 for overweight and obesity respectively and waist-to-hip ratio (WHR) $\geq$ 0.85 for females and WHR $\geq$ for 0.90 for males).

Elevated blood pressure was determined as systolic blood pressure greater than or equal to 140 mmHg and diastolic blood pressure greater than or equal to 90mm Hg.

Data from 141 respondents were included in the analysis. This included 73 (51.8%) junior staff, 40 (28.4%) senior staff and 28 (19.9%) senior members. There were 95

males (67.4%) and 46 females (32.6%). The mean age of the study population was 40.5 ± 10.8 years. Dietary knowledge scores of majority of respondents were below the overall average score of 5.2 ± 3.2 out of an expected total 15.0. Overall, 12.8% of respondents were obese and 30.5% were overweight. The proportions of overweight and obesity were higher among junior staff (11.3% for overweight and5.0% for obesity respectively) and senior staff (11.3% for overweight and 4.3% for obesity respectively) compared to senior members (7.8% for overweight and 3.5% for obesity respectively). There were significant differences among staff categories with regards to obesity ($p<0.00$). However differences among staff categories with regards to overweight was not significant ($p<0.42$). Elevated blood pressure was more common among junior staff (18.4%) and senior staff (10.6%) compared to senior members (8.5%). The differences among staff categories was also significant ($p<0.02$).

In conclusion, the high prevalence of obesity in the studied workers' sample, suggest that workers would benefit from a nutrition and health program to make them well informed on issues relating nutrition knowledge so as to make healthy food choices and to improve their eating habits. Regarding elevated blood pressure, there is the need to introduce health education measures that will promote prevention and early detection of hypertension and encourage better compliance to treatment.

Table of Contents

CHAPTER ONE

1.0 Introduction

1.1 Background

Adequate dietary intake and appropriate eating habits are important factors in the promotion and maintenance of good health throughout the entire life course. The role of inappropriate dietary practices as determinants of chronic Non-Communicable Diseases (NCDs) is well established, and therefore addressed as part of disease prevention (WHO, 2002). According to a report by the Joint WHO/FAO Expert Consultation on Diet, Nutrition and the Prevention of Chronic Diseases, the burden of chronic diseases is rapidly increasing worldwide. It has been estimated that, in 2001, chronic diseases contributed approximately 60% of the 56.5 million total reported deaths in the world and

approximately 46% of the global burden of disease .

The proportion of the burden of NCDs is expected to increase to 57% by 2020 (WHO, 2002). Almost half of the total chronic disease deaths are attributable to cardiovascular diseases. Obesity and diabetes are also showing worrying trends, not only because they already affect a large proportion of the population, but also because they have started to appear earlier in life (WHO, 2002). The chronic disease problem is not limited to the developed regions of the world. Contrary to widely held beliefs, developing countries are increasingly experiencing high levels chronic diseases (WHO, 2002).

Rapid changes in diets and lifestyles that have occurred with industrialization, urbanization, economic development and market globalization, has had a significant impact on the health and nutritional status of populations, particularly in developing

countries where standards of living have improved, food availability has expanded and become more diversified (WHO, 2003). Furthermore, changes in the world food economy are reflected in shifting dietary patterns of increased consumption of energy-dense diets high in fat, particularly saturated fat, and low in unrefined carbohydrates (WHO, 2003).

These changing dietary patterns combined with a decline in energy expenditure are associated with a sedentary lifestyle that is characterized by motorized transport, labour-saving devices in the home, the decline in physically demanding manual tasks in the workplace, and leisure time that is preponderantly devoted to physically undemanding activities. This has invariably resulted in significant negative consequences in terms of a corresponding increase in diet-related chronic diseases such as Type II diabetes, obesity, cardiovascular disease (CVD), hypertension and stroke, and some types of cancers and thus placing additional burden on the already overtaxed national health budgets (Colditz, 1995).

Of the several risk factors of NCDs, WHO obesity and elevated blood pressure have been identified as risk factors that are most important for predicting future disease burden (WHO, 2002). Obesity and overweight are defined as excessive fat accumulation associated with adverse health outcomes (Willett, 2000). Obesity is diagnosed using the Body Mass Index (BMI), which is a person's weight (in kilograms), divided by the person's height (in meters) squared. A person with BMI of 30 or more is considered obese and more than 25 is considered overweight (Willett, 2000).

Some African cultures consider weight gain and fat storage as signs of health and prosperity (Ukoli et al, 2007). Today however, weight gain and obesity are posing a

growing threat to health in countries all over the world (WHO, 2000; Hajian-Tilako et al, 2007). Globally more than 300 million people are obese. In Kenya, 12% of the population is obese and in Nigeria, 6% are also obese (Crawford, 2002). In Ghana studies conducted in 2005 have indicated a prevalence of 5.5% among the general population and higher prevalence of 7.4% among females compared to 2.8% among males (Biritwum et al 2005).

High blood pressure (hypertension) is defined as a systolic pressure greater than 140mm Hg and /or a diastolic pressure greater than 90mm Hg based on the average of two or more correct blood pressure measurement (Chobanian et al, 2003). Primary hypertension, which is the commonest type of hypertension, is believed to have unknown causes. However scientific evidence indicates that there are some predisposing factors. These include heredity, overweight and obesity, high alcohol consumption and high sodium intake (Badoe & Owusu, 2005). High blood pressure can be referred to as a risk factor for atherosclerotic cardiovascular diseases or a disease on its own. Whichever way one looks at it there is enough evidence to show that high blood pressure is fast becoming an epidemic all over the world.

There is also substantial scientific evidence that BMI is an important predictor of both systolic and diastolic blood pressure (Centers for Disease Control and Prevention (CDC), 2004). Furthermore, central obesity has been found to be strongly correlated with blood pressure (Kasiam et al, 2007).

In Ghana hypertension is fast becoming a major public health problem and major interventions including education on lifestyle modifications and changes in nutritional habits should be adopted as a matter of urgency (Badoe & Owusu, 2005).

The health of individuals and populations depend on their ability to identify risks for specific health problems. In addition, people must be willing to adhere to lifestyle modifications for health and wellness. Public health approaches therefore must focus on interventions that would educate the public on the dangers of poor lifestyle choices and their subsequent outcomes.

1.2 Problem Statement

In Ghana, urbanization and its associated lifestyle predisposes the population, to factors that have the potential to create health risks (Ministry of Health, 2007). "The lifestyle changes associated with high sugar intake, salty and fatty diets as well as lack of physical activities are all changing the epidemiology of morbidity and mortality in Ghana" (Ministry of Health, 2007).

A study to determine the socio-demographic variations in obesity among Ghanaian adults has revealed that overweight and obesity are common among residents in the Accra area. The study identified higher prevalence among females and urban upper-class residents. Besides, sedentary occupation was also associated with higher levels of obesity (Amoah, 2003).

All evidence point to the fact that Ghana is experiencing a "double burden of disease" with a high burden of both communicable and non-communicable diseases. Hypertension now features among the top 10 causes of morbidity at the OPD level in all regions, with Greater Accra Region recording the highest. This is a serious deterioration on the picture in 2006 when it featured among the top 10 causes of OPD attendance among adults in only four regions. Hypertension, heart failure, chronic liver disease and diabetes mellitus

are among the top 10 causes of mortality with hypertension alone accounting for 4.7% of deaths (Ghana Health Service, 2007).

A study done among urban civil servants in Ghana to determine the prevalence of hypertension revealed an age adjusted prevalence of 27.4% (Addo et al, 2008). Another study by Badoe & Owusu showed that the occurrence rate of hypertension is about 33% among urban dwellers who are over 40 years, and 35% for those between the ages of 20-64 years (Badoe & Owusu, 2005). There is no doubt that this age cluster constitutes the economic productive group of the country, including workers of the College of Health Sciences.

There is no doubt that obesity and elevated blood pressure, which remain major causes of some chronic diseases, are on the increase especially among residents in urban Accra. Also several studies independently done to determine the prevalence of obesity and elevated blood pressure among the urban working class have shown relatively high prevalence. This is a worrying situation and since workers of the College of Health Sciences belong to the working class, it is important to determine the health status of these workers who contribute immensely to the training of health professionals in Ghana.

The outcome of this study is expected to reinforce existing studies on obesity and hypertension among the urban working class as well as draw out new knowledge on the effects of dietary habits on health.

1.3 Justification of Study

An axiom by Hippocrates; “Let thy food be thy medicine and thy medicine thy food” is a reinforcement of the scientific fact that diet remains a very significant contributor to the

overall health of any individual. What people eat determines to a large extent their state of health.

