

**PREVALENCE, PERCEPTION AND SOCIODEMOGRAPHIC
DETERMINANTS OF OVERWEIGHT AND OBESITY AMONG
GHANAIAAN WOMEN**

BY

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DECLARATION

I Emelia Yaa Ayesu, author of this thesis do hereby declare that this work was done wholly by me in the Department of Nutrition and Food Science, University of Ghana, under the supervision of Prof Anna Lartey and Dr. Esi Colecraft. All references cited in this work have been fully acknowledged.

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ABSTRACT

Introduction: Understanding the determinants and perceptions of overweight (OV) and obesity (OB) using both quantitative and qualitative approaches is important due to their association with other chronic diseases.

Objective: To identify the sociodemographic determinants of OV and OB and explore the perceptions of Ghanaian women about OV and OB.

Methods: Data on sociodemographic characteristics and anthropometry (weight, height, percent body fat) were collected on 799 biological mothers of school children (9-15 y) in Accra and Kumasi, Ghana. Determinants of OV and OB were identified in a multinomial logistic regression using SPSS version 16.0. Mothers' views on OV and OB were explored in a focus group discussion (FGD) with 29 mothers using 5 thematic areas: knowledge; levels of concern about the issue; views on responsibility; possible consequences; ideas on prevention of OV/OB. FGDs were audio-recorded and transcribed. Analysis was done by noting the patterns in the comments and responses in the transcripts using Microsoft Word and Excel.

Results: Mothers in Accra had higher education ($p= 0.014$), were less likely to have their own houses ($p< 0.0001$), earned less income ($p< 0.0001$), have fewer children ($p= 0.005$) and more likely to be heads of their households ($p= 0.043$) than those in Kumasi. The overall prevalence of OB was 42.7% and OV, 35.0%. After adjusting for several sociodemographic variables in the regression, traders were more likely to be OV compared to mothers who were not employed (OR= 2.36; 95% CI =1.07-5.21). Women in the highest income category were more likely to be OB compared those in the lowest wealth category (OR= 5.36; 95% CI= 1.20-23.86). Mothers with 3 children were more

likely to be OB than mothers with one child (OR= 2.71; 95% CI= 1.06-6.92). From the FGDs, the mothers defined OV/OB as deviations from ‘normal’/‘average’ weight; ideal weight in relation to height and age; undesirable body proportions. OV/OB mothers were more likely to perceive factors that they have no control over such as genetics as the most important cause. There was a general preference for being just overweight to being morbidly obese (BMO) because BMO gives the impression of impaired metabolism, bad eating habits, inactivity and physical problems. The mothers believed that economic development, sedentary behaviour, changing dietary patterns and apathy are mainly responsible for the upsurge of OV/OB in Ghana. OV/OB mothers were more concerned about the psychosocial and socio-cultural consequences (i.e. depression, weight stigmatization) of OV/OB apart from clinical and economic problems. Mothers agreed that OV/OB is a problem in Ghana and that both conditions are controllable. Education or awareness and a general change of mindset about preferring a larger body size emerged as the most important preventive measure.

Conclusions: OV and OB were prevalent among Ghanaian women. The women interviewed had adequate knowledge about OV and OB. They perceived OV and OB, especially OB as problematic conditions that mainly require changes in lifestyles and environment. The country should take advantage of this knowledge and mount a serious educational campaign about the need for adopting healthy lifestyles, improving eating habits and increasing physical activities. Mass education should make people aware about the health risks associated with OV and OB.

DEDICATION

I dedicate this work to all those on whose shoulders I stood to make it this far in my education and to one of the mothers who lost a niece on one of the days of the focus group discussions yet made it to the discussions. For me, it showed how determined she was to contribute towards and support a worthy cause.



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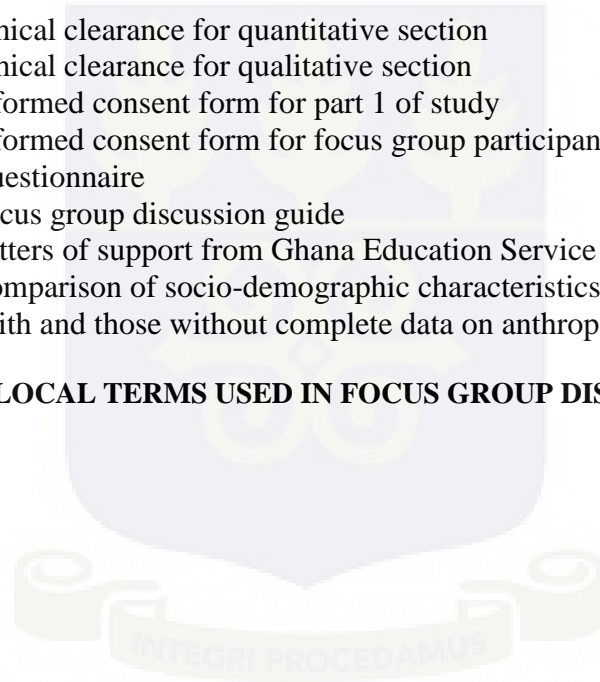
Finally, I say a big thank you to all the lecturers, support staff and colleagues of the Nutrition and Food Science Department of the University of Ghana, Legon for helping me in diverse ways towards the completion of this thesis.

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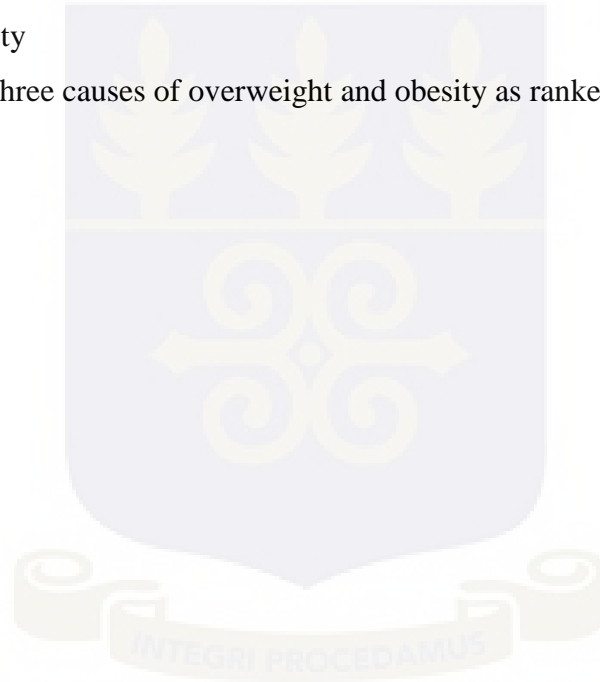
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LIST OF ACRONYMS AND ABBREVIATIONS

BMI	Body Mass Index
BMO	Being Morbidly Obese
CI	Confidence Interval
ES	Economic Status
GDHS	Ghana Demographic and Health Survey
GES	Ghana Education Service
FGDs	Focus Group Discussions
IASO	International Association for the Study of Obesity
IDRC	International Development Research Centre
NMIMR	Noguchi Memorial Institute for Medical Research
N	No
OB	Obesity
OR	Odds Ratios
OV	Overweight
PHT	Preventative Health Taskforce
PJHS	Primary and Junior High Schools
PTA	Parents and Teachers Association
RWJF	Robert Wood Johnson Foundation
SES	Socioeconomic Status
SHS	Senior High School
SPSS	Statistical Package for Social Sciences
WHO	World Health Organisation
WHSa	Women's Health Study of Accra
Y	Yes
Exp ^β	Exponent beta
Kg/m ²	Kilogram per metre square
Ref.	Reference category
p-value	Probability value

1.0 INTRODUCTION

1.1 Background Statement

Globally, prevalence of overweight and obesity have risen in the last decade (IASO, 2012) and have contributed to the increasing prevalence of non-communicable diseases that include heart disease, type 2 diabetes, hypertension, stroke and cancers along the spectrum of life (WHO, 2011). Of particular concern is the increasing rate of overweight and obesity especially among women (Mendez *et al.*, 2005; Ziraba *et al.*, 2009; Ng *et al.*, 2011). Estimates of the health and social implications (Wang *et al.*, 2005; Gill and Caterson, 2005) as well as the economic cost of obesity burden (Hossain *et al.*, 2007) reflect the severity of the problem. In the United States of America for instance, the total medical cost for obesity-related diseases has been estimated to be over \$200 billion (Hammond and Levine, 2010). An estimated \$58.2 billion was lost to health issues linked to obesity by the Australian society and government in 2008 (PHT, 2010).

A combination of biological, environmental, dietary and lifestyle, household and demographic factors seem to determine excess weight status across all stages of life (Girma and Genebo, 2002; Ziraba *et al.*, 2009; Moore *et al.*, 2010; Ahrens *et al.*, 2011; Gupta and Kapoor, 2012). The conceptual framework (Figure 1.1) shows the proposed factors associated with maternal overweight and obesity. A mother's employment, marital status and level of education influence the overall household income. This goes on to affect affordability, gain of physical assets and provision of household nutrition especially if she has greater control over the income. Also, if affordability means

CONCEPTUAL FRAMEWORK OF THE DETERMINANTS OF OVERWEIGHT AND OBESITY AMONG WOMEN

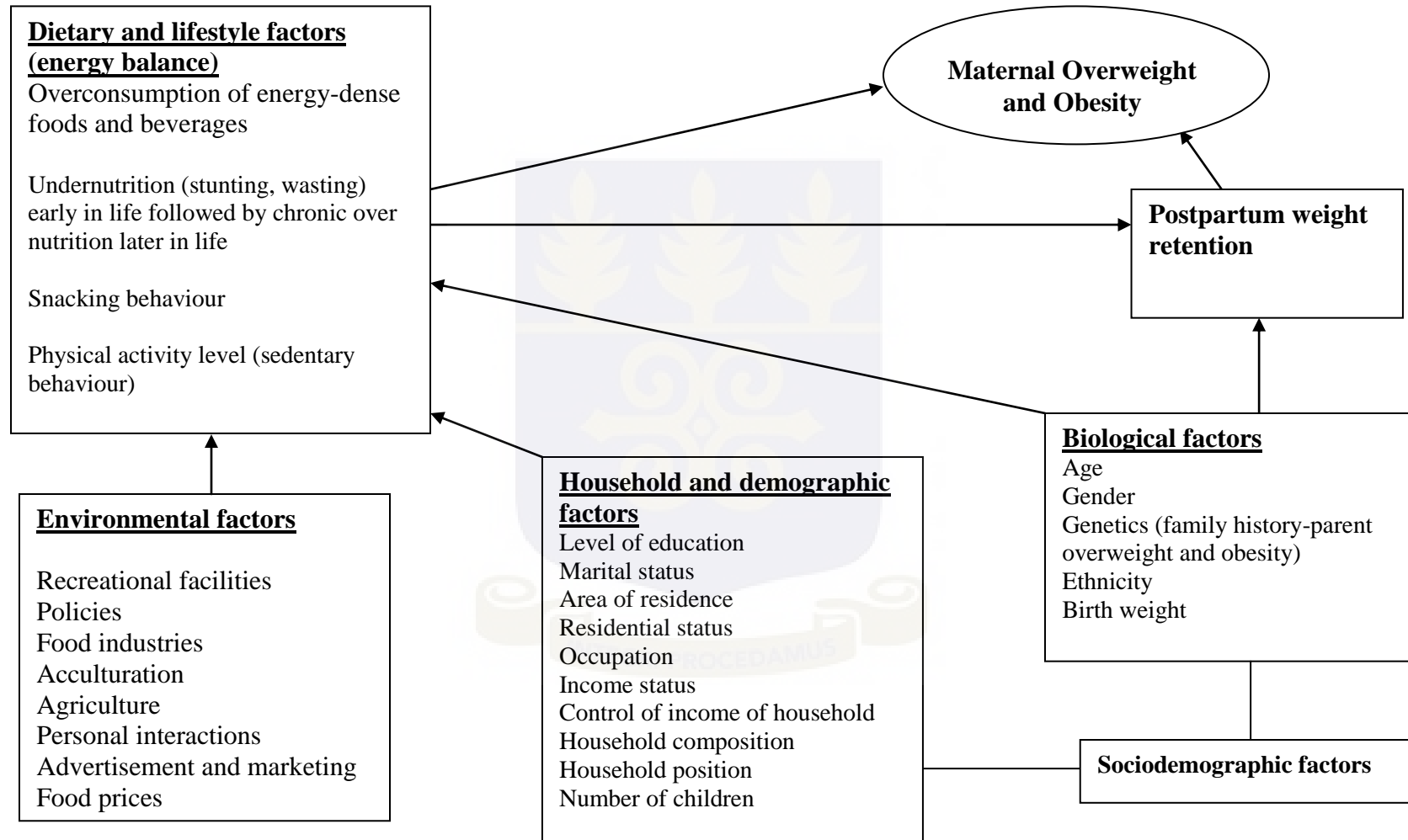


Figure 1.1 Determinants of overweight and obesity among women

purchase and consumption of energy-dense foods (less-quality) without sufficient energy expenditure over time, then she is likely to gain weight especially if she is biologically predisposed.

The environmental and social factors cannot be left out as the type of diet and the frequency of consumption are motivated by the existence of food industries, recreational facilities, policies, personal interactions and acculturation, agriculture, food prices, advertisement and marketing. Postpartum weight retention can lead to obesity where these factors mentioned are not controlled.

Being able to recognize overweight and obesity as a personal health problem has been demonstrated as a tool for reducing unhealthy weights and consequently the health outcomes associated with excess weight gain. Some researchers have attributed the poor recognition of excess weight to social influences or norms and cultural acceptances (Booth *et al.*, 2009; Lindsay *et al.*, 2010; Jones *et al.*, 2011; Taylor, 2012). In order to curb this, strategies have been employed to reduce the proportion of overweight and obesity worldwide by addressing some of these sociodemographic factors mentioned above and have been proven to be beneficial (Aranceta *et al.*, 2009; Hollingworth *et al.*, 2012). One means is the use of focus group discussions as a platform to better understand and explore the knowledge and attitudes of target groups towards the attainment of healthy weights (Befort *et al.*, 2008; Chang *et al.*, 2009; Garip and Yardley, 2011; Sikorski *et al.*, 2012; Derksen *et al.*, 2012; Tang *et al.*, 2012).

The Department of Nutrition and Food Science with funding from International Development Research Centre (IDRC) is carrying out a study to assess the prevalence of overweight and obesity among school-age children (9-15 years) in Accra and Kumasi. Data collection was started in November 2009 and ended January 2012. Data were collected on sociodemographic factors, dietary pattern, activity level, waist and hip circumference, height, weight and body composition of about 3000 children. This study provided the opportunity to also examine overweight and obesity among mothers of the school children. Additionally, focus group discussions (FGDs) were held to explore the mothers' views on overweight and obesity.

1.2 Rationale

Understanding the determinants of overweight and obesity using both quantitative and qualitative approaches is important due to their association with chronic diseases. Overweight and obesity are on the rise in Ghana. The Ghana Demographic and Health Survey (GDHS, 2008) shows high prevalence among women and Dake et al. (2010) confirmed this based on secondary data analysis. The IDRC study provides the opportunity to examine the problem in a large study using a large sample of women living in urban cities. Focus group discussions (FGDs) add a unique twist to hearing and gaining insight into what women know about the problem. Since information on how Ghanaian mothers perceive overweight and obesity is lacking, the outcome of a FGDs will therefore help to better understand and address the concerns expressed by Ghanaian women in order to stimulate appropriate future overweight and obesity interventions that target women.

1.3 Research questions

The data collected on anthropometry, body composition and sociodemographic factors of the mothers as well as that in the FGDs were analysed to address the following research questions:

1. What is the prevalence of overweight and obesity among mothers of school-going children in Accra and Kumasi (two urban cities in Ghana)?
2. What are the sociodemographic differences between mothers of school children in Accra and Kumasi?
3. What are the sociodemographic determinants of overweight and obesity among mothers of school-going children?
4. How do the mothers of these children perceive overweight and obesity?

1.4 Objectives of study

1.4.1 Main objective

The aim of the study was to identify the perception and sociodemographic determinants of overweight and obesity among Ghanaian women.

1.4.2 Specific objectives

- i. To determine the prevalence of overweight and obesity among mothers of school-going children in Accra and Kumasi
- ii. To determine the sociodemographic differences between mothers of school children in Accra and Kumasi
- iii. To identify the sociodemographic factors (e.g. education status, employment status, income, marital status, residence, number of

births, household position and age) associated with overweight and obesity among the mothers of school children

- iv. To explore the perception of Ghanaian mothers about overweight and obesity in a focus group discussion



2.0 LITERATURE REVIEW

2.1 Overweight and obesity among women

Overweight and obesity although sometimes reflects the social and economic status of an individual, often results from high energy consumption (energy-dense foods) without the corresponding level of physical activity. Research has shown that although in general, nutrition, physical activity and other behavioural factors interplay in the development of obesity, there are multiple ways in which excess weight gain occurs in women. Considering the trends in the global obesity rates compiled by the International Association for the study of Obesity (IASO), it is apparent that women are driving obesity pandemic among adult populations (IASO, 2012).

2.1.1 Trends in the prevalence of overweight and obesity among women

Global

While some groups argue that generally overweight and obesity rates are stalling most studies reveal that obesity prevalence is still increasing, and this has called for concern and occasional debates (Yanovski and Yanovski, 2011). In Norway for example, mean BMI increased from 25.1kg/m² to 26.9 kg/m² among women over a period of 22 years (Midthjell *et al.*, 2013). Similarly, over a period of 17 years (1993-2009) obesity increased among Chinese women (Xi *et al.*, 2012). Several other confirmatory findings (Heslehurst *et al.*, 2009; Marques-Vidal *et al.*, 2010; Ford *et al.*, 2011) lend support to the fact that overweight and obesity is indeed increasing among women. In contrast, however, other studies have reported no significant changes in obesity rates over time (Micciolo *et al.*, 2010; Flegal *et al.*, 2012).

Africa

Most countries in the developing world are living with the double burden of overnutrition and undernutrition (Rosen and Shapouri, 2008) whose consequences are overweight or obesity and stunting or wasting, respectively. Overweight and obesity is rapidly penetrating these countries with overweight particularly exceeding underweight among women (Mendez *et al.*, 2005; Ng *et al.*, 2011). Seven sub-Saharan African countries (Burkina Faso, Ghana, Kenya, Malawi, Niger, Senegal and Tanzania) reported 5% increase in overweight and obesity per year between 1992 and 2005 (Ziraba *et al.*, 2009). Also, abdominal obesity was almost six times higher among female than male adults in Nigeria (Amole *et al.*, 2011). Combined prevalence of overweight and obesity was 43.3% in a national representative sample of women in Kenya (Steyn *et al.*, 2011).

The irony is that while obesity is common among those with low socio-economic status within developed nations, countries undergoing 'nutrition transition' report high rates among both affluent and poor populations (Jones-Smith *et al.*, 2011a; Jones-Smith *et al.*, 2011b; Rosen and Shapouri, 2008). This indicates that the potential problems resulting from overweight and obesity may prevail among populations with these two extreme socio-economic exposures.

Ghana

The prevalence of overweight and obesity continue to increase in Ghana as well and is also higher among women. Current estimates show this disparity among populations in Ghana (Abubakari *et al.*, 2008; Amegah *et al.*, 2011; Mogre *et al.*, 2012). Obesity among

a cross-section of 1,015 civil servants in Accra was almost four times higher in females than in males (Addo *et al.*, 2009). Although the prevalence of overweight and obesity among women is higher than among men, it also varies among women across and within the regions in Ghana (GDHS, 2008; Dake *et al.*, 2010). From the 2003 and 2007 Women's Health Study of Accra (WHSa), the prevalence of overweight versus obesity among women in Accra, Ghana, increased from (27.1% vs. 20.2%) in 2003 (Amoah, 2003) to (27.4% vs. 34.8%) in 2007 (Duda *et al.*, 2007). Analysis of data from the 2008 Ghana Demographic Health Survey (GDHS) in comparison with that of 2003 by Dake *et al.* (2010), revealed similar increment in overall prevalence of overweight and obesity among women. The same report showed that the overall prevalence of overweight and obesity among women currently stands at 30.5%. On the whole, overweight and obesity rates are rising but at varying speeds across many parts of the world.

