

UNIVERSITY OF CAPE COAST

SAM JONAH LIBRARY

Telephone: +233-(0)3321 32482 / +233 (0)3321 30952 / 3
Telegrams: University, Cape Coast
Email: ucclib@libr.ug.edu.gh



UNIVERSITY POST OFFICE
CAPE COAST, GHANA

Our Ref:

Your Ref:

28th January, 2021

*Please address all correspondence to
THE LIBRARIAN*

* Dear Colleagues,

DIGITISED PAST QUESTIONS OF THE UNIVERSITY OF CAPE COAST (UCC)

I respectfully wish to bring your attention to the University Library's Current Awareness Services, where a digitised collection of UCC past questions are now available on the E Library platform.

The credentials for accessing the past questions (PASCO) database by Lecturers are as follows:

URL: pasco.ucc.edu.gh

User name for Academic Staff: Use your Institutional Email address.

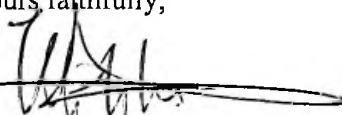
Password: Pasco

You will be asked to change the password as soon as you login into the system for the 1st time.

NB: Any queries on the Pasco database should be sent to librarythesis@ucc.edu.gh

Thank you.

Yours faithfully,


Mr. Theophilus Ocran
for: **UNIVERSITY LIBRARIAN**

cc: Deputy University Librarian

UNIVERSITY OF CAPE COAST

OVERWEIGHT AND OBESITY AMONG WOMEN IN GHANA

BY

DEREK ANAMAALÉ TUOYIRE

THESIS SUBMITTED TO THE DEPARTMENT OF POPULATION AND HEALTH OF THE FACULTY OF SOCIAL SCIENCES, COLLEGE OF HUMANITIES AND LEGAL STUDIES, UNIVERSITY OF CAPE COAST IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY DEGREE IN POPULATION AND HEALTH

DECEMBER 2015


CALL No.	
ACCESSION No.	
254273	
GAT. CHECKED	FINAL CHECKED

THE LIBRARY
UNIVERSITY OF CAPE COAST

DECLARATION

Candidate's Declaration

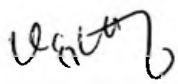
I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:  Date: 22-12-2015


Name: Derek Anamaale Tuoyire

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature:  Date: 22/12/15

Name: Prof. Akwasi Kumi-Kyereme

Co-Supervisor's Signature:  Date: 23-12-2015

Name: Dr. David Teye Doku

ABSTRACT

Overweight and obesity are among the leading threats to global health because of their association with increased risk of mortality and morbidity. Based on the pragmatist philosophical stance, a mixed method design was employed in this study to compare the socio-demographic and behavioural factors associated with overweight or obesity between childbearing and non-childbearing women in Ghana, using data from the 2003 and 2008 Ghana Demographic and Health Surveys. Further, perceptions, attitudes and experiences of women concerning overweight and obesity were explored using in-depth interviews with purposefully sampled women.

The results of the multivariate logistic regression models revealed that age, wealth status, and alcohol consumption significantly ($p < 0.05$) predicted overweight or obesity among both women groups. Television exposure, urban residence, professional/managerial occupation, religion, region, vegetable oil, and contraception significantly ($p < 0.05$) predicted overweight or obesity disparately between childbearing and non-childbearing women.

In the interviews, participants subjectively explained overweight and obesity. They knew about some causes and consequences of overweight and obesity, but mostly relied on unconventional measures to manage their weight. Some weight stereotyping was evident, with some women denying their overweight or obese status.

There is the need for the Ministry of Health to collaborate with other relevant agencies to undertake multi-faceted interventions that target specific groups and behaviours in order to curtail overweight and obesity among women in Ghana.

ACKNOWLEDGEMENTS

I have been through the highs and the lows in this journey of mine searching for knowledge. Making it this far would not have been possible without the nurturing support, encouragement and mentorship of several individuals whom I seek to acknowledge as far as this thesis is concerned. In that regard, I am profoundly grateful to my supervisors, Prof. Akwasi Kumi-Kyereme and Dr. David Teye Doku for their immense contribution and unwavering counsel leading up to this thesis.

I am also sincerely grateful to Prof. Samuel Debrah and Dr. Martin Morna for believing in me and encouraging me to pursue this noble course. My sincere gratitude also goes to Dr. Joshua Amo-Adjei, Dr. Sebastian Eliason, Dr. Harold Ayetey, Dr. Joseph Adu and Mr. Asare Pereko for their motivation through intellectual discourses throughout my studies. MEASURE DHS is also duly acknowledged for providing me with the 2003 and 2008 Ghana Demographic and Health Survey data for this thesis. Similarly, I am grateful to all the interview respondents for their fruitful insights concerning overweight and obesity.

I am grateful to my colleagues and friends at the Clinical Teaching Centre, especially Owusu Bempah and Chris Amoah for their immense help with the transcription of the tape recordings. I express my profound gratitude to my parents, Mr. and Mrs. Tuoyire, and siblings: Desmond, Dean and Dennis for their support. To my undying love, Ethel Osei-Tutu, I am sincerely grateful from the depths of my heart for your unquenchable love, patience, and understanding during my PhD studies.

DEDICATION

To my family

TABLE OF CONTENTS

Content	Page
DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
DEDICATION	v
TABLE OF CONTENTS	vi
LIST OF TABLES	xii
LIST OF FIGURES	xiii
LIST OF ACRONYMS	xiv
CHAPTER ONE: INTRODUCTION	1
Background to the Study	1
Problem Statement	6
Objectives of the Study	12
Hypotheses of the Study	12
Significance of the Study	13
CHAPTER TWO: REVIEW OF RELEVANT EMPIRICAL LITERATURE	15
Introduction	15
Global Epidemiology of Overweight and Obesity	16
Overweight and Obesity in the More Developed Countries	17
Overweight and Obesity in the Less Developed Countries	18
Overweight and Obesity in Ghana	21
Public Health Concern for Overweight and Obesity in Women	22
Factors Associated with Overweight and Obesity	24

Socio-Demographic Factors Associated with Overweight and Obesity	25
Age	25
Educational level	27
Income/wealth status	30
Occupation	32
Marital status	35
Ethnicity	38
Religion	39
Place of residence	43
Behavioural Factors Associated with Overweight and Obesity	45
Physical Activity	45
Fruit and Vegetable intake	48
Alcohol Consumption	49
Smoking	51
Perspective on Overweight and Obesity	53
CHAPTER THREE: THEORETICAL AND CONCEPTUAL	
ISSUES	58
Introduction	58
Definition and Aetiology of Overweight and Obesity	59
Behavioural Change Theories	63
Health Belief Model	64
Theory of Reasoned Action	67
Theory of Planned Behaviour	69
Social Cognitive Theory	70
Transtheoretical Model	73

Social Ecological Theories/Models	79
Bio-Ecological Theory	80
Ecological Model of Health Behaviour	82
PRECEDE-PROCEDE Model	85
Conceptual Framework for the Study	89
CHAPTER FOUR: RESEARCH METHODOLOGY	95
Introduction	95
Socio-Demographic and Health Profile of Ghana	95
Research Philosophy	100
Research Design	104
Ethical Considerations	107
Quantitative Data	108
Analytical Sample	111
Definition of Variables	113
Dependent Variable	113
Independent Variables	114
Analytical Strategies	116
Qualitative Data	119
Study Areas	120
Sampling Technique	122
Method of Data Collection	123
Research Instrument	123
Pre-testing of Interview Guide	124
Data Collection Procedure	125
Data Analyses	126

Data Quality Concerns	127
CHAPTER FIVE: SOCIO-DEMOGRAPHIC FACTORS ASSOCIATED WITH OVERWEIGHT AND OBESITY AMONG WOMEN IN GHANA	129
Introduction	129
Socio-Demographic Characteristics of Respondents	130
Prevalence of Overweight or Obesity	138
Socio-Demographic Predictors of Overweight or Obesity	138
Discussion	169
CHAPTER SIX: BEHAVIOURAL FACTORS ASSOCIATED WITH OVERWEIGHT AND OBESITY AMONG WOMEN IN GHANA	178
Introduction	178
Behavioural Characteristics of Women	179
Behavioural Predictors of Overweight or Obesity among Women in Ghana	182
Discussion	199
CHAPTER SEVEN: PERCEPTIONS OF WOMEN ABOUT OVERWEIGHT AND OBESITY	204
Introduction	204
Profile of Study Participants	204
Conceptualisation of Overweight and Obesity by women	206
Views of Women on Possible Causes of Overweight and Obesity	211
Endogenous Factors	211
Exogenous Factors	216
Views of Women on Possible Consequences of Overweight and Obesity	222

Medical Related Consequences	222
Non-Medical Related Consequences	225
Perceptions of Women on Preferable Body Image for Ghanaian Women – “Not too Skinny, but not too Fat”	228
Discussion	235
CHAPTER EIGHT: ATTITUDES AND EXPERIENCES OF WOMEN ABOUT OVERWEIGHT AND OBESITY	240
Introduction	240
Attitudes of Women Related to Overweight and Obesity	240
Weight Gain and Weight Loss Considerations and Experiences of Women	245
Weight Gain Considerations and Experiences	245
Weight Loss Considerations and Experiences	248
Self-Weight Status Representation versus Actual BMI Categorisation	254
Denial of Overweight or Obese Status	255
Acceptance of Overweight or Obese Status	257
Discussion	258
CHAPTER NINE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	264
Introduction	264
Summary of Main Findings	265
Evaluation of Conceptual Framework	270
Conclusions	274
Recommendations	275
Strengths and Limitations of the Study	278
Contributions to Knowledge	279

Recommendations for Further Research	280
BIBLIOGRAPHY	281
APPENDICES	321
APPENDIX A - Consent Form	321
APPENDIX B - Interview Guide	324
APPENDIX C - Ethical Approval	326

LIST OF TABLES

Table		Page
1	Socio-Demographic Characteristics of Women, 2003 and 2008	131
2	Mean and Percentage Distribution of BMI of Women, 2003 and 2008	139
3	Overweight or Obesity by Socio-Demographic Characteristics of Women, 2003 and 2008	141
4	Multivariate Logistic Regression Results on Socio-Demographic Predictors of Overweight or Obesity, 2003	150
5	Multivariate Logistic Regression Results on Socio-Demographic Predictors of Overweight or Obesity, 2008	159
6	Behavioural Characteristics of Women, 2008	180
7	Overweight or Obesity by Behavioural Characteristics of Women, 2008	183
8	Multivariate Logistic Regression Results on Behavioural Predictors of Overweight or Obesity, 2008	187
9	Profile of Interview participants	205

LIST OF FIGURES

Figure		Page
1	The PRECEDE-PROCEED Model	87
2	Conceptual Framework for the Study	92
3	Selection of Analytical Sample	112

LIST OF ACRONYMS

AIDS	-	Acquired Immune Deficiency Syndrome
BMI	-	Body Mass Index
CDC	-	Centres for Disease Control
CI	-	Confidence Interval
CVD	-	Cardiovascular Disease
DHS	-	Demographic and Health Survey
EPI	-	Expanded Programme on Immunization
EPIC	-	European Prospective Investigation into Cancer and Nutrition
GDHS	-	Ghana Demographic and Health Survey
GDP		Gross Domestic Product
GHS	-	Ghana Health Service
GHS-ERC	-	Ghana Health Service-Ethical Review Committee
GNI	-	Gross National Income
GSS	-	Ghana Statistical Service
HBM	-	Health Belief Model
HIV	-	Human Immunodeficiency Virus
HSE	-	Health Survey for England
JSS	-	Junior Secondary School
MOH	-	Ministry of Health
NACP	-	National AIDS Control Programme
NHANES	-	National Health Nutrition Examination Survey
NHIS	-	National Health Intervention Survey
NIH	-	National Institute of Health

NMCP	-	National Malaria Control Programme
NTP	-	National Tuberculosis Programme
ODI	-	Overseas Development Institute
OR	-	Odds Ratio
PBC	-	Perceived Behaviour Control
PRECEDE	-	Predisposing Reinforcing Enabling Construct in Educational Diagnostics and Evaluation
PROCEED	-	Policy Regulatory and Organisational Constructs In Educational and Environmental Development
RHN	-	Regenerative Health and Nutrition
SCT	-	Social Cognitive Theory
SSA	-	Sub-Saharan Africa
SVY	-	Survey
TB	-	Tuberculosis
TPB	-	Theory of Planned Behaviour
TRA	-	Theory of Reasoned Action
TTM	-	Transtheoretical Model
UK	-	United Kingdom
UNESCO	-	United Nations Educational, Scientific and Cultural Organisation
US	-	United States of America
WHO	-	World Health Organisation
XL	-	Extra Large

CHAPTER ONE

INTRODUCTION

Background to the Study

Until the 20th century, the human race struggled to overcome food insecurity and associated malnutrition (undernutrition or underweight), communicable diseases and a hostile environment. With the onset of the industrial revolution, it was recognized by the great powers that increasing the average body size of the population would be an important approach to improve health and industrial productivity (Caballero, 2007). This approach thereof, had an important impact on the survival, productivity and economic development of the industrialized countries (Caballero, 2007). However, as populations from these countries began to approach their genetic potential for longitudinal growth, they began to gain proportionally more weight than height, with the resulting high increase in the average body size of the population (Caballero, 2007).

Consequently, by the dawn of the 21st century, the human race reached a sort of historical landmark, when for the first time in human evolution, the number of adults who were overweight or obese surpassed the number of those who were underweight (Gardner & Halweil, 2000). Today, overweight and obesity are labelled as worldwide epidemics, with their rapidity of increase as striking as their magnitude of increase in prevalence. The World Health Organization (WHO, 2015) reports that globally, about 39% of adults 18 years and older were overweight in 2014, with about 13% being obese.

As a global phenomenon, prevalence rates similar to those once associated with high income countries, are currently seen in low and middle income countries at a very fast pace, particularly among adults in urban centres, but increasingly affecting younger age groups as well (Prentice, 2006; WHO, 2015). This is of particular concern considering that overweight and obesity are widely recognized as being among the leading threats to global health: as major risk factors for mortality, as well as noncommunicable diseases (NCDs) such as diabetes, cardiovascular disease, and hypertension (Swinburn et al., 2011).