Furthermore, the potential harm to health of non-communicable diseases has been overlooked for several years and when acknowledged, it has been viewed to be valid only among the affluent in society. However there are several indications that the burden of non-communicable diseases in developing countries is significant and risk factors of NCD identified by WHO include obesity and elevated blood pressure (WHO, 2002).

The College of Health Sciences is an organization that contributes to research and teaching. It is made up of varying professional disciplines and its contribution to the training of health professionals cannot be over-emphasized. It would be significant to find out whether workers of the college practice lifestyle habits that promote healthy living.

Again, the problem of ignorance about status with regards to hypertension among adult working population is alarming. Findings from a cross-sectional study conducted among urban civil servants aged 25 years and above from seven randomly selected central government ministries in Accra, Ghana, suggests that the age-adjusted (world standard population) prevalence of hypertension was 27.4% . The study further concludes that the "high prevalence of hypertension in this population with considerable under diagnosis and low levels of treatment and control is of great concern" (Addo et al, 2008).

The study asserts the importance of the introduction of health education measures that will promote prevention and early detection of hypertension and encourage better compliance to treatment. The reasons for inadequate control must be investigated to

enable implementation of appropriate measures to improve control and reduce the risk of developing complications. (Addo et al, 2008). There is a need to encourage healthier lifestyles with emphasis on preventing obesity and increasing level of activity

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Finally, in Ghana, the few risk assessment studies done have been community- based and so 'workers of the college' is an available population where a similar study can be done. This research is aimed at assessing their knowledge, dietary habits, obesity and elevated blood pressure among the workers of the College of Health Sciences.

The motivation of the researcher is that this study could kick-start the debate on workers dietary habits and its health implications. Findings from this study could form the basis for further study on the subject area as well as provide baseline information for planning nutrition and health promotion programmes for workers.

1.4 Objectives

1.4.1 General Objectives

To describe the dietary habits of workers of the College of Health Sciences and to determine their levels of obesity and elevated blood pressure.

1.4.2 Specific Objectives

- To assess knowledge of workers in the CHS on diet and its effects on health
- To describe the dietary habits of workers of the College of Health Science
- To determine the levels of overweight, obesity and elevated blood pressure among the workers
- To determine factors that predicts obesity and elevated blood pressure.

CHAPTER TWO

2.0 Literature Review

2.1 The burden of non-communicable disease

Globally, the burden of non-communicable diseases (NCD) has rapidly increased (WHO, 2002). A shift in the major causes of death and disease has already occurred in both developed and developing countries (WHO, 2002). Issues that are of greater concern are the effects of rapid nutrition transition and the increase in the prevalence of risk factors for NCDs in the developing world, where there is evidence of increasing prevalence of cardiovascular diseases, type II diabetes mellitus, obesity and cancers. According to WHO, the disease burden of NCDs in developing countries is projected between 27% and 43% from 1999 to 2020 (WHO, 2000).

In fact, the World Health Report -2002 describes in detail how, in most countries, a few major risk factors account for much of the morbidity and mortality (WHO, 2002). In view of the epidemiology and the future growth in NCDs, the prevention of these diseases presents a major challenge to global public health.

In Ghana, statistics have shown that in 2007 hypertension and diabetes type II were among the top ten leading causes of hospital outpatient department (OPD) visits. Also they have been rated the first and second leading causes of OPD visits in Greater Accra since 2006 (Ghana Health Service, 2007).

2.2 Risk Factors of non-communicable diseases

According to WHO, the most important risks factors for non-communicable diseases include high blood pressure, high concentrations of cholesterol in the blood, inadequate intake of fruits and vegetables, overweight or obesity, physical inactivity and tobacco use (WHO, 2002). With the exception of tobacco use, the rest of the factors are closely related to diet and physical activity thus, unhealthy diets and physical inactivity are among the leading causes of the major non-communicable diseases that contribute substantially to the global burden of disease, death and disability. A study by Kangue et al (2005) reported that the number of disability adjusted life years (DALY) lost to cardiovascular diseases in Sub-Saharan Africa is on the increase from 5.3 million for men and 6.3 million for women as of 1990 and projected to 8.1 million for men, and 7.9 for women by the year 2010 (Kengue, et al, 2005).

2.2.1 Obesity and its assessment

Fat distribution is a useful indicator of health risks associated with obesity. Overweight is an increase of body weight above a standard defined in relation to height. Obesity on the other hand, is an abnormally high percentage of body fat, which may be generalized or localized (Ekhard et al, 1997).

The distribution of fat in the body and effects of overweight and obesity on health have been evaluated in both prospective and retrospective studies. These studies indicated a clear-cut and significant increase in the risk of death or an increased risk of type II diabetes mellitus, hypertension, heart attack and stroke with increased upper-body obesity (Ekhard et al, 1997; Saris, 2002; Willett, 2000).

Furthermore, it has been widely concluded that the relationship between body mass index (BMI) and mortality is J-shaped (WHO, 1995). The causes of death at the extremes are strikingly different; high mortality at low BMI is dominated by digestive and pulmonary (respiratory) diseases and high mortality at high BMI is related predominantly to cardiovascular diseases, type II diabetes mellitus and gall bladder diseases (Ed et al, 2000). Invariably, the pattern of increasing relative risk of subsequent mortality with increasing overweight as indicated by BMI has been observed (Ed et al, 2000).

Anthropometry allows measurement of variations in physical dimensions and gross composition of the human body. At different ages, anthropometric measurements serve as an indicator of nutritional status. Body fat and fat free mass; the two major components of total body mass may be measured using anthropometric indices such as the body mass index (BMI). Since obesity indices cannot be used to differentiate between excessive weight produced by adiposity, muscularity or oedema, a more direct measure such as skin fold thickness is employed where practicable.

Upper body or abdominal obesity as measured by the waist/hip ratio (WHR) is another method for measuring sensitivity distribution (sub-cutaneous and intra-abdominal) of adipose mass (WHO, 1995). Studies have shown that BMI does not distinguish between mass due to body fat and mass due to muscular physique. It also does not take account of the distribution of fat. It has therefore been recommended that waist to hip ratio (WHR) is a better measure than BMI to identify those with a health risk from being overweight (Ekhard et al, 1997).

2.2.2 Physical inactivity

Physical activity has been found to be an important determinant of body weight. In addition, physical activity and physical fitness (which relates to the ability to perform physical activity) are important modifiers of mortality and morbidity related to overweight and obesity. There is firm evidence that moderate to high fitness levels provide a substantially reduced risk of cardiovascular diseases and all-cause mortality and that these benefits apply to all Body Mass Index (BMI) levels (WHO/FAO, 2002).

Economic development in Ghana during the last decade has changed nutritional and lifestyle habits (Biritwum et al, 2005). The concept of food has changed from a means of nourishment to a marker of lifestyle and a source of pleasure (Ministry of Health, 2007). This coupled with physical inactivity has contributed to the increasing prevalence of overweight and obesity and its associated diseases such as Type II diabetes, cardiovascular diseases and some cancers (Ghana Health Service, 2007).

2.2.3 High blood pressure

Hypertension, once rare in traditional African societies, is rapidly becoming a major public health problem (Badoe & Owusu, 2005). Findings from a cross-sectional study conducted among urban civil servants aged 25 years and above from seven randomly selected central government ministries in Accra, Ghana, suggests that the age-adjusted (world standard population) prevalence of hypertension was 27.4% . The study further concludes that the "high prevalence of hypertension in this population with considerable under diagnosis and low levels of treatment and control is of great concern" (Addo et al, 2008). The study asserts the importance of the introduction of health education measures

that will promote prevention and early detection of hypertension and encourage better compliance to treatment. The reasons for inadequate control must be investigated to enable implementation of appropriate measures to improve control and reduce the risk of developing complications. There is a need to encourage healthier lifestyles with emphasis on preventing obesity and increasing level of activity (Addo et al, 2008).

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Results of several other studies conducted all over the world has shown that major factors associated with hypertension are genetic makeup, body weight, excessive alcohol and salt intake (WHO, 2002; Badoe & Owusu, 2005; Haddy, 2006). Achieving optimal body weight, taking regular exercises, cessation of tobacco use and excessive alcohol intake and the reduction of salt intake are general health measures likely to reduce blood pressure levels in populations prone to hypertension as well as reducing elevated blood pressure levels in those who have already been diagnosed as having the disease.