2.1.2 Consequences and implication of overweight and obesity among women

Overweight and obesity among women have adverse consequences on their physical health as it is often a common risk factor for many non-communicable diseases like hypertension, diabetes, heart diseases (Flint *et al.*, 2010), strokes (Bazzano *et al.*, 2010) and cancers (Cleary and Grossman, 2009; Chen and Iverson, 2012). Even in a disease state, obesity has been considered as a single most important determinant of blood pressure abnormalities among young women with polycystic ovary syndrome (Luque-Ramirez *et al.*, 2007). Women who gain from 4kg up to 10kg of weight in adulthood increase their risk of coronary heart disease by 27% (Li *et al.*, 2006). Obese lactating women at 8-12 weeks postpartum had a significantly increased metabolic risk within one

year of participation in a study in Sweden (Winkvist *et al.*, 2013). These metabolic risks are also transferable from one generation to the other (Boney *et al.*, 2005) and Al Mamun *et al.* (2009) found that childhood overweight by age 5 years was central to the development of all types of diabetes by age 21 years. Addo *et al.* (2006), Agyeman and Owusu-Dabo (2008) and Owiredu *et al.* (2008) reported the co-existence of high proportions of overweight or obesity and its co-morbidities in the Greater Accra and Ashanti regions of Ghana.

Additionally, being obese can also increase a woman's chances of reproductive disorders, pregnancy complications and infant outcomes because of excess abdominal fat tissue. These include gestational diabetes, pre-eclampsia, cesarean delivery (Kaiser and Kirby, 2001; O'Dwyer *et al.*, 2011), small for gestational age births, and large for gestational age births (Abenhaim *et al.*, 2007; Kiel *et al.*, 2007; Langford *et al.*, 2011). Obese women also expose their children to conditions that continue a vicious cycle of obesity and metabolic disorders (Boney *et al.*, 2005).

There is also evidence from a population of Australian women with a high prevalence of overweight and obesity who participated in a study that investigated the use of antioxidants (Vitamins C and E) in the prevention of pre-eclampsia (Athukorala *et al.*, 2010). From this study, both overweight and obese women were found to be at a higher risk of pre-eclampsia, gestational diabetes, and had babies who were large for gestational age and macrosomic than normal weight women. Further, these same overweight and obese women from the above study were also more likely to be induced and required

caesarean section. Meanwhile the presence of excess subcutaneous fat limits the delivery of medications, surgery and the use of other life-saving therapies on obese patients, hence posing a threat to them (Odom, 2006). In this regard and for such women, it is advisable to have limited or no weight gain during pregnancy.

Further, evidence is building up on women's mental health and is emerging as a public health concern because of its association with obesity which also keeps increasing. Apart from depression (Lim *et al.*, 2008; Zhao *et al.*, 2011), certain mental disorders such as bipolar disorder, panic disorder, anxiety (Ball *et al.*, 2009) and sometimes suicide (Bjerkeset *et al.*, 2008; Mather *et al.*, 2009), have significantly been linked to obesity. However, a few studies have shown no (Rivenes *et al.*, 2009; Pagoto *et al.*, 2009) or inverse relationships between obesity and mental health (Herva *et al.*, 2006; Ho *et al.*, 2008) owing to the varied distribution of body fat (Fox *et al.*, 2007; Zhao *et al.*, 2011).

Finally, obesity among women has economic consequences (Friedman and Fanning, 2004; Runge, 2007; Hammond and Levine, 2010). The role of women in economic development is well known (Boserup, 1970; Ahl, 2006; Ogunlela and Mukhtar, 2009; Kithae *et al.*, 2013) as women are becoming increasingly employed in various settings in the nation. Since obesity increases the risk of early retirement and premature mortality (Flegal *et al.*, 2005; Orpana *et al.*, 2009) particularly due to health reasons (Houston *et al.*, 2008), the nation may lose human resource resulting from the high prevalence of the condition among women. The effect is a negative influence on the combined economic growth of the nation (Runge, 2007) as a result of the decreased life-expectancy exhibited

by both young (Peeters *et al.*, 2004) and old (Reynolds *et al.*, 2005) obese populations and the potential switch from normal weight to overweight or obesity in the rest of the population if appropriate measures are not put in place to curb unhealthy weight.

2.2. Factors related to maternal weight status

2.2.1 Biological factors

The female gender seems to respond to obesity more positively owing in part to the deposition and regulation of fat (Shi and Clegg, 2009; Taylor, *et al.*, 2010). Others have attributed this to oestrogen and progesterone concentrations at certain stages (i.e. menstrual cycle, pregnancy and menopause) in the lives of females that affect choice and quantity of food resulting in higher body fat content (Lovejoy, 1998). Thus, the female physiology is prone to obesity. Studies have also shown that in certain instances, development of early onset obesity is caused by genetic defects that interfere with appetite and this can be inherited (Farooqi, 2011).

Pregnancy and the postpartum periods are also potential periods for the development of overweight and obesity among women. During these periods, prepregnancy weight, ethnic differences, dietary patterns, number of births and interval between births (Lovejoy, 1998; Shrewsbury *et al.*, 2009; Abdulai, 2010; van Propel *et al.*, 2012; Davis *et al.*, 2009) influence weight retention. In their study, van Propel (2012) and his team examined the ethnic differences in postpartum weight retention in a multi-ethnic population and how SES, mental health and lifestyle explain these differences. Their analyses revealed that postpartum weight retention was significantly higher in Turkish

women than Dutch women although none of the factors investigated could explain this difference. Onyango et al (2011) also attributed postpartum weight retention among Ghanaian, Indian and Omani mothers to cultural practices of mother care that influenced dietary patterns and activity level of mothers during lactation. These practices are intended to enhance lactation. They explained that for instance in Ghana, lactating mothers receive enormous help from close relatives during the postpartum period. These mothers are also given herbs and high-calorie soups without the deliberate attempt to lose weight as the household chores are done by these relatives.

In addition, many studies have associated parity with increased BMI among women (Koch *et al.*, 2008; Chu *et al.*, 2009; Luoto *et al.*, 2011; Bobrow *et al.*, 2013). Considerable evidence shows that high parity number increases the odds of being obese (Ertem *et al.*, 2008; Cohen *et al.*, 2009; Gupta and Kapoor 2012) although most women gain much more weight in their first pregnancy (Gunderson *et al.*, 2000) while gradually accumulating weight from subsequent pregnancies with at least one additional short inter-pregnancy interval (Davis *et al.*, 2013).

Foetal and early years of growth in childhood are crucial because those periods may be the origin of the development of overweight or obesity (Heindel and vom Saal, 2009). Susceptibility to overweight and obesity is influenced principally by parents by their role during this period (Pocock *et al.*, 2009; Huffman *et al.*, 2010). Consequently, general care practices such as feeding potentially impart obesity risk on their children, especially females. There is substantial evidence to support that parental weight or socioeconomic status (especially of mothers) is a strong determinant of their children's weight (Whitaker

et al., 2000; Semmler *et al.*, 2009; Svensson *et al.*, 2011; Moraesus *et al.*, 2012). This is because of the likelihood of unhealthy weight impact on their children through social (Khlat *et al.*, 2009), physiological (Wells, 2007) and behavioural (Whitaker *et al.*, 2000) channels.

While Power and Parsons (2008) propose three ways in which parental influence can occur; overnutrition following over- or undernutrition; psychological factors (emotional deprivation in childhood) and behaviours acquired during childhood regarding food that are influenced by cultural or social norms, Heindel and vom Saal (2009) maintain that maternal nutrition and exposure to environmental disrupting chemicals during the perinatal period also promote weight gain in infancy. Therefore, childhood obesity is likely to translate into adolescent obesity and then adult obesity. Gorden-Larsen *et al.* (2010) confirmed this from their study that saw obesity prevalence doubling from adolescence to the early 20s, and doubling again from the early to late 20s or early 30s due to high rates of baseline pediatric obesity.

2.2.2 Dietary and other lifestyle factors

Obesity-enhancing behaviours with respect to diet can be seen in consumption of large portion sizes of energy-dense foods (Kossere-Konan, 2011) and to some extent, skipping of breakfast (Mozaffarian *et al.*, 2011). Varied conclusions have been drawn from studies that investigated the contributions of diet and lifestyle to obesity among women. For instance, one study examined how diet quality, physical activity and smoking status interacted with weight change. They found that weight gain was most prominent among

women who stopped smoking during the study but had poor quality diet (Kimokoti *et al.*, 2010). Wolongevics *et al.* (2010) also added that diet quality is key for obesity risk reduction among women. In another instance, Cupul-Uicab (2012) added that a woman's exposure to smoke *in utero* was linked to obesity, reporting 50% higher risk of obesity among those exposed than those who were not exposed to smoke *in utero*.

Decreased physical activity is also linked to excess weight gain. Romling and Qaim (2011) found that changing (either decrease or increase) food consumption with decreasing physical activity levels at work and leisure are direct determinants of excess weight. Hillemeier *et al.* (2011) also revealed that a normal weight woman of reproductive age is likely to transition into overweight within 2 years of insufficient physical activity.

The contribution of fat and carbohydrates (macronutrients) to the development of overweight and obesity has become common knowledge although their specific roles are complex due to the existence of nutrient-nutrient interactions (Willet, 2002; van Dam and Seidell, 2007). It has been recommended that, a decrease in the consumption of these macronutrients or substituting with protein (Austin *et al.*, 2011) can potentially control energy intake as the latter contributes lower calories (protein= 4 Calories vs. fat and carbohydrates= 9 Calories) when ingested. That notwithstanding, some researchers have acknowledged the effect of some micronutrients such as iron whose levels are crucial for foetal growth (Hwang *et al.*, 2013). In turn, the resulting low infant growth rates of low intake of these nutrients during pregnancy, (Moestue, 2009) and consequently stunting

may increase subsequent obesity risk, especially among females. Contrary to what others have reported, likelihood of overweight and obesity has been associated with lower risk of iron deficiency among women of reproductive age (Kordas *et al.*, 2013).

Obesity may also be induced by stress and emotional brain networks. This is another means found to promote excess weight gain especially around the abdomen by ‘comfort food’ ingestion that is mediated by a chronic stress-response mechanism (Dallman *et al.*, 2003) in the brain which can result in depression. When an individual is in this state, foods such as those high in sugar and fat are preferred (Laitinen *et al.*, 2002; Dallman, 2010; Parker and Brotchie, 2010). Depression is proposed to be higher among women (Essau *et al.*, 2010;) and since depressed people tend to overeat such foods that result in weight gain, then women who are exposed to chronic stress may be prone to overweight and obesity.

2.2.3 Environmental and social factors

The environmental factors include availability and proximity of obesity-promoting foods at fast food establishments, restaurants, large supermarkets, recreational points in a given area (Currie *et al.*, 2010) and at home. Environmental and social factors may either favour or minimise the attainment of unhealthy weight by affecting the dietary behaviours and activity pattern of individuals. For instance, the way supermarkets may influence weight gain is by providing a wide variety of obesity-enhancing foods at reasonable prices which then affect purchasing behaviour and subsequently the availability of these foods at home (Wall *et al.*, 2012; Leone *et al.*, 2008).

Secondly, some societies still have preference for overweight which is used as a measure of socioeconomic status (Fezeu, 2005; Jackson *et al.*, 2005; Kruger *et al.*, 2005; Duda *et al.*, 2007; Agyemang *et al.*, 2008; Fezeu *et al.*, 2008). Hence, women in areas where big size is preferred along with the prevailing environmental factors mentioned above find it difficult to keep normal weight and therefore tend to be more overweight or obese than their counterparts who are not exposed to such influences. The differences therefore lie in the lack of support for healthy eating and physical activity on the whole.

2.2.4 Socioeconomic, household and demographic factors pertaining to women's nutritional status

Socioeconomic, household and demographic factors influence the nutritional status of an individual. For example, several studies have supported the existence of high BMI among women in urban than rural areas explained by high SES (Vernay *et al.*, 2009) in urban than rural settlements (Kamadjeu *et al.*, 2006; Sodjinou *et al.*, 2008; Abubakari *et al.*, 2008; Bosu, 2010; Dahly *et al.*, 2010; Dake, 2012). However, those that found higher prevalence of overweight and obesity in rural than urban settlements only confirmed the individual sociodemographic factors and inequalities of inhabitants within them and not by virtue of being resident in those areas (Cleland *et al.*, 2010).

Furthermore, in a study that considered data on a nationally-represented sample of women from 34 maternity units in United Kingdom, demographic health inequalities were associated with maternal obesity (Heslehurst *et al.*, 2009). They included increased odds of being obese with increasing age, parity, Black ethnic group and deprivation. There was also an association between morbid obesity and increased levels of

unemployment. These factors that pertain to women's nutritional status have been explained.

2.2.4.1 Age of women

Age is a strong determinant of weight change among women. It is evident in the results found by El-Hazmi and Warsy (2002) and Dake *et al.* (2010) that overweight and obesity are common in older women. It appears that as women grow older, especially during menopause, hormonal and physical activity levels decrease, giving way to weight gain (Lovejoy, 1998). Low *et al.* (2009) and El-Hazmi and Warsy (2002) confirmed that obesity is usually at its peak by 50 years among women in developing nations. In addition, some studies have even suggested that older women express less willingness to reduce weight irrespective of their health status (Duda *et al.*, 2007).

2.2.4.2 Marital status of women

Current state of being married or ever been married (i.e. separated, divorced or widowed) has been linked to high BMI among women (Averett *et al.*, 2008; Tzotzas *et al.*, 2010), even independently of other sociodemographic characteristics (Fuchs *et al.* 2011). A study in Asia involving civil servants exemplifies how marital status with or without a better job can increase overweight and obesity risk nine fold (Simkhada *et al.*, 2011).

This observation has been explained by the possibility of being multiparous when married (Heliovaara and Aromaa, 1981). Averett *et al.* (2008) hypothesize that weight gain may arise as couples; especially women are obliged to regularly consume 'richer'

and denser foods and abandon the desire to attract a mate when married. One other explanation given is spousal influence as married women in particular are willing to yield to their husbands' request to either lose (Duda *et al.*, 2007; Meltzer *et al.*, 2011) or gain weight. Where the latter is followed, overweight and obesity may be the consequence. Thus, being married can be a strong determinant of overweight and obesity. Nonetheless, others have presented the prevalence of obesity among women who have never married (Sobal and Hanson, 2011) providing possible explanations in the fact that some of those women become exposed to psychosocial stress, stigmatization and depression that may compel them to overeat.

2.2.4.3 Educational level of women

Education has a singular potential of influencing food choices, income and cultural perceptions (Ene-Obong *et al.*, 2001). From some studies overweight and obesity seems to be higher among non-educated women (Tzotzas *et al.*, 2010) and less-educated (Marques-Vidal *et al.*, 2010; Xiao *et al.*, 2013) than educated ones. According to Chiriboga *et al.* (2008), this happens because educated women are better aware of the dangers of high caloric intake than poorly-educated ones and more often embrace the pressures of thinness than men.

On the contrary, some studies have found overweight and obesity to be higher among women with higher education, although this observation is mainly influenced by age, occupation and income status (Abdulai, 2010).

2.2.4.4 Residential status and area of residence of women

The urban environment has been implicated in compounding the problem of overweight and obesity. In African populations, 20-50% of overweight and obese adults live in urban areas (Kamadjeu *et al.*, 2006; Sodjinou *et al.*, 2008). Overweight and obesity more than doubled within 15 years among urban women in West Africa, (Abubakari *et al.*, 2008). Overweight mothers in Ghana are more likely to reside in the southern sector and in urban areas than in rural areas (Dake, 2012). Further, a review of the prevalence of hypertension in Ghana from 1970 to 2009 confirmed overnutrition as one of three factors independently associated with the high prevalence of hypertension within urban than rural cities (Bosu, 2010).

Although some studies have demonstrated that overweight and obesity may be higher among rural than urban women (Cleland *et al.*, 2010), their findings were attributable only to the sociodemographic composition of those areas as participants were sampled from socioeconomically disadvantaged areas.

2.2.4.5 Household position of women

One index that defines a woman's position in the household is income which gives her more control over resources. This also affects a woman's preference to spend on household nutrition (Girma and Genebo, 2002). Another important reason is the role played by women in household choice and distribution of food (energy). In the United States, female-headed households have been shown to serve diets higher in energy, total

fat and saturated fat than in households with two active heads (Bowman and Harris, 2003).

However, in most parts of Africa and Asia, women have reduced control over resources (Haddad, 1999) and that affects food security in households. Children, especially females who are exposed to scarcity or those from such food insecure households are prone to obesity when later exposed to plenty (RWJF, 2010). Yet, apart from this, research has also found that in food-insecure households, women tend to gain weight (Hanson *et al.*, 2007) because they opt for high-calorie foods that are usually less expensive, low in nutrients (Ludwig and Pollack, 2009) and can easily be overeaten frequently (Rolls, 2009) rather than high-cost-low-energy foods such as fruits and vegetables.

2.2.4.6 Economic status or income

The risk for overweight and obesity can also be viewed through the economic status (ES) of women (Mendez *et al.*, 2005; Romling and Qaim, 2011; Olatunbosun *et al.*, 2011; Subramanian *et al.*, 2011). The study that assessed weight status in a national sample of Kenyan women concluded that overweight was high among women in the high income group (Steyn *et al.*, 2011). Similarly, obesity was more prevalent among Nigerian women of high ES than those of low ES (Uthman, 2009) and also high among Ghanaian women in the higher wealth category (Abdulai, 2010). Research has also shown that women belonging to low-income households also gain weight because they tend to be food-insecure and are therefore likely to consume large quantities of high-energy staples and cheaper parts of meats because they are less expensive (Hanson *et al.*, 2007; Rolls 2009).

Most past studies like those mentioned before in this section have reported obesity prevalence, stating gender differences without considering the possible influence of other economic indices. This way of assessing obesity prevalence often elides the effect of economic issues. A recent comparison of worldwide obesity prevalence among populations was done based on three economic and social factors namely; per capita gross domestic product (GDP), the Gini index of national wealth inequality and the gender inequality index (GII) (Wells *et al.*, 2012). They reiterated the fact that although obesity may increase with economic development, men tend to be sensitive to the result than women because they (women) are both more at risk of poverty, given their reduced control over resources and also more sensitive to the adverse effects of poverty. In this regard, women are more susceptible to obesity in areas of low SES (Monteiro *et al.*, 2004; Ziraba *et al.*, 2009; Wells *et al.*, 2012).

2.2.4.7 Women's employment or occupation

The type of occupation exposes a person to various levels of sedentary activity. It has been confirmed from cross-sectional surveys that sedentary workers tend to be more overweight or obese than their active counterparts (Owiredu *et al.*, 2011; Mogre *et al.*, 2012). Contrary to this, results from 33 low- and middle-income countries showed differences in overweight among women of different occupational classes (Lopez-Arana *et al.*, 2013) - women in agriculture experienced higher weight gain than those in professional, technical and secretarial classes over a period of 18 years. This may have resulted from the lower educational status observed among the women in agriculture compared to those in the other occupational classes, considering that being more

educated influences food choices and cultural perceptions (i.e. increases awareness of the dangers of high caloric intake) that may consequently lead to weight gain.

