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**DETERMINANTS OF MALNUTRITION AMONG YOUNG GHANAIAN  
WOMEN**

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**ACCEPTANCE**

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**Supervisor.....**

**Prof. Ama de-Graft Aikins**

**Date.....**

## DECLARATION

I hereby declare that, except for the reference of other peoples work, which have been acknowledged. This dissertation is the result of my own research and that it has not presented elsewhere either in part or in whole for another degree.

SIGNED.....

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## ABSTRACT

The study aimed at exploring the double burden of nutrition being underweight and overweight in Ghana. There have been changes towards increased consumption of processed foods, fast foods, sugary and oily foods, reduction of physical activity and increase in sedentary lifestyle. The associated negative implications are type II diabetes, hypertension and stroke, reduction in labour force, low productivity and increase in health budget.

The purpose of the study is to provide information on underweight and overweight among young Ghanaian women which can serve as policy formulation and provide preventive measures that can help reduce the causes of malnutrition and the increasing rate of non-communicable diseases among women in Ghana. Using GDHS 2008, both bivariate and multivariate analysis was conducted to determine the likelihood of a young woman being underweight, overweight and obese, using socio-demographic factors as independent variables and BMI status as dependent variables.

The results show that a young woman's probability of being underweight is highest in her teen years (15-19) and when she has not married, whereas a young woman's chance of being overweight or obese is highest when she has attained higher level of education. It was concluded that underweight was found to be very common among young rural women, young women with primary and middle/JHS education and among young women between the ages of 15-19 years. Young women with higher education and the richest class are more likely to be overweight and obese. It was recommended that education of nutritional needs for young women in the rural areas should be strengthened especially the need for adequate consumption of balanced diet since it helps supply the necessary nutrients needed in the body

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## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the study

Malnutrition has plagued populations of developing countries for decades leading to severe increase in risk of morbidity and mortality. One relevant dimension of malnutrition stems from its adverse disproportionate effect on women. Malnutrition has been observed to affect the more vulnerable in communities especially women. Gender roles which are socially constructed behaviours, activities and attributes considered appropriate for men and women in most communities defines women at the lower end of the ladder to access material welfare and status. The problem of gender inequality is also embedded in rules, customs, laws and social norms thereby making women vulnerable to malnutrition. Since young women are the direct nutritional providers for children, during pre-natal and post natal periods, there is a ripple effect of malnutrition in children as well. (WHO, 2009).

Malnutrition is defined as deficiencies, excesses or imbalances in intake of energy, protein and/or other nutrients WHO (2009). The term malnutrition refers to both situations of under nutrition and over nutrition. Under nutrition is a lack of adequate nourishment containing protein, vitamin and other nutrients resulting in loss of body weight. Over nutrition is chronic intake of food more than the adequate proportion of dietary requirements of carbohydrates, fatty and oily foods resulting in overweight or obesity. In the past, malnutrition problems of developing countries like Ghana stemmed from under nutrition. However, with the incidence of globalization and the onset of Obesogenic environment, over nutrition has exacerbated. The increase in the two extreme, that is, overweight and underweight results in an epidemic of diseases among young women. Such diseases include hypertension cancers, stroke, diabetes, wasting and others. (Wane et , 2010).

Some studies (Krasovec and Anderson 1991) reviewed had reported that increased perinatal and neonatal mortality, higher risk of low birth weight babies, stillbirths, and miscarriage are some of the consequences of malnutrition in women. In addition to the diseases malnutrition causes an increase in the health budget, reduction in the labour force and adverse effect on the family.

Malnutrition is further dissected into macronutrient and micronutrient deficiency. Poverty is the main underlying cause of malnutrition and its determinants. However, the degree and distribution of protein energy malnutrition and micronutrient deficiencies among populations depend on many factors, including the political and economic situation; the level of education and sanitation; the season and climatic conditions; food production; cultural and religious food customs; breast feeding habits; prevalence of infectious diseases; the existence and effectiveness of nutrition programmes; and the availability and quality of health service (Mucha, 2012). Diets that place people at risk for malnutrition are those deficient in macronutrients (protein, carbohydrates and fat, leading to protein-energy malnutrition), micronutrients (electrolytes, minerals and vitamins, leading to specific micronutrient deficiencies) or both. In developing countries, the prevalence of bacterial and parasitic diseases also contributes greatly to malnutrition. Similarly, malnutrition increases susceptibility to and the severity of infections, and is thus a major cause of illness and death from disease and thus the most important risk factor for the burden of disease in developing countries. Micronutrient deficiencies often underlie other types of morbidity.

Globally, anemia affects more than 1.6 billion people, or approximately (25%) of the population. In developing countries, almost (50%) of anemia in the population is thought to be due to iron-deficiency, but the proportion may vary among population groups and in different areas according to local conditions. (57%) of pregnant women are suffering from iron deficiency (WHO, 2009).

Poverty is the main underlying cause of malnutrition and its determinants. However the degree and distribution of protein-energy malnutrition and micronutrient deficiencies among populations depend on many factors, including: the political and economic situation; the level of education and sanitation; the season and climate conditions; food production, cultural and religious food customs; breast-feeding habits; prevalence of infectious diseases; the existence and effectiveness of nutrition programs; and the availability and quality of health services

The problem of malnutrition can be resolved by using preventive, management and curative interventions. However the efficiency of such interventions will depend on accurate and correct identification of the factors causing malnutrition in Ghana so that workable interventions can be designed to address the onset of malnutrition.

## **1.2 Problem Statement**

The WHO, (2005) cites that in achieving MDG 3, MDG4, which is reduction in child mortality and maternal health respectively depends on the curbing malnutrition. Uthman, (2008) opines that prevalence and increasing rate of malnutrition in sub-Saharan Africa has coupled HIV AIDS pandemic to bring some countries on the brink of crisis. She further explains that food in often cases is identified as the most immediate and critical need by people living with HIV mostly young women. Mucha, (2012) has also suggested that sufficient maternal nutrition in the early part of child birth is crucial for both mother and child and the consequences of malnutrition at this stage are irreversible.

The recent increase in number of pregnant young mothers suffering from malnutrition is giving concern to those in adult education, women leaders, health care services and others. It is difficult for some people to afford balanced and nutritious foods and may end up eating more carbohydrate foods without knowing the consequences especially among pregnant women. Logic then suggests that a vital element in improving this situation is the need for

comprehensive and relevant based information that identifies the causes of malnutrition among women to enable efficient interventions to be designed. The problem of the study is to identify determinants of malnutrition among the vulnerable young women group. With increasing level of malnutrition among young Ghanaian women, Ghana is likely to face problems of reduction in labour force, low productivity and high rate of pregnancy related complications. Increasing obesity is associated with diseases such as diabetes, hypertension, cancers and others. The definitive negative outcome of poor health and nutrition among women is a high prevalence of maternal mortality; nearly 600,000 women in developing countries die each year from pregnancy related causes (UNICEF 1996).

The global maternal mortality rate is 460 per 100,000 live births: 500/100,000 live births in developing countries compared with 10/100,000 live births in developed countries. In Ghana maternal mortality ratio declined from 740 per 100,000 live births in 1990 to 540 per 100,000 live births in 2000 (WHO, 2007).

To help curb the problem of the determinant of young Ghanaian women this study tries to find out who among the young Ghanaian women population is likely to be underweight and overweight by asking the following research questions;

- i. What are the causes of underweight and overweight among young Ghanaian women?
- ii. Is there any association between the level of education attained by young women and their BMI status?
- iii. Are there any differences among rural and urban young women and BMI status?
- iv. Is there any relationship between marital status of young women and BMI status?
- v. Is there any relationship between the type of food consumed by young women and BMI status?

### **1.3 Objectives of the study**

The general objectives of the study is to determine the distribution and patterns of malnutrition among young Ghanaian women.

The specific objectives are to:

- i. Describe the socio-demographic variables of young Ghanaian women.
- ii. Determine the number of Ghanaian women who are underweight, overweight or obese.
- iii. Examine the pattern of underweight and overweight among rural and urban young women.
- iv. Determine the proportion of marital status and overweight among young women and
- v. Determine the distribution of underweight and overweight by food intake among young women.

### **1.4 Rationale of the study**

The prevalence of overweight among young Ghanaian women has reached an alarming state especially in the urban areas and underweight in the rural areas of the country. In the past that was not the case but rather underweight exceeded overweight. Mendez et al, (2005) based on the analysis of anthropometric measurements for women aged 20-49 years in 36 developing countries, observed that the proportion of overweight exceeded the proportion of underweight in both urban and rural areas.

This study is to provide information on underweight and overweight among young Ghanaian women. This information on dietary practices and physical activity patterns which both influence the BMI status of Ghanaian women can serve as a policy formulation and provide preventive measures that can help reduce the causes of malnutrition and the increasing rate of non-communicable diseases among women in Ghana. The study used Ghana

Demographic and Health Survey (GDHS), 2008 data. This will depict the country's determinants of malnutrition among young women and the distribution of BMI status across different educational levels, place of residents, age group, occupational status, and marital status. The study will consciously bring to bear the determinants of under nutrition and over nutrition and the likely associated health problems.

### **1.5 Literature review**

Malnutrition is defined as deficiencies, excesses or imbalance intake of energy, protein and / or other nutrients. The term malnutrition refers to both situations of under nutrition and over nutrition. Under nutrition is a lack of adequate nourishment containing protein, vitamin, and other nutrients resulting in loss of body weight. Over nutrition is a chronic intake of food more than the adequate the adequate proportion of dietary requirements of carbohydrates, oily and fatty foods resulting in overweight or obesity caused by inadequate food intake or the body's inability to make use of needed nutrients. Under-nutrition is usually thought of as a deficiency of one or more nutrients, primarily calories (overall food consumption) or of protein.

Under-nutrition can be divided into protein-energy-malnutrition and micronutrient deficiencies and also a chronic energy deficiency as a risk factor for adult low productivity, morbidity, and mortality. Chronic under-nourishment among women is a major risk factor for adverse birth outcomes for their children. Under-nutrition is a consequence of consuming too few essential nutrients or excreting them more rapidly than they can be replaced. People exposed to such prolonged stressors may be undernourished, even if they consume an appropriately normal diet. Prolonged physical stress causes the body to break down internal protein stores, and protein is excreted as a result.

Teenagers and women who are pregnant or breast-feeding need additional nutrients. Nutrient loss can be accelerated by diarrhea, excessive sweating, hemorrhage, or kidney failure.

Nutrient intake can be restricted by age-related illness and condition, excessive dieting, severe injury, serious illness, a lengthy hospitalization or substance abuse. Although under-nutrition is not widespread as such in urban places, it does exist as a result of poverty, illness, neglect, poor dietary planning, or environmental hazards. Under-nutrition does not occur, especially in people who are very poor, such as the homeless, those who have psychiatric disorder and also, people who are very ill may be unable to eat enough because they have lost their appetite or because their bodies need for nutrients is greatly increased. Poverty and lack of food are the primary causes of under-nutrition (WHO, 2007).