2.2.4 Dietary habits

According to the WHO/FAO Expert Consultation Report, there is convincing evidence that the factors that increase the risk of obesity include sedentary lifestyle, high intake of energy-dense and micronutrient-poor foods, increased number of fast-food outlets and marketing of energy-dense foods, high intake of sugars-sweetened carbonated drinks and fruit juices as well as low consumption of fruits and vegetables (WHO, 2002).

Several other studies have been done to assess the association between dietary habits and obesity. Findings from one such study done among male school children in Saudi Arabia indicate that skipping and or infrequent intake of breakfast at home, frequent consumption of fast foods, low servings of fruits and vegetables per day, and frequent

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consumption of sweets, candy and carbonated drinks were all predictors of obesity and overweight among the school children (Tarek et al, 2008). A study conducted by Hall et al (2009) on the Variability in Fruit and Vegetable Consumption showed that Low fruit and vegetable consumption prevalence ranged from 36.6% (Ghana) to 99.2% (Pakistan) for men and from 38.0% (Ghana) to 99.3% (Pakistan) for women (Hall et al, 2009). A study done by Yahia et al on the eating habits and obesity among Lebanese University students showed that majority of students (61.4%) reported taking meals regularly. Female students showed healthier eating habits compared to male students in terms of breakfast intake and meal frequency. Also the prevalence of overweight and obesity was more common among male students compared to females (Yahia et al, 2008). In Ghana however, literature on dietary habits among students and workers in training and academic environments is scanty.

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2.3 Nutritional Assessment Methods

A nutrition assessment is an in-depth evaluation of both objective and subjective data related to an individual's food and nutrient intake, lifestyle, and medical history (Christie & Mitchel, 2000).

The data for a nutritional assessment falls into four categories: anthropometric, biochemical, clinical, and dietary (Christie & Mitchel, 2000).

2.3.1 Anthropometrics

Anthropometrics are the objective measurements of body muscle and fat. They are used to compare individuals, to compare growth in the young, and to assess weight loss or gain in the mature individual. Weight and height are the most frequently used anthropometric

measurements, and skinfold measurement of several areas of the body is also taken (Grant & DeHoog, 1999).

2.3.2 Biochemical Data

Laboratory tests based on blood and urine can be important indicators of nutritional status, but they are influenced by non-nutritional factors as well. Lab results can be altered by medications, hydration status, and disease states or other metabolic processes, such as stress. As with the other areas of nutrition assessment, biochemical data need to be viewed as a part of the whole (Williams, 1997).

2.3.3 Clinical Data

Clinical data provides information about an individual's medical history, including acute and chronic illness and diagnostic procedures, therapies, or treatments that may increase nutrient needs or induce mal-absorption (Williams, 1997). In assessing the nutritional status of an individual using clinical data, current medications need to be documented, and both prescription drugs and over-the-counter drugs, such as laxatives or analgesics, must be included in the analysis. Vitamins, minerals, and herbal preparations also need to be reviewed. Physical signs of malnutrition can be documented during the nutrition interview since they are an important part of the assessment process (Williams, 1997).

2.3.4 Dietary Data

There are many ways to document dietary intake. The accuracy of the data is frequently challenged, because both questioning and observing can impact the actual intake (Winkler, 1993). During a nutrition interview the practitioner may ask what the

individual ate during the previous twenty-four hours, beginning with the last item eaten prior to the interview. Practitioners can train individuals on completing a food diary, and they can request that the record be kept for either three days or one week (Winkler, 1993). Documentation should include portion sizes and how the food was prepared. Brand names or the restaurant where the food was eaten can assist in assessing the details of the intake. Estimating portion sizes is difficult, and requesting that every food be measured or weighed is time-consuming and can be impractical (Winkler, 1993). Food models and photographs of foods are therefore used to assist in recalling the portion size of the food. In a metabolic study, where accuracy in the quantity of what was eaten is imperative, the researcher may ask the individual to prepare double portions of everything that is eaten—one portion to be eaten, one portion to be saved (under refrigeration, if needed) so the researcher can weigh or measure the quantity and document the method of preparation (Winkler, 1993).

Food frequency questionnaires are used to gather information on how often a specific food or category of food is eaten. The Food Guide Pyramid suggests portion sizes and the number of servings from each food group to be consumed on a daily basis, and can also be used as a reference to evaluate dietary intake (Winkler, 1993).

Once the data on an individual is collected and organized, the data can be assessed and the nutritional status of the individual evaluated. The assessment leads to a plan of care, or intervention, designed to help the individual either maintain the assessed status or attain a healthier status.

2.4 Interventions

In May 2004, the 57th World Health Assembly (WHA) endorsed the World Health Organization (WHO) Global Strategy on Diet, Physical Activity and Health. The Strategy was developed through a wide-ranging series of consultations with all concerned stakeholders in response to a request from Member States at World Health Assembly 2002 (Resolution WHA55.23). According to the report, the strategy addresses two of the main risk factors for non- communicable diseases: diet and physical activity. This strategy is to be implemented in tandem with the long-established and ongoing work carried out by WHO on other nutrition-related areas. These programmes, running throughout member countries, include under-nutrition, micronutrient deficiencies and infant- and young-child feeding (WHO, 2004).

The over-riding objective of the Global Strategy on Diet, Physical Activity and Health is the promotion and protecting of health by guiding the development of an enabling environment for sustainable actions (WHO, 2004). These interventions are targeted at the individual, community, national and global levels that, when taken together, will lead to reduced disease and death rates related to unhealthy diet and physical inactivity. These actions are in line the United Nations Millennium Development Goals, with immense potential for public health gains worldwide (WHO, 2004).

The Global Strategy seeks to among other things; formulate policies that would help reduce the risk factors for non-communicable diseases that stem from unhealthy diets and physical inactivity. These policies must be locally relevant through massive awareness creation and adaptation to suit local circumstances. There must be active participation of all key stakeholders; civil society, government and the private sector. Effective

monitoring and evaluation by the stakeholders is paramount to the achievement of the objectives.

In Ghana, the Regenerative Health and Nutrition Programme is a Ministry of Health intervention aimed at promoting healthy life styles among Ghanaians in order to reverse the trend of increasing prevalence of non-communicable and lifestyle related diseases (Ghana Health Service, 2006). Two components of this programme promote the importance of exercises and appropriate nutrition in reducing ill-health, increasing productivity and decreasing health bills (Ghana Health Service, 2006).

CHAPTER THREE

3.0 METHODS

3.1 Study Design

A cross-sectional study design was used, employing quantitative sampling methods. This is a descriptive study of a defined, random cross- section of a study population at one particular point in time.

3.2 Study Population

The study population consists of permanent staff of the College of Health Sciences of the University of Ghana, Legon. The College is made up of 7 institutions including the University of Ghana Medical School (UGMS), School of Nursing (SON), School of Public Health (SPH), School of Allied Health, Nouguchi Memorial Institute for Medical Research (NMIMR), School of Pharmacy, and the University of Ghana Dental School (UGDS). The mission of the college is to produce highly qualified and competent health professionals and medical scientists to provide promotive, preventive and curative services to meet the health of the nation and the global community through world class excellence in teaching, research and dissemination of knowledge. The colleges' human resource comprises of people with diverse but complementary core competencies in nursing, medicine, dentistry, public health, allied health sciences, pharmacy, biomedical research and consultancy services.

The organizational structure of employees of the College is categorized as follows: senior members, senior staff and junior staff. In all, the college has total permanent staff strength of one thousand, one hundred and fourteen (1,114).The table below shows the institutions and their respective permanent staff strength:

Table 3.1: Institutions and their respective staff strength (permanent):

Institution	Senior members		Senior staff		Junior staff		Total	Number interviewed from each institution
	Male	Female	Male	Female	Male	Female		
UGMS	110	29	85	47	233	53	557	71
UGDS	9	5	12	9	31	40	106	28
SON	2	7	5	16	9	6	45	6
Allied Health	14	5	16	15	12	5	68	9
School of Pharmacy	7	5	6	2	7	3	30	4
NMIMR	23	9	26	18	32	14	132	23
SPH	13	9	9	6	13	4	54	13
Central Administration*	12	0	32	8	50	20	122	26
Total							**1114**	**180**

***the central administration is not an institution under the college, but a department in charge of the day to day administration of the College. Sampling was done from the central administration. Source: Institutions' Administration**

3.3 Variables Measured

3.3.1 Socio-demographic characteristics and self reported medical history

Socio-demographic (age, sex, marital status, area of residence, household size, years of education, etc) and health- related (diagnosis of hypertension, diabetes etc) variables were obtained.