2.3 Women's perception of weight status and association with overweight and obesity

An individual's perception of weight status or attitude toward body weight is influenced by sociodemographic characteristics such as ethnicity, age and education; and to a large extent the existing social and cultural factors (Lindsay *et al.*, 2010). Many researchers have tried to explain why more women, particularly in Africa and especially West Africa, tend to be overweight or obese. Among the reasons that have been well documented are the influence of westernization, urbanization and cultural or social approval of weight status (Fezeu, 2005; Jackson *et al.*, 2005; Duda *et al.*, 2007; Agyemang *et al.*, 2008; Fezeu *et al.*, 2008; Steyn *et al.*, 2011; Lindsay *et al.*, 2010). They explain that westernization and urbanization improve availability and accessibility to high caloric diets. Also, the deliberate desire of women to gain weight is conceived from the society's perception that being overweight or obese is an indication of high SES.

That notwithstanding, Benkeser *et al.* (2012) caution that this perception of 'ideal body size' should not prevent women from keeping healthy weights as their study found that overweight and obese Ghanaian women were more dissatisfied with their weight than normal weight women. Hence, these women expressed their desire to lose weight and for others they expressed willingness to keep healthy weight despite the existing norms if only there is a very good reason to do so, such as reduction in disease risk or complications (Duda *et al.*, 2006). For this reason, understanding some of these societal

and individual weight preferences is key to explaining the reason for the high overweight and obesity rates and thus aid in ensuring healthy weight among women.

Taking this extensive review of literature above into account, there is a clear indication that effective reduction in global obesity rates may be achieved by addressing issues regarding overweight and obesity particularly among women.



3.0 METHODOLOGY

This present study was nested in a larger study on Childhood Obesity by IDRC involving the collection of data on school children (9-15 years, from Accra and Kumasi) and their parents. The study was in two parts involving quantitative and qualitative methods.

3.1 Prevalence and sociodemographic determinants of overweight and obesity

3.1.1 Study area

The study was done in 121 primary and junior high schools (PJHS) located in 24 circuits (based on Ghana Education Service–GES classifications) in Accra and 14 circuits in Kumasi (Figures 3.1 and 3.2). As obtained from GES, Accra has 1046 P/JHS of which 56.6% are public schools while Kumasi has 880 of which 46.7% are public schools. These two cities are the most urbanised and modernised in the Greater Accra and Ashanti regions of Ghana.

3.1.2 Study design and sampling procedure

The study was conducted among PJHS children between the ages of 9-15 years from private and public schools. Using a random cluster sampling technique, 30 public and 31 private schools having both PJHS were selected per city (Accra and Kumasi Metropolis) from the list of schools obtained from GES. The number of pupils needed per school was obtained based on the population (weighting) in each school. In public schools, a total of 960 pupils (480 in Accra and 480 in Kumasi) were selected. In the private schools, a total of 1860 (930 in Accra and 930 in Kumasi) were selected. The total number of pupils was also calculated with the assumption that parents of 20% of children contacted will refuse

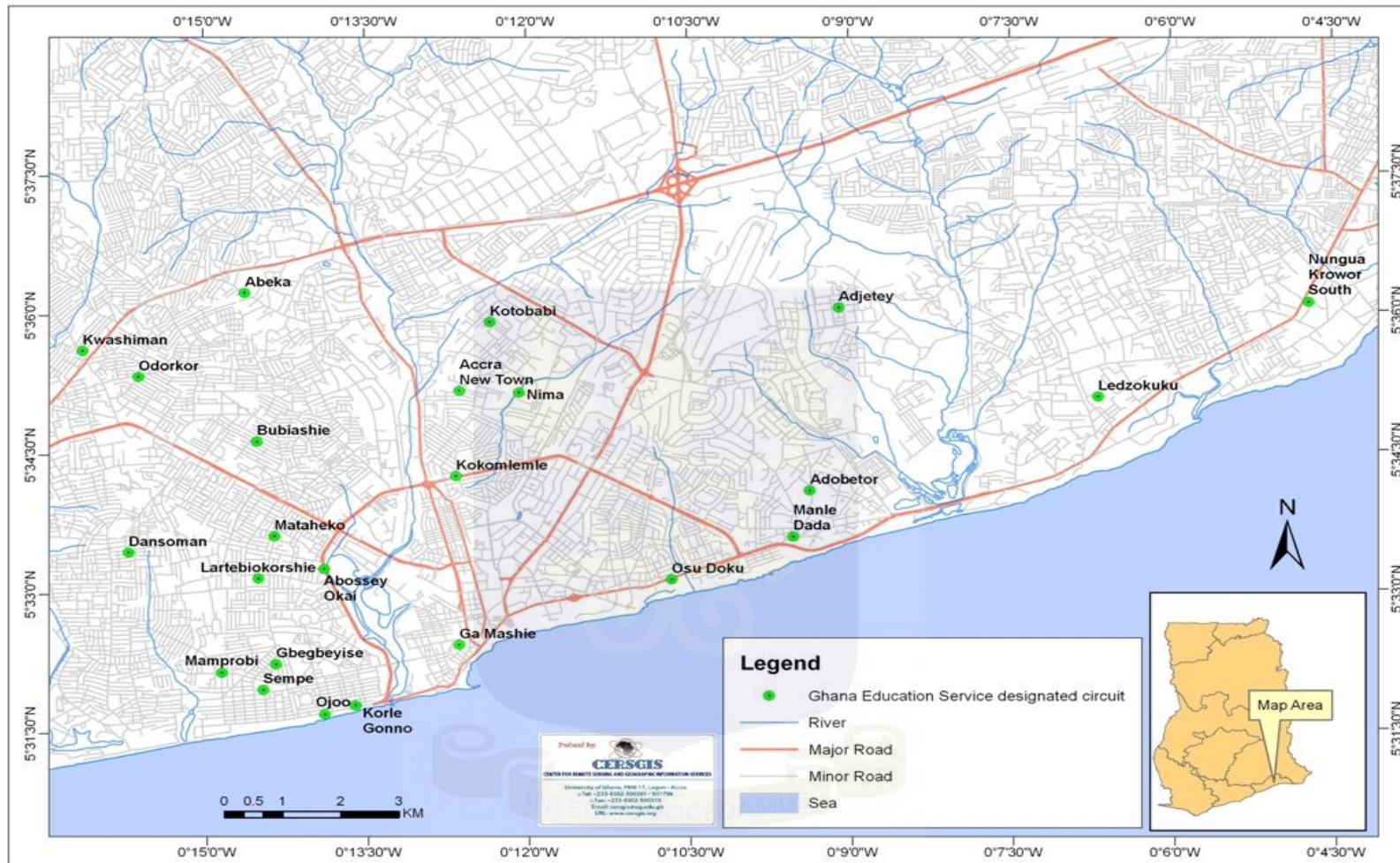


Figure 3.1 Map showing study circuits in Accra

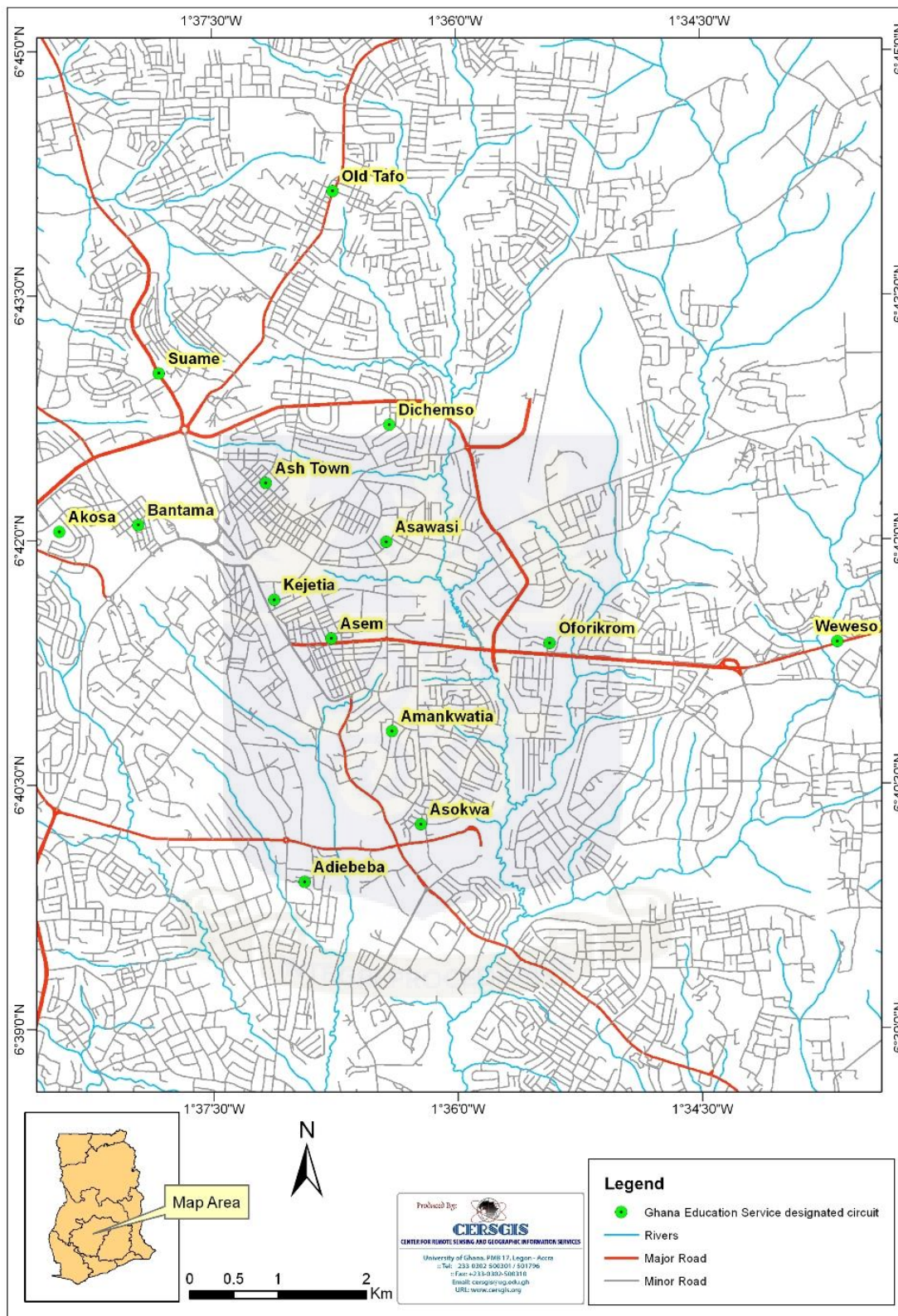


Figure 3.2 Map showing study circuits in Kumasi

consent. Within every school, pupils were selected by simple random sampling (balloting).

3.1.3 Inclusion criteria

Prior to selection of the children, ballot papers with ‘Y’ (meaning ‘Yes’ you have been selected) or ‘N’ (meaning ‘No’ you have not been selected) inscriptions were prepared. Within each school, children in the primary classes 4-6 and JHS 1-3 who fell within ages 9-15 were eligible. In schools that had more than one stream per class, representatives from each stream were made to ballot in order to select only one stream. The number of ‘Ys’ for a particular school was determined by the number needed for that school. In each class, we stratified on sex so number of boys needed was selected by balloting among boys and a similar procedure was used for girls. Children in the age bracket mentioned above, who expressed willingness to participate after the study was explained to them, were given the equal chance to be part of the study by balloting. The selected children were given letters (explaining the study) that were sent home for parental consent. Only those who received parental consent were included in the study. Parents whose children had been selected in the study were eligible to be part of the study also. For analyses in this present study, only biological mothers of study children were included.

3.1.4 Sample size

3.1.4.1 Sample size calculation

For the larger study (IDRC Childhood Obesity Study), sample size was calculated separately for public and private schools due to the existing differences in the prevalence

of overweight and obesity among such schools. Estimated prevalence of 10% in private and 5% in public schools were used to determine sample size at 960 and 1860, respectively. Altogether, about 3000 children were selected and the total split in equal numbers between Accra and Kumasi.

Based on the formula $N = Z^2 \times P(1-P)/d^2$ from Daniel (1999), the sample size for this present study which involved only biological mothers of the school children was calculated using an expected prevalence of 30.5% which is the current estimated overall prevalence of overweight and obesity among women in Ghana (Dake *et al.*, 2010).

Where N = the required sample size

Z = Z-statistic for 95% level of confidence (1.96)

d = Precision at a P-value of 0.05

P = Expected prevalence or proportion of overweight and obesity among women in Ghana (30.5%)

From the calculation, the sample size required was about 326 but 799 biological mothers from the larger study satisfied the requirements of having complete data on anthropometry and sociodemographic characteristics and were thus included in the analyses.

3.1.4.2 Study participants

Parents and guardians ($n = 2237$) were enrolled into the larger study of which 693 were males and 1544 were females. Of these 1544 females, 1233 were biological mothers. However, only 799 biological mothers had complete data on anthropometry. Therefore,

the results represent the characteristics of these biological mothers who met the inclusion criteria only, although sociodemographic data on the remaining 434 were analysed separately and then compared to that of those who had complete data on anthropometry. Our study mothers were not significantly different by all other sociodemographic characteristics except that they had slightly higher household income compared to those who had incomplete data on anthropometry (Appendix 8).

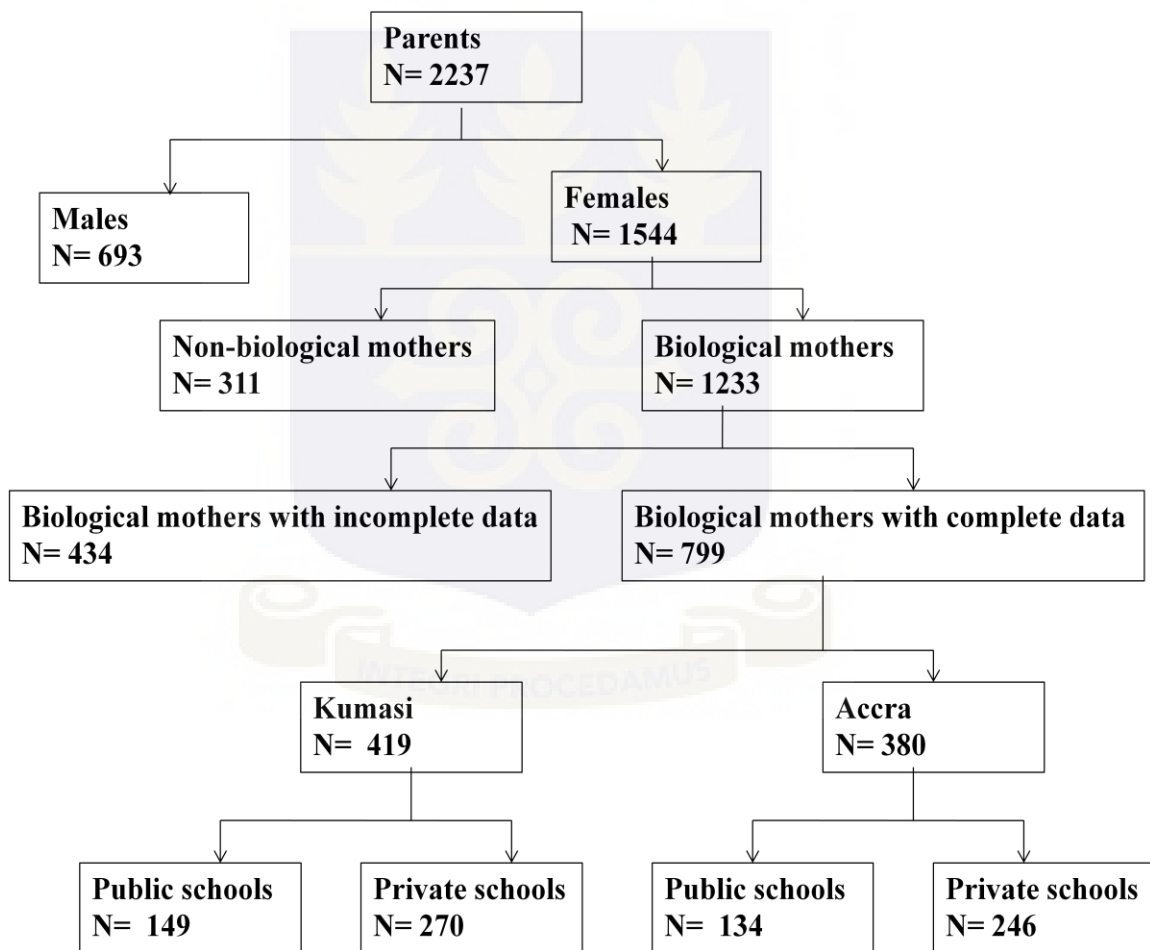


Figure 3.3 Flow of participants

3.1.5 Data collection

Mothers were invited to their children's schools on set dates during which the following data were collected on them.

Sociodemographic information

A structured questionnaire was used to collect background information on household, socioeconomic and demographic factors of mothers (Appendix5). These factors include level of education, employment status, income, marital status, residential status, relevant household possessions and age. This was relevant in determining which of the factors were associated with overweight and obesity among mothers who participated in the survey.

Anthropometry and body composition

All measurements were taken with mothers wearing clothing. However, those with heavy clothing such as jackets and sweaters were asked to remove them. They were also required to remove shoes or sandals, belts, watches or other jewellery on their wrists and empty their pockets prior to measurements. Weight and body composition was measured using the TANITA Body Composition Analyzer (model TBF-300A, TANITA Corporation, USA). A wall-mountable height rod (model HR-200, TANITA Corporation, USA) was used to measure the height of the mothers. Height, weight and body composition measurements of the biological mothers were used to estimate the prevalence of overweight and obesity in this study population.

3.1.6 Data analysis

Using SPSS (version 16.0) programme, analyses were done on data obtained from biological mothers who had full data on anthropometry. Weight and height measurements were converted to body mass index (BMI). BMI categories were defined using WHO cut-offs: underweight ($< 18.5 \text{ kg/m}^2$), normal ($18.5 - 24.9 \text{ kg/m}^2$), overweight ($25 - 29.9 \text{ kg/m}^2$) and obese ($\geq 30 \text{ kg/m}^2$). Frequencies, means and standard deviations obtained were used to describe the background characteristics of participants and determine the prevalence of overweight and obesity in the study population. Cross tabulations (bivariate analyses) were done firstly for each sociodemographic factor against BMI categories and secondly among the sociodemographic factors. A chi-square analysis was done to test the association for cross tabulations. Since bivariate analyses do not consider confounding effects, a logistic regression was done to identify sociodemographic variables associated with overweight and obesity.

3.1.6.1 Logistic regression

In this study, BMI category (underweight=1, normal weight=2, overweight=3, obese=4) was used as the dependent variable with normal weight as reference category in a multinomial logistic regression model using the enter method. This logit provides the opportunity to see the interaction between more than two categories of an outcome (in this case, BMI) and predictors (in this case, selected sociodemographic factors). The sociodemographic factors; education status, employment status, income, marital status, residential status, region, number of births, household position and age were considered as the independent variables.

In the model, all sociodemographic factors were entered in one block using one category as a reference category for each factor. For instance regarding age, the 20-29 category was used as the reference category to which the likelihood of a mother being either underweight, overweight or obese as against being normal weight in all the other age categories was compared. The R^2 of model and the significance of each predictor variable were obtained. The resulting regression coefficients revealed the decreased or increased chance of being in each BMI category considering the effect of the independent variables. Thus, the likelihood of being underweight overweight or obese was reported and interpreted using odds ratios ($\text{Exp } \beta$) with confidence intervals where estimates of odds greater than 1.0 were indicative of higher risk of underweight, overweight or obesity than that of the reference category while odds ratios less than 1.0 indicated a lower risk of underweight, overweight or obesity compared to reference category. However, this present study reported results for overweight and obese categories only, because of their relevance to the specific objectives outlined earlier.