There is an increased risk of under-nutrition associated with chronic diseases, especially diseases of the intestinal tract, kidney and liver. Patients with chronic cancer, AIDS and intestinal disorders may lose weight rapidly and become susceptible to undernourishment because they cannot absorb valuable vitamins, calories, and iron. People with drug or alcohol dependencies are also at increased risk of under-nutrition. These people tend to maintain inadequate diets for long periods of time and their ability to absorb nutrients is impaired by the alcohol or drugs effect on body tissues, particularly the liver, pancreas and brain. When 4.5kg or more is lost unintentionally, it may be a sign of under-nutrition.

### **1.5.1 Types of under nutrition**

Types of under nutrition include Protein Energy Malnutrition (PEM) due to imbalanced availability of protein and glucose and micronutrient deficiency due to lack of key vitamins and minerals. That is used to describe a wide range of nutritional syndromes, which are generally categorized as mild, moderate, and severe Jelliffe & Jellife (1971). Micronutrients deficiency is another type of under-nutrition such as lack of key vitamins and mineral brings anemia, cretinism and blindness to tens of millions of people. These mineral and vitamin deficiency can and impair intellectual development, cause ill health and early death on an almost unthinkable scale, and condemns a third of the world to live below their physical

and mental potential.

Iron plays a role in the brains dopamine system and the behaviours it generates. Essential nutrients such as iron must be consumed through dietary intake. Humans acquire dietary iron in two forms: heme iron found in meats, fish and poultry and non heme iron found in legumes and other plants. While heme iron is readily absorbed by the body at a high efficiency, non heme iron has far lower absorption rates. It is largely plant based diet, common in developing countries, which contain both low quantities of easily absorbable heme iron and high quantities of inhibitors of iron absorption common in staple cereals. Lack of dietary iron can lead to disorders during periods of high iron demand. Severe iron deficiency is diagnosed as anemia. Blood levels between 0.35 and 0.70 mmol/L can be classified as subclinical deficiency although subclinical deficiency may still be present at levels between 0.70 and 1.05mmol/l and occasionally above 1.05mmol/l (WHO, 2004).

#### **1.5.1.1 Types of micronutrient deficiencies**

##### **1.5.1.2 Vitamin A**

Vitamin A deficiency is mostly defined as tissue concentrations of vitamin A low enough to have adverse health consequences with or without evidence of clinical xerophthalmia (WHO, 1996). Vitamin A plays an important role in vision, bone growth, reproduction, cell division, and cell differentiation Institute of Medicine (2001). A major function of vitamin A is its role in the visual cycle in the retina of the eye. The visual pigment in the eye, rhodopsin, is found in the red cells of the eye after the conversion of trans-retinol to retinaldehyde a binding to opsin WHO (2004). Vitamin A in the form of retinol is present in a variety of foods including eggs, milk and fish, or in its precursor form as carotene in yellow fruits and vegetables, green leafy vegetables and red palm oil.

### **1.5.1.3 Zinc deficiency**

Zinc deficiency in deprived populations is contributing to growth retardation, diarrhea, immune deficiency, skin lesions Selenium deficiency. Severe zinc deficiencies are linked with individuals with a genetic disorder known as acrodermatitis entropathica. This is a condition of impaired uptake and transport of zinc. Immune system is very much influenced by adequate intake of zinc. (Shankar et al,1998).

### **1.5.1.4 Folic acid**

Folic acid deficiency means having a lower than normal amount of folic acid which is a type of B vitamin, in your blood. Folic acid works with vitamin B12 and vitamin C to help the body breakdown, use, and make new proteins. The vitamin helps form red blood cells.

### **1.5.1.5 Iron deficiency**

Iodine deficiency is the greatest single cause of mental retardation and brain damage, affecting 1.9 billion people worldwide. It can easily be prevented by adding iodine to salt. World Nutrition Situation 5th report, UN Standing Committee on Nutrition (2005)

### **1.5.1.6 Protein energy malnutrition (PEM)**

PEM is the main form of type II malnutrition which is almost always due to an imbalanced availability of proteins and glucose. It is the main cause of suffering and disease due to hunger.

The gender disposition of PEM among nursing mothers, reports a higher incidence among females. PEM can be classified into primary PEM and secondary PEM. The primary PEM, which is the most common type in developing world, when the patient suffers from an insufficient diet. The secondary type is an accompanying manifestation of malnutrition in patients already suffering an underlying disease such as cancer or AIDS. Chronic disease often hinders the body to absorb necessary nutrients thus resulting in this form of malnutrition. UNICEF divides type II malnutrition in acute and chronic disease. Chronic

disease will often cause stunting (a low height for age), as a sign of insufficient nutrition over a long period of time. Acute cases are those over shorter periods whose main presentation is wasting (a low weight for age).

#### **1.5.1.7 Over nutrition**

Over nutrition is chronic intake of food more than the adequate proportion of dietary requirements. On the other hand over-nutrition refers to excessive intake of energy and macro nutrients, It is high in unrefined carbohydrates and fiber which are replaced by diets containing a higher proportion of fats, particularly saturated fatty acids and sugars thus condition where there are more nutrients than required for normal growth.

Over nutrition, i.e. more than the required for normal growth, is chronic intake of food more than the adequate proportion of dietary requirements. It results from eating too much food and also eating too many of the wrong things, not exercising enough or taking too many vitamins or other dietary replacement and hence having an excessive intake of many nutrients rather than of a single one. The term over-nutrition in a nutshell, can refer to Obesity: brought on by general overeating of foods high in calorie.

In the past, the malnutrition problems of developing countries like Ghana stemmed from under nutrition. However, with the changes in lifestyle and status among young women over nutrition has exacerbated. The increase in the two extremes that is overweight and underweight results in an epidemic of diseases among young women including hypertension cancers, stroke, diabetes and others Wane et al. (2010). Malnutrition has been a global problem is associated with certain disease burden, such as heart disease, stroke, diabetes and cancer which is attributable to over-nutrition or the over-consumption of certain food or food components. Chronic diseases were the cause of 35 million deaths globally in 2005, 80% of which were in low and middle income countries WHO (2004). Among women overweight and obesity may lead to infertility, reduced fecundity and pregnancy

complications such as pre-eclampsia, gestational diabetes and macrosomia (Wane et al., 2010).

In the developed countries, particularly Australia the prevalence of overweight and obesity in young adult women has increased between 1995 and 2005, rates increased from 16.1% to 24.8% in 18- to 24-year-olds, and from (25.7% to 35.4%) in 25 to 34 year old. The Australian Longitudinal Study on Women's Health (ALSWH) reported that women in their twenties gained weight at an average rate of 1.4lb year (from ages 18 to 23 in 1996, and from ages 28 to 33 in 2006. This rate of weight gain was (30%) greater than that seen in women in their forties and fifties.

#### **1.5.1.8 Studies pertaining to Africa and developing countries**

In many developing countries, especially in the urban populations, there is an increase in the consumption of energy-dense nutrient poor foods which are high in fats and sugars and without enough nutrients and a decrease in physical activity. Socio-economic status of people has led to the greater consumption of meats, oils and sugars as cheap processed foods, with decreased consumption of fruits, vegetables and grains. Health problems associated with inadequate calorie consumption and insufficient micronutrients exist with the growing presence of diet related chronic diseases, such as heart disease, stroke, cancer and diabetes, in adults (Popkin et al., 2011)

Underweight women are susceptible to several infectious diseases while overweight and obese women are at a higher risk for several chronic diseases. There have been few studies in relation to underweight and overweight among young women in sub-Saharan African countries.

A study of 235,906 women from 74 nationally representative surveys conducted in 34 countries in Africa showed that (13%) of women were underweight while (17%) were overweight or obese. Overweight or obesity increased while underweight decreased as the

level of wealth and education increased. Women in the wealthiest households were nine times more likely to be obese, three times more likely to be overweight and (50%) less likely to be underweight ( $P < 0.001$ ) compared to women in the poorest households. However women with secondary or higher education were nearly twice as likely to be obese, (70%) more likely to be overweight and (55%) less likely to be underweight ( $P < 0.001$ ) compared to women without education.

The trend analysis showed that underweight was falling by 0.8% per year while overweight or obesity was rising by (3.2%). While underweight decreased at a similar rate in urban and rural settings, overweight or obesity was increasing nearly three times faster among women in rural areas. (Girmaye D., 2012).

According to the third National Family Health Survey NFHS-3, 2005-2006 (36%) of ever married in India have a BMI below 18.5 indicating underweight and (13%) of women are overweight or obese. Out of 29 Indian states, the prevalence of underweight and overweight or obese is more than the national average in 12 and 15 states, respectively and the percentage of overweight exceeded the percentage of underweight.

South Africa Demographic and Health Survey (2003) showed a high prevalence of over nutrition among South African women, with (52.3%) being either overweight or obese at national level SAHDS (2003). Studies have also shown that there were severe female overweight or obesity. In a rural area in KwaZulu-Natal, (76.9%) of the females were overweight or obese. (Oelofse et al, 1999).

Dugas et al., (2009) found that young adults in the peri-urban settlement in South Africa were equal to half of the women being overweight or obese (mean BMI 31.0kg/m), however none of their males were overweight (mean BMI 21.6 kg/m). Therefore the prevalence of obesity is higher in urban areas than rural areas (SADHS, 2003). With the rapid urbanization that is taking place in the country, the prevalence of obesity in adults is

expected to increase further (Vorster et al, 2000).

Mendez et al. (2004) examined the patterns of both underweight and overweight in adult women aged 20-49 in developing world using a cross sectional survey of Urban and rural status and socio-economic status. Body Mass Index (BMI) data collected in 36 countries from 1992-2000 showed the prevalence of overweight among urban women ranged from (10.3%-69.9%) (median: 32.4%). Overweight was higher (about twice as high) in urban areas than in the rural areas. Underweight ranged from (0.7%-16.5%) in the urban and (0.6%-21.5%) in the rural areas. Prevalence of underweight was about (5%) which is higher in rural areas than in urban areas. Studies have shown that obesity in rural areas is increasing. There have been a significance increase in obesity over a 10 year period with (54%) for women and (84%) for men in some rural areas of Cameroun. Similarly some studies reviewed had reported that among rural and urban residents in Kenya (40% and 16%) were overweight and obese among the urban residents while (16% and 5%) were overweight and obese among the rural residents (Fezue et al., 2008)

#### **1.5.1.9 Studies pertaining to Ghana**

According to Biritwum et al. (2005), the overall prevalence of obesity was found to be over (5.5%). Among females the prevalence was (7.4%) compared to males (2.8%). It was more common among the married. Obesity was very high among the employed than the self- employed and those not working. Obesity was very high in Greater Accra (16.1%) and almost absent in Upper East or Upper West regions. By ethnicity, obesity was highest among Ga Adangbe, Ewes and Akans (14.6%, 6.6% and 6.0% respectively). Obesity was high among those who had less physical activity in a week than the rest.

Amoah (2003) conducted a study of a sample of 4731 population, including 1857 males and 2874 females. The crude prevalence of overweight and obesity was (23.4% and 14.1%).