3.3.2 Nutrition knowledge of respondents

Questions were asked to determine respondents' level of knowledge on diet and its health implications.

Respondents' level of knowledge was assessed using basic health–related nutrition questions, which were generated from questionnaires developed and used for similar studies. There were 9 questions in all and responses were scored. Some questions demanded more than one answer. Each correct response attracted 1 point. The maximum number of points that a respondent could get was 15. Knowledge scores were grouped according to staff categories. Mean scores for each category was determined. Questions were adopted and modified from a study on nutrition knowledge among doctors in the US (Leslie et al, 2009).

3.3.3 Physical activity, alcohol consumption and smoking habits

Data regarding respondents' lifestyle behaviours (physical activity, alcohol consumption and smoking habits) were also obtained. Questions used to assess level of physical activities of respondents were generated from the International Physical Activity Questionnaire (IPAQ, 2002). Questions on alcohol consumption and smoking habits were adopted from a study by Yahia et al on eating habits and obesity among Lebanese University students (Yahia et al, 2008).

Data gathering regarding food intake and dietary habits was carried out through the use of open-ended questions, a validated Food Frequency Questionnaire from the Department of Nutrition and Food Science, University of Ghana, and a 24- hour dietary recall tool (Yahia et al, 2008).

3.3.4 Blood Pressure measurement

Blood pressure was measured with a mercury sphygmomanometer (Accoson-MK.3, by A.C. Cossor and son (surgical) Ltd, England) on the left arm with the respondent sitting and after 5 minutes rest. Measurements were done in respondents' offices or a quiet environment for those who did not have offices (security officers, drivers etc) and by nurses who had been recruited and trained as research assistants. Two measurements were taken with 10 minutes interval and readings recorded to the nearest ± 5mm Hg (Addo et al, 2008).

Elevated blood pressure was defined as systolic blood pressure greater than or equal to 140 mm Hg and /or diastolic blood pressure greater than or equal to 90 mmHg (Chobanian et al, 2003). Blood pressure readings of respondents already diagnosed with hypertension was included in the analysis to ascertain whether treatment and management of the disease condition was effective.

3.3.5 Anthropometric measurements

3.3.5.1 Weight

A portable electronic scale (Seca, by Precision Weighing Balances, Bradford MA, USA) with a digital display (precision of ± 0.1kg) was used. Two measurements were taken by trained research assistant and recorded. Respondents were weighed with minimal clothing; for example jackets, hats, sweaters shoes were taken off (NICE, 2007).

3.3.5.2 Height

Standing height was measured without shoes to the nearest 0.1cm with a shorr board (Shorr productions, Shotley Bridge Place, Oirey Marvland), with respondents standing

upright in a relaxed position, arms hanging freely and without shoes. Two measurements were taken, with the respondent positioned at maximum height and with the head positioned parallel to the Frankfort plane. The headplate of the shorr board rested on the crown of the head (NICE, 2007).

3.3.5.3 Waist and Hip Circumference

Waist circumference was measured on respondents, between the 12th rib and the iliac crest at the level of the umbilicus (NICE, 2007). Hip circumference was measured at the fullest point of the buttocks (NICE, 2007).

Measurements were done twice by trained research assistants with a non-stretchable tape (Butterfly brand, China) and recorded to the nearest millimeter.

3.3.6 Definition of Variables

- Elevated blood pressure: Systolic blood pressure ≥ 140mm Hg and/or diastolic blood pressure ≥ 90mm Hg
- Central Obesity: Waist/Hip ratio of more than 8.5 for females and more than 0.90 for males
- Obesity: A Body Mass Index (BMI) of 30kg/m2 or more
- Overweight: BMI greater than 25kg/m2
- Normal weight: BMI between 18.5-25kg/m2
- Underweight: BMI less than 18.5kg/m2
- High nutrition knowledge: Respondents within each staff category who scored above the average score.

- Low nutrition knowledge: Respondents within each staff category who scored below the average score
- Low fruit consumption: Respondents categorized as having high consumption of fruits and vegetables were those who consumed fruits and vegetables less than 5 times per week within one month.
- High fruit consumption: Respondents categorized as having high consumption of fruits and vegetables were those who consumed fruits and vegetables at least 5 times per week within one month.
- Physically active: Respondents who engaged in daily vigorous to moderate activities for at least 20 minutes were defined as physically active
- Alcohol consumers: Respondents who indicated that they currently consumed drinks that contained alcohol at least occasionally.

3.4 Sampling

3.4.1 Sample Size

Sample size was calculated using EPI info version 3.4.1 (July 2007). A study done in 2005 by Biritwum et al to determine the epidemiology of obesity in Ghana revealed a 5.5% prevalence of obesity among the general population (Biritwum et al, 2005). Assuming an expected prevalence (obesity) of 5.5%, among the study population, a worst acceptable prevalence (obesity) of 9%, and at 95% confidence interval, the estimated sample size was 142. A total of 180 questionnaires were given out to potential respondents to take care of non responses.

3.4.2 Sampling Procedure

A multi stage sampling technique was used.

First level- Selection of institutions

The primary sampling units were all the institutions of the college and the central administration.

Second level-Selection of potential respondents

Each institution was assigned a proportionate sample size based on their staff strength. Potential respondents were selected randomly from the staff list according to the proportion of staff in the three categories namely senior members, senior and junior staff as well as calculated ratios of male staff to female staff. This selection was done using random number tables. This process is illustrated with the University of Ghana Medical School (UGMS) which is one institution under the college with the highest staff strength:

Senior members - 139 (110 males; 29 females) (female to male ratio; 1:4)

Senior staff - 132 (85 males; 47 females) (female to male ratio; 1:2)

Junior staff - 286 (233 males; 53 females) (female to male ratio; 1:4)

Total - 557 (428 males; 129 females)

Sample size - (557/1114)* 142 =71

Senior members - (139/557)*71=18

(using the female to male ratio, we have 13 males and 5 females)

Senior staff - 132/557)*71=17

(using the female to male ratio, we have 11males and 7 females)

Junior staff - (289/557)*71=36

(using the female to male ratio, we have 29 males and 7 females)

1. Using random number tables, the starting point in the table was determined by randomly dropping the index finger on the tables.

2. From the starting point, the random numbers were read downwards

3. The required number (sample size) to be randomly selected was done from the tables, using last digits of numbers that fall within 0 and N, where N is the population size for each staff category (as shown above) (Kumekpor, 1999).

The process was repeated for the various staff categories within each institution. In all, a total of 80, 60 and 40 respondents were randomly selected from junior staff, senior staff and senior members categories of the college respectively. Potential respondents who had been randomly selected from the various institutions were approached by the principal investigator and objectives of the study, explained to them. Reselection was done in order to make up for those who declined to participate in the study as well as female potential respondents who were pregnant at the time of the study. More than three-quarters of potential respondents randomly selected from the senior members list of the University of Ghana Medical School and approached by the principal investigator, declined to be part of the study. After doing reselection and exhausting the senior members list, 5 senior members instead of 18 agreed to be part of the study. As a result, the sample size of senior members from the other six institutions was increased to make

up for those who declined from the medical school. The same sampling method which was used to obtain sample sizes from the various staff categories within each institution was used to get the additional respondents from the senior members category from the other six institutions.

3.5 Data Collection- Method and Tool

3.5.1 Data collection method

The data collection method used was interview, by the use of a structured questionnaire, which was given for administration by all staff.

3.5.2 Data collection tools

Data collection tool used was a structured questionnaire which was developed based on the following key issues relevant to the study objectives:

- Food frequency Questionnaire developed locally by the Department of Nutrition and Food Science of the University of Ghana
- WHO STEPwise Approach on surveillance of risk factors for non-communicable diseases (WHO, 2001)
- The International Physical Activity Questionnaire (IPAQ, 2002).

3.6 Quality Control

Training of research assistants was done to ensure that they are familiar with the objectives and methodology of the study, as well as guidelines for anthropometric measurements to ensure the use of consistent and correct techniques. Questionnaires were checked for errors and completeness and the necessary corrections were made

immediately after collection from respondents. Completed questionnaires were entered into EPI info 3.4.1on daily basis.

3.7 Data Processing and Analysis

Mean of blood pressure readings, heights, weights, waist circumference and hip circumference were calculated manually using a Casio fx-82TL scientific calculator and used for the analysis.