3.2 Focus group discussion on mothers' perception of overweight and obesity

3.2.1. Recruitment procedure

Focus group discussions (FGDs) were used to explore mothers' perception of overweight and obesity. Only mothers of the school children in Accra who participated in the larger IDRC Childhood Obesity Study were involved in the FGDS. Participants were contacted by telephone. They were led in focus group discussions about their thoughts on overweight and obesity. The number of participants was determined based on the recommended 6-10 participants per group (Kruger, 1994; Rabiee 2004).

The BMI and educational level of these mothers were obtained from the larger study (quantitative section) prior to grouping of participants. First, the mothers were grouped according to their weight status and educational level based on the chance that these groups will feel more comfortable sharing their experiences and may present different views on the topic. These groups constituted overweight or obese ($\text{BMI} \geq 25 \text{ kg/m}^2$) mothers with either low (\leq senior high school level-SHS) or high education (\geq SHS) and non-overweight ($\text{BMI} \leq 25 \text{ kg/m}^2$) mothers also with either low or high education (Figure 3.4). From this, a list of potential participants was generated. For each overweight or obese category, two FGDs were scheduled but not for the non-overweight groups. Thus, in all, six FGDs were scheduled.

A systematic sampling technique was used to select the needed number of participants into the characteristics generated above. The selected mothers were contacted and given the details about the study in order for them to express their willingness to participate. Sixteen women were scheduled for each focus group with the expectation that at least eight of them would attend. If for any reason a mother turned down the invitation she was replaced with the next available mother on the list. Dates convenient for the participants were set and the discussions were held in the Department of Nutrition and Food Science at the University of Ghana. Each participant received GH¢5.00 (\$2.50) and four cakes of soap as thank you gift at the end of the discussions.

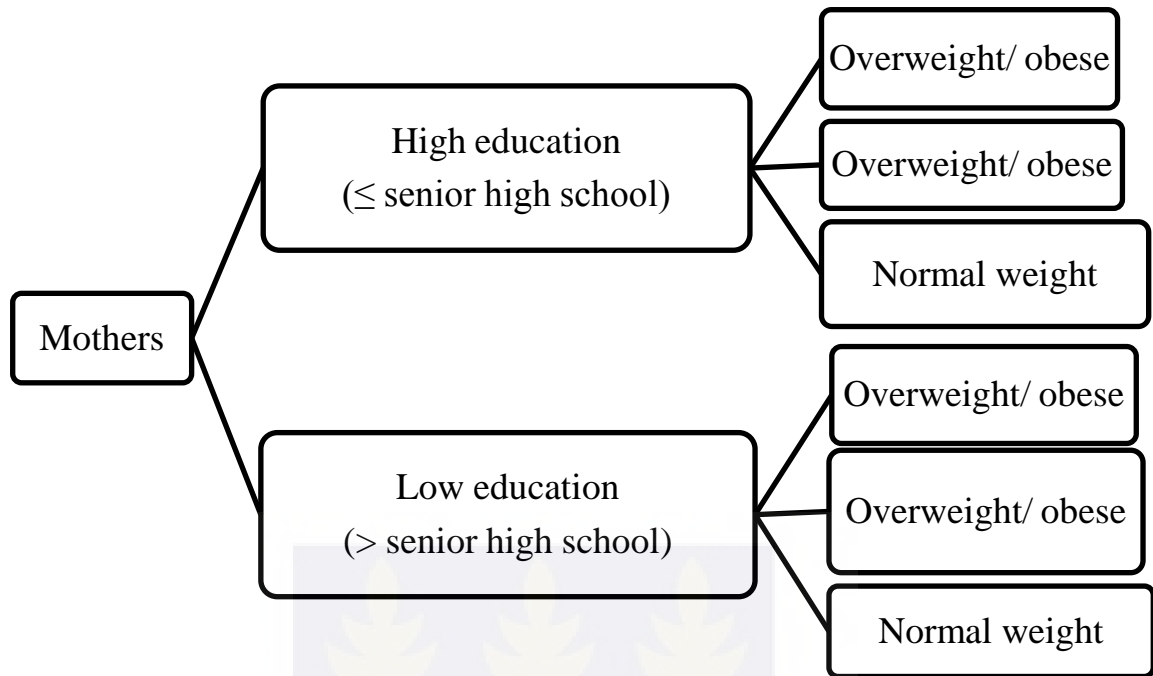


Figure 3.4 Focus groups

3.2.2 Data collection

Overweight or obese and normal-weight mothers who agreed to participate by either signing or thumb-printing an informed consent form on the days of discussions (after study was explained to them) were included in the FGDs. An interview guide consisting of open-ended questions was followed in conducting the FGDs and each participant was required to respond to them. These questions were pre-tested by engaging eight women who were not part of the main childhood obesity study but had similar socio-economic backgrounds and comparable characteristics to the study participants, in an approximately two-hour discussion.

In all the FGDs, five thematic areas were explored: knowledge of and causes of overweight and obesity; levels of concern about the issue; views on responsibility;

possible consequences of being overweight and ideas on prevention. The sequence of questions asked during the FGDs is presented in Appendix 6. Aiming to ensure order, questions on one thematic area were exhausted before moving on to the next. However, if a participant wanted to make additions to an issue already discussed she was allowed to contribute. Discussions lasted an average of seventy-five minutes, ranging in length of time from about fifty-five to hundred minutes. All discussions were audio-recorded and then transcribed appropriately.

Three personnel ensured the successful completion of the FGDs. The discussions were organized and led by the moderator (student investigator). There were two trained observers who took turns to attend to issues such as taking measurements, taking notes during the discussion, monitoring the recorder, logistics and creating name tag for a participant.

3.2.3 Quality control measures

Participants' current BMI status, educational level and age were also obtained on the day of discussion and checked against the pre-determined list to ensure that they were still qualified to be in the group in which they were placed during the selection phase. This was done because of the time that had elapsed between when their first set of data was collected and the day of the discussion. Therefore, their current information was reported in the results section. The FGDs were done mainly in the Twi (Akan) language which was the preferred language by the participants for the discussions. Apart from the audio recordings, extensive notes were taken while interactions were ongoing to capture non-

verbal responses. An assessment was done after each discussion by both moderator and observers to ensure the quality of subsequent FGDs. All interactions were transcribed verbatim and transcripts were checked against the audio recordings and the notes taken during the discussions. Each participant was made to mention her initials, the first time she responded to a question to aid voice identification during the transcription.

3.2.4 Data analysis

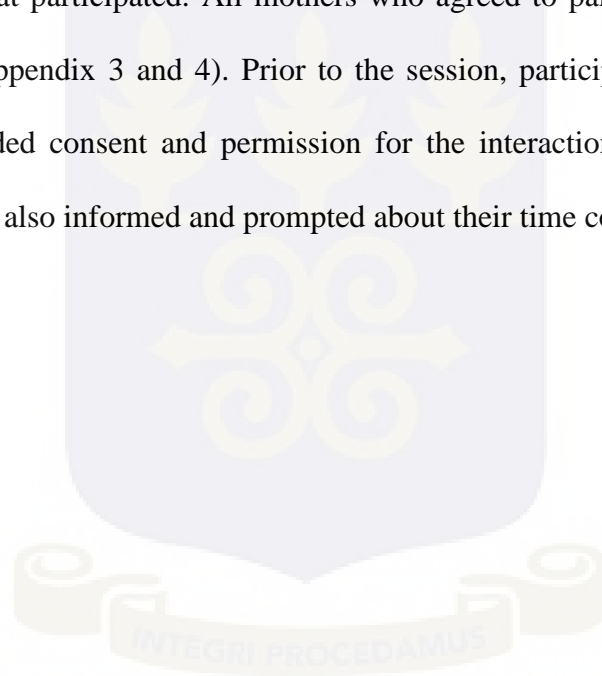
Microsoft Word and Excel were used for analyzing the data. The audio recordings were typed verbatim and translated into English by listening to all the tapes several times and comparing with the observers' notes until all the details of information were captured in the transcripts. Each transcript consisted of mainly questions by moderator with corresponding responses by each participant in the order in which the interactions took place. For the purposes of easy identification and comparison of themes, each transcript was typed in a different color for each FGD. However, a final transcript containing records for all FGDs was typed in black.

From the transcripts, major themes used in the discussion were recorded in a codebook that was designed prior to analysis. Similar quotes were grouped systematically in a tabular form under their appropriate themes. The relationships between the quotes relevant to the study were determined by noting the patterns in the data which reflected in the context, frequency, specificity and intensity of comments and responses (Rabiee, 2004). Quotes that did not fall under any of the themes were analyzed separately. The

other themes with their corresponding quotes that emerged from the contributions of the participants were also identified, recorded and analysed inductively.

3.3 Ethical considerations

Ethical clearance was sought from the Institutional Review Board (IRB) of the Noguchi Memorial Institute for Medical Research (NMIMR) separately for both sections of this study (Appendix 1 and 2). Permission was sought from GES (Appendix 7) and all heads of the schools that participated. All mothers who agreed to participate signed a written consent form (Appendix 3 and 4). Prior to the session, participants of the focus group discussion provided consent and permission for the interactions to be audio-recorded. Participants were also informed and prompted about their time commitment.



4.0 RESULTS

4.1. Background Characteristics of study participants

Of the total number of mothers who participated ($n= 799$) in this study, about 52% were from Accra and about 48% were from Kumasi. Table 4.0 describes the demographic characteristics of the mothers from these two cities. Considering the total study population, the average age was 40.97 ± 6.44 years with less than 10% of them above 50 years. Only 8.2 % had not had any form of formal education and only 10.6% have had up to tertiary level of education. Most of the mothers (42.7%) lived in rented houses. More than a quarter (26.5%) of the mothers were the heads of their households. The mothers were mostly traders (59.9%), married (77.9%) and had more than one child (94.2%) with majority (80.1%) earning between GH¢100 and GH¢600.

Comparison of the characteristics of mothers in Accra with those in Kumasi show significant differences in level of education, residential status, monthly household income, household position and number of births (Table 4.0). Mothers in Accra have higher education, were less likely to have their own houses, earn less income and have fewer children than those in Kumasi. More mothers in Accra were heads of their households than those in Kumasi.

4.2 Anthropometric characteristics of study mothers

From Table 4.1, the overall prevalence of overweight and obesity was 77.8% with obesity (42.7%) exceeding overweight (35.0%). The averages for height (1.60 ± 0.06 m), weight (75.71 ± 15.71 kg), percent body fat ($37.47 \pm 7.60\%$) and BMI (29.47 ± 5.55 kg/m²).

Table 4.0: Sociodemographic characteristics of study mothers

Variable	Total sample (N= 799) n (%)	Study areas		P-value ¹
		Accra (N= 380) n (%)	Kumasi (N= 419) n (%)	
Age (years)				
20-29	25 (3.1)	8 (2.1)	17 (4.1)	0.248
30-39	338 (42.3)	155 (40.8)	183 (43.7)	
40-49	359 (44.9)	176 (46.3)	183 (43.7)	
50+	77 (9.7)	41 (10.8)	36 (8.6)	
Marital status				
Not married	177 (22.1)	91 (23.9)	86 (20.5)	0.106
Married	622 (77.9)	289 (76.1)	333 (79.5)	
Educational level				
None	66 (8.2)	35 (9.2)	31 (7.4)	0.014*
Primary/elementary	442 (55.3)	188 (49.5)	254 (60.6)	
Secondary	167 (20.9)	97 (25.5)	70 (16.7)	
Post secondary	38 (4.8)	20 (5.3)	18 (4.3)	
Tertiary	86 (10.8)	40 (10.5)	46 (11.0)	
Occupation				
Artisan	146 (18.3)	78 (20.5)	68 (16.2)	0.213
Salaried worker	114 (14.3)	56 (14.7)	58 (13.8)	
Trading	479 (59.9)	218 (57.4)	261 (62.3)	
Not employed	60 (7.5)	28 (7.4)	32 (7.6)	

¹Pearson's chi-square test for categorical variables

*Statistically significant at p< 0.05

Table 4.0 cont'd: Sociodemographic characteristics of study mothers

Variable	Total sample (N= 799) n (%)	Study areas		P-value ¹
		Accra (N=380) n (%)	Kumasi (N=419) n (%)	
Residential status				
Own house	229(28.7)	80 (21.1)	149 (35.6)	<0.0001*
Family house	168 (21.0)	103 (27.1)	65 (15.5)	
Rented house	341 (42.7)	167 (43.9)	174 (41.5)	
Other ²	61 (7.6)	30 (7.9)	31(7.4)	
Number of births				
1	6 (5.8)	29 (7.6)	17 (4.1)	0.005*
2	133 (16.6)	73 (19.2)	60 (14.3)	
3	241 (30.2)	120 (31.6)	121 (28.9)	
4+	379 (47.4)	158 (41.6)	221 (52.7)	
Household income³				
<100	41 (5.1)	32 (8.4)	9 (2.1)	<0.0001*
100-300	302 (37.8)	163 (42.9)	139 (33.2)	
300-600	338 (42.3)	138 (36.3)	200 (47.7)	
600-900	66 (8.3)	18 (4.7)	48 (11.5)	
>900	45 (5.6)	24 (6.3)	21 (5.0)	
Respondent (mother) as head of household				
Yes	212 (26.5)	115 (30.3)	97 (23.1)	0.043*
No	587 (73.5)	265 (69.7)	322 (76.9)	

¹Pearson's chi-square test for categorical variables

²Company/Mission/Government house, Caretakers

³Amount in Ghana Cedis; represents monthly income

*Statistically significant at $p < 0.05$

Table 4.1: Anthropometric characteristics of study mothers

Variable	Total sample (N= 799) n (%)	Study areas		P-value ¹
		Accra (N= 380) n (%)	Kumasi (N= 419) n (%)	
BMI category				
Underweight	5 (0.6)	4 (1.1)	1 (0.2)	0.086
Normal	173 (21.7)	85 (22.4)	88 (21.0)	
Overweight	280 (35.0)	125 (32.9)	155 (37.0)	
Obese	² Grade I	209 (26.2)	101 (26.6)	108 (25.8)
	³ Grade II	98 (12.3)	42 (11.0)	56 (13.4)
	⁴ Grade III	34 (4.2)	23 (6.0)	11 (2.6)
		Mean ± SD		P-value ¹
BMI (kg/m ²)	29.47 ± 5.55	29.57 ± 5.91	29.37 ± 5.20	0.112
Percent body fat (%)	37.47 ± 7.60	37.56 ± 7.57	37.38 ± 7.64	0.273

¹Pearson's chi-square test for categorical variables and independent samples t-test for continuous variables
 BMI= Body Mass Index
 Underweight= BMI<18.5kg/m², normal weight= BMI 18.5-24.9kg/m², overweight= BMI 25-29.9kg/m², obese= BMI ≥ 30kg/m²
²Grade I= BMI 30-34.9 kg/m², obese
³Grade II= BMI 35-39.9kg/m², severely obese
⁴Grade III= BMI ≥ 40 kg/m², morbidly obese

4.3 Determinants of overweight and obesity

Results of the logistic regression (Table 4.2) indicate that compared to mothers who were not employed (the Ref.) those who were involved in trading were 2 times more likely to be overweight. With respect to income, women who earned more than GH¢900 were 5 times more likely to be obese compared those who earned less than GH¢100. Mothers with 3 children were about 3 times more likely to be obese than mothers with one child.

Estimates of odds for household income and number of births further reveal that the likelihood of a mother being obese increased as levels also increased for both predictors.

Table 4.2: Results of logistic regression of sociodemographic determinants of overweight and obesity among study mothers

Variables	Likelihood of a woman being overweight or obese		
		Odds ratio (OR) at 95% CI	
	(n)	Overweight N= 280	Obese N= 341
Age (years)			
20-29 (Ref.)	(14)	100	1.00
30-39	(262)	1.92 (0.67- 5.41)	2.68 (0.87- 8.24)
40-49	(283)	1.88 (0.64- 5.47)	2.67 (0.85- 8.35)
50 ⁺	(62)	2.86 (0.82- 9.94)	2.96 (0.80- 11.06)
Residential status			
Rented house (Ref.)	(255)	100	1.00
Own house	(187)	0.85 (0.51- 1.41)	1.43 (0.89- 2.32)
Family house	(179)	1.52 (0.90- 2.58)	1.35 (0.79- 2.30)
Occupation			
Not employed (Ref.)	(42)	1.00	1.00
Artisan	(104)	1.83 (0.77- 6.72)	0.65 (0.30- 1.41)
Salaried worker	(96)	2.02 (0.61- 6.72)	1.50 (0.50- 4.45)
Trading	(379)	2.36 (1.07- 5.21)*	1.15 (0.60- 2.30)
Marital Status			
Not married (Ref.)	(124)	1.00	1.00
Married	(497)	1.22 (0.49- 3.03)	0.89 (0.59- 1.34)

¹Company house/ mission house, government house, caretakers
 *Statistically significant at p<0.05; unmarked = not significant
 Ref.: Reference category

Table 4.2 cont'd: Results of logistic regression of sociodemographic determinants of overweight and obesity among study mothers

Variables	(n)	Likelihood of a woman being overweight or obese	
		Odds ratio (OR) at 95% CI	
		Overweight N=280	Obese N=341
Area of residence			
Accra (Ref.)	(291)	1.00	1.00
Kumasi	(330)	1.25 (0.82- 1.89)	0.89 (0.59- 1.34)
Household Income¹			
<100 (Ref.)	(27)	1.00	1.00
100-300	(217)	1.03 (0.43- 2.48)	1.05 (0.44- 2.51)
300-600	(272)	1.39 (0.57- 3.42)	1.75 (0.72- 4.26)
600-900	(57)	1.75 (0.54- 5.65)	2.87 (0.92- 8.94)
>900	(42)	4.00 (0.86- 18.65)	5.36 (1.20-23.86)*
Educational level			
No education (Ref.)	(47)	1.00	1.00
Primary/ Elementary	(332)	1.04 (0.52- 2.09)	1.19 (0.40- 4.09)
Secondary	(133)	1.41 (0.63- 3.15)	1.39 (0.61- 7.53)
>Secondary	(106)	1.87 (0.51- 6.83)	2.14 (0.62- 3.11)
Number of births			
1 (Ref.)	(29)	1.00	1.00
2	(102)	1.01 (0.42- 2.42)	2.16 (0.81-5.71)
3	(192)	1.14 (0.5- 2.61)	2.71 (1.06- 6.92)*
4 ⁺	(298)	1.17 (0.50- 2.73)	2.16 (0.84- 5.60)
Respondent (mother) as head of household			
No (Ref.)	(157)	1.00	1.00
Yes	(464)	0.96 (0.51-1.80)	1.38 (0.75- 2.55)

¹Amount in Ghana Cedis
²not disclosed; don't know
*Statistically significant at p<0.05, unmarked = not significant
Ref.: Reference category

4.4 Mothers' perception of overweight and obesity

4.4.1 Description of focus groups

Study participants belonged to two main groups: overweight or obese and non-overweight groups and each group was homogenous in terms of educational background. For example, one normal weight group was of low education while the other group was of high education. However, age was kept heterogeneous in each group. Twenty-nine mothers participated in six FGDs (four overweight or obese groups and two non-overweight groups). Each focus group was made up of an average of five women, ranging in size from two to nine participants. There were eighteen mothers in the overweight or obese groups and eleven in the non-overweight groups. Table 4.3 provides the composition of each focus group.