The rates of overweight (27.1% and 17.5%) and obesity (20.2% and 4.6%) were higher in women than men. There were high prevalence of overweight and obesity in urban high class residents than in the low class residents and high in urban than in rural. In most of the countries, there were high prevalence of overweight and obesity among women in the urban areas and high socio- economic status group including underweight.

### **1.5.2 Causes of malnutrition**

Overeating is also a form of malnutrition and much common in the developed countries, where for the majority of people, access to food is not an issue. The issue in these developed countries is choosing the right kind of food. The reason for this mass consumption of food is the affordability and accessibility. Oftentimes the fast food, low in cost and nutrition, are high in calories and heavily promoted. When these eating habits are combined with increasingly urbanized, automated, and more sedentary lifestyles, it becomes clear why gaining weight is difficult to avoid. However, overeating is also a problem in countries where hunger and poverty persist. In China, consumption of high-fat foods has increased while consumption of rice and other foods has decreased.

Poverty is the main underlying cause of under and over nutrition and its determinants in the developing world. The proportion of population below the national poverty line in urban areas was (11%) in 2005-2006, in rural areas was (39%) in 2005-2006 (WHO, 2007). However the degree and distribution of protein-energy malnutrition and micronutrient deficiencies among populations depend on many other factors such as political, level of education, social class, season and climate conditions, food production, cultural and religious food customs, the existence and effectiveness of nutrition programs, availability and quality of health services. In addition food shortages may be a contributing factor to malnutrition in countries with lack of technology.

Food shortages can be caused by a lack of farming skills such as crop rotation, or by a lack of technology or resources needed for the higher yields found in modern agriculture, such as nitrogen fertilizers, pesticides and irrigation. As a result of widespread poverty, farmers cannot afford or governments cannot provide the technology. Most farmers cannot afford fertilizer at market prices, leading to low agricultural production and unaffordable food prices. Many Ghanaians are faced with the problem of hardship and poverty which has increased migration of individuals from the country's three northern regions and the impoverished regions of the south, such as the Central and Volta regions, to the southern urban cities of Accra, Kumasi and Tarkoradi (Agyei-Mensah & de-Graft Aikins 2010).

Deriving too much of one's diet from a single source, such as eating almost exclusively corn or rice, can cause malnutrition. This may either be from a lack of education about proper nutrition, or from only having access to a single food source. On the other hand many parts of the world have access to a surplus of non-nutritious food, in addition to increased sedentary lifestyles which has created a universal epidemic of obesity. Yale psychologist Kelly Brownell calls this a "toxic food environment" where fat and sugar laden foods have taken precedent over healthy nutritious foods Popkin et al. (1993). Not only does obesity occur in developed countries, problems are also occurring in developing countries in areas where income is on the rise.

#### **1.5.2.1 Obesogenic environment**

In the United States of America (USA) it has been found that only (38%) of meals are eaten at home and most Americans have never cooked a meal from basic ingredients because people choose to eat at the abundant fast food restaurants and some use food from machine vendors Gardner & Halweil (2000). The creation of mechanized and convenience based communities reduces the amount energy people burn in their normal household and

livelihood chores whiles exposing them to over processed and unbalanced easily access diets.

The WHO (2000) estimates that by the year 2020, Non Communicable Diseases (NCDs) such as diabetes, cancers, hypertension and cardiovascular diseases, will cause more than 67% of the world's burden of diseases which will be a rise of more than 40% from the current burden of diseases. In certain developing countries such as South Africa, the current obesity epidemic is partly due to globalization, which is the driving force behind replacement of traditional diets rich in vegetables and fruit with rich in animal fats and low in carbohydrates (Renzaho, 2003). Increased perinatal and neonatal mortality, higher risk of low birth weight babies, stillbirths and miscarriage are some of the consequences of malnutrition in women. (Krasovec and Anderson,1991). In addition to diseases, malnutrition causes an increase in the health budget, reduction in the labor force and adverse effect on the family.

### **1.6 Theoretical framework**

Based on a conceptual framework on the causes of malnutrition developed in 1990 as part of the UNICEF Nutrition Strategy, an understanding of the complex and delicate causes of malnutrition is important to appreciate the depth of the problem, the progress achieved and the possibilities for further progress that exist (UNICEF, 1998).

Malnutrition is not a simple problem with a particular solution. Multiple and interrelated determinants are involved in the development of malnutrition. Intricate series of approaches, multifaceted and multisectoral, are needed to deal with the problem. The interplay between the two significant immediate causes of malnutrition thus inadequate dietary intake and illness tend to create a vicious circle malnutrition which lowers the body's ability to resist infection by undermining the functioning of the main immune-response mechanisms. This leads to longer, more severe and more frequent occurrences of illness. The causes lead to inadequate dietary

intake and infectious disease, inadequate access to food in household, insufficient health services and an un-healthy environment. Food security which is sustainable access to safe food of sufficient quality and quantity including energy, protein and micronutrients is to ensure adequate intake and a healthy life for all persons. In rural areas, household food security may depend on access to land and other agricultural resources to guarantee sufficient domestic production. In urban areas, food is largely bought on the market, where range of foods must be available at accessible prices (UNICEF, 1998).

### **1.11 Conceptual framework**

According to the literature, there are some socio-demographic and related lifestyle variables such as age, place of residence (rural and urban), occupational status, educational status, region of residence, marital status, wealth index, starchy foods, oily and fatty foods, physical activity, fruits and vegetables which have a direct relation with BMI status of young women. Some of these variables relate directly to BMI status while others work through other variables to affect BMI status. For example young women in the urban areas are more likely to eat 'western foods' and thus are more likely to be overweight or obese compared to young women in the rural areas. The educational level attained by a young woman can directly affect her BMI status. Also, the BMI status of a young woman with any level of education could vary depending on the kind of health lifestyle she leads.

Foreyt and Poston (1997), cite that dietary and activity are more responsible for overweight or obesity. Apart from the dietary and activity patterns, many factors have been associated with both forms of malnutrition of women which include socioeconomic (occupation, education background); demographic (age, marital status) and dietary characteristics (Monteiro et al. 2004). In Ghana, women with higher socioeconomic status group are more likely to be obese than those living in poverty (Biritwum 2005).

As the economies of developing countries continue to improve, the risk of becoming obese increases across all socio-economic classes as a result of improved access to food, decreased physical activity, and the consumption of "western" diets Popkin et al, (2011). These factors predispose people to becoming overweight or obese.

Prevalence of chronic and acute malnutrition (i.e. stunting and wasting, respectively) is higher in the Northern and Upper East regions. Among women, the prevalence of overweight and obesity is high, especially among those living in urban areas, while under nutrition persists, particularly in the Upper East region (GSS et al. 2007).

Women in their reproductive ages require appropriate doses of certain mineral nutrients that enhance the balance of their delegate biological, physiological and psychological wellbeing. However, the consumption of foods which do not specifically cater to this demand results in under or overweight.

Level of education has significant consequences on nutritional status among young women since the higher the level of education the more likely one may be overweight or obese since those who are educated are more likely to live sedentary lifestyles. In Ghana, the literacy rate remains low (58%) in 2000-2004, with female literacy rate of (50%) (UNESCO, 2006).

Married women are responsible for the production and preparation of food in most homes. A mother's limited decision-making ability affects nutritional outcomes since it reduces her ability to provide care and nutrition for her children.

Urbanization and related dietary changes improve health to a certain extent, they place a city-dweller at risk of certain health problems, including obesity. Changing lifestyles, Dietary

changes associated with urbanization are related to the fact that rural dwellers tend to be more self-reliant in obtaining food and also tend to eat traditional diets that are high in grains, fruit and vegetables, and low in fat. Once they arrive in urban areas, these same people tend to rely more on external forces for sustenance, resulting in a shift from production of their own food to the purchase of processed foods (Popkin, 1993).

People moving from rural to urban areas experience an increased intake of energy, sugar, refined grains and fat Monteiro et al. (1992). This dietary profile, referred to as a "western" diet, has been reported to be associated with diabetes, heart disease and excessive caloric intake and obesity, Popkin et al.(2012). In Ghana, the poorest populations, in terms of energy intake and wages, often reside in rural areas. Among the urban poor, energy intake and wages may have improved with regard to their rural counterparts, but the quality of energy consumed is of utmost importance. That is, while the urban poor may earn and consume more, the quality of the food they eat may lead towards weight gains.

Increasing rates of overweight obesity have been associated with food supply and the growing consumption of energy-dense foods. An increased consumption of snacks, caloric beverages and fast foods by young adults has been associated with obesity and excess weight gain. Studies have examined the contribution to the obesity epidemic of dietary sugars and fats, larger portion sizes and the lower nutrient density of foods eaten away from home. The quality and quantity of food consumed by young women has direct effect on their health and of their children, especially breastfeeding of children.

The Ghanaian diet largely relies on starchy roots (cassava, yams), fruit (plantain) and cereals (maize, rice). Starchy roots and cereals still supply almost three quarters of the dietary energy and diversity of the diet remains low. The dietary supply meets population energy requirements, but the share of protein and of lipids in the dietary energy supply is lower than recommendations.

Physical activity should be encouraged among women since low physical activity is a risk for transitioning from normal to overweight status. According to GDHS (2008) a person should exercise not less than three times a week lasting for at least fifteen minutes of every period of the activity. Younger overweight women are particularly at risk for transition to obesity. A low level of physical activity has been indirectly associated with weight gain and obesity.

People living in lower socio-economic situations who have recently moved to large cities tend to find work primarily as day labourers or factory workers. They leave behind continuous, physical labour and adopt sedentary, sporadic work (Popkin et al.1998).

Some people are able to carry out work that may actually increase their daily physical activity which does not lead to overweight or obesity. The inactive lifestyle among Ghanaian women has been associated with chronic disease burden and more prevalent in urban than rural settings Amoah (2003). The urban lifestyle with its prevalence of office jobs and use of cars is different from the traditional rural life style in which the daily work of rural farmer incorporate long-distance walking and physical exertion of farming” (MOH, 2008).