Overweight and obesity, together, constitutes the fifth leading attributable risk factor of these NCD deaths (WHO, 2010). An estimated 44% of the diabetes burden, 23% of the ischaemic heart disease burden and between 7% and 41% of certain cancer burdens are attributable to overweight and obesity (WHO, 2015). Indeed, excess body weight has long been associated with high mortality rates (de Gonzalez et al., 2010). Overweight and obesity account for at least 2.8 million adult deaths each year. Globally, more deaths are linked to overweight and obesity than to malnutrition (underweight) and the consequences of overweight and obesity surpass those from smoking and drinking and are as severe as the health effects of malnutrition (WHO, 2015)

In addition to the negative health-related repercussions, the economic burden associated with overweight and obesity is tremendous. It involves significant direct medical cost to the individual and his family members, the community and health care systems; as well as indirect costs linked to the loss of productivity due to the onset of the diseases (Barilla Center for Food &

Nutrition, 2012; Cecchini et al., 2010; Wang, McPherson, Marsh, Gortmaker, & Brown, 2011). It is estimated that direct costs linked to obesity are about 2-8% of total healthcare costs at the global level and that healthcare expenditures incurred by an overweight or obese person are, on average, 25% higher than that of a person of normal weight (Withrow & Alter, 2011). Overall, overweight and obesity significantly reduce an individual's physical function and overall quality of life (Rigby, Leach, Lobstein, Huxley, & Kumanyika, 2009).

Considerable efforts have been invested in identifying the determinants and predictors of body weight, particularly those of overweight and obesity. Researchers have identified a multiplicity of factors that lead to this global problem. The majority of health researchers and experts seem to agree that the current global trends in overweight and obesity is a result of 'obesogenic' environments associated with globalisation, industrialization, urbanisation, technological advances and economic expansion (Prentice, 2006). However, specifying the exact processes and pathways to the global rise in overweight and obesity has been problematic for researchers, as obesogenic environments contain multidimensional influences which are continuously changing at both the macro and micro levels.

Lake, Townshend and Alvanides (2010) define an obesogenic environment as the sum of influences that the surroundings, opportunities or conditions of life have on promoting overweight and obesity in individuals or populations. Obesogenic environments encourage high energy intake and less energy expenditure which increases the likelihood of obesity. An example is the global nature of modern commerce, sustained by the technical advances in

food production and transportation, which has permitted the introduction of low-cost, energy-dense foods across nations (Lake et al., 2010). Again, urban expansion and the changed built environment have caused individuals to rely on the motor car rather than traditional methods of walking and cycling (Prentice, 2006).

Demographic and socio-economic factors are also gaining special interest as determinants of overweight and obesity, largely because they have the potential to readily identify groups that are at risk for interventions (Sobal, Hanson, & Frongillo, 2009; Tzotzas et al., 2010). The most commonly researched of these factors include age (Zafon, 2007), educational level (Elo, 2009), marital status (Sobal & Hanson, 2011), ethnicity (Sidik & Rampal, 2009), income (McLaren, 2007) and occupation (Abdulai, 2010).

Some variations have also been noted between men and women. For instance, whereas overweight and obesity largely affect men than women in more developed countries such as the United Kingdom (UK) and United States (US), the reverse is the case for less developed countries, particularly in sub-Saharan Africa (Finucane et al., 2011; Flegal, 2012). Nonetheless, body composition, reproductive and maternal factors, and menopause have been argued to be linked with increased risk of overweight and obesity among women (Gunderson, 2009).

At the individual level, the rising prevalence of overweight and obesity has largely been linked to behavioural or lifestyle factors. This category of factors has been identified as important proximal factors that can strongly influence the energy balance equation, and the subsequent development of overweight or obesity. Several studies have reported on varied associations

between excess body weight and behavioural lifestyle factors such as physical activity, fruit and vegetable intake, alcohol consumption, smoking, amongst others (Ledoux, Hingle, & Baranowski, 2011; Nelson, Lust, Story, & Ehlinger, 2009; van Sluijs, McMinn, & Griffin, 2008). These are classified as the most modifiable factors that can easily be targeted in interventions to reduce overweight and obesity (Kruk, 2009; Tagoe & Dake, 2011).

Further, overweight and obesity are culturally rooted, dating back to antiquity (Mavoa, Kumanyika, & Renzaho, 2010; Renzaho, 2004; Renzaho & Mellor, 2010). Traditions and customs in relation to dress, food habits and marriage, as well as, perceptions of weight status have been suggested in the literature to influence body weight. In many parts of sub-Saharan Africa, for example, overweight and obesity have historically been considered to be a sign of success, wealth, good health and indeed optimism and happiness (Mokhtar et al., 2001; Rguibi & Belahsen, 2006). Likewise, there is widespread culturally related tolerance for fatness in some Arab countries such as Kuwait, Qatar, and Morocco (Musaiger, 2011; Rguibi & Belahsen, 2006).

Similar views have also been reported in Hispanics living in America (Crawford, Story, Wang, Ritchie, & Sabry, 2001). This predilection for large body sizes as reported among people in some developing countries, such as in sub-Saharan Africa, were also reported in white people from developed countries in the western world at the turn of the 20th century (Renzaho, 2004). The increased recognition of socio-cultural influences on body weight, have since inspired calls for insights into the perceptions of individuals, communities and societies on body weight (Ulijaszek & Lofink, 2006).

Despite this, the phenomenon remains largely resistant to public health efforts as it has not reduced in prevalence, unlike other health problems such as tobacco use, injuries and infectious diseases which have been more successfully addressed throughout the globe (Swinburn et al., 2011). Overweight and obesity may thus constitute the largest global chronic and multi-factorial health problem facing the world today, because of both its direct impacts and ripple effects on chronic NCDs, such as diabetes. The impacts on the developing world seem dire, considering that it is currently experiencing some of the fastest increases in the prevalence of overweight and obesity.

This therefore calls for continued research to inform public health interventions to curtail overweight and obesity and the consequences thereof. In view of this, the current study seeks to provide insights into understanding the multifaceted nature of overweight and obesity, particularly in developing countries where under-nutrition and communicable diseases are still a major problem. This study specifically attempts to explore the phenomenon among women in Ghana given that women are disproportionately affected.

Problem Statement

About three decades ago, the nutrition profile of most developing countries was dominated by undernutrition, commonly known as malnutrition. During this period, the WHO in collaboration with international experts and governments were more concerned with addressing hunger and starvation in such populations, particularly among children and women of childbearing ages. Today, in addition to undernutrition, the nutrition profile of these

countries is one increasingly characterized by overweight and obesity. Once thought to be problems only of the developed world, overweight and obesity have now become major public health concerns in developing countries (Finucane et al., 2011)

Developing countries are currently experiencing some of the fastest increases in the number of persons affected by overweight and obesity, particularly urban areas. For example, while the number of people affected by overweight or obesity increased 1.7 times between 1980 and 2008 in developed countries, that of the developing countries more than tripled over the same period (Stevens et al., 2012). Consequently, many developing countries are currently facing what is called a 'double burden of malnutrition', consisting of undernutrition among children and overweight and obesity in adults (Kolčić, 2012). Studies have reported classical cases of this in some countries where an underweight child and an overweight mother are found within the same household (Oddo et al., 2012).

The rising prevalence of overweight and obesity in developing countries is associated with corresponding increases in weight-related morbidities and mortalities (WHO, 2010). In both South-East Asia and Africa, over 40% of deaths caused by high body-mass index (BMI) occur among persons under age 60 years, compared with 18% in developed countries. In the African Region in particular, NCDs (which have established associations with overweight and obesity) are rising rapidly and are projected to exceed nutritional, communicable, maternal, and perinatal diseases as the most common causes of death by 2030 (WHO, 2010).

Like in many developing countries including those in sub-Saharan Africa, Ghana is not impervious to the rising global epidemic of overweight and obesity. In the late 1980s the rate of obesity was reported to be very low (0.9%) among Ghanaians (Berrios et al., 1997). By 2003, the prevalence of obesity rose to about 14%, while overweight was reported to be about 23% (Amoah, 2003b). A closer look at the evidence reveals that unlike in the UK and US where the phenomenon is more common in men, it is predominant among women in Ghana, as in other African countries. Prentice (2006) noted that obesity among women in Ghana was six times that of men in the late 1980s. (Amoah, 2003b) also found higher rates of overweight (27.1 vs. 17.5%) and obesity (20.2 vs. 4.6%) among women than men.

Studies based on women samples suggest that the problem of overweight and obesity is rising exponentially among Ghanaian women. According to the Ghana Demographic and Health Survey report, the prevalence of overweight or obesity in women aged 15-49 years increased from 13% in 1993 to 30% in 2008 (Ghana Statistical Service (GSS), Ghana Health Service (GHS), & ICF Macro (IM), 2009). Dake (2013) observed that the prevalence of obesity alone ($BMI > 30\text{kgm}^2$) among Ghanaian women aged 15-49 years increased from 3.4% in 1993 to 9.2% in 2008, representing close to a three-fold increase over the 15-year period. In the same study, the rate of increase was calculated to be 39.3% over the study period. The author further projected that 11.2%, 13.1% and 15.1% of Ghanaian women aged 15-49 years will be obese by 2013, 2018 and 2023, respectively.

Considering the well established link between overweight and obesity and NCDs (and related mortality), some scholars have warned that Ghana's

2012; Rguibi & Belahsen, 2006). Indeed, it is well documented that some ethnic groups in West Africa historically preferred overweight women and embraced cultural practices that encouraged female obesity. For instance, prospective brides in Nigeria were often taken to the famous pre-marital 'fattening rooms', where they were fattened for their prospective husbands (Peckmann, Gischler, Oschmann, & Reitner, 2001). However, some research in Ghana indicates that such perceptions and practices are slowly changing (Duda et al., 2006, 2007).

Consequently, a number of studies in Ghana so far have attempted to study various dimensions of overweight and obesity. While some have examined trends and patterns, others have focused on analyzing predictors or determinants. However, majority of such studies are small scale in nature and mostly restricted to the cities of Accra or Kumasi, which may largely misrepresent what pertains in the rest of the country (for example Amoah, 2003b; Duda et al., 2007). Although a few nationally representative studies (e.g Mattah, Kumi-Kyereme, Druye & Gifty, Osei; Dake, 2013; Dake, Tawiah, & Badasu, 2011) have focused on women, they are to a large extent limited in thoroughly examining the inherent heterogeneity among Ghanaian women.

For instance, despite the fact that women generally tend to gain the greatest amount of weight during their reproductive ages (15-49), those who give birth are often more prone to gaining excess weight associated with gestation and childbirth (Gunderson, 2009; Siega-Riz, Evenson, & Dole, 2004). As a result, childbearing women are more likely to be disproportionately affected by overweight and obesity compared with their

non-childbearing counterparts. In this regard, the prevalence of overweight and obesity as well as associated factors are likely to vary between and within population groups of women in their reproductive ages. Nonetheless, previous studies assessing the determinants of overweight and obesity among women in Ghana have not explored such differences, yet have generalized for all women irrespective of whether they have initiated childbearing or not.

Although some studies have used parity as a covariate (e.g. Mattah et al., 2013; Dake, 2013; Dake et al., 2011) in order to control for the difference in terms of childbearing, this does not clearly tell us how the factors associated with overweight and obesity operate differently or otherwise among different groups of women. The current study, therefore, is based on the premise that factors associated with the problem of overweight and obesity among women in Ghana operate in fundamentally different ways among two groups of women in their reproductive ages: childbearing women, and non-childbearing women.

Furthermore, understanding overweight and obesity requires an appreciation in terms of breadth and depth of individual perceptions about body weight, as well as the socio-cultural influences that inform such perceptions. For instance, gaining insight into what people know about overweight and obesity, or how they construct the problem could be useful in understanding the choice they make and the implications of such choices on their weight status. Studies of this nature are rather rare in Ghana. This provides further impetus for exploring the perceptions and experiences of women in Ghana about issues concerning overweight and obesity in the current study.

In order to view the problem holistically, this study conceptualizes the problem of overweight and obesity among women in Ghana within multiple perspectives. The study therefore employs both quantitative and qualitative techniques with the view to providing a generalizable assessment of factors associated with the problem, as well as detailed insights. This approach was adopted given that overweight and obesity are uniquely complex problems that warrant tailored empirical investigations, for intervention purposes. Therefore, the current study considers the socio-demographic, behavioural, and perceptive influences of overweight and obesity among women in Ghana.

Objectives of the Study

The major goal of the study is to assess overweight and obesity among women in Ghana. The specific objectives are to:

1. Compare the socio-demographic factors associated with overweight and obesity between childbearing and non-childbearing women;
2. Examine the behavioural factors associated with overweight and obesity between childbearing and non-childbearing women;
3. Discuss the perceptions of women about overweight and obesity; and
4. Explore the attitudes and experiences of women regarding overweight and obesity.

Hypotheses of the Study

The study is guided by the following hypotheses:

1. H_0 : There are no significant relationships between the socio-demographic background of women, and overweight and obesity.

how some of the correlates of overweight and obesity identified among the general population of women from previous studies may vary between and among childbearing and non-childbearing women. Given the multifaceted nature of the epidemic, this study should be useful in providing insights into developing interventions tailored to specific population sub-groups in the country.

Perceptions and beliefs about overweight and obesity have been observed to influence obesogenic behaviours, attitudes and lifestyle of people (Bittner, Diamond, Myers, & Gill, 2008; Moore, Harris, & Wimberly, 2010). On the other hand, perceptions and beliefs are, to a large extent, influenced by traditional socio-cultural values. Inaccurate perceptions and beliefs about overweight and obesity have been shown to negatively affect the prevention, treatment and management of excess body weight and associated health risks (Al-Sendi, Shetty, & Musaiger, 2004). Such perceptions and beliefs have been noted as socio-cultural drivers of the epidemic in Ghana and other African countries.

Taking due cognizance of this fact, this study attempts to understand how body weight is constructed within the context of the burgeoning epidemic and ongoing profound social changes in Ghana. Such information will be vital in designing interventions aimed at modifying health compromising perceptions about weight status. Overall, the study attempts to examine the problem of overweight and obesity among women in Ghana by transcending the spectrum of complex individual, social and environmental pathways that interact to influence the epidemic.

CHAPTER TWO

REVIEW OF RELEVANT EMPIRICAL LITERATURE

Introduction

This chapter seeks to provide a global overview of the problem of overweight and obesity, as well as position the study with the context of the extant relevant literature on overweight and obesity. To facilitate this review, a systematic online literature search using the following academic online resources: PubMed, Wiley online library, Emerald, Ebsco Host, Hinari, Taylor and Francis, Embase, Science Direct, and Google Scholar. Searches were performed for studies published in English up to March 2015, combining the following key words and subject headings: overweight, obesity, adiposity, body mass index, socio-demographic, lifestyle, behaviour, global, epidemiology among others. Key journal searches were conducted using references from all relevant literature and used to identify additional relevant studies. Articles discussing subjects other than those directly related to overweight and obesity were excluded. Articles were then reviewed critically and used in discussing this review.