Body mass index (BMI), was calculated as body weight (kg) divided by height^2 (m^2) (NICE, 2007). Calculations were done manually with a Casio fx-82TL scientific calculator for all respondents for whom both height and weight measurements were recorded.

Waist/Hip Ratio (WHR) was calculated using means of waist and hip circumference as waist circumference divided by hip circumference. This was done manually with a Casio fx-82TL scientific calculator.

3.7.1 Statistical Techniques

Data analysis was done using STATA version 8.0 (Stata Corporation, College Station, Texas, USA). Data files were exported into STATA for cross tabulations. The levels of obesity and elevated blood pressure were summarized as percentages. Logistic regression models were generated to determine associations between some risk factors (consumption of fruits and vegetables, alcohol consumption, smoking habits, physical activities) and obesity, as well as elevated blood pressure, and the significance of these associations.

3.8 Ethical Considerations

The study proposal was reviewed by the Ghana Health Service Ethical Committee for permission and approval. Permission was also sought from the office of the Registrar of the College as well as Assistant Registrars of the various institutions.

All data collected was analyzed and reported only for the purpose of quantifying the prevalence of obesity and elevated blood pressure and in the interpretation of the implications thereof.

The study objectives and protocol were explained to every potential respondent personally by the principal investigator. Individuals were then given the opportunity to ask questions and seek clarification on the information given. Informed consent was obtained by asking respondents to sign the consent document after they had satisfied themselves about the procedures of the study and agreed to participate. Respondents were however not under any obligation to continue to be part of the study if at any point they wished to do otherwise.

3.9 Limitations of Study

About 30 respondents who belong to the junior staff category were assisted to complete the questionnaires. Anthropometric measurements were done for respondents who completed their questionnaires.

As part of the assessment of dietary habits, respondents were required to provide information on a 24-hour food recall and a food frequency questionnaire. Some

respondents were not able to recall every detail and as such recall bias was one limitation of the study. Another limitation had to do with blood pressure readings. Even though qualified nurses did the measurements, every individual was likely to hear systolic and diastolic readings differently, since the sphygmomanometers that were used were not electronic ones. However every effort was done in terms of training to reduce errors on readings resulting from this limitation.

3.10 Pretest

The questionnaire was pre-tested among workers of STB McCann Ltd, an Advertising and Public Relations company located in Lartehbiokorshie, Accra. This made it possible for any corrections to be done to improve the research tool. Also protocols and equipment to be used were pretested to give opportunity for modification and fine tuning of the procedures before the actual survey began.

CHAPTER FOUR

4.0 RESULTS

4.1 Characteristics of Respondents

Data from one hundred and forty one respondents were included in the current analyses; 73 (51.8%) from the junior staff, 40 (28.4%) from the senior staff, and 28 (19.9%) from the senior members categories. There were 95 males (67.4%) and 46 females (32.6%) who participated in the study. The mean age of the entire study population was 40.5 ± 10.8 years with a median age of 41years. The mean age of the male respondents was 41.9 ± 11.2 years with a median age of 42 years and that of the female respondents was 37.6 ± 10.8 years with a median age of 36 years. Majority of the respondents (75.9%) were within the 20 to 49 years age bracket, with 29% of them falling within the 30 to 39 years age group. About 65% of respondents had up to 15 years of education and belonged to the junior and senior staff category. However, 45% of respondents within the senior staff category had up to 18 years of education. Almost 95% of respondents with more than 18 years of education belonged to the senior members' category. About two-thirds of respondents (61.7%) were married.

About 63% of respondents had a household size of up to five; whiles 36.9% had a household size of six or more. Also 32% of respondents were Akans, 22.7% were Ga-Dangbes, 18.4% were Ewes and 7.8% came from all the northern Ghana. Ninety-three respondents (65.9%) were defined as physically active. More than two-thirds of respondents (72.3%) consumed alcohol. However, almost 86% of them had never smoked.

Table 4.1: Characteristics of adult Ghanaian workers

of the College of Health Sciences, Accra

Characteristic	%	N
Sex		
Males	67.4	95
Age Groups		
20-29	19.1	27
30-39	29.1	41
40-49	27.7	39
50+	24.1	34
Marital Status		
Married	61.7	87
Single	34.1	48
Ethnicity		
Akan	32.0	45
Ga Dangbe	22.7	32
Ewe	19.1	27
Northern tribes	18.4	26
Staff Categories		
Senior members	19.9	28
Senior staff	28.4	40
Junior staff	51.8	73
Household size		
≤ 2	12.0	17
3-5	51.1	72
6+	36.9	52
Years of Education		
5-10	31.9	45
11-15	32.9	46
16-20	28.3	40
20+	7.2	10
Years of Employment		
< 2	19.9	28
3-5	22.7	32
6-10	26.2	37
10+	31.2	44
Physically active respondents	65.9	93
Alcohol consumers	73.8	104
Self- reported hypertensives and on medication	15.0	21
Self-reported overweight	14.2	20

Respondents who had previously been diagnosed with hypertension (15.0%) were all on antihypertensive medication. About 10% of respondents did not know whether they had either hypertension or diabetes. Among female respondents, hormonal contraceptive use reported was 36.9%.

4.2 Respondents' knowledge on diet and its implications on health

The minimum and maximum knowledge scores of respondents were 0 and 14, and an overall mean score of 5.2 ± 3.2.

Table 4.2: Summary of knowledge scores by staff category

Staff Category	N	Minimum score	Maximum score	Mean	Std. Deviation
Senior members	28	3.0	13.0	7.0	3.10
Senior staff	40	1.0	14.0	4.95	2.99
Junior staff	73	0.0	14.0	4.61	3.12

The mean score of senior members was the highest (7.0) compared to the other staff categories and the overall mean score. The range in knowledge scores showed variations within staff categories. There was however no difference in knowledge across staff categories ($p < 0.05$). This notwithstanding, responses were similarly across the three staff categories for some knowledge questions. For instance, respondents' knowledge about what food item was unsuitable for diabetics was very high; 89.3% of senior members, 77.5% of senior staff and 76.7%, of junior staff got the right response. On the other hand, knowledge on Regenerative Health and Nutrition Program, which is currently being piloted by the Ministry of Health in 30 districts, was low especially among respondents within the senior and junior staff category. About 50% of senior members,

95% of senior staff, and 88% of junior staff did not know anything about the program. Also about 61% of junior staff, 50% of senior staff and 21% of senior members did not know about what constitutes a balanced diet.

4.3 Dietary habits and food consumption pattern

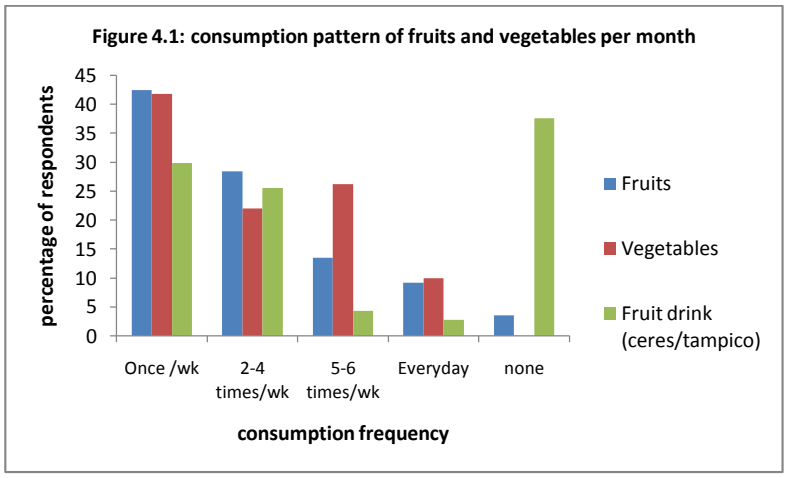
Overall, 59% of respondents (33% males, 26% females) ate breakfast almost every day in the last 7 days preceding the interview. While 10% of male respondents had skipped breakfast during the same period, only 2% of female respondents had skipped breakfast. Majority of respondents (90.7%) had 2 to 3 meals on a weekday. Similarly, 91.5% of respondents had 2 to 3 meals during weekends. Almost 40 % of respondents added salt to already prepared meals. About two-thirds of respondents (68.1%) did not delay lunch between 11.30a.m and 1.30p.m, and had super between 6p.m and 8p.m. Majority of respondents (83.7%) had snack at least once in a day in the last 7 days preceding the interview. Out of this, 53.2% snacked on pasteries and beverages with added sugar, 19% snacked on nuts and roasted corn/plantain and 11.5% snacked on fruits. Among those who snacked on pasteries, almost 80% were female respondents.