The average BMI recorded for the overweight or obese groups was $31.1 \pm 4.3 \text{ kg/m}^2$. The overweight or obese groups were made up of a combination of both overweight and obese mothers but were predominantly obese (10 out of 18). All mothers in the two non-overweight groups had normal BMI averaging $22.2 \pm 2.1 \text{ kg/m}^2$. Considering all the six focus groups, participants had a mean age of 41.8 ± 8.2 years ranging from 26 to 63 years.

Table 4.3 Characteristics of each focus group

Focus group	BMI category	Education status	Number of participants	Age range (years)
1	1 obese, 3 overweight	low	4	30-48
2	All obese	low	3	33-53
3	All overweight	high	2	39-44
4	6 obese, 3 overweight	high	9	31-52
5	All normal weight	low	5	26-63
6	All normal weight	high	6	36-54

4.4.2 Major Themes

4.4.2.1 Knowledge of overweight and obesity

4.4.2.1.1 Definition of overweight or obesity

In expressing their perceptions about what overweight or obesity is, mothers either attempted to define what the condition is or expressed opinions about how one becomes overweight or obese.

- *“What I understand by this is that obesity is a disease. From my own analysis I have come to realize that obesity is also an illness. I say this because someone might not deliberately become obese just by eating alone. In most cases it may result from the deliberate intake of medications” (Normal weight/ high education, Group 6).*

Mothers defined overweight or obesity in 4 ways. Some groups defined obesity as a deviation from ‘normal weight’ or ‘average weight’ which referred to the weight that the mothers were comfortable with.

- *“When we say one is overweight it means one has put on weight and the weight is not normal but more than what every normal person is expected to have” (normal weight/ high education, Group 6).*

However, among the overweight/obese groups, current weight of one of the mothers was defined as ‘average weight’.

- *“The average body weight is good or preferable. With her for instance [referring to one of the mothers] she can be considered as someone of average weight. Oh, you only have wider hips! You know for all of us seated here we are average weight, our weight is okay but if you should*

see someone who is not even bigger than a pen [meaning participant comparing thinness to how a pen appears] you might ask if she is not given enough food to eat” Obese/ low education, Group2).

Others defined overweight and obesity based on ideal weight in relation to age and height.

- *“Obesity? Everybody’s age goes with a corresponding weight and height, but if your weight is in excess and does not correspond with your height then we call it obesity” (Overweight/ high education, Group 3).*
- *“...Any woman who is 50-70 years and weighs more than 80kg is overweight or obese. If you are tall it is okay” (Overweight or obese/ high education, Group 4).*

Another definition was in relation to undesirable body proportions.

- *“Permit me to use a child I know to demonstrate how I understand obesity. The child’s shape was not desirable since the stomach bulges out but the lower part of the body from the hips to buttocks appear smaller. In fact the child’s original shape had changed. For such a person for instance, the bust and waist could be about 30 inches while the hip is about 20 inches” (Normal weight/ high education, Group 6).*

4.4.2.1.2 Source and mode of acquisition of information on overweight or obesity

All participants had heard about overweight or obesity. The most common sources of information reported were radio and television followed by hospitals, relatives, experts

(dietitians), religious group meetings, and peer conversations. Other sources include print media, conferences attended, and child's school. Most of the mothers who heard about overweight and obesity from the hospital were those who have been cautioned before about their weight by a health worker.

- *“For me the doctor has told me that I shouldn't eat too much to gain weight because it will be problematic if I gain too much weight” (Normal weight/ low education, Group 5).*

Except a few mothers who made time to gain knowledge on the topic, most participants admitted that they did not make frantic efforts to know about overweight or obesity and that their acquisition of knowledge on the topic was mainly accidental. For instance, one mother had studied about overweight and obesity as part of a course requirement in nursing training school. Another mother who is a teacher studied about overweight and obesity with the intention to impart knowledge to her pupils. Those who did not deliberately acquire knowledge on the subject mostly recounted their neighbours' experiences as well as personal experiences and observations that confirm this submission.

- *“...there is a woman I know who is a trader in the market just like me who happens to be obese. When she comes out of her car and sits at one spot of her shop, she remains there until close of day. Even the children usually do the sales for her and when it is over she has to be carried to the car also. I mean she cannot even walk let alone pick up goods for customers unless it is done for her. So that is how I learnt all about being obese” (Normal weight/ high education, Group 6).*

- *“For me, I had not heard anything about it. I only saw people around me becoming overweight. But when our children called on us, I thought it was just nice to also know something about obesity” (Overweight/ obese low education, Group 1).*
- *“I don’t intentional go to the hospital for that, maybe I go there because I am sick or when my child is sick and I take her to the hospital maybe they happen to talk about that and I listen to educate myself” (Obese/ low education, Group 2).*
- *“No it is not like I knew they were talking about obesity that is why I went [to the hospital] or I knew that maybe 11’oclock they talk about obesity that is why I tune into the radio. When I tune in to the radio I sometimes hear that obesity issues are being discussed or when I go to the hospital and they are counselling us they usually advise us who are obese to exercise, do this, eat this food, do that...” (Overweight/ high education, Group 3).*

4.4.2.1.3 Description of overweight or obese people by participants

According to the mothers, appearance, activity level, metabolism and eating habits were among the ways with which one could recognise an overweight or obese person. Table 4.4 summarises the contributions made by participants in describing overweight and obese people. These features, they believe, come about as a result of excess fat in the

body. They said that the excess fat in the body causes it to 'stretch' beyond its potential. As a result, some body parts protrude or become 'swollen', especially the arms, stomach, breasts, hips and thighs. Consequently, obese individuals are often seen in loose clothing in order to hide these swollen body parts. The resultant weight also exerts pressure on the limbs and impedes walking and activity, although the latter as explained by them, is mainly due to the lack of exercise.

They added that apart from making walking difficult because the thighs rub against each other, obese people may develop rashes that redden and become sore with time particularly, if the weight accumulates at the lower part of the body. Again, places such as under the breasts and underarm that may be exposed to heat due to friction during movement, can also develop these rashes.

They explained further that the fat also clogs the blood vessels and interferes with blood circulation and the entire body's metabolism. Therefore, the blood pressure and body temperature rise and cause them to either sweat excessively or feel hot all the time. This affects breathing process and also makes them tire easily. Also, impaired metabolism and the excess fat may affect biological processes and may lead to illness and early development of breasts in children as well as enhance the ageing process. Thus, obese people age fast and appear older than their counterparts. One normal weight group suggested that some people appear 'too obese' because the weight is hereditary while the all-obese group believe that occurs if the weight is induced with drugs.

Without giving plausible explanation, the participants also pointed out another effect of the impaired metabolism as inability to resist food, especially fatty foods. On two occasions a participant (Normal weight/ high education, Group 6) made the following statements expressing her amazement at some eating habits exhibited by obese people.

- *“I... cannot explain... but that is what I have noticed that obese people eat a lot, they eat a lot. It seems when you give them the normal quantities... even children with normal weight eat small quantity of food unlike the overweight or obese child. After eating you will realize that the person still wants more, s/he still wants more to eat.”*
- *“...three days ago, I went to Amasaman, I went on board a vehicle and a certain woman came to sit by me, like two seats away from mine. She is very obese yet she bought egg to eat but I couldn't say anything because if you say it she will be offended. Yesterday for instance I was going to town, I saw a very obese person, and she was eating bread and butter. I stood at a distance for about 10 minutes and I watched her in surprise as she busily munched the bread. I realized she was very hungry but I wondered why she did not look for proper food but bread and butter. I wondered whether she knew the implications...”*

Table 4.4 Attributes of overweight and obesity as suggested by participants from all four focus groups

Appearance	Activity level	Metabolism	Eating habits
Presence of ‘stretch marks’	Difficulty in walking	Breathlessness	Huge appetite for all foods especially fatty foods
Appear older than their age	Lack endurance	Difficulty in breathing	Overeating
Bigger than their counterparts	Always sleeping	Feels hot all the time/ uncomfortable	Skip meals
Protruding stomach	Tire easily	Excessive sweating	
Swollen body parts	Not flexible	Early development of breasts in children	
Occupies space meant for two people	Not athletic	Always sick	
Bow-legged		Age fast	

Negative attributes were also used by participants, irrespective of the group (overweight, obese and normal weight) they belonged to, in an attempt to describe overweight and obese people. They include the following adjectives in Table 4.5. Some participants explain why they think overweight and obese individuals are lazy, irritable and have bad body odour.

- “...No, some obese people have body odour too because their hands can’t reach every part of their bodies to clean up...but when you are a little slimmer, you can maintain yourself very well to the extent that people will even say that although you are big, you have maintained yourself well” (Overweight or obese/ low education, Group 1).

- “...Someone can be obese to the extent that they act foolishly; they behave like those children with autism. Sometimes they can’t sit in public...when you are passing by...you anger them because you are slim...” (Overweight or obese/ low education, Group 1)
- “...In some cases the overweight person might sit at one place and be sending people on errands. She will be at one place and start growing old. So if you are obese you should be able to perform some exercises...” (Obese/ low education, Group 2).

Throughout the discussions the mothers were of the view that obesity was not a good condition. Some of them revealed that when they came across an obese person they felt pity and dislike for them. Yet, others concluded that being overweight and obese meant being admirable, having adequate rest, wealth and being of sound mind. Another group view obese people as tired individuals with short life-span. The normal weight groups considered obesity as a disease.

Table 4.5 Attributes as suggested by the two main BMI groups to describe obesity

Overweight/ obese groups	Normal weight groups
Slow	Slow
Not smart	Not smart
Ugly	Ugly
Presence of body odour	Lazy
Irritable	Lack strength
Childish	Lack self-discipline
Not sociable	
Shy/ weak-willed	
Lack strength	
Deformed	

Despite these comments, not all the mothers agreed with the negative attributes ascribed to obese people and they tend to be defensive.

- *“But I also have a sister who is obese but can walk because she lives at Michel Camp but she can walk from Michel Camp to Number 1, she can do everything...she is very strong...she can really work...because she exercises...”* (Normal weight/ low education, Group 5).
- *“Some people are overweight but are active. Some people are obese but can really walk fast”* (Overweight/ high education, Group 3).

4.4.2.1.4 Causes of overweight and obesity

From the discussions the mothers named several causes of overweight and obesity. These causes were grouped into two: internal factors (physiology, heredity/ genetics, maternal/ individual health status, type of delivery, birth weight) and external factors (dietary issues, lifestyle, activity level, cultural perceptions, substance abuse, food environment, psychological issues, and parental influence).

4.4.2.1.4.1 Internal factors

Some of the mothers recognised that overweight and obesity could result from either low or high birth weight explaining that the former may result in obesity because mothers tend to over-feed such children. Others were of the view that obese mothers are likely to bring forth both high- and low-birth-weight babies while diabetic mothers are more likely to bring forth high-birth-weight babies. They also identified pregnancy (child birth) and

menopause as foundations of weight gain. One mother from the overweight or obese/high education group explained that hormonal changes that occur during pregnancy and menopause give way to the deposition of fat in women. However, with pregnancy, the type of delivery makes some women more prone than others. In that, if the delivery was through caesarean section then a woman was more at risk of overweight or obesity because she is unable to actively indulge in exercise after delivery for fear of experiencing pain or rupturing the wound from the surgery.

All the groups agreed that obesity can be caused by genetic influences and for those affected that way a simple reduction in quantity of food or improved physical activity in order to attain normal weight may not be applicable or helpful to them. This suggestion was mostly supported by the overweight/ obese groups.

4.4.2.1.4.2 External factors

According to the mothers, one of the ways in which one can gain weight is by frequently consuming large quantities of foods which are high in fats and sugars as well as those classified by participants as ‘heavy’ foods (*fufu, banku, tuozaafi, kokonte*, e.t.c., because they contain too much starch) and especially at night. They added that following such meals with inactivity or immediate sleep, builds up excess fat in the body. Snacking between short intervals and skipping meals were also considered as an additional cause of weight gain by the mothers. Two overweight groups were of the belief that foods prepared with flour (of any kind) and yeast, have the ability to ‘swell up’ in the body, stimulating frequent thirst. Therefore they promote excessive drinking of water resulting

in overweight because the water gets incorporated in the blood and adds to one's weight. They also added that drinking excess water after a prolonged exercise can also make one overweight for the same reason.

The participants also blamed the Ghanaian societal preference for overweight that encourages women to become either overweight or obese. As a result people employ various means to gain weight in order to be accepted, without considering the consequences. All but one focus group blamed the deliberate use of drugs (for example those meant for weight increment in animals, especially pigs), steroids and blood tonics by individuals to induce weight gain. They interpret it as 'buying' obesity. Similarly, 5 out of the 6 groups mentioned that having peace of mind can equally make one gain weight because it could be an indication of economic affluence and absence of worry or financial difficulties. Contrary to this, the other group pointed out that some people become obese even under difficulties because they practice 'emotional eating.'

The focus groups with high education insisted that parental influence and care practices play a major role in the development of overweight and obesity in a child and later adult obesity, particularly if he or she is an only child. One mother explains:

- *"I would also say that those who have no siblings, thus the only child of their parents. Because there is so much money to pamper such children, you will realize that their foods are over-nutritious. My neighbour for instance, got her fufu ready by 6am because the husband liked fufu. So morning, afternoon, evening she pounded fufu for him. The man later*

became diabetic so he passed on. So now the mum is left with just the child. The child has become so obese. Because the father liked fufu, the child also likes fufu. So sometimes, when someone is an only child and the parents are rich, over-pampering can make the child obese. Because whatever the child wants will be given to him or her and the child will not do any work to burn fats” (Overweight or obese/ high education, Group 4).

Few mothers, although they did not state specifics, also drew attention to the possibility that certain intravenous fluids given as emergency measure in hospitals may trigger weight gain. Others were of the view that patients with medical conditions such as diabetes, kidney disease as well as psychiatric problems are given drugs that induce weight gain. This is because most people who were not overweight or obese before become so not long after diagnosis and during treatment. They explained that these instances induce hunger and appetite in patients and make them overeat in such a way that necessitates immediate sleeping and inactivity. One mother added that alcohol and hard drugs can also cause similar effect on users. She said:

- *“Also taking alcoholic beverages like beer or gin. After taking it, it makes them eat a lot and then those on drugs like cocaine, heroin and others, those of them who are cautious and conscious they eat a lot...”*
(Overweight or obese/ high education, Group 4).

Another comment made by a participant illustrates the effect of alcohol intake while breastfeeding, on infant growth and subsequently, obesity.

- *“...People don’t feed their babies well. Some nursing mothers even after feeding their babies take ‘akpetshie’/ ‘alomo’ bitters [hard liquor] and still breastfeed their babies later. The babies indirectly take the alcohol and that gives them more appetite to eat and they become obese from infancy...” (Overweight or obese/ low education, Group 1).*

Environmental influences also emerged as one of the causes of overweight and obesity. Participants complained that very often food vendors and restaurants make fatty foods presentable and available to consumers. Others also take advantage of the low price to sell the cheap and unhealthy parts of meat (chicken wings, turkey tails, e.t.c.) to children in schools.

After all the issues raised by the mothers, they were asked to state which of the causes was the most important to them by whispering the answer. Those with low education ranked eating habits while those with high education ranked having peace of mind as the most important cause of overweight and obesity (Table 4.6). Meanwhile overweight and obese mothers were more likely to mention internal factors as part of the top three causes of overweight and obesity.

Table 4.6: Top three causes of overweight and obesity as ranked by participants

Overweight/ obese low education Group 1 and 2	Overweight/ obese High education Group 3 and 4	Normal weight Low education Group 5	Normal weight High education Group 6
Eating habits	Peace of mind	Eating habits	Peace of mind
Inactivity	Quality/ quantity of food	Inducing obesity using drugs	Genetic factors
Genetic factors	Genetic factors	Inactivity	Inactivity

4.4.2.2 Level of concern

Majority of the mothers agreed that one had to be concerned about being overweight or obese. However, according to some mothers from the overweight/obese and normal weight/low education groups, different stages of overweight and obesity exist. Also, the absence or presence of health complications when obese, can determine how a person carries herself. Therefore, one's level of concern is determined by one's weight status and health complications experienced. If an obese person is able to do all that is required of him or her like a normal weight individual does, then he or she does not need to be concerned. On the other hand, there is cause for concern if an obese individual is unable to do what is required of him or her due to health reasons or has been cautioned by a health worker.

- *“Yes, you have to be worried about it because if you see slim people you admire them. The madam sitting here [pointing to one of the assistants] I like her structure but am unable to get it...you see? But if I gain more weight it is a bad thing. Becoming obese has caused me two painful tragedies, I have delivered twice, yet they all died. So the doctor said if I*

continue like that, I will give birth several times and I won't have the baby because I am obese" (Overweight or obese low education, Group 1).

Almost all the mothers agreed that overweight and obesity is a problem in Ghana because the rates have increased over the past years. But two mothers from the normal weight/low education group added that obesity rate is not high in Ghana if compared to other countries in America and Europe. One group made reference to the fact that there are geographic variations in obesity prevalence even in the country.

- *"I have studied it and realized that obesity is not prevalent in the North [meaning northern Ghana]. If you study them, they are slim. They don't get so obese like we have in Greater Accra, Volta, even the Ashantis are better of. But Central Region, the Fantis, the Ewes are very obese because people who live along the coast are obese...but those in the northern parts are slimmer" (Overweight or obese/ low education, Group1).*

Meanwhile participants' opinion split on the issue of whether overweight and obesity is a recent occurrence in the country or has existed all along. They explained further that in the past however, obesity was mainly hereditary but now other factors are contributing.

4.4.2.3 Views on responsibility

All participants were expected to speak about what they felt was responsible for the increased prevalence of overweight and obesity. Major issues that emerged were the fact that obesity has increased because of economic development, lack of time and changing dietary patterns. One mother sums these up as follows:

- *“Earlier we were not buying foods in bulk. Yesterday, I was telling madam [meaning researcher] that when in my house they prepared fufu and light soup and it was the same ‘dead’ chicken [meaning frozen chicken from the cold store] which was used. I wasn’t around. They ate between 3.30 and 4pm...I don’t know why I decided to go to the kitchen. When I got there, they had soaked gari to eat. If we had not bought things in bulk, all these wouldn’t have happened. In the past, we didn’t use to do that. you go to certain houses and then you realize that a child will be frying eggs. The child will do that without the notice of the parent, but when you check the dustbin too, you will see egg shells. In the past we didn’t buy eggs in bulk. The foods that you even prescribe to the children, they will not eat it. The generation of children we have now are different. They overeat because they have access to foods. By the time you come back from work, they might have taken fish from the fridge and grilled it and eaten. So it is the trend now. You might have given your child money to go to school, perhaps they are going to El-Wak, because their friends might have bought ‘Papaye’ [fast food], they may have struggled to also go and buy those oily foods just as their friends have done. So our eating habits have drastically changed!” (Overweight or obese/ high education, Group 4).*

Most mothers admitted that there is reduced physical activity in the form of exercise—they walk less because of the improvement in transport services, infrastructure and social amenities (e.g. roads, pipe-borne water) and abundance of cars. Also, because of mothers’ desire for their children to excel academically they rather prefer that they spend

more time studying than involve them in house chores or even allow them the chance to play.

Urbanization has caused people to settle in the modernised parts of the country.

- *“Now we have all come to Accra to seek greener pastures because we think our grandparents haven’t gained anything from staying in the village and engaging in farming activities” (Overweight or obese/ low education, Group 1).*

They stated that technological advancements have led to improved agriculture. A few linked this to the common use of fertilizers and chemicals for farming and food processing that result in weight gain upon ingesting such foods because of their ability to alter genes.