To begin, the chapter discusses an epidemiological overview of overweight and obesity, and the public health implications for women. Going further, the various social and demographic predictors or determinants of overweight and obesity are discussed. The chapter concludes with a section on the perceptions, attitudes and experiences about overweight and obesity.

Global Epidemiology of Overweight and Obesity

The global nature of the obesity epidemic was formally recognized by the WHO consultation in 1997 (WHO, 1997). Since then, the rates of overweight and obesity have escalated rapidly in many parts of the world to epidemic proportions, reflecting increased consumption of energy dense diets high in fats and sugars, compounded by declining levels of physical activity (Finucane et al., 2011). The evidence in high income countries dates back to several decades to the point that almost half of their adult population is now overweight or obese (Popkin, 2010).

Reports indicate that a similar scenario is occurring in some low and middle income countries, notably those in Central and South America (Mexico, Peru and Bolivia) , the Gulf and Middle East (Egypt, Saudi Arabia, Kuwait), as well as Africa (Egypt, South Africa) and Asia (India, China) (Popkin, 2010). In 2014, the WHO estimated about 1.9 billion adults to be overweight or obese, out of which about 600 million were obese. These values have more than doubled since 1980 (WHO, 2015). Projections are that about 60% of the world's population, i.e., 3.3 billion people, could be overweight (2.2 billion) or obese (1.1 billion) by 2030 if recent trends continue (Kelly, Yang, Chen, Reynolds, & He, 2008). Most of the world's populations live in countries where obesity and overweight are responsible for a higher number of deaths than those due to underweight (WHO, 2015).

In fact, overweight and obesity have become a truly global problem that the term 'globesity' has been coined to describe the escalating global pandemic affecting both developed and developing countries (Finucane et al., 2011). Although overweight and obesity are prevalent in both developed and

developing countries, some significant differences have been found among the different geographic areas regarding the manner in which they develop and in the gravity of their distribution (Finucane et al., 2011).

Overweight and Obesity in the More Developed Countries

The United States presents a classical example of the problem of overweight and obesity in the more developed regions of the world. The prevalence of overweight and obesity is very high and continues to increase rapidly. A systematic review of published studies revealed adult obesity prevalence increased from 13% to 32% between 1960 and 2004 (Wang, Beydoun, & Liang, 2008). Recent Centres for Disease Control (CDC) studies indicate that almost 70% of Americans are overweight and nearly one-third are obese. Other studies estimate that up to 51% of the US population will be obese by 2030 (Finkelstein, Trogon, Cohen, & Dietz, 2009; Wang et al., 2008).

In 1990, ten (10) states that participated in the CDC's Behavioral Risk Factor Surveillance System (BRFSS) had an obesity prevalence of less than 10% and no state had prevalence equal to or greater than 15%. By 2010, no state had a prevalence of obesity less than 20% and 12 states (up from nine in 2009) had an obesity prevalence equal to or greater than 30%. The highest prevalence of obesity in the US is in the south (Finkelstein et al., 2009; Wang et al., 2008).

Apart from the United States, overweight and obesity are also among the most widespread threats to health and wellbeing in the European region. The average European BMI is about 26.5 kg/m², and it is among the highest in

the world, but considerable differences are found between countries. According to the WHO, the prevalence of obesity has tripled since the 1980s in many countries of the WHO European Region, with overweight and obesity affecting 50% of the population in the majority of European countries (WHO, 2015).

The prevalence of obesity over the past decade has increased from about 10% to 40%, with higher rates in Eastern Europe, compared to Western Europe. According to the Barilla Center for Food and Nutrition (2012), the European countries that are now most affected are: UK (24.5%), Hungary (19.5%), Greece (18.1%), Spain (17.5%), Germany (14.7%), and France (11.2%) . In the UK in particular, a Government commissioned Foresight report predicted that without any necessary action taken, 60% of men, 50% of women and 25% of children would be obese by 2050 – with direct obesity-related costs expected to double over that period (Barilla Center for Food & Nutrition, 2012; Nahal, 2012).

Overweight and Obesity in the Less Developed Countries

The burden of disease in developing countries has traditionally been characterized by undernutrition and infectious diseases. However, lifestyle in many developing countries now parallels that in the developed world, with dramatic increases in the prevalence of overweight and obesity (Caballero, 2007). Although few developing countries have nationally representative longitudinal data to assess trends, global estimates using both longitudinal and cross-sectional data indicate that obesity prevalence in countries in intermediate development has increased greatly over the past three decades

(Caballero, 2007). Recent analysis by the Overseas Development Institute (ODI) suggests that between 1980 and 2008, the numbers of people affected in the developing world more than tripled, from 250 million to 904 million (Keats & Wiggins, 2014).

Among the developing countries, the speed with which the phenomenon is growing in China is particularly worrisome. In 2004, there were 60 million obese Chinese, and 200 million were overweight, but in 2009 this increased to 100 million obese people and 310 million people who were overweight (Barilla Centre for Food and Nutrition, 2012). In Thailand, the prevalence of obesity has doubled in the past two decades. The prevalence of obesity in men increased from 13% in 1991 to 22% in 2004, while that of women increased from 18% in 1991 to 34% in 2004 (Aekplakorn & Mo-Suwan, 2009)

There is evidence that Mexico and other countries in Central and Southern Latin America are already dealing with the problem of having a high share of population that is overweight and obese, with rates similar to those in Europe, especially in the female population (Barilla Centre for Food and Nutrition, 2012). Finucane et al. (2011) estimate that in 2008, more than 30% of women in Central and Southern Latin America were obese, and about 25% of men in Southern Latin America and 20% of men in Central Latin America were obese.

In Mexico, a recent report, based on 2006 data collected across Mexico, finds that roughly 30% of Mexican adults are obese and 70% are overweight or obese, a 12% increase since 2000 (Barquera et al., 2009). Three

out of four Mexican adults have abdominal obesity, and women have higher rates of obesity and abdominal obesity than men.

Sub-Saharan Africa (SSA) is not immune to the obesity epidemic despite the continued burden of undernutrition and infectious diseases in many countries in this region (Bleich, Cutler, Murray, & Adams, 2007; Lopez, Mathers, Ezzati, Jamison, & Murray, 2006) As in other developing regions, nationally-representative studies of overweight and obesity in sub-Saharan Africa are scarce. The studies that are available, though, suggest increasing rates of overweight and obesity in SSA, especially among women and people dwelling in urban populations (Abubakari et al., 2008; Kimani-Murage et al., 2011).

South Africa is reported to have the highest prevalence of obesity in black men and women in Africa. As of 2006, the obesity prevalence (36%) among urban black South African women already exceeded that of black women in the U.S, and almost doubled that of urban women in the Gambia and Tanzania (Jamison, 2006). Available evidence from the West African sub-region indicates that 10% of adults were obese between 2000 and 2004, with approximately half of the urban population and 60% of women being overweight or obese (Abubakari et al., 2008; Duda et al., 2007). Some studies in urban settings in West Africa have found that obesity rates are rising more quickly in the poor than in the rich (Ziraba, Fotso, & Ochako, 2009).

Although the rates of overweight and obesity in developing countries are relatively lower compared with the developed nations, the absolute number of overweight obese population is striking (Keats & Wiggins, 2014). More data is needed in developing countries, particularly those in Africa in order to

aid in a more holistic assessment of overweight and obesity trends across the African continent.

Overweight and Obesity in Ghana

As far back as the 1980s, the prevalence rate of obesity in Ghana was reported to be less than 1% (Berrios et al. 1997). Subsequent reports suggest that Ghana, like many other less developed countries, has been experiencing increases in the prevalence of overweight and obesity, with remarkable disparities across gender and residence. While studying two urban and one rural community in the Greater Accra region, Amoah (2003a) showed an overall crude prevalence of obesity ($BMI \geq 30 \text{ kg/m}^2$) of 20.2% and 4.6% for females and males, respectively. The age-standardized prevalence of adult obesity was 13.6%. According to the study, residents from the high-class residential area had higher BMI compared to subjects from the lower class suburb. Urban residents had higher BMI compared to rural subjects. Obesity increased with age, peaking in the 55 to 64-year age group. Prevalence of obesity was found to be 5.5% and higher among females 7.4% compared to males 2.8%.

Given that women in Ghana appear to be disproportionately affected by the problem of overweight and obesity, studies have focused more on women. In fact, according to the WHO (2014), the number of overweight and obese women nearly doubled between 1987 and 2007. The Women's Health Study of Accra (WHSa) in 2007 showed that the prevalence of overweight versus obesity among women in Accra was 27.4% vs. 34.8% (Duda et al., 2007).

In Ghana, the DHS surveys indicate that the percentage of women aged 15–49 overweight/obese increased from 25 to 30% between 2003 and 2008 with the highest values among urban women (GSS et al., 2009). Based on GDHS data (1998, 2003 and 2008), Dake (2013) determined that the rate of increase of obesity among women was 39.3%, and on that bases projected the prevalence of obesity among women in Ghana to be 15% by the year 2023. Similarly, a recent analysis of the 1998, 2003 and 2008 rounds of GHDS by Doku and Nuepane (2015) in their study of the double burden of malnutrition among women in Ghana revealed 134.85 % increase in overweight and obesity (from 13.2 %, in 1993 to 31 in 2008) over the fifteen year period they also found that overweight was much more common in urban women (36.8 %) compared to rural women (15.6%).

The rising rates of overweight and obesity in Ghana, especially among women has led to calls for the urgent measures to curtail the phenomenon. Key among such measures include the need to promote physical activity and encourage healthy dietary habits.

Public Health Concern for Overweight and Obesity in Women

Aside the variety of health implication already mentioned, overweight and obesity pose special concerns for women's health, particularly in the area of sexual and reproductive health. Some of these concerns go beyond the women to affect the children that are born to overweight mothers. Overweight and obesity have been identified as major risk factors for breast, cervical, endometrial and ovarian cancers, as well as other disorders of reproduction (Klauer & Aronne, 2002). The link with these cancers peculiar to women is

believed to be due to the increase in oestrogen produced by adipose tissue. For postmenopausal women, the link may be related to the amount of visceral fat present.

Significant associations have been found between overweight or obesity and reproductive disorders including irregular menstrual cycles, reduced fertility and increased risk for miscarriage (Pasquali, Pelusi, Genghini, Cacciari, & Gambineri, 2003). Distinct changes in circulating sex hormones as a result of excess weight appear to underline these abnormalities (Pasquali et al., 2003). Fertility processes involve complex factors and mechanisms of both ovarian and extra ovarian origin. Overweight and obesity may interfere with many neuroendocrine and ovarian functions, thereby reducing both ovulatory and fertility rates in otherwise healthy women (Pasquali et al., 2003).

Overweight or obesity increases morbidity and mortality risks for both the pregnant woman and the fetus. Such women have higher incidences of hypertension, pre-eclampsia, toxemia, gestational diabetes, urinary infections, cesarean delivery and subsequent wound infections, endometritis, and increased hospitalization, which may lead to poor maternal and child health outcomes (Castro & Avina, 2002). Obese women have a 70% increase in postpartum hemorrhage, with possible compounding complication from surgical procedures (Castro & Avina, 2002).

The effect of overweight and obesity on the fetus include increased incidence of neural tube defects, preterm delivery, and fetal mortality. Other complications include large-for-gestational-age neonates, macrosomia, failure to progress, and shoulder dystocia (Castro & Avina, 2002). Infants of obese

mothers are at an increased risk themselves for overweight and obesity and associated morbidity in childhood or adult life.

Factors Associated with Overweight and Obesity

At the physiological level, overweight and obesity are fundamentally a consequence of an energy imbalance where energy or food intake exceeds energy expenditure or physical activity, over a prolonged period (Rigby et al., 2009). However, this physiological mechanism does not occur in isolation, but is determined by a number of factors including biological/genetic, behavioural and environmental factors (Rigby et al., 2009).

As overweight and obesity increasingly attract public health concern, social characteristics, which are broadly classified as socio-demographic factors, are increasingly gaining attention as elements that influence people's body weight (Tzotzas et al., 2010). Similarly, attention is also being drawn to understanding how individuals, communities and societies internalize excess weight gain (Ulijaszek & Lofink, 2006).

Although only few of these characteristics could be modified, they offer insights for targeted weight management purposes (Sobal et al., 2009; Tzotzas et al., 2010). Health determinants most often do not act separately but overlap, and in some cases can have an additive effect on each other. Therefore, such insights could help inform approaches to dealing with the multiple determinants of the problem of overweight and obesity at multiple levels. The section, therefore, provides a review of some of the major factors commonly associated with overweight and obesity in epidemiological studies.

Socio-Demographic Factors Associated with Overweight and Obesity

Age

Age is among one of the most frequently reported prognostic determinants of overweight and obesity in both men and women (Hou et al., 2008). Relative body weight usually increases as people grow throughout the aging process, with a proportionally higher increase among women than men. The effects of age on body weight are attributed to physiological changes in metabolic systems and functioning associated with energy input and output. For instance, as people increase in age, there is generally a decrease in energy requirements at rest, resulting in excess fat accumulated and subsequent weight gain (Nooyens et al., 2009).

Body fat and weight are regulated and defined throughout the individual's lifespan. Following rapid growth during childhood and adolescence, body weight usually increases at a relatively slow pace during adulthood and decreases in older age (Morley, 2007; Zafon, 2007). Even in the absence of body weight changes, age-related alterations in body composition occur in the individual. Fat-free mass progressively decreases after reaching its maximum level at the age 20, and fat mass increases reaching its maximum level at the age of 60-70 years (Zamboni et al., 2005). Thus the age-related decline of energy requirements at rest associated with weight gain is mainly attributed to the reduction in the quantity of fat-free mass (Lazzer et al., 2010). However, this could also be accounted for by various behavioural exposures that occur to individuals over the life course (Nooyens et al., 2009).

Several community-based cross sectional, as well as longitudinal studies, have reported a significant association of age with body mass index

and higher prevalence of overweight and obesity with increasing age (Chapman, 2007; Sidik & Rampal, 2009). In assessing the prevalence of obesity among adult women in Selangor, Malaysia, Sidik and Rampal, (2009) found a significant association between age and obesity. They also found the prevalence of obesity to be higher among respondents with increasing age. Although, a cross-sectional design was employed, their findings resonated with the National Health and Morbidity Survey 2, conducted by the Malaysian Ministry of Health in 1996 and 1997, in which BMI was found to increase with age.