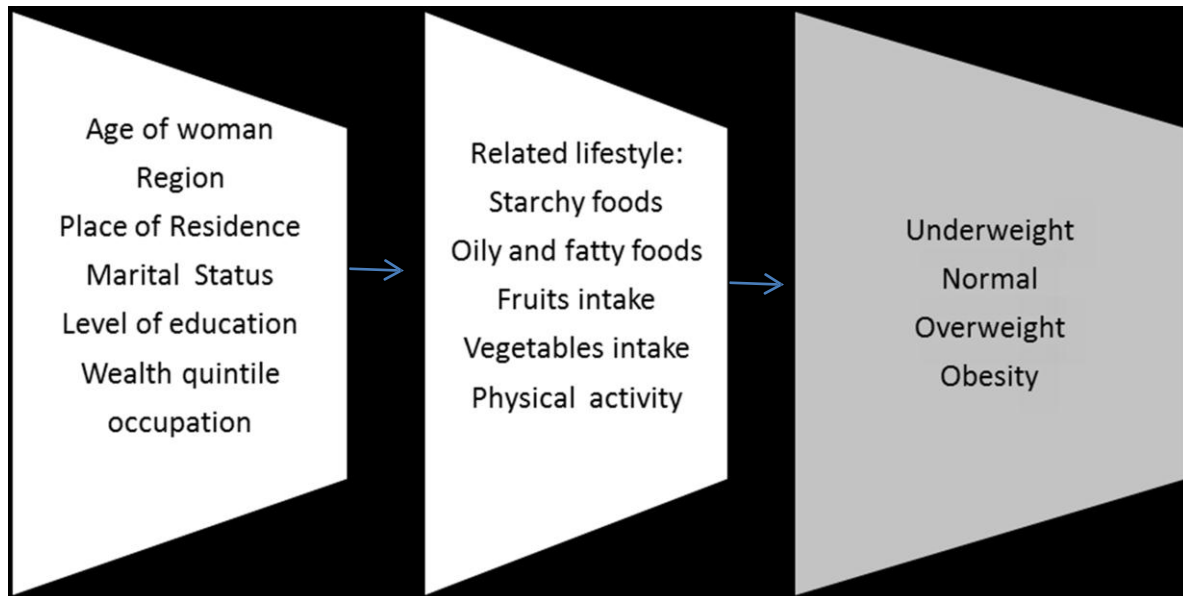
BMI is used to measure thinness or obesity and is defined as weight in kilograms divided by height squared in metres ( $\text{Kg/m}^2$ ). A BMI of < 18.5 indicates underweight, a BMI between 18.5 to 24.9 indicates normal and a BMI of 25.0 to 29.9 indicates overweight and a BMI of 30 and above indicates obesity.

### 1.7.1 Determinants of malnutrition among young Ghanaian women

#### Independent variable

#### Intermediate variable

#### Dependent variable



Source: Author's construct, 2012

### 1.8 Hypotheses

-Young women of higher wealth status are more likely to be overweight and obese compared to young women of lower wealth status.

-Young women with higher education are less likely to be overweight or obese compared to young women with no education

-Urban young women are more likely to be overweight compared to rural young women.

## **1.9 Sources of data and methodology**

### **1.9.1 Data**

The source of data for this study is the 2008 Ghana Demographic and Health Survey data set. This survey is a national survey that collects demographic and health data for men, women and children in the country over every five year interval since 1988.

### **1.9.2 Dependent variable**

In measuring the dependent variables of the young women, the BMI was used. BMI is calculated by weight in kilograms divided by height squared in meters (Hill et al. 2006). Mathematically,  $BMI = \text{weight (kgs)} / \text{height (m}^2\text{)}$ . A BMI of  $< 18.5$  indicates underweight, a BMI between 18.5 to 24.9 indicates normal and a BMI of 25.0 to 29.9 indicates overweight and a BMI of 30 and above indicates obesity.

The BMI method of determining underweight and overweight is acknowledge for population analysis and also recognized internationally as the standard of defining underweight and overweight or obese in adult populations WHO (2006). The BMI method is inaccurate in pregnant women and women who just had babies less than 12 months.

### **1.9.3 Independent variables**

The independent variables in this study are socio-demographic characteristics of the young women. These variables were age, place of residence, region of residence, education, occupation, wealth status, marital status. Age was put into categories of 15-19, 20-24. Place of residence was put into categories of rural and urban. Region of residence of the young women was also put into categories of ten administrative regions of Ghana (Western, Central, Greater Accra, Volta, Eastern, Ashanti, Brong Ahafo, Northern, Upper East and Upper West regions).

The highest level of education attained by young women were classified into categories of those with no education, women with primary education, women with middle/JHS, women

with secondary/SHS education, women with higher education. Occupation was put into categories of professional/ technical/managerial/clerical, sales/service, agric-self-employed, skilled/unskilled manual workers and women who were not working. Wealth index of women was used as a proxy for their socio-economic status and categorized as poorest, poorer, middle, richer, richest. Marital status was also categorized into currently married, formerly married and never married.

#### **1.9.4 Source of data collection**

The study uses data from the 2008 Ghana demographic and health survey (GDHS). The GDHS are nationally representative sample surveys that collect demographic and health data in developing countries. Ghana's demographic and health survey have been conducted every five years since 1988. The 2008 Ghana demographic and health survey is the fifth round of GDHS. The GDHS collects demographic, socio-economic and health information on men and women in their reproductive ages and also on children under the age of five years. Specifically, data are gathered on household characteristics, education. Maternal and child health, nutrition, family planning, knowledge, behaviour and attitudes towards HIV/AIDS.

The 2008 GDHS included a module on health in which questions on regenerative health and nutrition were asked to adult men and women.

#### **1.9.5 Sample design**

The 2008 GDHS was a household-based survey implemented in a representative sample of more than 12000 households selected nationwide. A two- stage sample based on the 2000 Population and Housing Census was used to produce separate estimates for key indicators for each ten regions in Ghana. A total of 11,778 households were interviewed including a total of 4,916 of all eligible women age 15-49 also interviewed. Based on this, a sample size of 1900 Young women between the ages of 15-24 years was selected for the purpose of this study.

### **1.9.6 Method of analysis**

The data was analyzed using descriptive statistics (frequencies, percentages). A cross tabulation was used for each independent variable against the dependent variable and a chi squared test was used to test the significance of the association between the dependent and independent variables. Multivariate analysis using multinomial logistic regression analysis was used. BMI status was used as the dependent variable with normal weight as reference category. For each of the independent variables, a certain category was used as reference based of what was being examined. For instance, for age, 15-19 year age group was used as the reference category and the likelihood of the other age group being underweight, overweight or obese was compared to the likelihood of the 15-19 year group being underweight, overweight or obese. The fit of the model was tested using the chi-squared test and  $R^2$  was determined. The significance of each of the independent variables in predicting the BMI status was determined using the likelihood ratios including the chi-squared significance of each independent variable in the model. The results of the model were interpreted using the odds ratio (OR) which gives the likelihood of young women being underweight, overweight or obese compared to young women of normal weight. The statistical analysis for the study was done by using the statistical package for social sciences (SPSS) version 17.0.

### **1.10 Limitations of the Study**

Some literature suggests that physical activity influences BMI status. The proportion of young women in this study who performed physical activity was very small to be used for rigorous statistical analysis. There was no difference between leisure time physical activity and work time physical activity. The reported levels of physical activity in the data can however not be

wholly attributed to healthy lifestyle practices. The proportion of young women's intake of fruits and vegetables were also very small and cannot be used for statistical analysis.

### **1.12 Organization of the study**

The study is organized in five chapters. Chapter One is which is introduction is divided into background of the study, statement of the problem, rationale of the study, objective of the study, literature review, conceptual framework, proposed hypotheses, source of data and methodology and organization of the study. Chapter Two contains the description of background characteristics of the respondents. Chapter Three comprises of results and discussion of the cross tabulations of the independent and dependent variables (BMI status) and three will focus on both unilateral and bilateral analysis of the data. Chapter Four will present the results and discussion of multivariate analysis. Chapter five will give conclusions and recommendations to the study.

## CHAPTER TWO

### SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

#### 2.1 Introduction

To have an appreciative comprehension of the determinants of malnutrition among young Ghanaian women, it is good to know about the background characteristics of the young women. This chapter focuses on the description of the background characteristics of the respondents which include age, education, place of residence, region, wealth status, marital status, occupation

##### 2.1.1 Age

The Table 2.1 shows the percentage distribution of young Ghanaian women by various demographic characteristics including age, level of education, wealth index, marital status and occupation of the respondents. More than half of the respondents (53.9%) were between the ages of 15-19 years while (46.1%) of the young women were between the ages of 20-24 years. This shows that the population is mostly youthful and is not different from the population of Ghana and other developing countries where there are more youth compared to the aged. This youthful age structure could have some implications on the socio-economic development of the country.

### **2.1.3 Highest level of education**

Education is one of the means of impacting knowledge in the society, the higher the level of education of a person can have an effects on other things such as gaining knowledge and the development of one's cognitive abilities which can influence the lifestyle of an individual and even enhance the intake of adequate proportion of dietary requirement.

It is expected that those who have higher education should have more knowledge on nutritional status and practice adequate intake of balance foods. Table 2.1 shows that (10.6%) of the young women had no education. Also, almost (48%) of the respondents had middle/JHS education. In addition, about one fifth of the respondents had primary and secondary education. Only few proportions of the young women had higher education (2.5%).

### **2.1.5 Wealth status**

Wealth status of an individual may contribute to the risk of becoming obese, since high socio-economic classes has resulted in improved access to food, decreased physical activity, and the consumption of "western" diets Popkin et al. (1997) predispose people to becoming overweight or obese. In addition, poverty can enhance poor nutrition in that a poor person has a reduced ability to purchase nutritious foods which may eventually results in underweight. Poverty can also engender over and under nutrition at household and individual levels (Popkin et al., 2010).

Table 2.1 indicates that almost equal proportions of the young women were from both the richer and richest income families (24.2% and 22.5% respectively). This indicates that about (46.7%) belonged to high income group. (32.4%) were from poor income household while (20.9%) belonged to the middle income status.

### **2.1.6 Marital status**

Marriage is an institution which provides social support and financial resources that promote health and access to better nutrition. According to Waldron et al. (1996) married people have more stable eating patterns, better dietary intake, higher levels of physical activity and generally healthier lifestyle which may reduce the risk of obesity. On the other hand the less educated married women tend to have, on the average a higher BMI than those with more education. In many African countries, it is expected that a married woman should be fat which indicates the wealth and social status of her husband.

Table 2.1 shows that more than seven out of ten young women have never been married (71.3%). However about quarter of the women were currently married (26.2%). This may be probably due to the fact that majority of them may be schooling.

### **2.1.7 Occupation of respondent**

The kind of work people are engaged in may influence their life style and the kind of food they eat. Those engaged in office jobs tends to eat western diets and may not be able to engage in vigorous intensity activity which may lead to overweight and obesity ( Popkin et al. 1998). On the other hand, those in manual work may be exposed to lot of vigorous intensity activities because of the nature of their works.

Table 2.1 indicates that a higher proportion of young women (47.4%) were not working. However, more than a quarter of the women (36.3%) were in service sectors and quite a few of the women (3.5%) were in the professional sector.

Table 2.1: Characteristics of respondents

<b>Characteristics</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Age</b>		
15-19	1025	53.9
20-24	878	46.1
<b>Level of education</b>		
No education	202	10.6
Primary	380	20
Middle/JHS	899	47.3
Secondary/SHS	373	19.6
Higher	47	2.5
<b>Wealth index</b>		
Poorest	263	13.8
Poorer	353	18.6
Middle	397	20.9
Richer	461	24.2
Richest	427	22.5
<b>Marital Status</b>		
Never married	1356	71.3
Currently married	499	26.2
Formerly married	47	2.5
<b>Occupation of respondent</b>		
Not working	887	47.4
Professional	66	3.5
Services	678	36.3
Agriculture	238	12.7

**Source:** Computed from GDHS data, 2008.

### **2.1.2 Place of residence**

Where an individual stays may influence her nutritional status, having less access to balanced and nutritious foods. Studies have shown that people who stay in the urban areas experience an increased intake of energy, sugar, refined grains and fatty diets (Monteiro et al., 1992). This dietary profile, referred to as a “western diet”, has been reported to be associated with diabetes, heart disease and excessive caloric intake and obesity (Popkin et al., 1995).