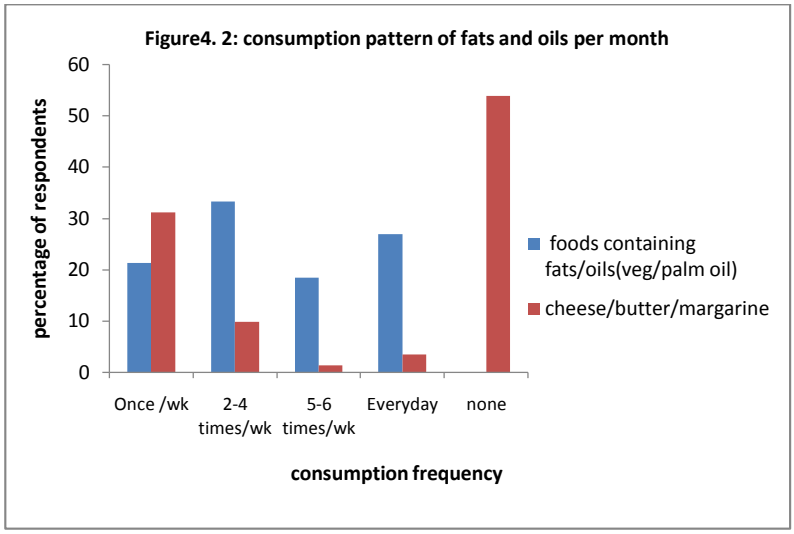
Even though about 55% of respondents had bought or eaten fast food in the last 7 days preceding the interview, 16.4% had bought or eaten fast food 3 to 6 times per week over the same period.

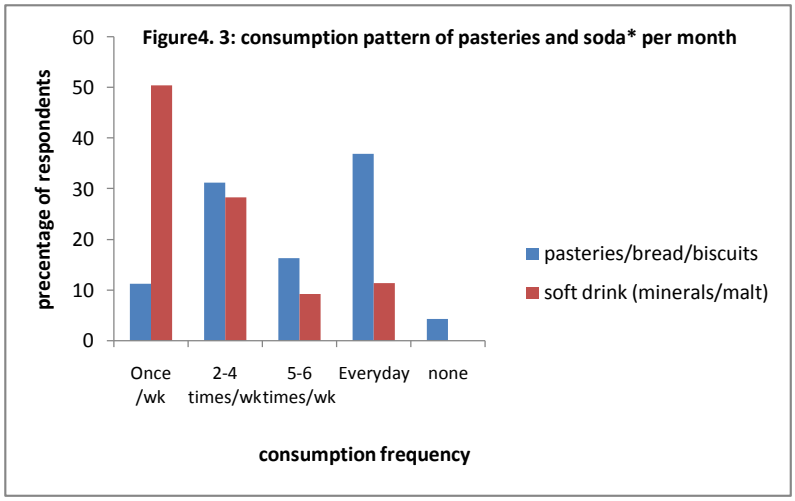
Table 4.3: Dietary Habits of workers of the College of Health Sciences, Accra

Dietary Habits	%	N
Frequency of eating breakfast in the last 7 days		
Almost everyday	59.5	84
Less than 3 times/wk	27.7	25
Skipped	12.8	18
Number of meals (excluding snacks) per weekday		
One meal	5.7	8
Two to three meals	90.7	128
Four or more meals	3.6	5
Number of meals (excluding snacks) per weekend day		
One meal	2.8	4
Two to three meals	91.5	129
Four or more meals	5.7	8
Adds salt to your already prepared meal		
Sometimes/Always	37.6	53
Rarely	15.6	22
Never	46.8	66
Frequency of snacking per day		
No snack	16.3	23
At least once /day	83.7	118
Bought or eaten fast food/last wk		
Everyday	0.7	1
3 to 6 times	15.6	22
Less than 3 times	38.3	54
None	45.3	64
Frequency of eating from fast food joint/outlet		
Sometimes	57.5	81
Rarely/Occasionally	36.8	52
Never	5.7	8

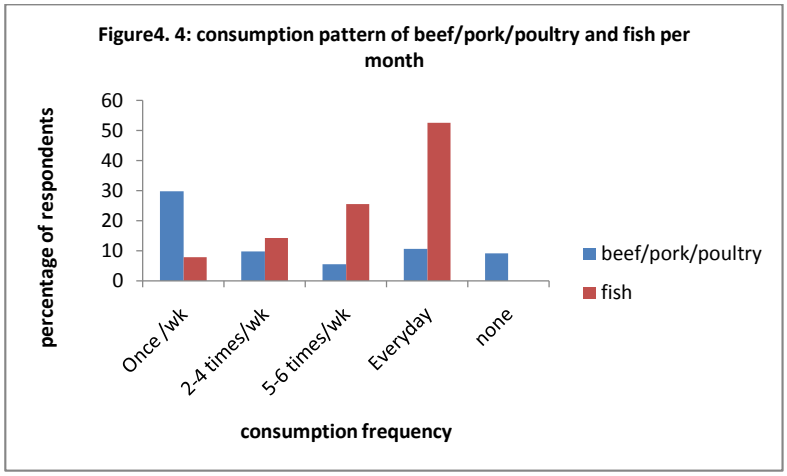
Consumption patterns among respondents of selected food items showed that only about 25% consumed fruits and vegetables at least 5 times in a week within a period of one month preceding the interview. About a third of respondents consumed foods containing fats and oils everyday within the same period. On the other hand, a higher proportion (60%) did not consume cheese/ butter/margarine. Almost 37% of respondents consumed bread/pasteries everyday, compared to soft drinks (minerals/malt) which about 50% of respondents consumed once in a week within one month preceding the interview. More than half of respondents (52.5%) consumed fish everyday compared to beef/pork/poultry.







***malt, fanta, coke, etc**



4.4 Body Composition

The mean weight of respondents was 67.6 ± 11.2kg. The mean weight of the males was 68.9 ± 10.5kg compared to 65.2 ± 9.8kg for females. The mean height of respondents was 1.67 ± 0.10m. The male respondents were relatively taller than the females with mean height of 1.70 ± 0.09m compared to 1.60 ± 0.07m.

Average waist circumference for the study population was 87.09 ± 11.67cm whiles average hip circumference was 99 ± 11.16cm. Also average waist circumference for male and female respondents was 86.63 ± 11.85cm and 87.93 ± 11.49cm respectively.

Similarly, the hip circumference for male and female respondents was 97.74 ± 9.06cm and 102.93 ± 10.59cm respectively.

Table 4.4. Anthropometric measurements of respondents

Characteristic	Weight (kg)	Height (metres	Hip circum. cm	Waist circum + cm
Age				
All ages	67.7 ± 11.2	1.67 ± 0.10	87.07 ± 11.67	99.00 ± 11.16
Sex				
Male	68.9 ± 10.6	1.70 ± 0.09	86.64 ± 11.85	97.74 ± 9.06
Female	65.2 ± 9.8	1.60 ± 0.07	87.93 ± 11.49	102.93 ± 10.59
Staff Categories				
Senior members	65.5 ± 7.6	1.69 ± 0.10	86.65 ± 11.54	98.23 ± 10.28
Senior staff	68.3 ± 11.4	1.66 ± 0.32	87.19 ± 10.62	97.47 ± 11.47
Junior staff	69.4 ± 10.2	1.68 ± 0.15	87.32 ± 11.61	100.30 ± 11.55

4.5 Levels of overweight, obesity and elevated blood pressure

4.5.1 Overweight and obesity

The average BMI of the respondents was 24.9 ± 4.21kg/m^2. Almost one-third of respondents (30.5%) were overweight with a higher proportion among senior (11.3%) and junior staff respondents (11.3%) (t=2.14, p<0.42). Also 12.8% of respondents were obese; 5.0% among junior staff, 4.3% among senior staff and 3.5% among senior members (t=1.58, p<0.00). More than half (56.8.1%) of respondents were classified as having normal body mass index (BMI). No respondent was classified as underweight, (BMI ≤ 18.5). Among male respondents, 39.7% had normal weight, 22.7% were overweight and 5% were obese. Even though more male respondents were overweight than the females (t=15.66, p<0.00), more female respondents were obese than the males (t=4.81, p<0.00). Overall, the prevalence of obesity among respondents was 6.4%. Higher proportions of central obesity (defined by waist-hip ratio) was found among junior staff (13.5%), compared to the other staff categories (9.2 % of senior staff and 4.3% of senior members (t=3.25, p<0.05). Female respondents (14.3%) were more likely

to be centrally obese than males (11.3%) (t=2.77, p<0.01). Altogether, 25.5% of respondents were centrally obese.