In Ghana, a variety of studies (Mattah et al., 2013; Amoah, 2003b; Biritwum, Gyapong, & Mensah, 2005; Dake et al., 2011; Duda et al., 2007) have confirmed and emphasised the established link between age and overweight or obesity. Much as these studies seem to agree that overweight or obesity increases with age, they vary in terms on the ages more associated with the condition. For instance, in studying the socio-demographic variations of obesity among Ghanaian adults, Amoah (2003b) noted that obesity increased with age up to 64 years, while (Biritwum et al., 2005) established in their epidemiology of obesity in Ghana that obesity increased with age up to 60 years. Again, Mattah et al. (2013) surmised that women within the 35-44 age group had the highest odds of being overweight or obese. These differences could be as a result of the use of different samples as well as different age cut-offs.

Educational Level

In the literature, educational attainment is recognized as the single socio-economic indicator that most consistently exhibits a significant association with various measures of health, such as life expectancies, morbidity, and mortality and with the timing of disease onset (Elo, 2009). According to Mirowsky and Ross (2004), one pathway to the education-health relationship is through its influence on the knowledge and beliefs of individuals regarding healthy lifestyle choices. Another is through its effects on the degree of mastery and control individuals may have over their own health.

Regarding overweight and obesity, it is recognized that knowledge, behavioural skills, and normative socialisation, which are acquired through education, may be very important elements in maintaining a healthy body weight and a socially desired body size (Sobal, 1991; Wardle, Waller, & Jarvis, 2002). For example, people with higher education may have more knowledge about nutrition and healthy weight control practices that might influence their weight, making them more likely to integrate healthy behaviours into a coherent lifestyle. Nevertheless, the expected effect of education in the maintenance of healthy body weight appears to vary by society and depends largely on the society's level of socio-economic development.

In developed countries where thinness is glorified, education is generally reported to have a strong protective effect against weight gain, particularly among women (Ball & Crawford, 2005; Baltrus & Everson-Rose, 2007; McLarn, 2007). Using data from National Health Interview Survey

(NHIS) to evaluate education and health in the United States. Cutler and Lleras-Muney (2006) found that those with more years of schooling are less likely to be overweight or obese. They also found the better educated to be more likely to exercise, which could explain their lower probability of being overweight or obese. Cross-sectional estimates from a study of Australian identical twins conducted by Webbink, Martin, and Visscher (2010), further confirm that education reduces the probability of being overweight.

Unlike in the developed countries, the available evidence in developing countries regarding the relationship between education and overweight or obesity indicate inconsistent results. Scholars have identified the inconsistent association between education and overweight or obesity in developing countries to be dependent on the level of socio-economic development of the country in question (Aitsi-Selmi, Bell, Shipley, & Marmot, 2014). Because education is often associated with income or wealth in developing economies, it is argued that as developing countries make economic progress, rising incomes among the more educated may be used to purchase greater quantities of processed food leading to a positive energy balance (Aitsi-Selmi et al., 2014; Dinsa, Goryakin, Fumagalli, & Suhrcke, 2012). Hence, education may play a minimal role as a protective factor, and positively influences overweight or obesity.

Khan and Krämer (2009), for instance, found higher education to be associated with increased obesity in a study of factors associated with being underweight, overweight and obese among ever-married non-pregnant urban women in Bangladesh. Their findings were consistent with reports from a population-based study of the determinants of under-and overnutrition of

women in India (Subramanian & Smith, 2006). Studies (Mattah et al., 2013; Dake et al., 2011; Amoah, 2003b) conducted in Ghana, have also generally reported higher probabilities of overweight and obesity among more educated women. For example, Mattah et al., (2013) noted in their study of predictors of overweight and obesity among women in Ghana that those with higher education were about two times more likely to be overweight or obese.

On the contrary, some studies have reported inverse associations between education and overweight or obesity – similar to developed countries. While assessing risk factors for overweight and obesity, and changes in body mass index of Chinese adults in Shanghai, Hou et al., (2008) found higher education among women to be less associated with the risk of overweight or obesity. Separate studies conducted earlier in Latin American countries by Monteiro, Conde and Popkin (2001), and Martorell, Khan, Hughes and Grummer-Strawn (1998) similarly found higher education levels to be associated with decreased odds of overweight or obesity.

The reason given for such latter results is that as developing countries progress beyond a certain point, the more educated acquire cognitive skills that inform their choices regarding food intake, dietary restraint and levels of energy expenditure (Monteiro et al., 2001). In this new context, education mitigates the initial income or wealth effect on energy balance (Aitsi-Selmi et al., 2014). Thus, as developing countries transit in terms of socio-economic progress, the direction of influence of education on overweight or obesity varies.

Income/Wealth Status

Income and wealth both reflect material well-being and are commonly used in social science and health research as proxy measures of socio-economic status. Income is often estimated by monetary terms, whereas wealth is usually estimated by material asset such as home ownership and housing conditions. Since income and health reflect an individual's ability to access health-related material resources, several studies have found significant associations between these dimensions of socio-economic status and health indicators. For example, studies have consistently concluded that those in the lower levels of income or wealth status are at higher risk of morbidity and mortality.

Material resources provide the means for individuals to seek the ideal body size of a society, thus, reflecting the observed varied effects of income or wealth on overweight and obesity across the developed and developing regions of the world. In view of this, while studies (Akee, Simeonova, Copeland, Angold, & Jane Costello, 2013; Albright et al., 2005; Brodersen, Steptoe, Boniface, & Wardle, 2007; Mauro, Taylor, Wharton, & Sharma, 2008; Proper, Cerin, Brown, & Owen, 2007) in developed countries have repeatedly shown an inverse association between income or wealth and overweight or obesity among women in developed countries, the association in developing countries remains less clear (Dinsa et al., 2012; Edomwonyi & Osaigbovo, 2006; McLaren, 2007; Monteiro, Moura, Conde & Popkin, 2004; Poterico, Stanojevic, Ruiz-Grosso, Bernabe-Ortiz, & Miranda, 2012).

In a comprehensive systematic review of 144 published studies comparing the association between socioeconomic status and obesity, Sobal

and Stunkard (1989) noted that obesity appeared to be predominantly associated with the more affluent in developing countries. A subsequent, but highly influential review of studies published between 1989 and 2003 by Monteiro et al. (2004) found mostly inverse associations between level of affluence and obesity for women, concluding rather firmly that obesity was no longer solely a problem of the higher socio-economic groups in developing countries. The authors further suggested that in developing countries, the burden of obesity was shifting from the rich towards the poor, as one moved from countries with lower gross national income (GNI) per capita to countries with higher GNI per capita.

The latter suggestion has since been corroborated separately by more recent studies. In reviews covering publications from 1988 through 2003 and 1989 through 2007 by McLaren (2007) and Dinta et al., (2012), respectively, the authors conclude that more affluent women tend to be more likely to be obese in developing countries, but this association tends to turn into an inverse one, as one moves from countries with lower income to countries with higher income. In effect, the direction of association between income or wealth and overweight or obesity in developing countries depends on the income tier of the country. Various scholars have attempted to provide explanations to this pattern of mixed association between income or wealth and excess body weight in developing countries.

Regarding the observed positive associations between income/wealth and excess body weight, it is posited that in developing countries, higher income or wealth increases one's ability to get adequate food and therefore a higher chance of being overweight and obese (McLaren, 2007; Monteiro et al.,

2004). It is also argued that patterns of high energy expenditure among the poor and the symbolic meaning of a large body size also contribute to the positive association between income/wealth and increased body weight (Monteiro et al., 2004). By contrast, it is noted that as a developing country reaches a certain level of economic development, weight loss resources (such as increased leisure time physical activity, and informed choices regarding food intake, diet) rather than food supply are more closely related to body weight, accounting for a negative association between income or wealth and body weight.

Although the systematic reviews offer mixed results, individual level empirical studies in specific developing countries largely point to a positive association between overweight or obesity and income/wealth status. For example, in urban China, higher household income was associated with higher overweight or obesity risk (Huo et al., 2008). Higher income has also been described to be associated with increased obesity rates in Bangladesh and India (Khan & Kraemer, 2009; Subramanian & Smith, 2006). Studies conducted in Ghana from national demographic and health surveys also indicate overweight and obesity increased as wealth status improved (Mattah et al., 2013, Dake et al., 2011).

Occupation

Similar to education and income/wealth, occupational status, which is a marker of social status in most societies, is related to health and well-being (Mirowsky & Ross, 2004; Wardle & Griffith, 2001). In sociological literature two major approaches are identified for conceptualising and measuring

occupational status. The first considers subjective prestige, which is aggregated from perceived, collective belief of worthiness and status of an occupation (Alfonsi, Conway, & Pushkar, 2011; Hansen, Blau, Duncan, & Tyree, 1968). The second looks at objective social class positions based on social relationships (Erikson & Goldthorpe, 1987; Sosnaud, Brady, & Frenk, 2013). Hence, inquiry of occupation effects on health mainly focuses on the health outcomes of prestige and status rankings of occupations across race, sex and countries (Burgard, Stewart, & Schwartz, 2003).

In social epidemiology, the relationship between occupational status and health operates through two major pathways: occupations set individuals in a social structure that defines access to resources and constraints related to health and mortality (Fujishiro, Xu, & Gong, 2010). Also, different job characteristics of demands and rewards can influence health, such as physical hazards or psychological stress in work place, and job-related lifestyles that can influence health (Babones, 2010). Through such causal pathways, the literature suggests occupational status has similar effects on overweight and obesity. However, given that occupation often correlates with income or education, the occupation status effects are usually studied together with education and wealth.

Irrespective of this, overweight or obesity risks associated with occupation, such as level of work-related physical activity and social prestige, differ from those associated with education or income. Overall, low-status jobs usually involve more physical activities than high-status jobs do, which are protective against overweight or obesity in developing countries (Bell, Adair, & Popkin, 2004). Abdulai (2010) found that women who were engaged in

garden work or farming in Ghana were significantly less likely to be overweight, compared to those who were not engaged in similar work. By contrast, in developed countries, low-status occupations are often associated low work-related physical activities and less free leisure time for recreational physical activity, thereby, increasing the risk of overweight and obesity (Estabrooks, Lee, & Gyurcsik, 2003; Hanson & Chen, 2007; National Obesity Observatory, 2012).

Generally, as societies shift from being based on primary to secondary to tertiary production with increasing levels of industrialization, the amount of work-related physical labour decreases markedly. Consequently, work-related physical activities converge to low or moderate levels in all social classes in both developing and developed societies (Wells, 2012). However, the effect of occupation on body weight is more significant in women than in men. Studies that have investigated the relationship between overweight or obesity and occupation-based social class mostly report higher overweight or obesity prevalence among women in unskilled or lower classification occupations than in professional occupations (National Obesity Observatory, 2012; Wardle et al., 2002).

As an indicator of social status, occupational status may be a marker of shared beliefs about body size/shape. Those high in the occupational hierarchy may internalize the symbolic value of a thin body and a healthy lifestyle and at the same time face exposure to a workplace environment that promotes these values (McLaren & Kuh, 2004; McLaren, 2007). For example, evidence shows that women who are in high status jobs are more concerned about body shape and engage in more efforts to lose weight (Wardle & Griffith, 2001).

This probably explains the strong inverse relationship between occupational status and body weight among women in developed countries.

Marital Status

Marital status is an important social characteristic that is known to influence health through its selection and protective effects. The selection hypothesis purports that as a function of the process by which marriage partners are selected, the healthy are selected into marriage because they make better marriage partners (Averett, Sikora, & Argys, 2008). The protection hypothesis on the other hand explains that married people are healthier because their partners are more likely to monitor their health behaviours, care for them when they are ill and discourage them from engaging in risky behaviours (Averett et al., 2008).

Although less attention has been paid to the relationship between marital status and body weight, the literature suggests that marriage may be associated with body weight in many ways, both through social selection of individuals into and out of marital states because of their weight, and through social causation where particular marital states influence body weight (Jeffery & Rick, 2002). Body weight is influenced by interactions between dietary intake, physical activity, smoking, and other factors that are embedded within marital relationships. For example, Averett and Korenman (1999), and Conley and Glauber (2006) both report that obese women fare far worse in the marriage market than their peers in the recommended BMI range.

Studies explicitly investigating marital status and body weight tend to find that married people are more likely to be overweight or obese. This

finding is however not consistent for all investigations, particularly in cross-sectional investigations. For example, in their cross-sectional study of Greek adults, Tzotzas et al. (2010) concluded that marital status was significantly associated with obesity and abdominal obesity in both males and females. The authors found a higher risk of both obesity and abdominal obesity in married men and women than in the respective unmarried ones. Similarly, Janghorbani, Amini, Gouya, Delavari, Alikhani, and Mahdavi (2008) found increased odd of both overweight and abdominal obesity among married men and women than their unmarried counterparts. On the other hand, the findings of Sobal and Hanson (2011) indicate that married men were heavier than separated/divorced men, while never married women were heavier and more often more obese than married women.

Longitudinal analyses tend to be more consistent in suggesting that marital entry predicts weight gain, whereas marital termination (through divorce or widowhood) predicts weight loss, particularly in women, although some suggests it may be equally influential in both men and women (Hanson, Sobal, & Vermeulen, 2014). Hanson et al. (2014) used longitudinal data to examine the relationship between weight and marriage transitions and found that women who were unmarried at baseline and married before the follow-up survey had greater weight gain than those who were married at both times. Several other longitudinal studies support conclusions that marriage may be associated with weight gain, whereas separation or divorce may be related to weight loss (Ball & Crawford, 2005; Sobal et al., 2009)

The reasons for the positive relationship between marital status and weight are not clear. However, among the many hypotheses include changes

in social obligations and roles associated with marriage that may lead to increased food consumption and decreased time for physical activity. Others purport that for women especially, because maintaining a low weight is very demanding, once marriage is established, there is less focus on body image related to the lack of concerns to attract a potential marital partner (Janghorbani et al., 2008; Tzotzas et al., 2010).

That notwithstanding, the marriage-weight relationship has been reported to exhibit ethnic differentials. Some consistent differences have been noted to occur between ethnic groups in marital patterns and processes and body weight and the prevalence of obesity. For example, Sobal et al., (2009) observed some ethnic variations in the marriage-weight relationship in their cross-sectional study based on data from the 1999–2002 National Health and Nutrition Examination Survey (NHANES). They noted that compared with married women in the same ethnic category, white women's weights did not significantly differ by marital status and Hispanic never-married women had lower odds of being overweight. On the other hand, black women who were separated had higher odds of being overweight than those who were married. They interpret their findings as indicative of larger societal patterns of involvement in marriage, commitment to family, and body-weight norms and expectations (Sobal et al., 2009).

Explicit studies on the association between marital status and weight gain in Ghana are missing; however, some cross-sectional studies have explored marriage and overweight or obesity. Several studies in Ghana have established higher probability of overweight and obesity among the married than the unmarried (Amoah, 2003b; Biritwum et al., 2005; Dake et al., 2011).

Overweight or obesity among Ghanaian women is often attributed to childbearing and the socio-cultural perceptions about fatness being associated with beauty (Dake, 2013).