Table 2.2 shows that almost equal proportion of young women stayed in both rural areas and urban areas (49.9% and 50.1% respectively).

### **2.1.4 Region**

Region of residence plays a vital role in nutritional status. Some regions are more urbanized than others, thus may be developed than the others, therefore where one stays may influence what one eat which may determines ones BMI status.

Table 2.2 shows that a higher proportion of young women (21.2%) resided in Ashanti region, followed by Greater Accra (17.6%), with the rest of the region below (10.0%).

**TABLE 2.2**

Characteristics	Frequency	Percentage
<b>Place of residence</b>		
Urban	953	50.10
Rural	949	49.90
<b>Region of residence</b>		
Western	160	8.4
Central	173	9.1
Greater Accra	335	17.6
Volta	161	8.5
Eastern	188	9.9
Ashanti	403	21.2
Brong Ahafo	162	8.5
Northern	176	9.3
Upper East	93	4.9
Upper West	50	2.6

**Source:** Computed from GDHS data, 2008.

### 2.1.8 Body mass index (BMI) of the respondents

BMI is used to measure thinness or obesity and is defined as weight in kilograms divided by height squared in meters ( $\text{Kg/m}^2$ ). A BMI of  $< 18.5 \text{ Kg/m}^2$  indicates underweight, a BMI between  $18.5- 24.9 \text{ Kg/m}^2$  indicates normal and a BMI of  $25.0- 29.9 \text{ Kg/m}^2$  indicates overweight and a BMI of  $30.0 \text{ Kg/m}^2$  and above indicates obesity.

Table 2.3 shows that almost the same proportion of young women were underweight and overweight (11.8% and 12.6% respectively). Whereas quite a few proportion of women were obese (2.5%).

**TABLE 2.3**

<b>Characteristics</b>	<b>Number of young women</b>	<b>Percentage</b>
<b>BMI status</b>		
Underweight	219	11.8
Normal	1356	73.1
Overweight	233	12.6
Obese	46	2.5

**Source:** Computed from GDHS data, 2008.

## CHAPTER THREE

### BACKGROUND CHARACTERISTICS AND BODY MASS INDEX

#### 3.1 Introduction

This chapter focuses on the relationship between the background characteristics and BMI status. The association between the background characteristics of young women and their BMI status were analyzed by using cross tabulations. The background characteristics of the respondents examined include age, education, place of residence, region, wealth status, marital status, occupation, fruits and vegetables, starchy foods, oil and fatty foods and the association with BMI. A Pearson chi-square test of independence was calculated and the p-value is set at 0.05

There is a relationship between age of a woman and BMI status. In developing country especially Ghana the fatness of a woman is seen to represent her beauty whereas thinness is frowned upon. Therefore at certain age she has to eat well in order to grow fat and beautiful.

#### 3.1.1 Place of residence and BMI status

Table 3.1 shows that higher proportion of young women in the rural areas was underweight and normal weight (14.4%, 75.3% respectively) compared to young women in the urban areas (9.1%, 71.1% respectively). Urban residents had higher proportion of young women who were both overweight and obese (15.8% and 4% respectively) compared to young women in the rural areas (9.3% and 1%). Urban residents are thus more likely to be overweight and obese compared to young rural women. This finding is the same as that of Amoah (2003) and Biritwum (2005) who found that there is high prevalence of overweight

and obesity among women in the urban areas in Accra.

**Table 3.1 Distribution of young women by Place of residence and BMI status**

Place of residence	Percentage in BMI category				Total
	Underweight	Normal	Overweight	Obese	
Urban: percent	9.10	71.10	15.80	4.00	100
Rural	14.40	75.30	9.30	1.00	100

Chi-square value= 44.351      Degrees of freedom= 3      X<sup>2</sup> significance=0.000

Source: computed from GDHS 2008 data set

Young women staying in rural areas are generally involved in activities such as farming and house chores, which require lots of physical activities. Their exposure to less processed foods results in lower caloric intakes. However, the rural women have less access to medical health and as a result may be deficient in certain micro and macro nutrient which may affect weight gain. In the urban communities life is less simple and requires less physical activity, the existence of transport system, processed foods increases the rate overweight and obesity. This is probably due to the fact that women in the urban areas may be eating 'western diets' with little or no physical activity. More so relatively high proportion of young women (4.0%) in urban areas are obese compared to (1.0%) in the rural areas indicating the fact that people moving from rural to urban areas experience an increased intake of energy, sugar, refined grains and fat resulting in obesity (Monteiro et al. 1992).

### 3.1.2 Highest level of education and BMI status

The level of education attained by young women had an effect on the BMI status. Table 3.2 indicates that underweight decreased with increasing level of education while overweight and obesity increased with higher levels of education. Young women with higher education had

the highest proportion of overweight (27.9%) and obese (11.6%) and were the lowest proportion of underweight (2.3%). Young women with primary education had the highest proportion of underweight (15.9%) and those with no education had the lowest proportion of overweight and obese (8.6% and 0.5% respectively). These finding supports those by Amoah (2003) and Biritwum et al. (2005) in Ghana. The higher the level of education, the more likely to be engaged in sedentary type of work and involved in very little or no physical activity and tend to consume processed foods thereby increasing the chances of overweight and obesity.

**Table 3.2: Distribution of women by the highest level of education and BMI status**

Highest level of education	Percentage in BMI category				Total
	Underweight	Normal weight	Overweight	Obese	
No education	10.7	80.2	8.6	0.5	100
Primary	15.9	70.6	11.9	1.6	100
Middle/JHS	12.5	74.1	11.2	2.2	100
Secondary	7.4	71.4	17.0	4.1	100
Higher	2.3	58.1	27.9	11.6	100

Chi-square value=59.116      Degrees of freedom=12      X<sup>2</sup>significance=0.000

Source: Computed from GDHS 2008 data set

### 3.1.3 Region of respondents and BMI status

Table 3.3 shows the distribution of women by region and BMI status in Ghana. Underweight was more prevalent in the Upper East and Volta regions while Greater Accra and Ashanti regions had the higher proportions of overweight. The low rate of overweight and obesity in the in the northern part of the country may be probably due to high physical activities such as farming, house chores and the consumption of natural and unprocessed foods.

**Table 3.3: Distribution of young women by region of residence and BMI status**

Region of residence	Percentage in BMI category				
	Underweight	Normal weight	Overweight	Obese	Total
Western	8.3	77.7	12.7	1.3	100
Central	11.8	74.6	13	0.6	100
Greater Accra	8	68.8	15.6	7.6	100
Volta	16.8	74.2	8.4	0.6	100
Eastern	11	70.9	14.3	3.8	100
Ashanti	13.3	69.8	15.3	1.5	100
Brong Ahafo	8.2	80.5	10.7	0.6	100
Northern	14	79.5	5.8	0.6	100
Upper East	21.4	69	7.1	2.4	100
Upper West	10.2	77.6	10.2	2	100

Chi-square value= 87.015

Degrees of freedom=27

 $X^2$  significance=0.000

Source: Computed from GDHS 2008 data set.

The table above shows that higher proportion of young women in Upper East region (21.4%) are underweight followed by Volta region of (16.8%) which could be as a result of under-nutrition where there is lack of adequate dietary requirement in their food intake.

Whiles in Greater Accra only few women (8.0%) are underweight .Also Greater Accra region has a higher proportion of young women been overweight and obese (15.6% and 7.6% respectively). This is basically due to the fact that Greater Accra Region is more urbanized than other parts of the country and women in those areas tend to adopt

sedentary lifestyle by consuming processed foods which lead to increase in weight.

### 3.1.4 Wealth status and BMI

A rise in socio-economic status as a result of improved access to food, decreased physical activity, and the consumption of "western" diets Popkin et al. (1998) has led people to becoming overweight or obese.

**Table 3.4: Distribution of young women by wealth index and BMI status.**

Wealth index	Percentage in BMI category				Total
	Underweight	Normal weight	Overweight	Obese	
Poorest	16.7	77.0	5.6	0.8	100.0
Poorer	18.4	72.0	9.0	0.6	100.0
Middle	10.4	80.0	8.3	1.3	100.0
Richer	8.7	68.8	19.2	3.3	100.0
Richest	8.2	70.4	16.3	5.0	100.0

Chi-square value=93.513      Degrees of freedom=12      X<sup>2</sup> significance= 0.00

Source: Computed from GDHS 2008 data set.

The results in table 3.4 show that there is a relationship between wealth status and young women. The table reveals that high proportions of young women (35.1%) in the low income group are underweight. This may be because those in the low income status are not able to afford nutritious and balanced diet. On the contrary, higher proportions of women in high income status group are overweight and obese (35.5% and 8.3% respectively). This may be due to the fact that those in the high income group consume foods that are rich in fats and oil.

### 3.1.5: Marital status of respondents and BMI status

Young women who had not married may have limited access to food and health care depending on their family background. Whereas married women with financial support of the husbands may have access to food and may consume more than the adequate dietary requirement leading to overweight and obesity.

**Table 3.5: Distribution of young women by marital status and BMI status.**

Marital status	Percentage of BMI category				Total
	Underweight	Weight	Overweight	Obese	
Never married	13.7	72.1	11.9	2.4	100.0
Currently married	6.7	75.4	14.8	3.0	100.0
Formerly married	10.6	80.9	8.5	0.0	100.0

Chi-square value=20.876      Degrees of freedom= 6      X<sup>2</sup>significance=0.002

Source: Computed from GDHS 2008 data set.

The results in table 3.5 indicate that there is a significant association between marital status and BMI. A high proportion of young women (13.7%) who had never been married were underweight compared to (6.7%) of those who were currently married. However higher proportion of young women who were currently married were overweight and obese (14.8% and 3.0% respectively) whereas relatively few women (8.5%) who were formerly married were overweight and not obese. In some developing country, particularly Ghana, fatness is recognized as wealth and attraction and thinness is frowned at. A fat married woman represents the wealth status of her husband which explains why married young women may be overweight or obese compared to those who had never married.

### 3.1.6: Occupation of respondent and BMI status

Formally educated people tend to work in white collar offices which involve very little physical activity and then tend to consume processed foods thereby increasing the chances of overweight and obesity.

**Table 3.6: Distribution of young women by occupation and BMI status**

Occupation	Percentage in BMI category				Total
	Underweight	Normal	Overweight	Obese	
Not working	15.7	73.0	8.8	2.5	100.0
Professional	4.7	65.6	25.0	4.7	100.0
Services	7.6	70.8	18.6	3.0	100.0
Agriculture	10.7	82.0	6.4	0.9	100.0

Chi-square value=75.984      Degrees of freedom=9      X<sup>2</sup> significance=0.000

Source: Computed from GDHS 2008 data set.