4.5.2 Levels of elevated blood pressure

The average diastolic and systolic blood pressure measurement of respondents was 80.68 ± 13.22 mm Hg and 126.38 ± 18.13 mm Hg respectively. Average systolic blood pressure was lower by 13.62 mm Hg with respect to the systolic cutoff of 140 mm Hg. Similarly average diastolic blood pressure was lower by 9.32 mm Hg with respect to the diastolic cutoff of 90 mm Hg. Higher proportions of elevated blood pressure was found among junior staff compared to the other staff category (t=7.45, p<0.02).

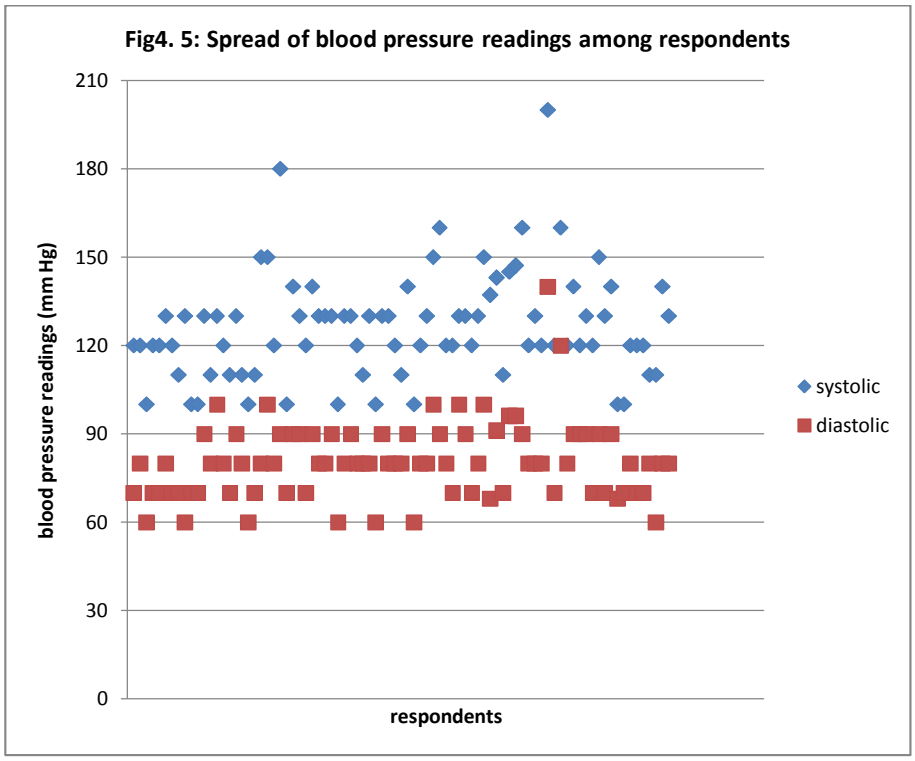


Table 4.5: Overweight, obesity and elevated blood pressure among workers of the College of Health Sciences

Characteristic	BMI						central obesity		elevated blood pressure	
	18.5-24.9		25.0-29.9		30+		WHR >0.85 for females, WHR> 0.90 for males		Sys ≥ 140 Dias ≥ 90	
	%	N	%	N	%	N	%	N	%	N
Sex										
Males	39.7	56	22.7	32	5.0	7	11.3	16	22.7	32
Females	17.1	24	7.8	11	7.8	11	14.3	20	14.8	21
Totals	56.8	80	30.5	43	12.8	18	25.6	36	37.5	53
Staff category										
Senior members	8.5	12	7.8	11	3.5	5	4.3	6	8.5	12
Senior staff	12.8	18	11.3	16	4.3	6	9.2	13	10.6	15
Junior staff	35.5	50	11.3	16	5.0	7	12.1	17	18.4	26
Totals	56.8	80	30.5	43	12.8	18	25.6	36	37.5	53

4.6 Obesity, elevated blood pressure and risk factor relationship

Findings showed a positive association between age and obesity, the older the age the more risk of obesity. Respondents, who were 50 years and above were 87% more likely to be obese, compared to respondents within the 20-29 years age group ($p<0.02$). Marital status was also associated with obesity. Respondents who were single were 74% less likely to be obese ($p<0.01$), compared to those who were married. Respondents who had high fruit consumption were 58% less likely to be obese ($p<0.03$), compared to respondents who had low consumption. Also respondents who had high consumption of vegetables were 54% less likely to be obese ($p<0.03$). Respondents who were classified as physically inactive were 48% more likely to be obese ($p<0.03$), compared to respondents who were classified as physically active. Respondents who did not consume

alcohol were 65% less likely to be obese ($p<0.01$), compared to those who consumed alcohol.

Table 4.6.1: Factors associated with obesity among respondents

Variable	Odds Ratio	P-value
Age		
20-29	1.00	
30-39	1.53	0.04
40-49	1.78	0.02
50+	1.86	0.02
Marital Status		
Married	1.00	
Single	0.26	0.01
Sex		
Male	1.00	
Female	1.28	0.06
Fruits		
Low consumption	1.00	
High consumption	0.42	0.03
Vegetables		
Low consumption	1.00	
High consumption	0.46	0.03
Alcohol consumption		
Yes	1.00	
No	0.35	0.01
Physical Activities		
Physically active	1.00	
Physically inactive	1.48	0.04
Nutrition knowledge		
High knowledge	1.00	
Low knowledge	0.78	0.11
Staff category		
Senior members	1.00	
Senior staff	0.68	0.37
Junior staff	0.88	0.08

Findings showed an association between age and elevated blood pressure. Respondents, who were older, were more likely to have elevated blood pressure. Respondents who were 50 years and above, were 57% more likely to have elevated blood pressure ($p<0.04$), compared to those within 20-29 years age bracket. Female respondents were

42% less likely to have elevated blood pressure (p< 0.04), compared to male respondents. Central obesity and self reported hypertension had a strong and significant association between elevated blood pressure (p>0.00).

Table 4.6.2: Factors associated with elevated blood pressure among respondents

Variable	Odds ratio	P-value
Age		
20-29	1.00	
30-39	1.20	0.07
40-49	1.59	0.04
50+	1.57	0.04
Sex		
Male	1.00	
Female	0.58	0.04
Alcohol consumption		
Yes	1.00	
No	0.87	0.11
Adding salt to already prepared meal		
Never	1.00	
Sometimes	1.22	0.74
Rarely	1.14	0.89
Central Obesity		
Yes	1.00	
No	0.12	0.00
Self reported hypertension		
Yes	1.00	
No	0.10	0.00
Staff category		
Senior members	1.00	
Senior staff	1.14	0.63
Junior staff	1.05	0.12

CHAPTER FIVE

5.0 DISCUSSIONS

5.1 Respondents' knowledge on diet and its implications on health

The study explored the knowledge base of the study population on dietary effects on health and findings revealed that generally was no difference in knowledge across staff categories. However, the range in knowledge scores suggested that level of knowledge within each staff category was evenly distributed. There were some responses that were unanimous across staff categories. For instance, one food item unsuitable for diabetics, which is table sugar, was known by almost 80% of respondents. Reason for this is based on the assumption that public awareness on diabetic management is high. Also the name for diabetes in most local dialects in Ghana is associated with sugar. For instance in the Akan language, diabetes is referred to as "asikyere yarieɛ " literally meaning sugar disease. There is therefore the assumption that these names may have informed respondents about diabetes.

Knowledge about what constitutes a balanced diet was considerably low. Only 27% of the respondents were able to explain correctly what balanced diet was all about. Issues emanating from these findings may be as a result of inadequate and inappropriate information dissemination to the general public. Besides, the study population, belonging to a health teaching institution presents a grim picture of health information dissemination. Similarly, respondents' knowledge on the Regenerative Health and Nutrition Program (RHNP) was also abysmally poor. This program is a preventive health initiative by the Ministry of Health, designed to promote good dietary practices. It is currently being piloted in about 30 districts in the country. This initiative has been disseminated through the mass media to the general public (RHNP, 2008). It is expected

that workers of the college should be adequately knowledgeable to the programme and its components. Unfortunately, the study showed that this is not the case. These findings are not surprising because there is evidence to show that most health professionals focused on their core competence, and issues about nutrition are not priority. A study by Leslie et al (2009) among doctors revealed that clearly, not all doctors are competent in nutrition and a lack of knowledge has also been demonstrated by general practitioners. The study further asserts that in a recent US survey, only 14% of resident physicians reported feeling adequately trained to provide nutrition counselling (Leslie et al, 2009).