Ethnicity

Ethnicity is a multi-dimensional concept which may imply shared origins, social background, culture, or traditions which are distinctive and maintained between generations. In view of this, body weight has been found to differ substantially between ethnic groups. The ethnic differences in body weight are rooted in cultural-specific factors that influence obesogenic lifestyles and behaviour (Allan, 2008; Ebbeling, Pawlak, & Ludwig, 2002). Ethnicity-specific socio-cultural norms about ideal body image may lead to ethnic differences in body weight and body perception that may inform the weight management choices of individuals.

Studies in the US have consistently shown that white Americans tend to be thinner than black Americans, and average body weights of Hispanic Americans tend to be situated between those two ethnic groups. For instance, Ogden, Carroll, Curtin, McDowell, Tabak and Flegal (2006) in their study of the prevalence of overweight and obesity in the United States observed that approximately 30% of non-Hispanic white adults were obese, so were 45.0% of non-Hispanic black adults and 36.8% of Mexican Americans. Nonetheless, ethnic disparities in overweight or obesity are most obvious when examined across the different sexes. This mostly reflects gender differences in body image ideals. Such is the case among in the United States where, compared to

men in the same ethnic category, black American women were found to have increased odds of being overweight or obese (Sobal et al., 2009).

Even within the same gender, overweight or obesity prevalence may vary as higher rates were reported among black women compared to white women (Sidik & Rampal, 2009; Sobal et al., 2009). Again, using data from the Health Survey for England (HSE) to examine ethnicity and obesity in England, Higgins and Dale (2013) found Black-Caribbean and Black African women to have higher odds of obesity by comparison with White women. In addition, they further observed that Chinese women had lower odds of being obese than their White counterparts, but found no significant difference in obesity between South Asian women and White women.

Studies in Ghana have also noted some ethnic variations in overweight and obesity, with contrasting findings. For example, while Amoah (2003b) found overweight and obesity was highest among the Akans than other ethnic groups in Ghana, Biritwum et al. (2005) later reported overweight and obesity to be highest among the Ewe and the Ga Adangbe. Further, Mattah et al. (2013) found higher odds of overweight or obesity among the Ewes than other ethnic groups in Ghana. Duda et al. (2007), however found no significant association between ethnicity and obesity while studying obesity among women of Accra.

Religion

Until about a decade ago, the idea of the link between religion and health was viewed with much scepticism. However, with the ever growing number of rigorous social and epidemiologic investigations, most sceptical

scientists are beginning to appreciate more seriously the association between religion and health (Cline & Ferraro, 2006; Kim, Sobal, & Wethington, 2003; Kortt & Dollery, 2012). Studies have found substantial positive effects of religious involvement on various health outcomes. For instance, people who regularly attend church, pray, or read the Bible tend to have lower blood pressure than less religious people. They are also more likely to have healthier lifestyles, a stronger sense of well-being and life satisfaction, stronger immune systems, and longevity (Hill, Angel, Ellison, & Angel, 2005; Hill, Burdette, Angel, & Angel, 2006; Nam, 2013).

The relationship between religion and body weight has not been extensively examined. However, given the established positive effect of religion on health, it is expected that religion will serve as a protective factor against overweight and obesity (Ayers et al., 2010; Cline & Ferraro, 2006). The literature suggests that religion may contribute to decreased body weight through several protective pathways. One way is through reduced stress or anxiety. Stress or anxiety is related to higher body weight through induced eating which can trigger increase preferences for high fat and/or high sugar foods and the subsequent onset of overweight or obesity (Ayanian, Block, He, Zaslavsky, & Ding, 2009). However, as a stress coping mechanism, religion may help decrease body weight through helping adherents cope with stressors. Religion also provides social support, which is frequently cited in weight loss literature as a critical component for controlling body weight (Kim et al., 2003)

According to another school of thought, certain components of religious theology may also discourage weight gain. For instance, depriving

the body of food was analogous to purity in historical Catholicism, while in Judaism, the human body is considered to be made in the image of God (Merrill & Thygeson, 2001). Also, Conservative Protestants consider the body to be the 'temple of the Holy Spirit'. For people who hold these theological view points of the body, emphasising good health, and thus ideal body weight, may be of greater importance (Kim et al., 2003). Such people are thus more likely to engage in healthy weight practices such as greater leisure time, physical activity, and healthier food choices as measured by breakfast, green vegetable, and fruit intake (Kim et al., 2003). Furthermore, certain religious groups promote vegetarian diet, which is associated with lower body weight.

Much as these explanations seek to offer some credence to the possible protective effects of religion against body weight and overweight or obesity, the relatively few studies that have attempted to systematically examine the association between religion and body weight indicate otherwise. Indeed, a number of studies have shown a positive relationship between religion and overweight or obesity. In the Pawtucket Heart Health Program involving a cross-sectional Dutch community sample, Lapane, Lasater, Allan and Carleton (1997) reported that church members had significantly higher BMIs than non-church members and were likely to be 20% more obese.

Right about the same period, Ferraro (1998) found a similar association between religion and body weight using both state-level ecological data and individual level data. From the state-level ecological data, Ferraro (1998) found that there are more obese individuals in states with a higher proportion of persons claiming religious affiliation, and in states with a higher

proportion of Baptists. Likewise, the individual-level data indicated that those with more extensive religious practice tended to be more obese, independent of socioeconomic status. However, Ferraro's measure of religious practice predominately included sedentary activities (i.e watching religious television), which could thus be more of a measure of inactivity rather than religiosity.

These findings to a large extent have been corroborated in some studies investigating the difference between men and women. Kim et al., (2003) found that men in conservative Protestant denominations were more likely to have a higher body weight than men in other religious affiliations, but found no such relationship among women. More recently, while examining various dimensions of religiosity and religious affiliation, Cline and Ferraro (2006) showed that the more women participate in religious media practice, the more likely they were to be obese. However, the more men used religion as consolation, the less likely they were to become obese. The authors inferred from their findings that men may be turning to religion, instead of food, as a form of comfort, and through this avoid obesity.

Some studies in Ghana have found significant associations between religious affiliation and overweight or obesity. Mattah et al. (2013) found a significant association between religious affiliation and overweight or obesity in their bivariate, with higher rates among Christians than other religious groups. No significant association was found in their multivariate analysis. However, in an earlier study, Dake et al. (2011) found that Roman Catholic worshippers have higher significant probabilities of being obese.

There is some consistency across these studies regarding the relationship between religion and higher body weight, but there may be many

different explanations for this relationship. This could be attributable to the inconsistencies in the measurement of religion across studies. Moreover, such inconsistencies do affect the comparability of results.

Place of Residence

Understanding the distribution of overweight and obesity by place or type of residence is integral to designing interventions that target high-risk areas. Epidemiologic studies suggest overweight and obesity may differ significantly between rural and urban regions of the same country, largely reflecting differences in lifestyle factors associated with socioeconomic status and/or environmental conditions (Faeh & Faeh, 2007; Jokela, Elovainio, & Kivimäki, 2008).

Many developed countries show a greater regional distribution of overweight or obesity in rural areas, owing to structural and behavioural discrepancies between rural and urban areas. Higher rates of overweight or obesity have been observed in rural than in urban areas in Finland (Fogelholm, Murros, Rissanen, & Avikainen, 2005), Sweden (Rasmussen, Johansson, & Hansen, 1999), Germany (Harman-Boehm et al., 2007) and the United States (Borders, Rohrer, & Cardarelli, 2006; Jackson, Doescher, Jerant, & Hart, 2005). Poorer health behaviours (energy-dense dietary intake and a sedentary lifestyle), fewer opportunities for physical activity, and also the rapid transition from heavy labour activities to more sedentary professions and lifestyles are factors more often described to account for the higher rates of overweight and obesity in rural than urban regions in developed countries (Cummins & Macintyre, 2006).

In contrast to more developed countries, in less developed countries with the lowest gross domestic product (GDP), residents of urban regions are more likely to be overweight or obese than residents in rural areas (Mendez, Monteiro, & Popkin, 2009; Pawloski, Curtin, Gewa & Attaway, 2012). For example, in examining geographic relationships of nutritional status (BMI) in Kenya, Pawloski et al. (2012) found clusters of both overweight mothers and children in the urban Nairobi region, whereas both underweight mothers and children clustered in rural areas. Studies in Ghana (Mattah et al., 2013; Dake et al., 2011) and Gambia (van der Sande, 2003) have also reported higher rates of overweight or obesity in rural than urban settings. Some explanations have been suggested regarding the rural-urban discrepancies in overweight or obesity observed in developing countries.

The lower rates of overweight or obesity in the rural setting is suggested to be a reflection of the high energy demanding agricultural activities and the consumption of traditional staple foods which are low in fats calories (Bleich et al., 2007). In contrast, urban settings are noted for lower physical activity levels associated with the use of motor transport and sedentary jobs, as well as greater access to high calorie diets imported from the western world, which can only result in a high prevalence rate of overweight and obesity (Bleich et al., 2007; Caballero, 2005; Dake et al., 2011).

However, scholars have indicated that with increasing GDP in developing countries, the variation in the prevalence of overweight or obesity between rural and urban settings decreases and converges in most countries, while in others, a pattern similar to the developed countries is observed (Faeh

& Fach, 2007; Jokela et al., 2008). This trend may be due to economic growth that starts first in urban areas (or cities) and progressively extends to rural regions (Jokela et al., 2008; Mendez et al., 2009). Indeed, no or only small differences in prevalence of obesity between rural and urban environments were found in developing countries such as Mexico, Brazil and South Africa, which have relatively high GDP (Mendez et al., 2009; Monteiro et al., 2004).

Behavioural Factors Associated with Overweight and Obesity

Physical Activity

Regular physical activity has been shown to have many health promoting properties. It plays an independent and vital role in preventing and reducing the effect of several NCDs including obesity, hypertension, diabetes and heart diseases (WHO, 2010). Physical inactivity on the other hand is one of the most important factors that have been known to fuel overweight and obesity, as well as other non-communicable diseases. According to the International Food Information Council Foundation (2010), the burning of calories through physical activity is a key contributor to energy balance, helping to prevent excess weight gain and obesity.

In spite of the protective effects of physical activity on overweight or obesity, physical activity is declining in parallel to the increasing mechanisation of life across the globe. This is brought about as a result of the increased drive to reduce difficult, dangerous and strenuous activities at work through the use of modern technology (Popkin, 2006). The decline in physical activity can be seen in the increasing level of sedentary lifestyle associated with modernisation, in which the use of motorized transport, mechanized

equipment and labour saving devices in the home and at work have freed people from physically arduous tasks.

There is sufficient empirical evidence linking physical activity with overweight or obesity. Studies generally indicate that low levels of physical activity are associated with weight gain. This inverse association between physical activity and weight gain is more consistently reported from numerous cross-sectional studies (Blokstra, Burns, & Seidell, 1999; Kruger, Ham, & Prohaska, 2009; Stam-Moraga, Kolanowski, Dramaix, De Backer, & Kornitzer, 1999). For example, in one US study, Kruger et al. (2009) noted that men and women who were regularly active during leisure time were less likely to be obese, compared with inactive men and women. However, some previous studies found no association (Tremblay, Doucet, & Imbeault, 1999) or an inverse association (Fentem & Mockett, 1998) between physical activity and overweight or obesity.

Observational studies of the longitudinal association between physical activity and weight changes have produced more inconsistent estimates of the effect of physical activity on overweight or obesity. In a systematic review of literature describing data from observational cohort studies on physical activity and weight gain in adults, Fogelholm and Kukkonen-Harjula (2000) concluded that there is inconsistent evidence of the predictive effect of baseline physical activity on subsequent weight gain. However, they observed that the association between weight gain and change in activity or activity at follow-up is stronger, although still modest.

In a more recent systematic review, van Sluijs et al. (2008) suggest that most studies report on longitudinal associations between physical activity and

BMI or body weight. They note that such studies mostly report a negative association between physical activity and weight gain, indicating that lower physical activity predicts higher subsequent weight. They however, cited one study (Petersen, 2004) in which it was suggested that higher baseline levels of BMI predict future low levels of physical activity. A few other studies (Mishra, Ball, Dobson, Byles, & Warner-Smith, 2002; Rainwater et al., 2000) were cited to have found no associations between physical activity and weight gain.

The lack of consistent conclusions from studies on physical activity and weight could stem from issues of measurement error, residual and unmeasured confounding, and reverse causality. In support of this view van Sluijs et al., (2008) suggest that the results linking physical activity with weight gain may be interpreted in three different ways: (a) physical activity is an important factor in preventing weight gain, but the true association is not detectable because of measurement error; (b) less weight gain leads to better exercise adherence; a reverse causality argument; (c) the self-reported physical activity may be a proxy for a general healthy lifestyle; a confounding argument.

While efforts should continue to improve study design with greater emphasis on objective measures with known degree of measurement error, in the meantime, to stick to the consensus public health advice of moderate intensity activity daily to prevent obesity.

Fruit and Vegetable Consumption

Many epidemiological studies have associated fruit and vegetable consumption with a decreased risk of many chronic diseases, including heart disease, stroke, high blood pressure, diabetes, and some cancers (Ledoux et al., 2011; Vioque, Weinbrenner, Castelló, Asensio, & Garcia dela Hara, 2008). Likewise, research has found that the consumption of fruits and vegetables can be an important strategy for preventing overweight or obesity. Fruit and vegetables may be protective from overweight or obesity due to their rich water and fibre content, as well as their low energy density (Vioque et al., 2008). Fruit and vegetables may also prevent overweight or obesity through their satiating effect resulting in fewer calories consumed, and may help in the modulation of dietary glycemic load, affecting postprandial hormonal shifts (Livesey, Taylor, Hulshof, & Howlett, 2008).

In a review of 30 cross-sectional studies which investigated the food intake patterns and their associations with BMI or obesity, the evidence suggested that the intake of diets high in fruits and vegetables was associated with a lower BMI (Togo, Osler, Sørensen, & Heitmann, 2001). However, in a later review, Tohill, Seymour, Serdula, Kettel-Khan and Rolls (2004) identified too many inconsistencies in the literature to draw definitive conclusions about the nature of association between fruit and vegetable intake and body weight. To avoid the inherent weak design of cross-sectional studies for drawing causal inferences, some prospective studies have been employed in studying the relationship between body weight and fruit and vegetable intake.

Vioque et al. (2008) conducted a 10-year follow-up study in an adult Mediterranean population and found a significant reduced risk of weight gain among participants with a high intake of fruits and vegetables. This association persisted even after controlling for potential confounding factors such as anthropometric, lifestyle and other nutritional variables commonly controlled for in other studies. Their findings are in accordance with earlier studies (He et al., 2004; Howard et al., 2006). Quite recently, Ledoux et al., (2011) conclude from the systematic review of longitudinal and experimental studies that fruit and vegetable consumption potentially leads to weight loss or lower weight gain as part of a larger dietary change pattern.