- *“Fertilizers, at first there were no fertilizers and the likes seeping into our food, they were not available. The crops were planted on soil without applying any fertilizer. Therefore, no fertilizers seeped into the crops before we ate. Now our population exceeds the food available so the farmers are in a hurry to produce more in order to meet our needs otherwise we will go hungry. They put things [meaning fertilizers] in the soil that will speed up the growth of the crops and save time. They [farmers] harvest these crops, and then we buy and eat them. This is what causes problems for Ghanaians. It is clear that now, just about everyone is overweight and our stomachs are bulging. Currently most women have protruding stomachs and that is also as a result of the food they eat.*

However you can control how big your stomach becomes” (Overweight/ high education, Group 3).

- *“I wished they could even ban the importation of banana, I know a friend whose land was taken by a ‘white man’ to cultivate that. When it gets to a certain stage he just injects the banana for it to ripen early...and when he harvests it too, he will spray Carbide on it. Then they put it in plastic bags to send to Accra...by the time it gets here it will be yellowish and not long afterwards it starts to melt. It cannot survive the sunshine. It is just like how it will be when it gets into your system which also contains heat. So, while it is melting it changes your system and gives you diseases like obesity” (Overweight or obese low education, Group 1).*

The roles of advertising and food processing companies were also mentioned frequently.

- *“‘One Ghana for your pocket’ [referring to an advert in which an obese man plays a key role]. So that is an example. I don’t even know why they chose that man purposely for that advert. You see children learn easily from these things and a child might even say that s/he would want to be like that man” (Normal weight/ high education, Group 6).*

Cultural perception about larger body size also leads to overweight and obesity. In this context, there was the general perception that being overweight is preferable to being too slim.

- *In our culture too, if you are not big, you are considered as a poor person and then if you are poor, it means you are hungry. And also even when*

people are a little heavy and they wear their cloth...we praise them and say;” eei go and look Aunty Joe, she is looking very ‘fine’ but look at [pauses] ...she has become ‘chingilingi’ [local parlance for being thin]. So that encourages people to become obese. But you see people who make efforts to become obese later regret. You may want to slim down but you will be thinking of what people will be saying about you. You will even think that people may speculate that some debt is drowning you, and then it sets you thinking” (Overweight or obese/ high education, Group 4).

Another reason is the lack of information and awareness in certain areas in the country. In fact, a few mothers think that some people virtually lacked interest when it came to issues about weight. Thus, some people still hold on to socio-cultural perception about obesity.

- *“Please I would like to say that it’s only in bigger towns or cities that obesity is considered as an illness or a problem but for us in the villages, people still admire those who are obese. They still say that they look fine and if you are not gaining weight they try to find out what is wrong with you since everyone is gaining weight. I have therefore realized that, people in our rural areas have not received much education on obesity” (Normal weight/ high education, Group 6).*

4.4.2.4 Possible consequences of overweight and obesity

The mothers cited physical problems such as joint aches, bone fracture, spinal cord injury, deformities, eye defects, breathing problems and inability to exercise as consequences of overweight and obesity. They also said that chronic conditions namely

diabetes, hypertension, cancer and heart diseases are also associated with overweight and obesity and can lead to early retirement and even death. There was also the problem of ageing fast when obese. According to them, overweight and obesity may set the stage for pregnancy complications, anaemia and delivery of babies with low birth weight. These problems make overweight and especially obesity undesirable. One mother shares her frustration,

- *“I also feel that obesity is a form of disease that disturbs mankind. You can see that your stomach has protruded yet you are not pregnant. You become so uncomfortable to the extent that whether you have a dress or a cloth on, you have difficulty in breathing. You always wish to wear some ‘maternity’ dress [meaning loose clothing meant for pregnant women] or use a wrapper and sit out for fresh air. Obesity can make you get rashes in between your thighs, underneath your breast. Any part of your body that stick together and produces heat, you really suffer a lot. These are the consequences of being obese” (Overweight or obese/ low education, Group 1).*

As a result many obese individuals virtually contemplate weight loss, employing various means that may have adverse effects on their health.

Participants’ (mainly obese) primary concern was the issue of weight stigmatization which sometimes affects self-esteem. They complained that in most cases obese individuals become the object of ridicule. Many experiences recounted by them pointed to this consequence.

- *“You will hear people say, “eiii this sister has grown fat oo”. There is one obese woman in my area, anytime she is passing by, the children will be following her and calling her names...’obolo’, ‘ngozi’...they can even give you names that you don’t deserve and then they will be teasing you” (overweight or obese/ low education, Group 1).*
- *“...If you are fat and you see a slim person walking and you look at yourself, you don’t feel happy about yourself. You would wish to even get some medicine to take and slim down” (overweight or obese/ low education, Group 1).*

The other concerns they had were in relation to socio-cultural issues. They felt that being obese comes with general inconveniences, discomforts, frustrations and embarrassments (e.g. not fitting in seats or spaces). Most clearly stated was that resulting from societal prejudice.

- *“Please obesity can cause you to be at a disadvantage in certain areas in life. I know a lady who was engaged to be married to a young man. At first, the lady was slim but when the man returned from completing his education after years of schooling, the lady had gained more weight and the man upon seeing her no longer wanted to marry her. He said jokingly that, if initially they used 5yards to sew the wedding gown now due to her weight increase, they would use 6 yards. Hence, this issue of obesity has become a big headache for women. For instance if you are an obese person and you board a 4-seater vehicle with three people already seated,*

a passenger can even insult you by saying 'fat woman, you have occupied a lot of space, we can hardly sit comfortably.' Even the overweight people who sit in cars can cause overload and make the tire burst [they all laugh]" (normal weight/ high education).

Other consequences of overweight and obesity that subtly emerged from the discussions were psychosocial, potentially; alcoholism and depression.

- *“Obesity has disfigured the person. Even if that person is there, he or she is not happy but depressed. So they will take alcohol to do the things they wish to do, although the person has a lot of diseases” (overweight or obese/ low education, Group 1).*

In addition, the overweight and obese mothers admitted that most of these above-mentioned consequences also acted as barriers to engaging in exercises for fear of developing pains and complications and being ridiculed, if not given constant support. They also demonstrated that the consequences of being overweight and obese go beyond just the clinical problems encountered by fat accumulation.

Yet in the discussions, the comments made by a few overweight and obese participants suggested that they were satisfied with their weight status. They also mentioned that it is desirable to be overweight or obese because in our society, people tend to respect such individuals.

4.4.2.5 Ideas on prevention

There were a variety of ideas on how to prevent overweight and obesity. Many of the recommendations were related to the following:

Education or awareness

Education was mentioned as the most important means of preventing overweight and obesity. In many instances they demonstrated that the awareness can be created through experts (dietitians, doctors, and researchers), teachers, religious leaders, the media and nationwide campaigns.

Dietary, physical activity and lifestyle modifications

Participants emphasised that eating too much or too little is not healthy but rather in moderation. By reducing meal quantities and consuming healthy diets, you are able to regulate calories that enter the body. Regular consumption of fruits and vegetables was also suggested by participants to substitute for some of those foods high in fat.

It was suggested that people need to make conscious efforts to improve physical activity. They added that obese people also need to show positive attitudes towards physical activity and weight loss and not only when it is being motivated by health. One mother proposed free weight loss facility in hospitals for obese patients.

The mothers themselves identified several approaches in which they can impact positively on their children including: involving children in house chores; inculcating healthy eating habits; encouraging consumption of home-made foods; minimising the use of high caloric foods like chocolates, toffees, cakes, fried rice etc. to substitutes for

healthy foods and as rewards for good behaviour; and taking precautionary measures if there is family history of obesity.

Good agricultural practices

Participants recommended the use of natural compost instead of artificial fertilizers for farming because they felt the fertilizers may seep into the crops and lead to overweight and obesity by altering human genes. They therefore proposed backyard gardening in order to avoid ingesting these chemicals.

Research and law enforcement

Regarding research and law enforcement, participants recommended the following: government and institutions of higher learning to commit resources to research in the area of obesity; promote the use of herbal medicine; perform routine checks at food sale points; and enforce law on import of unhealthy parts of meat, for example, turkey tail.

On the whole, the mothers appealed for a general change of mindset about preferring a larger body size.

Despite the contributions made by them towards preventing unhealthy weights, some participants disclosed the possibility of facing difficulties in adopting these strategies.

- *“...The problem is that in our homes if you observe that your relative is overweight or obese, you start having issues with them. You find it difficult to tell him or her that this food is not good for you. Maybe s/he will say*

you are envious of the food s/he is eating. Indeed, if it were not so you could easily talk to your relative about his/her weight and the kinds of foods to eat once you know his or her condition. However, s/he might misinterpret this as envy. All the same we can tell other people about eating healthy in our homes and neighborhoods. Thus, we can educate ourselves” (Overweight/ high education, Group 3).

- *“...I use ‘abobi’ [smoked herrings] and ‘koobi’ [dried/ salted tilapia] to prepare my food and when my child sees it s/he will not eat it but my sister may use chicken and beef for her stews and when s/he finds out that she has prepared the meal with chicken s/he will rather eat hers” (Normal weight/ high education, Group 6).*

It was drawn from the interventions proposed by participants that they required the concerted efforts of policy makers, researchers, parents, doctors, dieticians, teachers, religious leaders, food vendors, the media, and children. They also acknowledged the needed commitment of overweight and obese individuals to keeping healthy weights.

4.4.3 Other themes

4.4.3.1 Common terms emerging from the FGDs

4.4.3.1.1 ‘Average weight’

The use of this term revealed some of the participants’ perception of their own weight status.

- *“The average body weight is good or preferable. With her for instance [referring to one of the mothers] she can be considered as someone of average weight...Oh, you only have wider hips. You know for all of us seated here we are average weight...our weight is okay but if you should see someone who is not even bigger than a pen [meaning participant comparing thinness to how a pen appears] you might ask if she is not given enough food to eat” (Obese/ low education, Group 2).*

4.4.2.1.2 ‘Peace of mind’

In all FGDs, one interesting reason mentioned by participants for gaining weight was ‘peace of mind’. Some participants explained what this term meant to them.

- *“Peace of mind is when nothing bothers you...like you have a good marriage and nothing bothers you...whatever you want you get it...everything is at your beck and call” (overweight or obese/ low education, Group 1).*
- *“I think it’s about one’s peace of mind...If the person feels s/he can get anything s/he wants then all s/he does is to eat” (Normal weight/ high education, Group 6).*
- *“I also think that having a sound mind, one’s peace of mind can lead to obesity. This is because if you have a sound mind ,you do not have to worry about anything... you already have something to eat or drink and this can result in obesity” (Obese/ low education, Group 2).*

- *“It is also partly due to enjoying a peaceful environment. Meaning maybe before, I was not financially sound but now by God’s grace I can afford to hire a helper; one who will cook for me, one who will fetch water for me and so on. So I don’t have to worry about going out to struggle with others over money” (Overweight/ high education, Group 3).*

Yet for some of the participants, having ‘peace of mind’ does not necessarily mean the absence of environmental or social influences and financial problems but rather the fact that one is able to maintain equanimity in the midst of such influences. They explained this by saying:

- *“Yes, now there is no peace in Ghana but when you have your own peace of mind you gain weight and go your way” (Overweight/ high education, Group 3).*

4.4.2.1.3 ‘Looking fine’

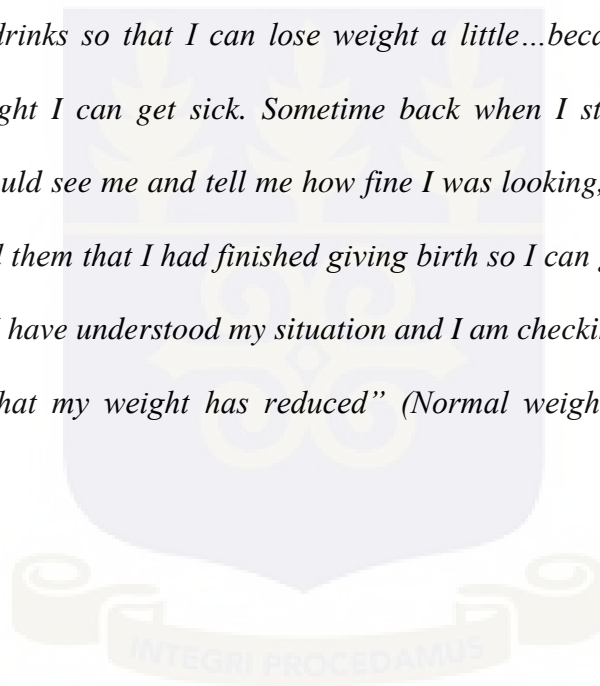
This term was used to describe the pleasant remarks made by people to someone who puts on weight. This was often related to how they appeared in certain clothes and usually indicates appropriateness and acceptability.

- *“[If the person is overweight or obese] that person is seen to be enjoying comfort and wealth. When she wears clothes especially ‘Kaba and slit’, they fit her well and people are full of admiration for her. Anything she puts on looks fine and it fits her better than a slim person. It is agreeable therefore that she can cut and design her kaba such that it exposes her*

back which is fleshy and full. For me, that is more appealing to the eye. How can you put on such design when the bones at your back appear to stand out because you are slim?” (Overweight/ high education, Group 3).

For many of the women these remarks generate a feeling of happiness and attractiveness.

- *“When I had my son, you see, I wasn’t fat but when I started gaining weight...anytime I go to the hospital, the doctor tells me not to eat sweets and soft drinks so that I can lose weight a little...because if I gain too much weight I can get sick. Sometime back when I started getting fat, people would see me and tell me how fine I was looking, I became happy, then I told them that I had finished giving birth so I can gain weight... but now that I have understood my situation and I am checking my diet, I have realized that my weight has reduced” (Normal weight/ low education, Group 5).*



5.0 DISCUSSION

5.1 Background characteristics of study mothers

Accra and Kumasi are two most urbanised cities in the country. Between these two cities differences lie in the economic levels, social and cultural (ethnic) factors (Owusu and Agyei-Mensah, 2011) which define the sociodemographic characteristics of inhabitants and thus affect their nutritional status. Accra which happens to be the nation's capital serves as the economic hub. From our study, it was observed that compared to mothers in Kumasi, those in Accra are less likely to have their own houses. Urbanization and industrialization increases the demand for houses in urban areas (Tufuor, 2009) resulting in increased preference for rented settlements because home ownership becomes more difficult and expensive for low-income earners (Boamah Addai, 2010; Owusu, 2011). Similar impacts of rapid urbanization and industrialization on home acquisition have been reported in China and Indonesia (Zhu, 2010; Zhu, 2012), India (Narain, 2009; Batra, 2013) and Latin America (Caldieron, 2013).

Our study also found that mothers in Accra had higher education but fewer children than those in Kumasi. This lends support to the notion that women who have higher education tend to have fewer children. Education influences child bearing by providing literacy skills, greater personal autonomy, and exposure to new values, ideas, and role models (Basu, 2002; Yu, 2006).

Further observation was that more mothers in Accra are heads of their households than those in Kumasi. In addition, households in Accra received less income than those in

Kumasi. This could imply that households (in Kumasi) which did not have mothers as heads may be more privileged to receive additional monetary support from other sources (family and friends) that contributed to the higher total household income. It could also mean that the women from Kumasi overestimated their total household incomes.

5.2 Prevalence of overweight and obesity among mothers

Our study recorded a high prevalence of overweight and obesity among the mothers. This was also the case for urban women who participated in the Women's Health Study of Accra (WHSA) which identified overall prevalence of 62.2% (Duda *et al.*, 2007) and other studies that reported a high prevalence of obesity among women (Abubakari *et al.*, 2008; Addo *et al.*, 2009; Amegah *et al.*, 2011; Mogre *et al.*, 2012; Pobee *et al.*, 2013). The high prevalence may have resulted because women by their physiology deposit fat more than lean mass (Lovejoy, 1998; Shi and Clegg, 2009; Taylor *et al.*, 2010) and with the possibility of engaging in sedentary lifestyles e.g. trading, they are more likely to put on excess fat. In addition, this could also be attributable to the observation that about two-thirds of the mothers were married and the potential influence of marital status (Averett *et al.*, 2008) shown in the consumption of 'richer' foods when married and perhaps pressure from spouses to gain weight coupled with female gender (O'Sullivan, 2011) may have exposed our study mothers to weight gain. Malhotra *et al.* (2008) found that female gender and being married were associated with a high BMI. Also, postpartum weight gain that is not shed off accumulates with parity (Onyango *et al.*, 2011).

5.3 Determinants of overweight and obesity among mothers

5.3.1 Occupation

Our participants were mostly traders. This study identified occupation, specifically trading as the only predictor of overweight among the mothers. In Ghana and typical of most African countries, buying and selling trade is dominated by women and the setting for this is usually either open markets or structures like table-tops and shops. Apart from a few who are hawkers and therefore move about with their wares, majority sit behind their wares. Others employ the services of assistants to do the physical tasks of loading, unpacking, and delivering, while they remain sedentary throughout the day. This sedentary behaviour may contribute to weight gain among women.

5.3.2 Household income

The study results show that obesity was common among mothers in the highest income category and was in agreement with other research findings (Steyn et al., 2011; Uthman 2009; Abdulai, 2010). Households with high income tend to purchase food in bulk spending more on both healthy and less healthy foods (French *et al.*, 2010) and are more likely to over-consume food. Hanson et al. (2007) and Rolls (2009) have also reported that overweight and obesity are not always confined to households with high income but affects low income households as well. This is because low-income households compared to high income ones tend to buy and consume foods of low quality (Kaufman *et al.*, 1997; Drewnowski and Specter, 2004) like sugar sugar-sweetened beverages (French *et al.*, 2010) and large portions of high-energy staples and cheaper parts of meat since they are less expensive.

5.3.3 Number of births (Parity)

Our finding generally supports the existing literature (Koch *et al.*, 2008; Ertem *et al.*, 2008; Chu *et al.*, 2009; Cohen *et al.*, 2009; Luoto *et al.*, 2011; Gupta and Kapoor 2012; Bobrow *et al.*, 2013) that high parity increases likelihood of overweight and obesity. This is not surprising because more than two-thirds of the mothers had more than one child. We expected the risk of obesity to significantly increase among mothers with 4 or more children. However, contrary to what others found (Steyn, *et al.*, 2011) obesity was more common among those with 3 children but not those with 4 or more. Although this study controlled for several sociodemographic variables, it did not capture in the analysis the possible influences of inter-pregnancy intervals, diet, physical activity, ethnic differences, cultural and other behavioural factors that are also known to modify the relationship between parity and weight gain (Wolfe, *et al.*, 1997; Lee *et al.*, 2005; Koch, *et al.*, 2008; van Propel *et al.*, 2012; Davis *et al.*, 2013). Also, it is likely that the study did not have enough power to detect differences by parity.

With respect to income and number of births, there was a trend towards an increase in the likelihood of being overweight or obese. This means that as household income or parity increased, obesity also increased. This observation is similar to that found among Kenyan women (Steyn *et al.*, 2011). Another study by Mendez *et al.* (2004) among women in Jamaica found the prevalence of obesity to increase with income. However, Sutherland *et al.* (2013) found that obesity was significantly associated with lower household income levels but with increasing parity.

Despite the differences in educational level, residential status, income, household position and number of births, no significant difference was observed in overweight and obesity prevalence between mothers in the two cities. It is not surprising therefore that area of residence (residing in Accra or Kumasi) did not significantly predict overweight or obesity among mothers. This implies that mothers from Accra and Kumasi are similarly affected by the urbanised environmental conditions.

5.4 Mothers' perception of overweight and obesity based on focus group discussions

5.4.1 Knowledge of overweight and obesity

Apart from one mother who related obesity to weight and height, none of the participants used suggested BMI classifications to define overweight or obesity. This means that the mothers were not familiar with BMI and therefore could not readily relate overweight or obesity with it. Thus, they recognised overweight or obesity mainly by appearance, activity level, metabolism and eating habits of an individual and used these as primary means of defining the conditions. This observation was also made by Sikorski et al. (2012) that mothers who are not conversant with BMI terms tend to use other means such as mentioned above. Mothers need to be educated on objective methods of classifying BMI.