The results in table 3.6 indicate a significant relationship between occupation and BMI where a higher proportion of young women (15.7%) who are not working are underweight. This may be due to the fact that the young women cannot afford to purchase a well nutritious and balanced diet required for development. Quite a few women (4.7%) in professional sectors are underweight. In addition quarters (25.0%) of young women in the professional sector are overweight. This may be as a result of changes in lifestyle and status. However (6.4%) of the young women in the agriculture sector are overweight while quite a higher proportion of young women in the professional sectors are obese compared to (0.9%) women in the agriculture sector.

### 3.1.7: Starchy food and BMI status

Increased consumption of refined and energy dense foods like cassava, rice, yam may lead

to weight gain. From table 3.7 Yes means those who take in starchy foods and No means those who do not take in starchy foods.

**Table 3.7: Distribution of Starchy food and BMI status of young women**

Starchy food	Percentage of BMI				Total
	Underweight	Normal weight	Overweight	Obese	
No	7.4	77.0	11.9	3.7	100
Yes	8.1	78.6	11.9	1.4	100

Chi-square value= 2.342                      Degrees of freedom=3                      X<sup>2</sup> significance=0.505

Source; Computed from GDHS 2008 data set.

The results show that there is an inverse and non-significant relationship between starchy food and BMI which indicates that, a higher proportion of young women (8.1%) who consumed starchy foods were underweight compared to those who were not. However (3.7%) of young women who consumed starchy foods were obese compared to (1.4%) of those who were not consuming starchy foods. This is because starchy foods are high energy giving foods and that people who use less energy than what they put in their system compels their bodies to store the excess energy in terms of fat.

### **3.1.8: Oily and fatty foods and BMI status**

These are foods that contain high proportion of saturated fat including animal fats such as cream, cheese, butter, and fatty meats as well as certain vegetable products such as coconut oil, palm kernel oil, chocolate, and many prepared foods. In Ghana, energy intake for some population groups may be inadequate, energy expenditure is high and body fat stores are low (BMI <18.5 kg/m<sup>2</sup>). The amount and quality of fat supply has to be considered keeping in mind the need to meet energy requirements. From the table Yes means those who take in oil and fatty food and No means those who do not take in oil and fatty food.

**Table 3.8: Distribution of Oil and fatty foods and BMI status among young women**  
**Percentage in BMI category**

Oil and fatty food	Underweight	Normal	Overweight	Obese	Total
No	5.1	80.1	13.0	1.9	100.0
Yes	10.8	76.4	10.3	2.5	100.0
Chi-square value=5.367	Degrees of freedom=3		X <sup>2</sup> significance=0.147		

Source: Computed from GDHS 2008 data set.

The results from table 3.8 indicate that there is no significant association and also about 1/10 of the young women who consume oil and fat foods are underweight (10.8%) compared to those who do not. In addition higher proportion of young women (13.0%) who do not consume oil and fat food are overweight compared to those who consume. However quite a high proportion (2.5%) of those who consume oil and fatty foods are obese compared to those who do not.

This may be due to the fact that these women consume foods that contain high proportion of saturated fat which when not expelled; the system tends to store lots of fats leading to overweight and obesity.

### 3.1.9: Physical activity and BMI status

Low physical activity among young women has been associated with increase in weight gain. According to GDHS 2008 physical activity was defined as activities that respondents did as part of their economic activities, house work or yard work as part of their exercise or sport or in moving from one place to another.

The Ministry of Health (M.O.H) recommends that a person should engage in 30 minutes of physical activity at least three times a week in order to reduce the risk of overweight and obesity.

In the 2008 GDHS, respondents were asked questions about vigorous activities which took hard physical effort to do. The question used to assess involvement in vigorous physical activity among respondents was in the last seven days, on how many days did you do vigorous physical activity that lasted for fifteen minutes each time?

Physical activity in this study was measured in terms of frequency. (number of days respondents engaged in such activity in the last seven days) and the duration ( whether such activity lasted for fifteen minutes each time). One physical activity day means that on one day of the days in the last seven days, the respondent engaged in vigorous physical activity that lasted for fifteen minutes.

**Table 3.9: Distribution of physical activity and BMI among young women**

Physical activity	Percentage in BMI category				Total
	Underweight	Normal	Overweight	Obese	
No activity	9.1	64.2	24.4	2.3	100.0
Less than 3 times	7.1	71.4	10.7	10.7	100.0
3 or more times	28.6	57.1	14.3	0.0	100.0

Chi-square value=10.82    Degrees of freedom=6    X<sup>2</sup>significance=0.094

Source: Computed from GDHS 2008 data

The result in table 3.9 indicates that there is no significant association between physical activity and BMI where more than a quarter (28.6%) of young women who perform physical activity for 3 or more times are underweight compared to those (7.1%) who perform less than 3 times. In addition a higher proportion of young women, about quarter (24.4%) of those who do not perform any physical activity are overweight compared to (10.7%) of those who performs less than 3 times weekly. However, a higher proportion of women (10.7%) who perform less than 3 times weekly are obese whereas none of the young women who perform 3 or more times weekly are obese. Although it is expected that

those who perform 3 or more times physical activity are not supposed to be overweight, the result shows otherwise (14.3% of young women who did physical activity 3 or more times were overweight compared to 10.7% of those who did physical activity of less than 3 times). This could be as a result of eating of energy and sugary foods. This is because the more one performs vigorous physical activity the more the energy consumed are utilized and the system would not have any excess fat to store hence no weight gain.

### 3.1.10: Fruits intake and BMI status

Increasing the intake of fruits may be an effective dietary strategy to control weight and mitigate the risk of obesity and other health conditions. From the table below Yes means those who take in fruits and No means those who do not take in fruits.

**Table 3.10: Distribution of fruits intake and BMI among young women**

Percentage in BMI category					
Fruits intake	Underweight	Normal	Overweight	Obese	Total
No	6.9	78.6	13.8	0.7	100.0
Yes	8.5	77.9	10.7	2.9	100.0

Chi-square value=3.801                      Degrees of freedom=3                      X<sup>2</sup> significance=0.284

Source: computed from GDHS 2008 data set

The result in table 3.10 shows no significant association between fruits intake and BMI and indicates that less than 1/10 young women (8.5%) who take fruits are underweight compared to (6.9%) of those who do not take fruit. This may be due to the fact that those young women are increasing the consumption of fruits and decreasing the consumption of high calorie foods. In addition a higher proportion of young women (13.8%) who do not take fruits are overweight compared to (10.7%) of those who take fruits. This is because those women may be consuming high fatty and sugary foods rather than fruits. On the contrary (2.9%) of those women who take fruits are obese compared to the young women

who do not (0.7%).

### 3.1.11: Vegetables intake and BMI status

Increasing consumption of vegetables may be beneficial to the health which helps in reducing some of the risk factor for heart diseases and cancers, also Vegetables have fiber which binds to and aids in excretion of cholesterol and fat. In table 3.11 Yes means those who consume vegetables and No means those who do not consume vegetables.

**Table 3.11: Vegetables intake and BMI status**

Vegetables	Percentage in BMI category				Total
	Underweight	Normal	Overweight	Obese	
No	7.2	76.9	13.9	1.9	100.0
Yes	8.5	79.6	9.5	2.4	100.0

Chi-square value=2.211      Degrees of freedom=3      X<sup>2</sup> significance=0.530

Source: Computed from GDHS 2008 data set.

The result in table 3.11 shows no significant association between vegetables intake and BMI of young women. It indicates that (8.5%) of the women who consume vegetables are underweight compared to (7.2%) of those who do not consume. This may be due to the fact that these women have increase the consumption of vegetables and reduce the consumption of high calorie foods. In addition a higher proportion of young women (13.9%) who do not consume vegetables are overweight compared to (9.5%) of those who consume. This is because those women may be consuming foods that are high in cholesterol and sugar. On the other hand quite a higher proportion (2.4%) of young women who consume vegetables are obese compared to (1.9%) of those who do not.

## CHAPTER FOUR

### DETERMINANTS OF MANUTRITION AND BMI STATUS

#### 4.1.1 Introduction

The likelihood of a young Ghanaian woman being underweight and overweight was carried out using multivariate analysis. All the independent variables were included in the multinomial logistic regression model. The multivariate analysis predicts BMI status and considered independent with intermediate and dependent variables first and only the intermediate variables with the dependent variables later in order to see the impact of the intermediate variable on the dependent variable. The model involving independent variables showed a significant predictor of BMI status ( $P=0.000$ ) with  $R^2$  of 0.183. This means that 18.3% of the variation in BMI status is explained by the other variable.

Table 4.1 below shows the results of multivariate analysis of the independent and dependent variables. For each of the independent variables, a reference category was used based on the outcome that was being investigated. For example normal weight was used as a reference category for BMI status and women who had never married were used as reference category for married status.

**Table 4.1: Parameter estimates for the odds of a young woman being underweight, overweight or obese. Results of multinomial logistic regression model**

Independent variables	BMI <sup>a</sup>											
	Underweight				Overweight				Obese			
	B	SE(B)	EXP(B)	P-value	B	SE(B)	EXP(B)	P-value	B	SE(B)	EXP(B)	P-value
<b>Age</b>												
20-24	-0.354	0.207	0.702	0.087*	0.106	0.186	1.111	0.571	-0.126	0.397	0.882	0.751
15-19 (RC)	0	–	–	–	0	–	–	–	0	–	–	–
<b>Region</b>												
Western	0.04	0.587	1.041	0.946	-0.114	0.567	0.892	0.841	-0.573	1.493	0.564	0.701
Central	0.459	0.568	1.583	0.419	-0.149	0.566	0.861	0.792	-0.817	1.562	0.442	0.601
Greater Accra	0.551	0.567	1.734	0.332	-0.251	0.547	0.778	0.646	0.991	1.331	2.693	0.457
Volta	1.017	0.562	2.765	0.07*	-0.345	0.594	0.709	0.562	-0.801	1.644	0.449	0.626
Eastern	0.403	0.565	1.497	0.475	0.056	0.556	1.057	0.92	0.85	1.346	2.34	0.528
Ashanti	0.912	0.536	2.49	0.089*	-0.009	0.533	0.991	0.987	-0.407	1.758	0.665	0.765

Brong Ahafo	0.086	0.586	1.09	0.883	-0.221	0.574	0.801	0.7	-1.41	1.551	0.244	0.422
Northern	0.767	0.554	2.153	0.166	-0.885	0.61	0.413	0.147	-0.613	1.505	0.542	0.693
Upper East	0.973	0.572	2.646	0.089*	-0.299	0.664	0.741	0.652	0.156	–	1.169	0.917
Upper West (RC)	0	–	–	–	0	–	–	–	0	–	–	–
<b>Type of place of residence</b>												
Urban	-0.03	0.214	0.97	0.888	0.125	0.203	1.133	0.537	0.653	0.512	1.921	0.202
Rural (RC)	0	–	–	–	0	–	–	–	0	–	–	–
<b>Wealth index</b>												
Poorer	0.214	0.271	1.238	0.43	0.328	0.372	1.388	0.378	-0.724	1.018	0.485	0.477
Middle	-0.507	0.315	0.603	0.107	-0.13	0.403	0.878	0.747	-0.661	0.984	0.516	0.502
Richer	-0.501	0.338	0.606	0.138	0.846	0.391	2.331	0.03**	-0.074	0.945	0.929	0.938
Richest	-0.696	0.38	0.499	0.068*	0.627	0.422	1.45	0.138	-0.212	0.993	0.809	0.831
Poorest (RC)	0	–	–	–	0	–	–	–	0	–	–	–