Results from studies in Ghana have typically been inconclusive. Britwum et al., (2005) noted in their study of obesity in Ghana that those who were obese reported taking fewer servings of fruits compared to the amounts eaten by other groups. Duda et al. (2007) their Women's Health Study of Accra, however, found no association between fruit and vegetable consumption and overweight or obesity.

Alcohol Consumption

Alcohol consumption is another element that might exhibit associations with body weight. This is because alcohol serves as a significant source of dietary energy, accounting for nearly 10% of the calorie intake amongst adults who drink. It also has an energy value of 7kcal/g, second only to fat which is the most energy dense macronutrient at 9kcal/g. Physiologically, alcohol may be a contributor to excess body weight by providing an extra energy source and by acting as a catalyst to increased food

intake by stimulating appetite (Breslow & Smothers, 2005; Yeomans, Caton, & Hetherington, 2003; Yeomans, 2010).

However, due to the fact that alcohol intake forms part of broader lifestyle and social factors, its association with overweight or obesity is quite complex. This therefore, makes it difficult to draw conclusions on a direct cause-effect association (Almiron-Roig, Chen, & Drewnowski, 2003). Ethanol which is a constituent of alcohol is the least satiating dietary macronutrient, and may therefore induce overeating among people who drink (Almiron-Roig et al., 2003; Yeomans, 2010). Indeed, heavy drinking has also been reported to lead to overeating.

The literature suggests that in the short term, small amounts of alcohol consumed prior to meals causes a clear and consistent increase in food intake. In a study of freshman students in the US, Lloyd-Richardson and Lucero (2008) reported that those who typically drank an average of 4-5 drinks per episode were more likely to report increases in appetite following drinking compared to those who consumed 2-3 drinks per episode. According to the authors, about half of the students in the study reported overeating and making unhealthy food choices following an episode of drinking. Heavier drinkers in the study demonstrated significant increases in BMI during their first semester, relative to non-drinkers and those who drank at lower levels.

Similarly, binge drinking increases the odds of being overweight or obese, perhaps as a result of its association with an array of adverse behaviours including poor diet, unhealthy weight control, body dissatisfaction and sedentary behaviour (Nelson et al., 2009). Following an analysis of data from the National Health and Nutrition Examination Survey (NHANES) of

adults in the US, researchers found that the odds of overweight and obesity were significantly higher among binge drinkers and/or heavy drinkers (consuming four or more drinks per day) than among those who consumed the same amount of alcohol over multiple sessions (Arif & Rohrer, 2005).

Some studies suggest that sex differences appear to influence the relationship between obesity and alcohol consumption. For example, beer consumption was associated with waist circumference gain in men but not in women in the European Prospective Investigation into Cancer and Nutrition (EPIC) study (Schütze et al., 2009). However, according to Yeomans (2010), such difference between sexes may be an indirect consequence of habitual drink choice. Beer may be more favoured by men and the additional energy derived from the carbohydrate in beer may enhance the risk of weight gain. In contrast, wine-drinkers would consume less energy overall per unit of alcohol.

Studies on alcohol consumption prevalence and its association with and overweight and obesity are rare in sub-Saharan Africa. However, Mattah et al. (2013), found higher prevalence and increased odds of overweight or obesity among women who consume alcohol in Ghana.

Smoking

The link between smoking and body weight has been known for many years. It is generally known that smoking lowers body weight, as smoking tends to reduce appetite, while at the same time increases energy expenditure, both in resting and in light physical activity conditions (Aubin, Farley, Lycett, Lahmek, & Aveyard, 2012). Large cross sectional studies show that on average, smokers weigh less than non-smokers, and former smokers weigh

more than both smokers and non-smokers (Pisinger & Jorgensen, 2007). The relationship between smoking and BMI as reviewed by Chiolero, Faeh, Paccaud and Cornuz (2008) showed that smoking a cigarette induces a 3% increase in energy expenditure within a few minutes.

Considered as an approach for weight control, smoking has also become common among overweight and obese individuals (Pepino & Mennella, 2014), a phenomenon that makes it more difficult to understand the relationship between smoking and obesity. However, having a lower BMI than ex-smokers and non-smokers does not mean that smokers are not prone to increased visceral fat (Tweed, Hsia, Lutfy, & Friedman, 2012). Heavy smokers tend to have a greater BMI, probably as a consequence of several risky behaviours, such as poor diet, low physical activity, and alcohol use (Chiolero et al., 2008).

Compounding the issue further, several studies also indicate that people who stop smoking gain weight (Eisenberg & Quinn, 2006; Fidler, West, Van Jaarsveld, Jarvis, & Wardle, 2007). Smoking cessation weight gain through increased appetite, due to the absence of nicotine (after quitting), which serves as an appetite suppressant (Hughes, Stead, & Lancaster, 2003). Furthermore, evidence suggests that nicotine increases the basal metabolic rate, and removal of this effect results in a decline in energy expenditure at a time when appetite is increased (Fidler et al., 2007). The increases in weight gain associated with smoking cessation has led to smokers, even pregnant women, expressing concern that smoking cessation might lead to increased food intake, decreased energy expenditure, and thus eventually overweight and obesity (Alves, Alves, & Lunet, 2009).

Perspective on Overweight and Obesity

People across the world differ in their worldviews. A clear testimony of this assertion is reflected in the political and religious differences of people. Even in the same environment, people may not see their physical environment in a similar light. In the same vein, discrepancies can be found when comparing how people view body weight or size (Venter, Walsh, Slabber, & Bester, 2009). For example, how overweight or obese people see themselves may differ from how other people view the overweight or obese person's body, and vice versa.

Body weight beliefs, perceptions, attitudes and meaning given to experiences are influenced by a number of factors including culture, socio-economic status, and perceptions of health in relation to body weight amongst others. The socio-cultural environment influences body weight preferences, as well as eating and activity patterns, through dominant ethos and culturally-shaped values, beliefs, attitudes and expectations (Mavoa et al., 2010). While these socio-cultural influences are universal, their expressions differ among populations, classes and ethnic groups (Kumanyika, 2008). For example, the WHO's definition of an optimal body mass index ($18.5-25 \text{ kg/m}^2$) does not necessarily concur with the views of all population groups.

African Americans and sub-Saharan Africans prefer larger body sizes than their white counterparts in the Western world (Mavoa et al., 2010; Kumanyika, 2008). Overweight and obese body types are more desirable among African-Americans, especially among women. Black females who are overweight or obese have a more positive view of their weight and their level of attractiveness compared to their white counterparts (Kumanyika, 2008).

Within the African-American social context, larger body types are preferred and sought by normal weight, overweight and obese individuals alike while normal weight body types among men and women are held in a less positive regard. While Black Americans view larger body types as more desirable and sexually attractive, their white counterparts attach such values to thinner body types (Matus, 2000).

In most parts of sub-Saharan Africa, constructions of 'excessive' body weight in women have historically been linked with beauty or sexual attractiveness, power, social status, wealth, good health and indeed optimism (Renzaho, 2004; Renzaho & Mellor, 2010). For example, whilst in the western world thinness in women is desirable and associated with beauty, in Sub-Saharan Africa pejorative words for such physical states are prolific. Terms such as "umuguta" in central Africa and "mkonda" in Kenya mean a malnourished or thin lady or "caato quruntay" in Somali (a skinny lady) are used with negative connotations (Renzaho, 2004).

In the horn of Africa, thin women are understood to be "smelly" or suffering from tuberculosis or HIV and AIDS, whilst in central Africa thinness is undesirable and is seen as a sign of poverty, despair and deprivation. Women, who may otherwise be called "fat" in the western world are often desirably described as "nzele ya vundese" in central Africa; meaning a lady with a good bottom or "mnono" in Kenya or "hibil fiican" in Somali to mean a lady with presence or simply literally a lady with good meat or good flesh (Renzaho, 2004). Among men, body weight is attributed to economic advantage. Hence, fat equals wealth equals power. For example, a rich, prosperous and envied man is described as "taajir calool weyn" in Somali to

mean a man with a pot belly strolling with a “bokoor” or a walking stick or cane with gold or silver on top (Renzaho, 2004).

These social constructions associated with larger body sizes prevalent among sub-Saharan Africans and African Americans were also reported in White people in Western countries at the turn of the 20th century. For example, Grivetti (2001) described how obesity was admired in North America at the turn of the 20th century, with wealthy consumers exhibiting their wealth around their waist. The author further describes how fat cheeks and ample stomachs were visual cues that individuals were healthy, not infected with the dreaded slim tuberculosis.

This preference for larger body sizes observed, however, disappeared only to be replaced with the preference for the lean body size after the Second World War. This shift in body preference has been enthusiastically promoted by the media, especially in television advertising. Some scholars have suggested that such shifts in body preference are beginning to take place in sub-Saharan Africa and other non-western countries (Duda et al., 2006).

Beyond body image perceptions and preferences, studies have reported on various other perceptions, beliefs, attitudes and experiences relating to body weight and in effect overweight and obesity. In their study, Faber and Kruger (2005) observed that the majority of the participants believed that overweight was caused by a biological disorder (96%); to a lesser degree by poor eating habits (39%); and least by eating too much food (9%). Most of the women simply failed to see a connection between a person’s health and the food they consumed.

Similarly, Puoane, Fourie, and Shapiro (2005) observed that most of the adult black women (community health workers) in a study in Cape Town were oblivious of the exceptionally high prevalence of obesity, thus, clearly under a misconception of their own weight status. The women generally expressed a positive picture about overweight or obesity. They preferred being overweight because of the negative connotation of HIV/AIDS and thinness in their culture/society. Being thin was also associated with being unhappy or worrying too much. Thus, they preferred being overweight because they associated being overweight with not merely having more strength but also with being happy, dignified, respected, healthy, affluent and to receiving good treatment from one's spouse.

While exploring the perceptions of Malaysian adults about overweight or obesity in focus groups discussions, Chang, Chang, and Cheah (2009) indicated that some participants perceived themselves as ugly, felt ashamed of their body size and were frustrated because they did not desire to be overweight. Participants also had negative attitudes toward themselves because of their excess weight. Most participants in the study also expressed that they had reduced work performances because of their excess body weight. By contrast, adolescent schoolgirls (10-18 years) in a township in Cape Town reported that that being obese is in actual fact better because it enables them to participate in certain activities requiring physical strength (Puoaane, Tsolekile & Steyn, 2010).

According to Chang et al. (2009), difficulty to resist eating, lack of knowhow and previous failed attempts to lose weight were some of the perceived barriers to losing weight as reported by the participants in their

study of Malaysian adults. There are clearly some relativities as far as body weight and for that matter overweight or obesity is concerned. This reflects socially and culturally-shaped values, beliefs, attitudes and expectations with regards to body weight, with implication for the epidemic of overweight and obesity, particularly in sub-Saharan Africa.

CHAPTER THREE

THEORETICAL AND CONCEPTUAL ISSUES

Introduction

Overweight and obesity have been defined from various conceptual standpoints. Similarly, various schools of thought have been advanced in attempts to explain the aetiology, and the multiple interlinking biological (Hankey, Eley, Leslie, Hunter, & Lean, 2004); psychological (Annesi & Whitaker, 2010; Palmeira et al., 2010); socio-demographic (Elo, 2009); and environmental (Harris, Pomeranz, Lobstein, & Brownell, 2009; Leung, Agaronov, Grytsenko, & Yeh, 2012) factors associated with overweight and obesity.

Given the complexity of overweight and obesity, theories serve as useful frameworks for the investigation and understanding this public health phenomenon. Theories describe a set of interrelated concepts, definitions, and propositions that present a systematic view of events or situations by way of specifying relations among variables for the purpose of explaining and predicting events or situations (Glanz, Lewis, & Rimer, 1997).

Numerous theories developed to explain health problems and promote behaviour change have been applied in the field of obesity research with considerable successes. This chapter, therefore, reviews some conceptual and theoretical definitions of overweight and obesity. It also considers the most widely used theories and models from two broad theoretical perspectives: Behavioural change theories; and Social ecological theories. This section concludes with the conceptual framework for the study.

Definition and Aetiology of Overweight and Obesity

Overweight and obesity are simply the presence of either localised or general excess adipose tissue in the individual. In order to avoid overly simplistic definitions, some attempts have been made to distinguish between overweight and obesity. The National Institutes of Health (1998) specifically refers to overweight as an excessive amount of body weight in the individual that may come from muscles, bone, adipose (fat) tissue, and water, while obesity is specifically referred to as an excessive amount of adipose tissue in the body. However, for the purpose of standardisation, the WHO generally defines overweight and obesity as conditions of abnormal or excessive fat accumulation in adipose tissue that may impair health (WHO, 2015).

On the bases of increased risks of chronic disease morbidity and mortality, the Body Mass Index (BMI), defined as weight in kilograms divided by the squared of height in meters (kg/m^2) has been recommended by the WHO as international standard for defining overweight and obesity. BMI cut-off points of $25\text{kg}/\text{m}^2$ and $30\text{kg}/\text{m}^2$ are the international standard definitions for overweight and obesity respectively (WHO, 1995, 1997). The BMI is used in epidemiologic surveys to track change in the overall incidence and prevalence of overweight and obesity, by identifying the proportion of people who have an excess storage of body fat (WHO, 1995).

Those in the overweight and obese category are considered to be at an increased risk of disease irrespective of the presence of other risk factors (Thomsen & Nordestgaard, 2014). Obesity can further be subdivided based on subclasses of BMI and extreme obesity is defined as a BMI greater than $40\text{kg}/\text{m}^2$ (WHO, 1995, 1997).

The mechanisms by which people attain excessive body weight and adiposity remains partially understood. Overweight and obesity are widely understood to occur as a result of an energy imbalance in input and expenditure, that is, consuming more calories than are equivalently expended in physical activity (Rigby et al., 2009). According to the laws of thermodynamics, the only way to accumulate excess body weight is through a positive energy balance. When a person's caloric intake exceeds his/her energy expenditure, the body stores the extra calories in the fat cells present in adipose tissue (Rigby et al., 2009).

Adipose cells act as energy reservoirs, and they enlarge or contract depending on how people use the energy stored. If people do not balance energy input and output by adopting healthy eating habits and regular exercise, then fat builds up, and they may become overweight and eventually obese (Ref'at, 2011; Slovin, Galsky, & Busam, 2006). The energy balance theory explaining body weight changes involves inter-individual variations in a number of key factors, including the number and size of fat cells, energy intake, basal metabolic rate, the relative rates of carbohydrate-to-fat oxidation, the degree of insulin sensitivity and spontaneous physical activity (Slovin et al., 2006). Research continues in the quest for explanations of differences in these biological regulatory systems and how they affect the energy balance equation in individuals (Rigby et al., 2009).