The media and health workers seem to play an important role in the dissemination of information about overweight and obesity. One mother raised the point that she decided to lose weight because she was warned about the health consequences at the hospital. Education about obesity could be intensified in hospitals but must be modelled in a way

that benefits all women irrespective of weight status. An appreciable number of mothers also connected their knowledge of the conditions to radio, television and print media. However, considering that their acquisition of knowledge on overweight and obesity was merely accidental is indicative that there is no consistent effort to reach women with health issues.

In this study, the term ‘external’ factor is used to describe the cause of overweight and obesity that is modifiable. Our participants cited both internal (e.g. genetic factors, birth weight, emotional problems, pregnancy) and external (e.g. diet, physical activity) factors as causes of overweight and obesity. Mothers ranked more external factors as the most important causes of overweight and obesity. In line with other studies (Goncalves *et al.*, 2012) the internal factors were rather emphasized by the overweight and obese groups in our study. They were also of the belief that these factors interfere with the attainment of healthy weight among the obese. Attributing weight gain to factors they have little or no control over is a means of reducing self-blame among the obese. This attitude although has been proven to positively influence weight loss (Lewis *et al.*, 2012), has also been found to encourage complacency in other instances (Meisel and Wardle, 2013). Complacency and satisfaction with weight status may be the reason some overweight or obese Ghanaian mothers may not bother to make efforts to control their weight.

5.4.2 Level of concern

Participants correctly mentioned that overweight and obesity are prevalent among women in Ghana as several studies have reported (Abubakari *et al.*, 2008; Amegah *et al.*, 2011;

Mogre *et al.*, 2012) and our study also confirmed it. They also correctly reported that geographic variations exist in overweight and obesity prevalence in Ghana (Dake *et al.*, 2010). It is a concern that some overweight and obese mothers do not regard obesity as a serious health issue. They held on to the notion that one should only be concerned only when health problems accompanied weight gain. This suggests that issues about overweight or obesity may not be important to these women unless they have the confirmation that a clinical condition they may be facing is as a result of their weight status. Duda *et al.* (2007) and Benkeser *et al.* (2012) also reported that Ghanaian women would take weight loss seriously when it was central to health.

5.4.3 Views on responsibility

Regarding the drivers of obesity, participants named economic development, lack of time, changing dietary patterns, reduced physical activity, urbanization, technological advancement, cultural perceptions, food processing, advertisement and apathy. These factors cited also reflect what others have confirmed in literature (Reardon and Berdegue, 2002; Lobstein, 2005; Apovian, 2010; Goncalves *et al.*, 2012) to be responsible for the high rate of overweight and obesity.

5.4.4 Possible consequences of being overweight or obese

Overall, consequences of overweight or obesity were linked with greater perceived risk for clinical problems, economic problems, how receptive the society is towards those who have the conditions and how those who are affected are able to handle their situation. Diabetes, hypertension and heart diseases are undoubtedly common with

obesity (Flint *et al.*, 2010). Obese individuals can also develop various forms of dermatological conditions and diseases that appear on the arms, breasts, buttocks, abdomen and thighs (Yosipovitch *et al.*, 2007). Therefore participants were familiar with this kind of information as these diseases appeared throughout all the discussions as consequences of overweight and obesity. Mothers correctly identified pregnancy complications, anaemia and delivery of low-birth-weight babies as consequences of obesity. This is also information that they gathered from their own experiences and that of relatives and friends. In view of these consequences, obese women are usually advised to have limited or no weight gain during pregnancy (Odom, 2006).

Modifiable sedentary behaviours including television-viewing, sleeping, reading, writing, driving and spending long hours behind the computer are related to reduced physical activity, and the risk of obesity, cardiovascular diseases and diabetes in women and children (Jakes *et al.*, 2003; Tucker and Tucker, 2011). Reports from other qualitative studies suggest that often obese individuals are burdened with disabilities (Peeters *et al.*, 2004) and thus are unable to indulge in physical activity because they are self-conscious, feel pressure from their weight (Schmalz, 2010; Nantel *et al.* 2011), feel pains and aches, and lack self-discipline (Hoebeke, 2008; Napolitano *et al.*, 2011). This explains why overweight and obese mothers from the FGDs acknowledged some of the consequences of overweight and obesity as barriers to physical activity. It implies that their attitude towards keeping a healthy weight is likely to be negatively affected because controlling their weight through increased physical activity becomes a problem. Meanwhile physical activity (exercising) is strongly recommended as it contributes immensely to weight

control and overall health of an individual (Wing *et al.*, 2009; Kimokoti *et al.*, 2010; Foster-Schubert *et al.*, 2012). Nonetheless some researchers also recommend arm ergometry (Henry, 2010) which is usually non-weight-demanding for obese individuals who are unable to do intensive exercise.

Obese individuals experience all forms of discrimination (Puhl and Heuer, 2009). We found that participants persistently mentioned how the Ghanaian society encourages overweight and obesity among women yet later ridicule, discriminate and disapprove their weight status. Citing this point in any of the discussions always received much emphasis. One other striking observation was that unlike in one study in Nepal (Simkhada *et al.*, 2011) where participants of a FGD gave less negative descriptions of themselves, overweight/obese participants in our study gave even more negative descriptions of themselves than the normal weight participants. This is an observation that tells how overweight and obese people perceive themselves to be and is often because of how society also views them (Lapinski and Rimal, 2005; Siervo *et al.*, 2006). It usually forms the basis for weight stigmatization, particularly self-stigmatization (Cossrow *et al.*, 2001). Behavioural research has shown that when stigmatized people are blamed for their condition, they tend to internalize and have negative perception of themselves (Puhl *et al.*, 2007; Rahman and Berenson, 2010; Vieir *et al.*, 2011). Such people (especially women) can resort to finding comfort in foods and binge drinking because they become depressed (Laitinen *et al.*, 2002; Dallman *et al.*, 2003; Angle *et al.*, 2009; Dallman *et al.*, 2010). Others even practice improper and chronic dieting

(Thompson *et al.*, 1995) and that becomes detrimental to their health. Participants even made contributions to attest to these behaviours.

5.4.5 Ideas on prevention

The general emphasis on education or awareness by mothers was laudable as it has the potential to stimulate behaviour change. However, research has shown that awareness alone is not enough to cause the change (Aryeetey and Ansong, 2011). This is because most interventions that apply only education or awareness without narrowing down to target group (Wardle *et al.*, 2001) or adjusting the physical, social and cultural environment of individuals, have less impact.

Preventing overweight and obesity comes with challenges (Malterud and Tonstad, 2009). It is therefore not surprising that mothers also enumerated instances when they had problems. To paraphrase what one mother said, to caution a person about her diet or inactivity may be interpreted as being envious of her wealth in a culture where big size is equated to 'good living'.

5.5 Strengths and limitations of the study

Arguably, however, caution needs to be exercised in generalising our finding on the high prevalence of overweight and obesity. The first reason is sampling procedure employed. In this study, parents were automatically eligible for participation by virtue of their child being selected. They were not given the equal chance of selection as their children. Thus the findings are not representative of Ghanaian women in the two cities.

Secondly, majority of the school children whose biological mothers participated in the study were from private schools (64.6%, Figure 3.3). Households of children in private schools usually have a relatively higher SES than those in public schools in Ghana. The disparity between households in terms of SES may have introduced bias and perhaps accounted for the high prevalence of overweight and obesity among the mothers as observed.

Nonetheless, the high prevalence of overweight and obesity observed for participants should not be overlooked entirely but should be given the necessary attention and support it deserves as with a nationally-representative sample because the implications for overall health are comparable. Ultimately, our concern and motivation should be to promote healthier lifestyles that will consequently curb the problem among Ghanaian women.

Again our study draws strength from the fact that it is a large sample study that provides information on biological mothers of Ghanaian school children who are between the ages of 9-15 in two large cities. Availability of information on the nutritional status of this group of children is limited. Therefore, information on the extent of the problem of overweight and obesity among school children has been provided by the main study. This study also provided the opportunity to also investigate the extent of the problem of overweight and obesity among the mothers of these children so that it serves as a useful tool in informing intervention approaches for the conditions among women in Ghana.

We attempted to explore the views of mothers by stratifying on level of education because of the expectation that each group would present unique views on the subject. However, except for the differences observed for ranking the causes of overweight and obesity, the content of the discussions was not different between the two strata. This should not deter future researchers from doing same but rather pursue this through different avenues. What could be done differently would be to explore in a wider education gap, for example, by comparing views of mothers who have no formal education to those who have at least SHS or tertiary education to allow for possible differences in perception.

One major limitation of the FGDs was the small cell (sample) sizes obtained for 4 out of the 6 focus groups. It is worth mentioning that the findings in the 4 groups were comparable in content and were consistent with that of the other 2 large sample size groups reflecting a wide range of opinions. Another precaution taken was that in our study the FGDs were done in duplicates for the overweight or obese groups in order to elicit some of the differences that may exist. Yet, this does not dispute the fact that FGDs involving small sample sizes although may provide useful information, may not allow for dynamism and rigor often associated with larger sample sizes. We therefore acknowledge that the small cell size may also be the reason for not detecting substantial differences in the two education strata used.

In our case also, the FGDs were done several months after the quantitative data collection (survey) by which time the mothers' enthusiasm may have been affected considerably

and hence the reduction in attendance despite the appreciable efforts to revamp their interest. Future research intended to replicate our approach should endeavour to collect both qualitative and quantitative data concurrently in order to minimize the effect of such delays.



6.0 CONCLUSIONS AND RECOMMENDATIONS

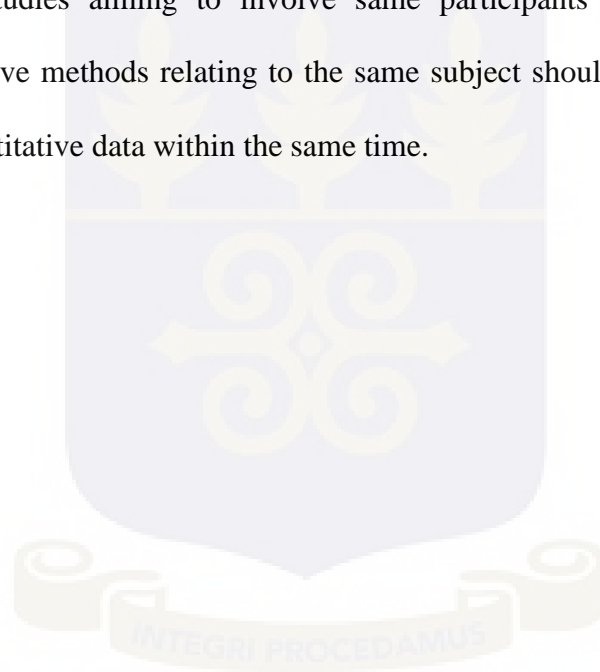
6.1 Conclusions

Overweight (35.0%) and obesity (42.8%) were prevalent among the study mothers. Mothers from Accra differ significantly from those in Kumasi by their education, residential status, household income, number of births and household position. Overweight was more common among traders while mothers from households with the highest income category and those with 3 children were more at risk of obesity. Mothers had adequate knowledge about overweight and obesity. They perceived overweight and obesity, especially obesity as problematic conditions that mainly require changes in lifestyles and environment. The country should take advantage of this knowledge and mount a serious educational campaign about the need for adopting healthy lifestyles, improving eating habits and increasing physical activities. Mass education should make people aware about the health risks associated with overweight and obesity.

6.2 Recommendations

- Further studies needs to be done in a similar setting to investigate what accounted for the reduction in the likelihood of mothers with 4 or more children being obese.
- Concerted efforts involving all stakeholders should be made to reduce the prevalence of overweight and obesity among women in Ghana. There is the need for women to adopt healthy lifestyles and for all to consider the concerns put forward by the mothers as they could be beneficial in reducing overweight and obesity in Ghana.

- Radio, television, hospitals and schools (Parents and Teachers Association-PTA) since were the main sources of information for the mothers who participated in this study. Therefore, education of mothers could be channeled through these sources to create awareness.
- Also, future interventions targeting overweight and obese women should include behaviour modifications and strengthening of food policies in order to check the general inflow and sale of unhealthy foods.
- Future studies aiming to involve same participants in both qualitative and quantitative methods relating to the same subject should collect both qualitative and quantitative data within the same time.



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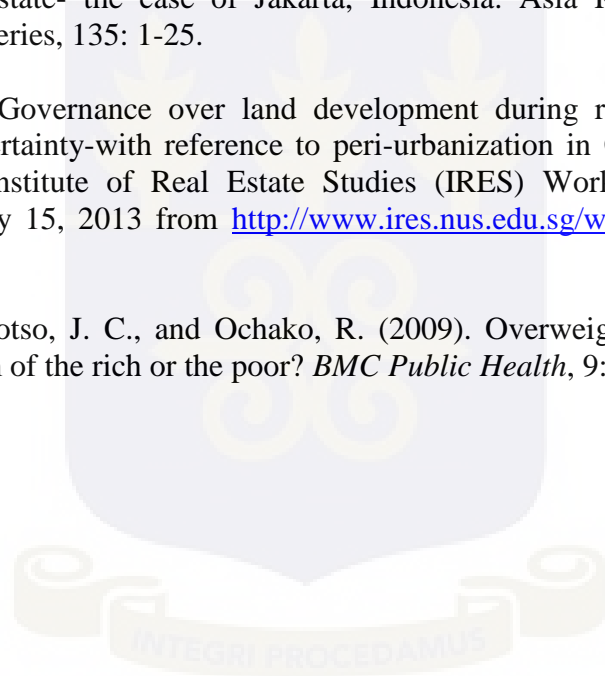
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APPENDIX 1

NOGUCHI MEMORIAL INSTITUTE FOR MEDICAL RESEARCH
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INSTITUTIONAL REVIEW BOARD



Post Office Box LG 581
Legon, Accra
Ghana

My Ref. No. DE.11
Your Ref. No.

4th July, 2012

ETHICAL CLEARANCE

FEDERALWIDE ASSURANCE FWA 00001824

IRB 00001276

NMIMR-IRB CPN 004/09-10 revd. 2012

IORG 0000908

On 4th July, 2012, the Noguchi Memorial Institute for Medical Research (NMIMR) Institutional Review Board (IRB) at a full board meeting conducted continuing review and approved your protocol titled:

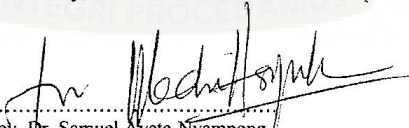
TITLE OF PROTOCOL : **Prevalence of childhood obesity and its risk factors among school-age children in two urban cities of Ghana**
PRINCIPAL INVESTIGATOR : **Anna Lartey, PhD & Grace Marquis, PhD**

Please note that a final review report must be submitted to the Board at the completion of the study. Your research records may be audited at any time during or after the implementation.

Any modification of this research project must be submitted to the IRB for review and approval prior to implementation.

Please report all serious adverse events related to this study to NMIMR-IRB within seven days verbally and fourteen days in writing.

This certificate is valid till 3rd July, 2013. You are to submit annual reports for continuing review.

Signature of Chairman: 
Rev. Dr. Samuel Ayete-Nyampong
(NMIMR – IRB, Chairman)

cc: Professor Alexander K. Nyarko
Director, Noguchi Memorial Institute
for Medical Research, University of Ghana, Legon

APPENDIX 2

NOGUCHI MEMORIAL INSTITUTE FOR MEDICAL RESEARCH
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INSTITUTIONAL REVIEW BOARD



Post Office Box LG 581
Legon, Accra
Ghana

My Ref. No: DF.22
Your Ref. No:

5th September, 2012

ETHICAL CLEARANCE

FEDERALWIDE ASSURANCE FWA 00001824

IRB 00001276

NMIMR-IRB CPN 009/12-13

IORG 0000908

On 5th September, 2012, the Noguchi Memorial Institute for Medical Research (NMIMR) Institutional Review Board (IRB) at a full board meeting reviewed and approved your protocol titled:

TITLE OF PROTOCOL : **Perception of overweight and obesity among Ghanaian mothers**

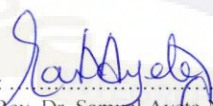
PRINCIPAL INVESTIGATOR : **Emelia Yaa Ayesu (MPhil Student)**

Please note that a final review report must be submitted to the Board at the completion of the study. Your research records may be audited at any time during or after the implementation.

Any modification of this research project must be submitted to the IRB for review and approval prior to implementation.

Please report all serious adverse events related to this study to NMIMR-IRB within seven days verbally and fourteen days in writing.

This certificate is valid till 4th September, 2013. You are to submit annual reports for continuing review.

Signature of Chairman: 
Rev. Dr. Samuel Ayete-Nyampong
(NMIMR – IRB, Chairman)

cc: Professor Kwadwo Koram
Director, Noguchi Memorial Institute
for Medical Research, University of Ghana, Legon

APPENDIX 3

INFORMED CONSENT – For Parents

A study to assess the extent of childhood obesity and its risk factors among school children in selected urban settings of Ghana.

Principal Investigators: ¹Anna Lartey (PhD), ²Grace Marquis (PhD)

¹Department of Nutrition and Food Science, University of Ghana / ²School of Dietetics and Human Nutrition, McGill University, Canada

Study Sponsor: International Development Research Center (IDRC), Canada

Introduction

Childhood obesity is a problem in many parts of the world. In Ghana, childhood obesity is seen mainly in urban cities. There is concern about overweight and obese children because they are likely to be obese adults. Obesity sets the stage for many chronic diseases such as diabetes, hypertension and heart diseases in adulthood. The extent of the problem among urban Ghanaian school children is not known. This study is to find out how common obesity is among school-age children in two cities (Accra and Kumasi) and to determine what contributes to the problem. It is hoped that through this study we can develop appropriate approaches to encourage healthy eating habits for school children.

Study procedures

This study will involve school children between the ages of 9-15 years and their parents. You are being contacted to participate in the study because your child has been selected to participate. If you agree to participate, we will make an appointment with you (the mother/father or guardian), to come to your child's school to help us fill a questionnaire about your household. You will answer questions such as your age and educational level, occupation, tenancy status and relevant household possessions.

We will take the following measurements on you if you are the biological parents: weight, height, waist and hip circumference. This will enable us determine whether there is an association between parents' measurements and that of the child. We will determine the amount of fat in the body by using a simple machine. For this measurement, you will stand on the machine (which is also a weighing scale) for a few minutes for body fat to be read directly

We will collect information on your diet/food intake and physical activity.

Duration of study

You and /or your spouse will be in the study for 1 day (just about two hours) during which we will collect information about your household and your body measurements.

Benefits

The results of the body measurements will be given to you. There will be no other direct benefits to you or your partner for participating in this study. However, the information provided from the study will help us in the near future to understand the extent of childhood obesity in Ghana and how we can develop appropriate educational approaches for proper eating habits among school-aged children.

Risks to the individual

There are no foreseeable risks associated with this study.

Costs

There is no cost to participate in this study.

Compensation

You will be given information on your nutritional status.

Confidentiality

All data collected will be kept in strict confidence and used for purely research purposes. No information by which you can be identified will be released or published. Subjects will not be identified by name during data entry and in any project report. The study investigators at University of Ghana and McGill will have access to the study data. Data will be kept for ten years after the study ends in locked cabinets and secured computers at the University of Ghana and McGill University. Original questionnaires will be destroyed after the period of storage.

Voluntary participation and subject rights

Participation in this study is voluntary. If you or your spouse refuses to participate in the study, this will not affect you, your spouse in any way. You can choose to withdraw from the study at any stage without penalty or loss of benefits to which you are entitled. Please feel free to ask questions at any time regarding this study. You will be given a copy of this consent form.