RC=Reference Category<sup>a</sup> The reference category is Normal weight

Table 4.1 Continued

Independent variables	Underweight				Overweight				Obese			
	B	SE(B)	EXP(B)	P-value	B	SE(B)	EXP(B)	P-value	B	SE(B)	EXP(B)	P-value
<b>Level of education</b>												
Primary	0.399	0.314	1.49	0.205	0.282	0.345	1.326	0.414	1.46	1.092	4.306	0.181
Middle/JHS	0.005	0.31	1.005	0.987	0.106	0.331	1.112	0.749	1.598	1.053	4.944	0.129
Secondary/SHS	-0.241	0.38	0.786	0.526	0.271	0.366	1.311	0.459	2.147	1.084	8.557	0.048**
Higher	-0.798	1.025	0.45	0.436	0.885	0.513	2.424	0.085*	3.191	1.19	24.307	0.007**
No education (RC)	0	–	–	–	0	–	–	–	0	–	–	–
<b>Occupation</b>												
Professional	-0.495	0.648	0.61	0.445	0.756	0.366	2.13	0.039**	-0.166	0.768	0.847	0.828
Services	-0.574	0.198	0.563	0.004**	0.812	0.182	2.253	0	0.21	0.367	1.234	0.566
Agricultural	-0.658	0.273	0.518	0.016**	0.014	0.345	1.015	0.967	-0.375	0.938	0.687	0.69
Not working (RC)	0	–	–	–	0	–	–	–	0	–	–	–
<b>Marital status</b>												
Currently married	-0.708	0.275	0.493	0.01**	0.376	0.215	1.456	0.08*	1.226	0.449	3.409	0.006**

Formerly married	-0.257	0.517	0.773	0.619	-0.386	0.551	0.68	0.484	-16.586	6.515	6.2608	0.998
Never married (RC)	0	-	-	-	0	-	-	-	0	-	-	-

Source: GDHS 2008 \*\*\*P<0.000 \*\*P<0.05 \*P<0.10

Table 4.1 Continued

Independent variables	Underweight				Overweight				Obese			
	B	SE(B)	EXP(B)	P-value	B	SE(B)	EXP(B)	P-value	B	SE(B)	EXP(B)	P-value
<b>Starchy foods</b>												
No	0.168	0.336	1.183	0.617	0.074	0.28	1.077	0.79	0.665	0.648	1.945	0.305
Yes (RC)	0	–	–		0	–	–	–	0	–	–	–
<b>Oil and fat foods</b>												
No	-0.661	0.343	0.516	0.054*	0.413	0.309	1.511	0.181	-0.253	0.641	0.776	0.693
Yes(RC)	0	–	–	–	0	–	–	–	0	–	–	–
<b>Fruits</b>												

No	1.266	0.956	3.546	0.185	-0.774	0.52	0.461	0.137	-1.339	0.96	0.262	0.163
Yes(RC)	0	–	–	–	0	–	–	–	0	–	–	–
<b>Vegetables</b>												
No	0.101	0.358	1.106	0.778	0.529	0.321	1.698	0.099*	0.093	0.642	1.097	0.885
Yes(RC)	0	–	–	–	0	–	–	–	0	–	–	–
<b>Physical activity</b>												
Less than 3 times	-0.175	0.289	0.839	0.545	-0.869	0.211	0.42	0	0.383	0.569	1.467	0.501
3 times and more	1.193	1.026	3.299	0.245	0.508	1.068	1.661	0.634	-16.824	0	4.9408	–
No activity(RC)	0	–	–	–	0	–	–	–	–	–	–	–

Source: GDHS 2008 \*\*\*P<0.000 \*\*P<0.05 \*P<0.10

#### 4.1.2 Predicting underweight

Young women who were between the ages of 20-24 years were less likely to be underweight compared to young women between the ages of 15-19 years (OR=0.702). With respect to region of residence, young women residing in the Upper West region was used as the reference category, young women in the Volta and Upper East regions were about 2.7 times more likely to be underweight compared to young women in the Upper West region. Young women in the Central, Greater Accra and Eastern regions were about (1.6, 1.7, 1.5 respectively) times more likely to be underweight compared to young women in the Upper West region. Young women in the Western region had (59%) higher chance of being underweight compared to young women in the Upper West region. Young women in the Brong Ahafo region were also more likely to be underweight (OR=1.09) compared to young women in the Upper West region. Young women in the Northern region and Ashanti regions were more likely to be underweight (OR=2.153 and 2.49 respectively) compared to young women in the Upper West region.

With respect to place of residence urban young women were less likely to be underweight (OR=0.97) compared to young women in the rural areas.

Poorer young women were 1.2 times as likely as poorest women to become underweight compared to the poorest young women. Middle, richer and richest young women were less likely to be underweight (OR=0.603, 0.606 and 0.499 respectively) compared to young women in the poorest group.

Young women who had primary and middle/JHS education were more likely to be underweight (OR=1.49 and 1.005) compared to the young women with no education. Young women who had secondary and higher education were less likely to be underweight (OR=0.786 and 0.45

respectively) compared to the young women with no education.

Young women who were working, irrespective of the type of occupation they were involved in were less likely to be underweight compared to young women who were not working. Young women who worked in the professional sectors were less likely to be underweight compared to young women who were not working (OR=0.61). Young women who worked at the services and agricultural sectors were less likely to be underweight compared to young women who were not working (OR=0.563 and 0.518 respectively).

Young women irrespective of their marital status were less likely to be underweight compared to young women who have never been married. Currently and formerly married young women were less likely to be underweight compared to young women who have never been married (OR=0.493 and 0.773 respectively).

Young women who were not consuming starchy foods were about 1.2 times more likely to be underweight compared to young women who were consuming starchy foods. Young women who were not consuming oily and fatty foods were less likely to be underweight compared to young women who were consuming oily and fatty foods (OR=0.516). However young women who were not consuming fruits were 3.5 times more likely to be underweight compared to young women who were consuming fruits. On the other hand, young women who were not consuming vegetables were 1.1 times more likely to be underweight compared to young women who were consuming vegetables.

Young women who performed physical activity less than 3 times were less likely to be underweight compared to young women who had not performed any physical activity (OR=0.839). On the other hand, young women who had performed physical activity of 3 and

more times were about 3.3 times more likely to be underweight compared to young women who had performed no physical activity.

#### **4.1.3 Predicting overweight**

The likelihood of being overweight is associated with increases with age. In table 4.1 young women between the ages of 20-24 years had the higher chance of being overweight .They were 1.1 times more likely to be overweight compared to young women between the ages of 15-19 years.

Young women who resided in Western, central, Greater Accra, Volta regions were less likely to be overweight compared to young women in the Upper West region (OR=0.892, 0.861, 0.778 and 0.709 respectively). Young women who resided in Ashanti, Brong Ahafo, Northern and Upper East regions were less likely to be overweight compared to young women in the Upper West region (OR=0.991, 0.801, 0.413 and 0.741 respectively).However young women who resided in the Eastern region were about 1.1 times more likely to be overweight compared to young women in the Upper West region. Compared to young women in the rural areas, young women in the urban areas were 1.1 times more likely to be overweight.

Young women who were in the middle class group were less likely to be overweight compared to young women in the poorest group (OR=0.878). On the other hand, young women in the poorer and the richest group were about 1.4 times more likely to be overweight compared to Young women in the poorest group. Also young women in the richer class group were 2.3 times more likely to be overweight compared to young women in the poorest group.

Young women with any level of education other than no education were more likely to be overweight. Young women with primary, middle/JHS and secondary were about 1.3 times more

likely to be overweight compared to young women with no education. Young women with higher education were 2.4 times more likely to be overweight compared to young women with no education.

Young women with any type of occupation other than no occupation were more likely to be overweight. Young women in the professional and service sectors were about 2.2 times more likely to be overweight compared to those not working. Young women in the agricultural sector were also more likely to be overweight compared to young women who were not working (OR=1.015).

Currently married young women were 1.4 times more likely to be overweight compared to young women who have never been married. However young women who were formerly married were less likely to be overweight compared to those who have never been married (OR=0.68).

Compared to young women who consumed starchy foods, young women who did not consume starchy foods were more likely to be overweight (OR=1.077). Young women who were not consuming oily and fatty foods were 1.5 times more likely to be overweight compared to those who were consuming oily and fatty foods. Compared to young women who consumed fruits, young women who were not consuming fruits were less likely to be overweight (OR=0.461). Young women who were not consuming vegetables were about 1.7 times more likely to be overweight compared to those who were consuming vegetables.

Young women who performed physical activity less than 3 times were less likely to be overweight compared to young women who had not performed any physical activity (OR=0.42).

However young women who performed physical activity for 3 and more times were 1.6 times more likely to be overweight compared to young women with no physical activity.

#### **4.1.4 Predicting obesity**

The possibility of being obese is associated to age increased. From the Table 4.1, young women aged 20-24 years group were less likely to be obese compared to young women aged 15-19 years (OR=0.882).

Young women staying in Western, Central, Volta, Ashanti and Northern regions were about 0.5 times less likely to be obese compared to young women in the Upper West region. Young women in Brong Ahafo region were also 0.2 times less likely to be obese compared to young women in the Upper West region. However young women in Greater Accra and Eastern regions were about 2.7 and 2.3 times more likely to be obese compared to young women in the Upper West region. Whereas young women in the Upper East region were 1.1 times more likely to be obese compared to those in the Upper West region.

Young women residing in the urban areas were 1.9 times more likely to be obese compared to those in the rural areas. Young women irrespective of the wealth status were less likely to be obese other than young women in the poorest status which was used as a reference category. Young women in the poorer and the middle class group were less likely to be obese compared to young women in the poorest group (OR=0.485 and 0.516 respectively). More so young women in the richer and richest status were about 0.9 times less likely to be obese compared to those in the poorest status group.

Young women with various level of education other than those with no education were more likely to be obese. Young women with primary and middle/JHS education were 4.3 and 4.9 times

more likely to be obese compared to young women with no education. Young women with secondary/SHS and higher education were 8.5 and 24.3 times more likely to be obese compared to young women with no education.

Young women who were in professional and agricultural sectors were less likely to be obese compared to young women who were not working (OR=0.847 and 0.687). However, young women who were in the services sector were 1.2 times more likely to be obese compared to those who were not working.

Young women who were currently married were more likely to be obese compared to young women who were never married (OR=3.409). Young women who were formerly married were more likely to be obese compared to those who have never been married (OR=6.26)

Compared to young women who consumed starchy foods, young women who were not consuming starchy foods were more likely to be obese (OR=1.945). On the other hand, young women who were not consuming oily and fatty foods were less likely to be obese compared to those who consumed oily and fatty foods (OR=0.776).