Nonetheless, more than a century's worth of research has shown that genetics has a tremendous role to play in these energy balance processes. Such researches have suggested that certain individuals have a genetic susceptibility for weight gain. Although a large number of genes have been identified and

believed to affect body weight and adiposity, studies indicate very strongly that the process is generally not ‘monogenic’, but rather ‘polygenic’ – the consequence of not single genes with large effects, but the cumulative action of many genes, each of which has a relatively minor effect (Stanley, 2009).

The assimilation, storage and utilization of nutrient energy involve a number of metabolic pathways by which body weight and body fat content in the individual is controlled. This system works through a pool of genes, several of which are known for their roles in energy homeostasis and appear to be associated with obesity phenotypes in humans (Stanley, 2009). The identity and nature of the specific genes that determine one’s susceptibility to obesity have generated much interest.

The genetic predisposition of humans to obesity is beyond question today. However, why humans possess these genes is less certain, although most agree that the reasons are rooted in the evolutionary history of man. The ‘thrifty gene’ hypothesis, which was first proposed by Neel in the early 1960s, suggests that food supplies were limited throughout most of human history and that individuals possessing genes that encouraged the collection of food and the storage of excess energy as fat would tend to survive better during periods of famine (Stanley, 2009).

These advantageous ‘thrifty genes’ would be positively selected through thousands of generations, and their persistence into modern and affluent societies, where food is readily and continuously available, will continue to promote the deposition of fat and hence obesity (Speakman, 2007; Stanley, 2009). Despite dominating the thinking for more than 50 years, the

'thrifty gene' hypothesis was challenged by Speakman (2007) with a rather radical alternative, namely the 'release from predation' hypothesis.

Speakman (2007) argues that body weight ranges between a lower limit, imposed by the risk of starvation, and an upper limit that relates to the risk of being killed by predators. Ancient hominids such as Australopithecus (2-6 million years ago) lived among large predators, and overweight individuals might not have survived. The development of social behaviour, fire and weapons is postulated to have removed the threat of predation and thus the ceiling on body weight. According to Spearman (2007), the consequent freedom of weight from selection pressure would be subject to random genetic drift, giving way for overweight and obesity. This hypothesis is supported by mathematical modelling of the distribution of BMI in modern populations following two million years of genetic drift: the predicted distribution is close to that in present-day USA (Speakman, 2007).

Many have argued that the global increases in overweight and obesity have been too rapid to be associated with genetic changes in the population. There seem to be some consensus among scholars that while individuals may have a genetic susceptibility to gain weight, the current obesity epidemic is clearly not of genetic origin per se, but due to unfavourable changes in lifestyle and environment. These changes stem from economic growth, modernization, urbanization and globalization of the food market, as well as technological and other changes that tend to encourage overconsumption of food and/or decrease energy expenditure, primarily through reduced physical activity (Popkin, Adair, & Nizer, 2012; Popkin, 2010).

The importance of social contacts in propagating overweight and obesity has also been recognized. Data from the Framingham Heart Study revealed that obesity developed in clusters and appeared to spread within social networks, with the chances of close friends and family members of an obese person also becoming obese increasing by 40–60% (Christakis & Fowler, 2007; Knecht, Reinholz, & Kenning, 2007). The foregoing discussion suggests that multiple interacting factors are involved in the aetiology and development of overweight and obesity at both the individual and population levels. Hence, an imbalance in either of these factors (genetic, metabolism, lifestyle and environment) may manifest in overweight or obesity through a positive energy balance (Srivastava, Lakhan, & Mittal, 2007).

Behavioural Change Theories

Behavioural change theories have their origins in psychological theory and generally focus on the underlying cognitive processes involved in determining behaviour and propelling behavioural changes. However, these theories vary in terms of their core unit of interest when it comes to understanding behaviours. While some emphasize the ability of the individual to make personal decisions about behaviour and related outcomes, others consider external factors such as the web of influence of members within the social circles of the individual.

Nonetheless, behavioural change theories have been very useful in informing interventions aimed at reducing overweight and obesity in populations. The following section presents a review of the most widely used behavioural change theories in overweight and obesity related research

including: The Health Belief Model (HBM); Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB); Social Cognitive Theory; and The Trans-theoretical Model.

Health Belief Model

The Health Belief Model (HBM) has been one of the most widely used frameworks in health behaviour research to explain health-related behaviours and as a useful guide for designing intervention strategies. The HBM was first developed in the 1950s by social psychologists in the U.S. Public Health Service to explain the low participation of people in tuberculosis screening programmes (Strecher & Rosenstock, 1997). The HBM posits that health behaviour is a function of personal beliefs or perceptions about a health condition or disease and the strategies to reduce its occurrence (Champion & Skinner, 2008).

These personal beliefs or perceptions are mediated by a whole range of intrapersonal factors such as socio-demographic and socio-psychological characteristics. The model identifies four main constructs – *perceived seriousness*, *perceived susceptibility*, *perceived benefits*, and *perceived barriers* – which could individually or in combination explain health behaviour and related outcomes. The model has since been expanded to include *cues to action*, *motivating factors*, and *self-efficacy* (Abraham & Sheeran, 2005).

Perceived susceptibility refers to beliefs about the likelihood of getting a disease or condition. The logic here is that the greater people believe they are at risk or susceptible to a disease or condition, the more likely they are to

take measures to reduce such risks. In the same light, the opposite occurs when people believe they have a reduced susceptibility (Champion & Skinner, 2008). For instance, a woman must believe there is a possibility of her becoming overweight or obese before she may begin to take measures to maintain a healthy weight. Perceived seriousness talks about an individual's evaluation of the possible consequences (for instance death, disability, pain, stigma, family life, social relations among others) of having the disease or condition (Champion & Skinner, 2008).

Perception of seriousness is often based on information or knowledge a person has about the condition, but could also be based on the person's beliefs about the difficulties or the effects the condition would have on his or her life in general (Champion & Skinner, 2008). In this case, a woman who sees weight gain as a thing of beauty would perceive obesity as a less serious condition and may therefore not attempt to reduce weight, compared with one who sees it as a major cardiovascular disease risk. The combination of perceived susceptibility and perceived seriousness form the construct *perceived threat* (Champion & Skinner, 2008).

People tend to adopt healthier behaviours when they believe such behaviours will decrease their chances of developing a disease. The value a person attaches to a behaviour that may reduce the risk of developing a disease is constructed in the HBM as perceived benefits. The premise is that even if a person perceives personal susceptibility to a serious health condition (perceived threat), whether this perception leads to healthy behaviour choice will be influenced by the person's beliefs regarding perceived benefits of making a choice from alternatives behaviours (Abraham & Sheeran, 2005).

Thus, individuals exhibiting optimal beliefs in susceptibility and severity are not expected to accept any recommended health action unless they also perceive the action as potentially beneficial by reducing the threat.

Perceived barriers are the potential negative aspects of a particular health action which may act as impediments to undertaking recommended behaviours. A kind of non-conscious, cost-benefit analysis occurs, wherein, individuals weigh the action's expected benefits with perceived barriers (Champion & Skinner, 2008). This means that before a healthy behaviour choice is made, the person needs to believe that the benefits of the healthy behaviour outweigh the consequences of not making that choice. For example, a lack of motivation, reliable dieting information, and social support were noted as perceived barriers of African-American women participating in weight-loss programmes and lower success rates when they do so (James, Pobee, Oxidine, Brown, & Joshi, 2012).

A later expansion of the model also suggests that behaviour is influenced by cues to action, which are triggering mechanisms to action. Examples include media reports and campaigns, or illness of a family member or someone close. Self efficacy was added to the model in 1988 to describe the conviction that one has about his or her ability to successfully execute the desired health behaviour (Abraham & Sheeran, 2005; Bandura, 2001). Although the HBM identifies personal beliefs and perception as important determinants of health behaviour, other variables such as age, educational level, and culture are suggested as potential modifiers to these perception and beliefs.

One common criticism of the HBM is that an individual's level of perceived risk does not necessarily translate into behaviour change (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003). That notwithstanding, the model has been applied in a number of obesity and weight management research with inconsistent findings, partly as a result of differences in the measurement of the original HBM constructs. The application of the HBM in the current study is limited, considering that the study is more concerned with the specific socio-demographic and behavioural factors, rather than measuring psychological antecedents to overweight and obesity.

Theory of Reasoned Action

The Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) is among the few influential and widely applied theories that aim to examine the link between peoples' attitudes and behaviours. The theory offers a simple, yet logical, framework for examining the relationship between beliefs, attitudes, subjective norms, intentions and actual behaviour.

According to this theory, attitude towards a specific behaviour is a function of the beliefs a person has about outcomes or attributes of performing the behaviour (*behavioural beliefs*), weighted by evaluations of whether those outcomes or attributes are favourable or unfavourable (Montaño & Kasprzyk, 2008). Thus, a person who holds strong beliefs that favourable outcomes will result from performing a particular behaviour will have a positive attitude toward that behaviour. Conversely, a person who holds strong beliefs that

unfavourable outcomes will result from a particular behaviour will have a negative attitude towards that behaviour.

Similarly, subjective norms towards a specific behaviour are determined by a person's *normative beliefs*, that is, the person's perception of whether important referent individuals approve or disapprove of performing the behaviour. This perception of expectations of those referents is pulled together with the individual's motivation and a decision to comply or not to comply is made. This decision is generally referred to as behavioural intention, in terms of the motivation to exert effort to perform a particular behaviour (Montaño & Kasprzyk, 2008).

The TRA assumes that the most important direct determinant of behaviour is behavioural intention. Hence, a person who believes that certain referents think he or she should perform a particular behaviour, and is motivated to meet expectations of those referents will hold a positive subjective norm. The reverse is the case for a person who believes these referents think he or she should *not* perform the behaviour, whereas a person who is less motivated to comply with those referents will have a relatively neutral subjective norm.

To summarize, the TRA suggests that attitudes and subjective norms are developed from beliefs while behavioural intentions are developed from attitudes and subjective norms. Furthermore, actual behaviour takes place as a consequence of behavioural intentions. Although, behavioural intentions may serve as intermediate variables between attitudes/subjective norms and actual behaviour, the TRA fails to account for behaviour that is not under the complete volitional control of the individual (Ajzen, 2002, 2005). To address

this limitation, TRA was extended to include the concept of Perceived Behaviour Control (PBC) to account for factors outside the individual's control that may affect intentions and behaviours (Ajzen, 2005).

Theory of Planned Behaviour

With the addition of PBC to the original concepts of TRA (attitudes and subjective norms) the Theory of Planned Behaviour (TPB) was created (Ajzen, 2002, 2005). PBC reflects the presence or absence of facilitators and obstacles to behavioural performance, weighted by a person's perceived power or the impact of each control factor to facilitate or inhibit the behaviour performance (Ajzen, 2002, 2005). Thus, TPB proposes that intention is the proximal antecedent to behaviour, the cognitive process of an individual's readiness to perform a given behaviour, and the predictive variable to be measured.

A number of studies have been conducted to investigate how well the TPB also predicts behaviours related to overweight and obesity. Several studies have used a TPB approach to investigate overweight and obesity related behaviours such as exercise behaviours (Hoyt, Rhodes, Hausenblas, & Giacobbi, 2009; Rhodes & Courneya, 2003), eating habits (Conner, Norman, & Bell, 2002) and weight (Baranowski et al., 2003; Gardner & Hausenblas, 2004).

These studies have found that attitudes, subjective norms, and perceived behavioural control predicted intentions to lose weight, exercise, and healthy eating. However, one criticism of the TPB is that it overemphasizes the predictive value of intentions, rather than actual behaviour

(Crăciun & Băban, 2008). As an extension of the TRA, the TPB emphasises the role of behavioural intentions as determinants of health related behaviour, thereby limiting its applicability in the current study.

Social Cognitive Theory

The Social Cognitive Theory (SCT) developed by Bandura is one of the few psychological theories which considers both the individual, as well as his or her social environment in understanding the determinants of behaviour. SCT describes factors that affect and determine behaviour. It also specifies mechanisms through which the determinants work and how they may be translated into effective health behavioural interventions (Bandura, 2004). The theory identifies self-efficacy and outcome expectancy as its core psychological determinants of human behaviour (Bandura, 2004, 2006).

Self-efficacy is the confidence that one has in his or her capability to perform behaviour in a particular context (Bandura, 2006). Accordingly, perceptions of efficacy are influenced by four sources of information: performance accomplishments, vicarious experiences, verbal persuasive messages, and physiological signals (Bandura, 2006). For example, self efficacy is strengthened when a person successfully performs a behaviour (performance accomplishment), observes someone similar to them successfully perform the behaviour (vicarious experiences), receives positive verbal statements from a competent other (verbal persuasive messages), and interprets bodily signals (psychological signals) as indicators of successfully executing a behaviour.

In effect, persons who are more efficacious try new behaviours, expend more effort on those behaviours, and persevere longer when they encounter challenges (Bandura, 2006). Outcome expectancy is a judgment that behaviour will result in costly or beneficial consequences. These consequences or outcomes could be physical, social, or self-evaluative (Bandura, 2006). Physical outcomes include bodily sensations (e.g., muscle soreness). The behaviours exhibited by other people (e.g., shouts of encouragement) constitute social outcomes while feelings of pride, satisfaction, dissatisfaction, and guilt reflect self-evaluative outcomes.

Perceived self-efficacy affects outcome expectancy, in that, people who are more efficacious tend to envision positive rather than negative outcomes. For example, consider two individuals, one efficacious and the other inefficacious, poised to maintain a healthy weight through an exercise programme. The efficacious one anticipates a sense of fulfilment in engaging in healthy practices while the less confident one ruminates on how painful exercise is going to be.

Aside the self efficacy and outcome expectancy, SCT sees the exceptional human capacity for *observational learning* as a central component to behaviour. According to Bandura (2006), observational learning is governed by four processes: (1) attention, (2) retention, (3) production, and (4) motivation. Each of these four processes may be influenced by different factors. For example, access to family, peer, and media models determines what behaviours a person is able to observe, while the perceived functional value of the outcomes expected from the modelled behaviour determines what

they choose to attend to closely. Cognitive retention of an observed behaviour depends on intellectual capacities such as reading ability.

Production, that is, the performance of the modelled behaviour, depends on physical and communication skills and on self-efficacy for performing, or learning to perform, the observed behaviour. Motivation is determined by outcome expectations about the costs and benefits of the observed behaviour. The process of observational learning is such that models are imitated most frequently when observers perceive the models as similar to themselves. This makes peer modelling a well-recognized method for influencing behaviour.