5.2 Dietary Habits and consumption patterns

This study revealed the consumption of fruits and vegetables was considerably low. About 42.5% and 41.8% of respondents had consumed fruits and vegetables once in a week over one month. This finding is consistent with a recently published study by Hall et al (2009) on the Global Variability in Fruit and Vegetable Consumption. The study, which was conducted in 52 countries, revealed that Ghana has the lowest prevalence (36.6%) of fruit and vegetable consumption (Hall et al, 2009).

Almost 40% of respondents added salt to already prepared meals, even though in the study this was not associated with hypertension. This notwithstanding, excessive sodium intake as a risk factors of hypertension has been documented by some studies (Haddy, 2006, Badoe & Owusu, 2005). This current study further revealed that a high proportion of respondents (80%) patronized commercially prepared food especially during lunch time. It is suggested that this food source is known to contain high amounts of food additives which are basically flavoured salts, to enhance taste. Secondly since the

recommended daily requirement of sodium (salt) is 2400mg, it is unnecessary to add salt to the already prepared meals (Hardy, 2006).

More than half of respondents (52.5%) consumed fish every day, compared to the consumption of beef/pork/poultry (10.6%). This is a good dietary habit because according to Mori et al (2004), increasing fish intake, in combination with increased physical activity may be effective in lowering blood pressure. In one trial, consuming fish and losing weight were associated with a reduction in blood pressure from 133/77 mmHg to 119/68 mmHg, twice that observed with either intervention alone (Mori et al, 2004).

Noticeably, majority of respondents (68%) were eating ate supper between 6pm and 8pm. If respondents remained inactive after supper, then eating at that time constitutes a risk factor to obesity. According to Ekhard et al (1997), the foods we eat everyday contribute to our well-being. Foods provide us with the nutrients we need for healthy bodies and the calories we need for energy. However if dietary energy is too much, the extra energy turns to fat and is stored in the body.

5.3 Levels of overweight, and obesity

This study revealed that, out of the total number of respondents who were obese as classified by BMI cutoffs, 61% were females and 39% were males. However, there were high proportions of overweight among males (74%) than females (26%). These findings are consistent with a study done by Biritwum et al (2005) on the epidemiology of obesity in Ghana, which revealed that obesity was more common in females than in males; 7.9% and 2.8%, respectively. The study also showed that 17.6% of females and 10.6% of males were overweight. Pobee in 1973 (unpublished), in a study among civil servants obtained

a prevalence rate of 5.1% for obesity and in another study among residents of Mamprobi in Accra in 1975, Pobee (unpublished) found a prevalence rate of obesity to be 7.4% and higher in females than males; 9.8% and 1.6% respectively. In a study done by Biritwum et al (2005), obesity was found to be high among individuals who consumed fewer servings of fruits and vegetables in a day as well those who were engaged in less physical activity Similarly, low consumption of fruits and vegetables, physical inactivity and alcohol consumption was positively associated with overweight in this current study, even though the frequency of alcohol intake did not have any association with obesity, probably because about 50% of respondents indicated that they drank occasionally/rarely. On the contrary, findings of one study done by Hajian-Tilako et al, 2007, on the prevalence of obesity, central obesity and the associated factors in an urban population in north Iran aged 20-70, showed a positive association between frequency of alcohol consumption and levels of obesity.

This study revealed that out of the proportions of central obesity, among respondents, 55.6% were females and 44.4% were males. A study by Kasiam et al (2007) to determine the prevalence of abdominal obesities in an adult urban population of Kinshasa showed a higher prevalence of abdominal adiposity among women (33.5%) than men (26.8%). Another study by Kamadjeu et al (2006) on anthropometric measures and prevalence of obesity in the urban population of Cameroon also revealed that the prevalence of abdominal adiposity, defined by the waist-hip ratio was high among women (28%) as compared to the prevalence among men (32%). Abdominal adiposity has not only been identified as a risk factor for cardiovascular diseases and type II diabetes, but also prostate cancer among men (WHO, 2004). A study conducted by Ukoli

et al (2007) on the anthropometric predictors of elevated prostate-specific antigen among rural and urban Nigerians concluded that central adiposity may be a more important predictor of elevated prostatic specific antigen (PSA) than BMI cutoffs.

5.4 Levels of elevated blood pressure

This study showed higher rates of elevated blood pressure among junior staff and male respondents. Almost 90% of respondents who had already been diagnosed with hypertension and on medication recorded high blood pressure readings. This outcome reflected poor management of the disease condition. Other studies in Ghana have shown similar findings (Amoah et al, 2003; Addo et al, 2008). The study by Addo et al (2008) among Ghanaian civil servants, reported a high prevalence (27.4%) of hypertension was observed with considerable under-diagnosis and low levels of treatment and control as a matter of great concern (Addo et al, 2008). This current study showed a positive association between alcohol consumption, central obesity, and elevated blood pressure. There was a suggestion of an inverse association between staff category and the risk of elevated blood pressure but this was not statistically significant. Similarly, associations between adding salt to already prepared meals and elevated blood pressure was not significant.

Generally, knowledge, dietary practices and nutritional status of the workers of the College were expected. The reason is that studies done among civil servants in Ghana on obesity and hypertension have shown similar results, even though the studies did not assess nutrition knowledge among the study population (Biritwum et al, 2005; Addo et al, 2008). Findings of this study have implications for the general public, which is premised on the fact that it is expected that workers within health teaching institutions should be

knowledgeable in issues regarding good nutrition and hence practice healthy dietary habits. If this was observed even among this group, then there is every indication that a more worrying situation may exist among the general public.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

This study provides information on the health status of workers of the College of Health Sciences. Findings from the study showed that there was inadequate nutrition knowledge among respondents. The high prevalence of obesity in the studied workers' sample, indicate that the workers would benefit from a nutrition and health program to make them well informed on issues relating nutrition knowledge so as to make healthy food choices and to improve their eating habits. Also results from this study have confirmed the associations between physical inactivity, alcohol consumption, low consumption of fruits and vegetables and obesity. This should inform efforts at controlling obesity in order to reduce the burden of chronic diseases that consume a lot of the nation's health resources.

Regarding elevated blood pressure, findings have shown a higher prevalence among male respondents than females. Also results from the study have confirmed associations between central adiposity, self-reported hypertension and elevated blood pressure. There is the need to introduce health education measures that will promote prevention and early detection of hypertension and encourage better compliance to treatment. The reasons for poor management and control of hypertension among the workers should be investigated and appropriate interventions put in place.

6.2 Recommendations

The following are recommendations that are being made in the light of the findings of this study in order to promote healthy lifestyle among the workers of the College of Health Sciences:

University of Ghana and College of Health Sciences

1. Efforts must be made to find ways of educating workers and promoting the adaptation of some of the components of Regenerative Health and Nutrition Program. Workers would then be well informed to also educate the general public.

2. Periodic screening of workers to detect undiagnosed hypertension and providing resources to facilitate treatment and control is essential.

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Dietary Habits, Obesity and elevated blood pressure among workers of the College of Health Sciences

CONSENT FORM

I am a student of the School of Public Health, College of Health Sciences, University of Ghana, Legon. This survey is being undertaken to describe dietary patterns and to determine nutritional status and blood pressure among workers of the College of Health Sciences. Every permanent staff member is eligible to participate in this study. You have been included using a random selection procedure.

I will ask questions will be asked of you regarding your dietary consumption habits, health history, and physical activity. Also I will measure blood pressure, height and weight, waist and hip circumference. The data will provide knowledge on the health status of workers in the College.

You are assured of strict confidentiality and anonymity. Participation in this survey is obligatory and you have the right to withdraw from the study at any time you so wish.

This study has been approved by the Ghana Health Service Ethical Review Committee. Also permission has been sought and given by the Registrar of the College as well as Assistant Registrars of the various institutions.

If you have any questions about the study please contact the principal investigator, Joana Ansong on telephone number: 0208134549 or email: j_ansong@yahoo.com

If you agree to be part of this survey please sign your name

Signature/Thumb print of respondent	Signed Principal investigator
…….....	……..

Thank you for agreeing to participate in this study.