Young women who were not consuming fruits were less likely to be obese compared to young women who consumed fruits (OR=0.262). However young women who were not consuming vegetables were more likely to be obese compared to young women who consumed vegetables (OR=1.097).

Young women who performed physical activity less than 3 times were more likely to be obese compared to young women who never performed physical activity (OR=1.467). Young women who performed physical activity 3 and more times were more likely to be obese compared to those who never performed any activity (OR=4.94).

**Table 4.2: Description of results of multivariate analysis with intermediate variable and dependent variables.**

Intermediate variable	Underweight				Overweight				Obese			
	B	s.e (B)	Exp (B)	P-value	B	s.e (B)	Exp (B)	P-value	B	s.e(B)	Exp (B)	P
Intercept	-1.424	1.208	–	0.238	-1.545	0.913		0.091*	-1.759	1.102	–	0.11
Starchy foods :No	-0.695	0.753	0.449	0.356	0.372	0.336	1.45	0.269	0.344	0.448	1.411	0.443
Starchy foods :Yes (RC)	0	–		–	0	–	–	–	0	–	–	–
Oily and fatty foods :No	0.48	0.661	1.616	0.467	-0.986	0.344	0.373	0.004**	-0.696	0.455	0.498	0.126
Oily and fatty foods :Yes (RC)	0	–	–	–	0	–	–	–	0	–	–	–
Fruits intake :NO	-0.839	0.83	0.432	0.312	-0.503	0.585	0.605	0.39	-0.556	0.738	0.574	0.452
Fruits intake :Yes (RC)	0	–	–	–	0	–	–	–	0	–	–	–
Vegetables intake :No	0.004	0.615	1.004	0.995	0.594	0.33	1.811	0.072*	0.313	0.441	1.368	0.478
Vegetables intake :Yes	0	–	–	–	0	–	–	–	0	–	–	–
Physical activity :No	-0.328	0.929	0.72	0.724	1.191	0.735	3.291	0.105	0.538	0.872	1.713	0.537
Less than 3 times	-1.261	1.193	0.283	0.291	0.745	0.792	2.107	0.346	0.637	0.923	1.891	0.49
3 or more times (RC)	0	–	–	–	0	–	–	–	0	–	–	–

#### 4.1.5 Predicting underweight, overweight and obese

Table 4.2.1 show that, young women who were not consuming starchy foods were less likely to be underweight compared to those who were consuming (OR=0.449). Young women who were not consuming starchy foods were 1.4 times more likely to be overweight and obese compared to those who were consuming starchy foods.

Young women who were not consuming oily and fatty foods were 1.6 times more likely to be underweight compared to those who were consuming oily and fatty foods. There was a significant relationship between those who were not consuming oily and fatty foods and overweight. Young women who were not consuming oily and fatty foods were less likely to be overweight and obese compared to those who were consuming oily and fatty foods (OR=0.373 and 0.498 respectively).

Young women who were not consuming fruits were less likely to be underweight, overweight and obese compared to those who were consuming fruits (OR=0.432, 0.605 and 0.574 respectively).

Young women who were not consuming vegetables were more likely to be underweight, overweight and obese compared to those who were consuming vegetables (OR=1.004, 1.811 and 1.368 respectively).

Young women who performed no physical activity and less than 3 times physical activity were less likely to be underweight compared to those who performed 3 or more times physical activity (OR=0.72 and 0.283 respectively). Young women who performed no physical activity and less than 3 times physical activity were more likely to be overweight compared to those who performed 3 or more times physical activity (OR=3.291 and 2.107 respectively). Young women

who performed no physical activity and less than 3 times physical activity were more likely to be obese compared to those who performed 3 or more times physical activity (OR=1.713 and 1.891 respectively).

#### **4.1.6 Discussion**

The findings of this study show that young Ghanaian women are faced with the problem of both underweight and overweight. Ghanaian young women have almost equal proportion of overweight (12.6%) and underweight (11.8%). Cultural and educational factors may be liable for the increasing prevalence of underweight and overweight. Young Ghanaian women attribute fatness to beauty and wealth. The increasing rate of urbanization in areas such as Greater Accra, Kumasi and Takoradi have resulted in a high rate of overweight or obesity. People in urban areas experience an increased intake of energy, sugar, refined grains and fat (Monteiro et al., 1992) resulting in obesity. In addition people in the urban areas are less likely to engage in physical activity since they may own their personal cars and to board public transport than to walk over a distance while people in the rural areas walk over long distance since they engage in farming, fishing and house chores activities. Urbanization is characterized by overcrowding and densely populated areas (5000 people and above) with huge traffic congestion compared to the rural areas where the population is less dense.

Young women who have higher physical activity level were less likely to be overweight or obese. Marital status influenced whether a woman is likely to be obese or not. A never married woman was more likely to be a woman aged 15-19 years and less likely to be obese. There was a significant relationship between those who were not consuming oily and fatty foods and overweight. Young women who were not consuming oily and fatty foods were less likely to be

overweight and obese compared to those who were consuming oily and fatty foods (OR=0.373 and 0.498 respectively).

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1.1 Summary

The objectives of the study included the analysis of socio-demographic characteristics of young Ghanaian women between the ages of 15-24 years. Also this study would be examining the determinants of these socio-demographic characteristics and BMI status of young women. The study aims at providing policy makers and government agencies with information for appropriate implementation of policies to help curb the increasing causes of underweight and overweight among young Ghanaian women. The source of data for this study was 2008 Ghana Demographic and Health Survey data set.

In the data set 5310 women were interviewed. The results indicate that almost equal proportion of the young women resided in the rural areas (49.9%) and urban areas (50.1%). The proportion of young women in the five-year age groups decreased while age increased. Young women aged 15-19 years were the highest proportion (53.9%) compared to young women aged 20-24 years (46.1%). Never married young women constituted about three quarters of the total number of young women being studied. A little above one tenth of the young women had no education. One fifth of them had primary and secondary education while about (48%) of the young women had middle/JHS education, however only (2.5%) of the young women had higher education.

Findings from this study indicate that, young women in the urban areas are more likely to have

secondary and higher level of education and more likely to be engaged in professional and services work leading to the adoption of sedentary lifestyle by consuming of oily and fatty foods with no physical activity leading to overweight and obese. On the other hand, young women in the agricultural sector were more likely to be residents of rural areas and less likely to be overweight and obesity because of the nature of the work which involved physical activity. Young women aged 15-19 were more likely to be underweight and less likely to be working and married. Married women between the ages of 20-24 years were more likely to be overweight and obese.

Multivariate analysis was conducted to determine the likelihood of a young woman being underweight, overweight and obese, using socio-demographic factors as independent variables and BMI status as dependent variables. The results show that a young woman's probability of being underweight is highest in her teen years (15-19) and when she has not married, whereas a young woman's chance of being overweight or obese is highest when she has attained higher level of education and occupation.

Young women with higher level of education and occupation thus (service sectors) were more likely to be overweight or obese compared to young women with no education, who were more likely to be underweight. Young women in the richer and richest class were more likely to be overweight; however young women in the poorer class were more likely to be underweight and overweight. Young women who resided in the urban areas were more likely to be overweight and obese. Young married women were more likely to be overweight and obese. In addition young women who were not consuming starchy foods were more likely to be underweight, overweight and obese compared to those who consumed starchy foods.

Whereas those who were not consuming oily and fatty foods were more likely to be overweight and less likely to be underweight and obese compared to those consumed oily and fatty foods. Young women who were not consuming oily foods were more likely to be overweight, while those who were not consuming vegetables were more likely to be underweight, overweight and obese. In contrast those who were not consuming fruits were more likely to be underweight and less likely to be overweight and obese.

Young women who performed physical activity less than 3 times were less likely to be underweight and overweight and more likely to be obese while those who performed physical activity 3 or more times were more likely to be underweight and overweight.

### **5.1.2 Conclusions**

Underweight was found to be very common among young rural women, young women with primary and middle/JHS education and among young women in the Upper East, Volta and Northern regions. Underweight was also very high between the ages of 15-19 years. Young women in the professional and service sectors tend to practice sedentary lifestyle than their counterparts in the agricultural sector. Young women in the richest group also tend to consume more energy and sugary foods than those in the poorer group.

Young women with higher education tend to eat more fatty food than those with primary and no education. Young women who were not consuming starchy foods tend to consume more oily and fatty foods than those were consuming starchy foods. Young women who were not consuming oily and fatty foods tend to consume more starchy foods than their counterpart who consume oily and fatty foods. Young women who were not consuming fruits were less likely to be obese while those who were not consuming vegetables were more likely to be obese.

Young women who were not consuming oily and fatty foods were less likely to be overweight and obese compared to those who were consuming oily and fatty foods. Young women who performed physical activity for less than 3 times were less likely to be overweight. Young Ghanaian women between the ages of 15-24 years face the problem of both underweight and overweight. (11.8%) of the women are underweight and (2.5%) are obese. Almost three quarters (73.1%) of the women are normal weight and (12.6%) are overweight.

### **5.1.3 Recommendations**

Considering that young women in the rural areas are more likely to be underweight and could possibly suffer from micronutrient deficiency, it is recommended that this group of the population especially in the three northern regions is provided with improved education on the need to balance diets and ensure that essential nutrients to the body are also supplemented. Incidentally, this group is the least accessible to public health infrastructure and as a result there should be an actual project to train and disseminate public health infrastructure and professionals to these deprived areas as a matter of national policy in the long term.

It is recommended that a general drive to educate the whole population on the dynamics of human nutrition be implemented. To correct minds of how important it is that certain foods are needed in their right proportions requires the use of an efficient public education system using both the formal and informal sector.

In most homes, women are caregivers while men provide for the economic wellbeing of the family. Although women prepare the daily nutritional needs of the family, the men are served the choicest portions of the cooked foods. Certain nutritional choices of women are dependent on traditional as well as economic disposition. It is therefore recommended that women be

empowered to wield independent and economic might capable of improving their ability to make the right nutritional choices.

Education about healthy lifestyle should be encouraged especially among women living sedentary lifestyles and those engaging in limited physical exertions in their daily routines. The concept where corporate institutions incorporate exercise gyms in the office to encourage staff to work out after work should be widely encouraged. Simple activities like climbing stairs instead of using lifts should also be encouraged as well as keep fit clubs. Closely related to sedentary obesity is the type of food intake in the offices and among sedentary working women. There must be a general migration from the processed, oily and fatty foods to whole grain, fruits and vegetable foods in the offices.

As a measure to address micro nutrient deficiency in women, it must be ensured that essential nutrients such as Vitamin A and iron are readily available in the refined form as supplement for women who are unable to ingest this nutrition through their usual staple diets. Resorting to this supplement will only produce efficient results upon availability in the public dispensary system. To ensure that will mean that prices are subsidized, education is improved to remove any stigma about food supplement as fat making drugs. There should also be an improvement in maternal access to vitamin A and iron supplement.

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