Contact

Please contact the Principal Investigator or Co-Investigator at the following address if you have any further questions, need clarifications about your rights or experience any problems in this study:

Prof. Anna Lartey

Department of Nutrition and Food Science, University of Ghana

P.O. Box LG 134, Legon.

Tel: 021-513294 or 0244237188 (mobile)

E-mail: aalartey@ug.edu.gh

Dr. Grace Marquis

School of Dietetics and Human Nutrition, McGill University

21,111 Lakeshore Dr.
Ste-Anne-de-Bellevue, Quebec, Canada
Tel: +1-514-398-7839 (Canada)
E-mail: grace.marquis@mcgill.ca

Declaration by Parent /Guardian

“THE STUDY HAS BEEN EXPLAINED TO ME AND MY QUESTIONS HAVE BEEN ANSWERED TO MY SATISFACTION. I CONSENT TO PARTICIPATE IN THIS STUDY. I DO NOT WAIVE MY CHILD’S LEGAL RIGHTS BY CONSENTING TO HIS/HER PARTICIPATION IN THIS STUDY. MY SPOUSE AND I DO NOT WAIVE OUR LEGAL RIGHTS BY CONSENTING TO PARTICIPATION IN THIS STUDY”.

Parent’s name

Parent’s signature

Date

Spouse is available to participate _____yes; _____no

Spouse’s name

Spouse’s signature

Date

Child’s name

Researcher’s signature

Date

APPENDIX 4

INFORMED CONSENT DOCUMENT UNIVERSITY OF GHANA, NUTRITION AND FOOD SCIENCE DEPARTMENT

Title of study: Perception of overweight and obesity among Ghanaian mothers

Investigators: Emelia Yaa Ayesu (Graduate student)
Prof. Anna Lartey (PhD) (Supervisor)
Dr. Esi Colecraft (Dr. PH) (Co-supervisor)

General Information about Research

This is a research study. This form is to seek your willingness to participate. You can ask questions at any time. The purpose of this study is to know your views on overweight and obesity. You are being invited to be part of this study because of your previous participation in the IDRC Childhood obesity study.

Description of Procedures

If you agree to participate in this study, you will be part of a small group discussion involving other women. About eight women will be in the group. As part of the discussion, you will be asked questions about what the term overweight or obesity means, the causes and the severity of the condition in Ghana. Also, you will be asked to share any personal experiences (if any) concerning your weight. Suggestions on what could be done to reduce the occurrence of overweight or obesity in women will be sought from you. You will be required to freely respond to these questions. The discussions may take up to two hours and will be recorded on tape. If at any point you feel uncomfortable during the interaction you may skip any question you do not wish to answer. However, your contribution to this discussion will help us.

Possible Risks and Discomforts

There are no risks involved in participating in this study.

Possible Benefits

There is no direct benefit to you for participating in the study. However, the information gained in this study will aid in coming up with practical and acceptable means of controlling overweight and obesity among women in Ghana.

Confidentiality

Information about you will be kept confidential. Only study investigators would have access to the records. The tape recording is just a means to recollect what each member contributed. You will not be named in any reports. The records of the study will be stored in locked cabinets at the Department of Nutrition and Food Science of the University of Ghana. However, the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your record for quality assurance and data analysis.

Compensation

You are not required to pay anything. You will receive a thank you gift (4 cakes of soap) as compensation for your time and effort for participating. We will reimburse your cost of transportation to the interview venue.

Voluntary Participation and Right to Leave the Research

Your participation in this study is completely voluntary. You have the right to refuse to take part in the study or withdraw at anytime. This will not result in any penalty or loss of benefits.

Contacts for Additional Information

If you have any questions about your rights as a research participant you can contact Emelia Yaa Ayesu (Tel: 0244445053; emie20045@yahoo.com), Prof. Anna Lartey (0302-513294; aalartey@hotmail.com).

Your rights as a Participant

This research has been reviewed and approved by the Institutional Review Board of Noguchi Memorial Institute for Medical Research (NMIMR-IRB). If you have any questions about your rights as a research participant you can contact the IRB Office between the hours of 8am-5pm through the landline 0302916438 or email addresses: nirb@noguchi.mimcom.org or HBaidoo@noguchi.mimcom.org .

VOLUNTEER AGREEMENT

The above document describing the benefits, risks and procedures for the research title (*Perception of overweight and obesity among Ghanaian mothers*) has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

Date Name and signature or mark of volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the research.

Date Name and signature of witness

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

Date Name Signature of Person Who Obtained Consent

APPENDIX 5

**DEPARTMENT OF NUTRITION AND FOOD SCIENCE, UNIVERSITY OF GHANA / MCGILL
UNIVERSITY, CANADA**

**QUESTIONNAIRE TO ASSESS THE PREVALENCE AND DETERMINANTS OF OBESITY
AMONG PUPILS IN SELECTED URBAN PRIMARY AND JUNIOR HIGH SCHOOLS IN
GHANA**

QUESTIONNAIRE FOR PARENT

A. BACKGROUND INFORMATION

CODE

- | | | | |
|---|---|---------|--|
| 1. Date of interview (dd/mm/yy) | | DATE | __/__/__ |
| 2. Parent/Child ID | | PARTID | <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> |
| 3. School ID | | SCHID | <input type="text"/> <input type="text"/> <input type="text"/> |
| 4. Name of school and type | | SCHTYPE | <input type="text"/> |
| 1. Private 2.Public | | | |
| 5. Name of child | | | |
| 6. Region: | 1. Accra 2. Kumasi | REGION | <input type="text"/> |
| 7. Name of respondent | | | |
| 8. Sex of respondent | 1=Male 2=Female | SEXRES | <input type="text"/> |
| 9. Age of respondent (completed years)..... | | AGERES | <input type="text"/> <input type="text"/> |
| 10. What is your relationship with the child involved in the study?
1=Biological son/daughter 2= Niece/Nephew 3=Non-biological son/daughter
4= Brother/Sister | | RELCH | <input type="text"/> |
| 11. Marital status: | 1=Single 2=Married 3.=Separated/Divorced 4=Widowed/Widower | MARSTAT | <input type="text"/> |

B. SOCIODEMOGRAPHIC INFORMATION

- | | | | |
|--|--|---------|----------------------|
| 12. Head of household: | 1=Father 2= Mother 3= Other (specify) | HEDHSE | <input type="text"/> |
| 13. Educational level of mother/Guardian(female) | 1= Primary/Elementary 2= Secondary 3= Post secondary
4= Tertiary 5= None 6=Don't know 7= Other (specify) | EDUMTH | <input type="text"/> |
| 14. Number of years of education completed by mother:..... | | EDUMYRS | <input type="text"/> |
| 15. Educational level of father/Guardian(male) | 1= Primary/Elementary 2= Secondary 3= Post secondary
4=Tertiary 5=None 6=Don't know 7= Other (specify) | EDUFTH | <input type="text"/> |
| 16. Number of years of education completed by father:..... | | EDUFYRS | <input type="text"/> |

17. Occupation of mother/Guardia OCUMTH
 1=Artisan (Carpenter, hairdresser, seamstress etc.)
 2=Professionals (Teacher, lawyer, accountant)
 3=Office worker (Secretary) 4=Trading 6=Don't know 5=Not employed
18. Occupation of father/Guardian: OCUFTH
 1=Artisan (Carpenter, mason, tailor etc.)
 2=Professionals (Teacher, lawyer, accountant)
 3=Office worker (Secretary) 4=Trading 5=Don't know 6=Not employed
19. Residential status: RENSTAT
 1= Own house 2= Family house 3= Rented house
 4=Company/mission house 5=Government house 6=Caretakers
20. How many persons are in your house hold? HHSIZE
21. How many children ≤ 15 years are there in your household? HWCHN
22. How many children have you given birth to? _____ children CHILDBTH
23. On the average, how much income comes into the house per month in GHC? HHINC
 1= <100 2=100-300 3= 300-600 4=600-900
 5=1000-3000 6= >3000
24. What fraction of income of the household is the above? FRAINCM
 1=Total income 2=Partial income

Name of interviewer: _____
 Signature of interviewer: _____

E ANTHROPOMETRY FOR PARENT

1. Date of interview (dd/mm/yy)		DATE	__/__/__
2. Parent/Child ID		PARTID	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
3. School ID		SCHID	<input type="text"/> <input type="text"/>
4. Name of school and type		SCHTYPE	<input type="text"/>
1. Private 2.Public			
5. Name of child			
6. Region: 1. Accra 2. Kumasi		REGION	<input type="text"/>
7. Name of respondent			
8. Sex of respondent 1=Male 2=Female		SEXRES	<input type="text"/>
9. Age of respondent (completed years).....		AGERES	<input type="text"/> <input type="text"/>
Waist Circumference (cm):	WC1	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> WC2 <input type="text"/> <input type="text"/> <input type="text"/>
Hip Circumference (cm)	HPC1	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> HPC2 <input type="text"/> <input type="text"/> <input type="text"/>
Height (cm):	Ht1	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>
Weight (kg):	Wt1	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>
BMI(kg/m ²)	BMI1	<input type="text"/> <input type="text"/>	<input type="text"/>
Percent Body Fat (%):	PVF1	<input type="text"/> <input type="text"/>	<input type="text"/>
BMR (Kcal)	BMR1	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
Impedance (Ω):		<input type="text"/> <input type="text"/> <input type="text"/>	
Fat Mass(kg):	FM	<input type="text"/> <input type="text"/>	<input type="text"/>
Fat Free Mass (kg):	FFM1	<input type="text"/> <input type="text"/>	<input type="text"/>
Total Body Water (kg):	TBW	<input type="text"/> <input type="text"/>	. <input type="text"/>
Blood pressure (mmHg) (SBP/DBP):		<input type="text"/> <input type="text"/> <input type="text"/>	/ <input type="text"/> <input type="text"/> <input type="text"/>
Are you on any hypertensive drugs:	1=Yes		2=No

APPENDIX 6

FOCUS GROUP DISCUSSION GUIDE UNIVERSITY OF GHANA, NUTRITION AND FOOD SCIENCE DEPARTMENT

Title of study: Perception of overweight and obesity among Ghanaian mothers

Investigators: Emelia Yaa Ayesu (Graduate student)
Prof. Anna Lartey (PhD) (Supervisor)
Dr. Esi Colecraft (Dr. PH) (Co-supervisor)

QUESTIONS

1. Knowledge and causes of overweight/obesity

1.1 Can you describe to me what overweight or obesity means to you?

(Probe: differences between normal weight, overweight and obesity)

1.2 What is the source of your knowledge?

(Probe: how you came by the source, accidental, effort,)

1.3 How can you tell if a person is overweight/ obese?

(Probe: appearance, activity level, breathlessness, overeating, reasons for saying so)

1.4 What causes a person to be overweight/ obese?

(Probe: among the causes which are the most important to you?)

2. Levels of concern about the issue

2.1 Should one be concerned if overweight/ obese?

(Probe: both positive and negative responses)

2.2 Is overweight/obesity a problem in Ghana?

(Probe: why?)

2.2 Do you think it is a recent occurrence in this country or has existed all along?

3. Views on responsibility

3.1 If yes to any of the two in 2.2, what could be driving overweight and obesity in Ghana?

3.2 How do you think people perceive obese persons?

(Probe: normal, not overweight, overweight, obese, etc.)

3.3 What are the cultural perceptions or views about overweight and obesity?

3.4 What are your own views about this?

4. Possible consequences of being overweight

4.1 Is being overweight or obese desirable?

(Probe: why?)

4.2 What are some conditions you believe may be associated with obesity?

5. Ideas on prevention

5.1 What could be done to address overweight and obesity in Ghana?

5.2 Who should be involved?

(Probe: for as many actors as possible)

APPENDIX 7

GHANA EDUCATION SERVICE

*In case of reply the number and date of
this letter should be quoted*



HEADQUARTERS
Ministry Branch Post Office
P.O. Box M. 45
ACCRA

My Ref. GES/DG/038/11/35

REPUBLIC of GHANA

17th June, 2009

THE PROJECT PRINCIPAL INVESTIGATOR
DEPT. OF NUTRITION AND FOOD SCIENCES
UNIVERSITY OF GHANA, LEGON,
ACCRA

Dear Madam,

**STUDY ON CHILDHOOD OBESITY IN PRIMARY AND JUNIOR HIGH SCHOOLS
IN ACCRA AND KUMASI**

We acknowledge receipt of your letter of 15th June 2009 on the above subject.

Note has been taken of the proposed study areas and your desire to collaborate with our School Health Education Programme (SHEP), in the process.

By this letter therefore, you have been given approval to conduct the proposed study in schools in collaboration with SHEP. Management looks forward to your report findings and recommendations on completion of the study.

We trust that heads of schools, both private and public will accord you the necessary courtesy and assistance.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Samuel Bannerman-Mensah'.

SAMUEL BANNERMAN-MENSAH
DIRECTOR-GENERAL

Cc: Deputy Director-General, GES HQ, Accra
All Divisional Directors, GES HQ, Accra
Director BED/SED, GES HQ, Accra
Regional Director, GES, GAR
Regional Director, GES, Ashanti

GHANA EDUCATION SERVICE

Tel: 24571 / 33621/28308

In case of reply the number
and date of this letter
should be quoted

Our Ref No : GES/ASH/KM/



REPUBLIC OF GHANA

Metro Education Office
P.O. Box 1918
Kumasi – Ashanti
Ghana

13th January, 2011.

**HEADS OF BASIC SCHOOLS
CONCERNED PUBLIC AND
PRIVATE –KUMASI**

STUDY ON NUTRITIONAL STATUS OF IN-SCHOOL PUPILS IN KUMASI METROPOLIS.

Childhood obesity has now become a health issue among children in Ghana this condition if not handled earlier in the affected individuals life will serve as a basis for other complications in later life.

In view of the above, a team from department of Nutrition and Food Science University of Ghana Legon led by Prof. Anna Lartey, the Principal Investigator will visit your school to conduct a survey on childhood Obesity in some selected Schools in the metropolis.

The survey will involve children between the ages of 9-15 years in both public and private schools. The exercise will involve random selection of pupils from B.S.4- JHS 3 .

The selected pupils will be taken through some formalities some of which include:

1. Letters to their parents explaining the objective of the study
2. Parental consent to carry out the study on their children /wards.
3. Measurement of body weight
 - a. Height

APPENDIX 8

Comparison of sociodemographic characteristics of mothers with and those without complete data on anthropometry

Variable	n (%)		P-value ¹
	With complete data (N= 799)	Without complete data (N= 434)	
Age (years)			
20-29	25 (3.1)	22 (5.1)	0.280
30-39	338 (42.3)	190 (43.8)	
40-49	359 (44.9)	182 (41.9)	
50+	77 (9.7)	40 (9.2)	
Marital status			
Single	45 (5.6)	32 (7.4)	0.532
Married	622 (77.9)	327 (75.4)	
Separated/ divorced	84 (10.5)	44 (10.1)	
Widowed	48 (6.0)	31 (7.1)	
Educational level			
None	66 (8.2)	33 (7.6)	0.904
Primary/elementary	442 (55.3)	232 (53.4)	
Secondary	167 (20.9)	95 (21.9)	
Post secondary	38 (4.8)	25 (5.8)	
Tertiary	86 (10.8)	49 (11.3)	
Occupation			
Artisan	146 (18.3)	67 (15.4)	0.450
Professional	98 (12.3)	61 (14.1)	
Office worker	16 (2.0)	13 (3.0)	
Trading	479 (59.9)	265 (61.1)	
Not employed	60 (7.5)	28 (6.4)	

¹Pearson's chi-square test for categorical variables

Comparison of sociodemographic characteristics of mothers with and those without complete data on anthropometry cont'd

Variable	n (%)		P-value ¹
	With complete data (N=799)	Without complete data (N=434)	
Area of residence			
Accra	380 (47.6)	216 (49.8)	0.458
Kumasi	419 (52.4)	218 (50.2)	
Residential status			
Own house	229 (28.7)	117 (27.0)	0.496
Family house	168 (21.0)	82 (18.9)	
Rented house	341 (42.7)	204 (47.0)	
Company/ mission house	13 (1.6)	7(1.6)	
Government house	32 (4.0)	20 (4.6)	
Caretakers	16 (2.0)	4 (0.9)	
Number of births			
1	6 (5.8)	33 (7.6)	0.082
2	133 (16.6)	93 (21.4)	
3	241 (30.2)	117 (27.0)	
4+	379 (47.4)	191 (44.0)	
Household income²			
<100	41 (5.1)	32 (7.4)	0.035*
100-300	302 (37.8)	155 (35.7)	
300-600	338 (42.3)	167 (38.5)	
600-900	66 (8.3)	56 (12.9)	
>900	45 (5.6)	18 (4.1)	
Other ³	7 (0.9)	6 (1.4)	
Head of household			
Respondent	212 (26.5)	116 (26.7)	0.356
Spouse	581 (72.7)	310 (71.4)	
Other ⁴	6 (0.8)	8 (1.8)	

¹Pearson's chi-square test for categorical variables

²Amount in Ghana Cedis; represents monthly income

³Don't know, undisclosed

⁴Mother, father, sibling, other relatives and friends

*Statistically significant at $p < 0.05$

GLOSSARY OF LOCAL TERMS USED IN FOCUS GROUP DISCUSSIONS

TERM	DESCRIPTION/ MEANING
‘Obolo’ or ‘ngozi’	Terms used in Southern Ghana to refer to a person who is fat usually with the intention to ridicule.
‘Papaye’	A very popular fast-food restaurant in Ghana known for its sale of fried rice and chicken with a unique taste. The term may also be used metaphorically to refer to any fried rice that tastes good.
Fufu	A traditional Ghanaian dish usually made from yam or a cassava-plantain combination suitable as an accompaniment for soups. It is prepared by peeling and boiling followed by pounding the starchy staples in small quantity of water using locally made wooden mortar and pestle. The final product is molded into a ball and can be eaten with soups.
Banku	A traditional Ghanaian dish prepared by mixing fermented maize/cassava dough proportionally and cooking in hot water into a smooth, whitish consistent paste. It is molded and served with soup (usually okro soup), stew or a pepper sauce with fish.
Tuo zaafi	A maize flour dish from Northern Ghana made by cooking in hot water into a consistent paste. It is eaten hot with specially prepared soups from herbs.
Kokonte	A traditional dish from Southern Ghana prepared from by cooking fermented cassava flour in hot water into a smooth, golden brown consistent paste. It is molded and served with soup.
Gari	It is a fermented, dry and grainy product of cassava tubers used in the same manner as rice. cassava tubers are first cleaned, peeled, and soaked in water, they are then grated, and the resulting mass is packed into cotton sacks, topped with weights to squeeze out the water, and allowed to partially dry and ferment for a few days. The grated cassava is then spread out to dry in the sun, pressed through a sieve, and dry-

fried in shallow pans until it is completely cooked and free of moisture. The finished product can be stored until needed.

Light soup

This is soup prepared by cooking protein stock (meat, fish, chicken, e.t.c) and blended tomatoes, onions, pepper and garden eggs together in adequate water. This can be eaten with any starchy portion like fufu, gari, banku, e.t.c.

Ashanti

An ethnic group found in the Ashanti Region located in the middle belt of Southern Ghana.

Fanti

An ethnic group found in the Central Region located in the south-western coastal region of Ghana.

El-Wak

An area in Accra, Ghana known to be inhabited by military personnel and popular for its fine stadium for military personnel.

Michel Camp

Another area in Accra with housing facilities for military personnel and their families.

Kaba and slit

An African equivalent of the Western tailored top and skirt. 'Kaba' is the top half of the traditional attire. The 'slit' comprises the long wrap skirt to match the top.