SCT also goes beyond factors operating at the individual level to include concepts that describe environment influences on behaviour. SCT hypothesizes that no amount of observational learning will lead to behaviour change unless the observers' environments support the new behaviours (Bandura, 2004). A form of environmental change to modify behaviour is *incentive motivation*, through the use of rewards or punishments for desired or undesired behaviours. Another approach to behaviour modification through environmental change is *facilitation*.

Facilitation involves creating an enabling environment, such as the provision of new structures or resources to facilitate the performance of desired behaviours (Bandura, 2004). Motivation serves as a manipulative tool for behaviour through external control, whereas facilitation seeks to empower people. Through the concepts of environmental change, SCT joins a number of other theories and models of health behaviour in stressing the importance of

recognizing barriers to health-promoting behaviour change and identifying ways to overcome such barriers.

In a nutshell, SCT stresses *reciprocal determinism* in the interaction between people and their environments. Although it recognizes how environments shape behaviour, this theory focuses on people's potential abilities and the important roles played by vicarious, symbolic and self regulatory processes in psychological functioning (McAlister, Perry, & Parcel, 2008). Thus, SCT looks at human behaviour as the product of the dynamic interplay of personal, behavioural, and environmental influences. SCT has been shown to have good predictability with behaviours related to weight loss (Baranowski et al., 2003). However, the data being used for the current study do not provide for the adequate measurement of key constructs of the SCT, such as self-efficacy.

Transtheoretical Model

The Transtheoretical Model (TTM) is a promising model when it comes to understanding and promoting behaviour change related to the acquisition of healthy lifestyle behaviours. TTM integrates processes and principles of change across major theories of psychotherapy and health psychology, hence the name *Transtheoretical* (Jordan, Nigg, Norman, Rossi, & Benisovich, 2002). The theory was developed out of a smoking cessation programme when Prochaska and colleagues conducted a comparative analysis of self-changers compared to smokers in professional treatments. Some processes of change that predicted successful smoking cessation were identified from the analysis. It was realised that participants used different

processes at different times in their struggles with smoking, and that behaviour change unfolds through a series of stages (Prochaska, 2008).

This profound insight, which was then not a formal part of any therapy theories, changed the course of the research and led to development of the TTM. From initial studies of smoking, the model has been used with a broad range of health and mental health behaviours, including sedentary lifestyles, eating disorders and obesity, high-fat diets, alcohol and substance abuse, anxiety and panic disorders, depression, HIV/AIDS prevention among others.

Stages of change is the first important construct of the TTM. Unlike other behaviour change theories, this construct describes change as a process that unfolds over time, with progress through a series of six stages: Precontemplation, Contemplation, Preparation, Action, Maintenance and Termination (Riley, Rivera, Atienza, Nilsen, Allison & Mermelstein, 2011). Although frequently not in a linear manner, one must progress through each stage in order to successfully change behaviour. Precontemplation depicts the stage in which people do not intend to take action towards behaviour change, perhaps because they do not see the need to take action. People may be in this stage either because they are not well informed about the consequences of their behaviour, or because they may have tried to change a number of times and become demoralized about their abilities to change.

People in the Contemplation stage intend to change their behaviours in the next six months. They may be more aware than those in the precontemplation stage, but may still be ambivalent about change as they try to evaluate the benefits of changing behaviour. Those in the Preparation phase acknowledge that change is necessary and are ready to take action soon,

usually within the next month. Most often people in this stage have made some significant past attempts to change the problematic behaviour and are taking small steps toward their goal. The Action stage encompasses overt modifications in people's behaviour within one day to the next six months. Because the behaviour at this stage is new, relapse is a reality and can most likely occur.

The Maintenance stage is a continuation of the Action stage, where the overt behaviour modifications made become more of a routine and the potential for relapse is reduced than in the previous stage. Based on temptation and self efficacy data, this stage was estimated to last from six months to about five years. In the final stage, Termination, people no longer have the temptation to engage in the old behaviour. Whether they are depressed, anxious, bored, lonely, angry, or stressed, they are sure they will not return to their old unhealthy behaviours. It is as if the old behaviour never once existed and the new behaviour becomes automatic.

The Termination stage is rather too idealistic and may depend on the behaviour being changed and whether it involves complete abstinence, such as smoking cessation, or simply modification, such as dietary or activity changes. Some individuals may relapse or recycle through previous steps and may even return to Precontemplation. Although the cycle is fluid in nature (allowing for progression and regression while changing behaviour), progress through the cycle depends on people's belief in their ability (self-efficacy) to change behaviour.

Another important construct in the model is the *Processes of Change*. This construct describes the covert and overt activities within the *Stages of*

Change. The *Processes of Change* incorporates concepts from other models and theories of psychology to show how behaviour change actually occurs as people move through the *Stages of Change*. Currently, ten individual processes of change, with different focuses, have received the most empirical support in research (Prochaska, Redding, & Evers, 2008; Prochaska, 2008). The first process, *consciousness-raising*, involves increasing awareness about the causes, consequences, and cures for a particular problem behaviour. Here, feedback, confrontations, interpretations, and media campaigns can be very useful.

The second process, *social liberation*, requires an increase in opportunities available in the external environment to assist with reinforcing the new behaviour. Examples can include: no smoking areas, support groups or low-fat menus. The third Process of Change, *emotional arousal or dramatic relief*, initially produces emotional experiences such as loss and feelings related to behaviour change, followed by anticipated relief, if appropriate action is taken. The fourth process, *self-reevaluation*, combines both cognitive and affective assessments of the current situation, while envisioning one's self-image with and without an unhealthy behaviour, such as one's image as a severely obese or an active normal weight person. Here, values clarification, healthy role models, and imagery are techniques that can move people evaluatively.

Self liberation is the fifth process of change. This is both the belief that one can make the change and the commitment and re-commitment to act on that belief. It involves, first, a private (e.g., New Year's resolutions) and then a public announcement (public testimonies). The sixth process is *counter*

conditioning, originally found in behavioural psychology. This requires substituting healthier behaviour for problem behaviour. For example, regular intake of soft drinks could be substituted with ordinary water. The seventh, *stimulus control*, involves self-generated restructuring of the environment by removing cues for unhealthy behaviour while adding prompts for healthier alternatives.

Contingency management, the eighth process, provides consequences through rewards and punishment for taking steps in a particular direction. Although contingency management can include the use of punishment, rewards by others or by self that sustain behaviour change are emphasized in accordance with the philosophy of working harmoniously for change to occur naturally. Contingency contracts, overt and covert reinforcements, incentives, and group recognition are procedures for increasing reinforcement and the probability that healthier responses will be repeated.

The penultimate process, *environmental reevaluation*, combines both affective and cognitive assessments of how the presence or absence of a personal behaviour affects one's social environment, such as the impact of obesity or its consequences on others including family relations. The last process, *helping relationships*, is a humanistic perspective that involves using the support of significant others while attempting to change and maintaining that change. It combines caring, trust, openness, and acceptance, as well as support for healthy behaviour change. Self-change does not mean doing it alone. Though the behaviour and the change must come from within, asking for help and encouragement is part of this process.

Additional constructs of the TTM are *decisional balance*, *self-efficacy* and *temptation*. *Decisional balance* reflects an individual's relative weighing of the pros and cons of changing behaviour. *Self-efficacy*, originally introduced by Bandura (2004) as part of his Social Cognitive Theory, describes the self-confidence that people must have in order to change behaviours without relapsing to their former behaviours. *Temptation* reflects the converse of self-efficacy. It describes the intensity of urges to engage in a specific former behaviour when in difficult situations. Typically, three factors reflect most common types of temptations: negative affect or emotional distress, positive social situations, and craving.

Each of the model's core constructs has been applied to a wide variety of studies across a broad range of behaviours and populations. Studies over the last decade have shown that the model can be applied to various behaviours associated with obesity: eating low fat foods, weight control, diabetes, eating fruit and vegetables, and doing physical exercise (Miilunpalo, Nupponen, Laitakari, Marttila, & Paronen, 2000; Siero, Broer, Bemelmans, & Meyboom-de Jong, 2000; Terence & Schlam, 2004). However, unlike the *Stages of Change* themselves which have been well researched, the *Processes of Change* have not. Hence, there have been calls on the need for further research into the definition and measurement of each stage and process.

This is a process of change oriented model that tries to understand the psychological situations people progress through in their attempts to modify behaviour or abstain from certain habits. By contrast, the current study only seeks to understand the factors associated with overweight and obesity, and

the perspectives of women, thereby limiting the application of the TTM in this study.

Social Ecological Theories/Models

In contrast to behavioural change theories/models which seek to explain health problems and behaviours from a psychological perspective, social ecological theories/models take into consideration broader structural and environmental concerns. The core premise of this ecological approach is that health, behaviour, and their determinants are interrelated. Social ecological models investigate health behaviours by emphasizing the environmental and policy context of behaviour, while harnessing social and psychological influences (Glanz, Rimer, & Viswanath, 2008). They explicitly consider multiple levels of influences on behaviour, thereby providing more comprehensive frameworks for understanding the multiple and interacting determinants of health problems.

Social ecological theories/models have since the 1980s generated great enthusiasm among researchers, interventionists and other public health professionals in the area of disease prevention and health promotion (Richard, Gauvin, & Raine, 2011). These theories/models have been useful for integrating and conceptualising the environment amid other influences on behaviours associated with overweight and obesity in populations (Glanz et al., 2008; van Dyck, Cardon, Deforche, Owen, Sallis & Bourdeaudhuij, 2010). The most commonly used social ecological models are reviewed in this section of the thesis.

Bio-Ecological Theory

The bio-ecological theory was developed out of Bronfenbrenner's attempt to integrate human development into the ecological systems theory first described in his groundbreaking book, *The Ecology of Human Development: Experiments by Nature and Design* published in 1979 (Bronfenbrenner & Morris, 2007; Bronfenbrenner, 2001). With his primary interest in the extent to which human development is influenced by the social system, Bronfenbrenner (2001) defined development in the newly formulated bio-ecological theory as the phenomenon of continuity and change in the biopsychological characteristics of human beings both as individuals and as groups. In other words, a person's development primarily refers to the psychological and social dimension of human development, which of course is an important aspect of health related behaviour.

The theory explains further that the social ecology of human development involves sustained mutual transactions between human beings and the properties of the environmental systems in which they interact over the life course, and across successive generations (Bronfenbrenner, 2001). The individual in this context is seen to possess developmentally instigative or personal attribute characteristics that invite, inhibit, or prevent engagement in sustained interactions with the ecological environment (Bronfenbrenner, 2001). The ecological environment is seen as a series of nested and interconnected structures operating at four important system levels: microsystem, mesosystem, exosystem, and macrosystem.

The microsystem level refers to the most proximal and significant sphere or setting to the individual. It is a dynamic system in which the

individual is influenced by the pattern of activities, roles, and interpersonal relations in a given setting containing other persons with distinctive characteristics, personalities, and systems of belief (Bronfenbrenner, 2001). Examples include the family, the classroom, a peer group and the neighbourhood. The mesosystem level is an interaction between two microsystems. For example, family influences on an adolescents' peer group. This level contains society's blueprint for a particular culture or subculture.

The third level, the exosystem, refers to the aspect of the environment which does not directly involve the individual, but may influence his or her setting in an indirect manner. This may include parent's work, the economic state of a community, parent's marital status amongst others. Finally, the macrosystem level refers to the larger societal and cultural context, including issues of cultural values and expectations in which the other systems function. This also includes ideologies, laws and customs that may impinge on the individual.

Bronfenbrenner's bio-ecological theory goes beyond providing a framework for identifying and conceptualizing the multi-system factors that influence human development. It, most importantly attempts to underscore the dynamic processes that influence healthful development of the individual (Lewthwaite, 2011). According to Bronfenbrenner (2001), people develop positive or negative behaviours through their direct and indirect interactions with the four system levels. For instance, a fit between the individual and these systems influences successful development of healthful behaviours and vice versa.

Using the Bronfenbrenner's bio-ecological model, addressing obesity would entail examining policies and programmes that seek to promote physical activity or the intake of less energy dense foods (macrosystem); promoting physical activity and fruit and vegetable intake through media campaigns (exosystem); promoting healthy food options in canteens and restaurants at work environments and schools (mesosystem); and implementing school-based educational programs on preventing obesity (microsystem).

Through its ecological paradigm, the bio-ecological theory has over several decades become a fundamental framework for developing other ecological models in many areas of social sciences and practice, including health education and health promotion, social work, child development and sociology. That notwithstanding the practicability and feasibility of the bio-ecological theory as a whole has often been questioned. In view of this, the model is not deemed suitable for the current study.

Ecological Model of Health Behaviour

Inherent in many ecological models of social behaviour is the lack of sufficient specificity to guide both the conceptualization of specific health problems and the identification of appropriate interventions. In an attempt to resolve this problem, McLeroy, Bibeau, Steckler, and Glanz (1988) developed the ecological model of health behaviour. As a variation on Bronfenbrenner's bio-ecological model, the model looks at patterned behaviour as the outcome of interest. Behaviour itself is viewed as being determined by five levels of factors within the ecological environment: intrapersonal factors, interpersonal

processes and primary groups, institutional factors, community factors and public policy (Kilian, 2008; McLeroy et al., 1988).

At the intrapersonal level, the implicit assumption is that proximal causes of behaviour lie within the individual. Health problems or health related behaviours at this level are influenced by individual psychological processes and characteristics such as knowledge, attitude, skills as well as developmental history. Interpersonal processes and primary groups reflect both formal and informal social network and support systems that may influence the individual. The underlying assumption at this level of influence is that behaviour does not strictly occur as a result of intra-individual factors and processes, but includes interactions in the individual's immediate environment. The emphasis here is on the important role played by family members, friends, neighbours, contacts at work and acquaintances as sources of influence on the individual.

Institutional or organizational factors represent the third level of influences on health behaviour within the ecological environment. This level talks about how social institutions with organizational characteristics can exert influences on the performance of health behaviours. Of particular concern is the importance of organizational context in the diffusion of health behaviours. For example, one way to promote healthy weights in work places is making provision for registering employees at a gym and allowing them time off from work for participation.

In the fourth level, McLeroy et al. (1988) describe community factors that influence health related behaviour. These are the relationships among organizations, institutions, and informal networks within defined areas. They

more importantly considered the mediating structures such as family, informal social networks, churches, voluntary associations and neighbourhoods, which may be important sources of social resources and social identity for people.

The mediating structures are significant repositories and important influences on the larger communities' norms and values, and individual's beliefs and attitudes, which translate into behaviours. Because mediating structures represent strong ties and serve as connections between individuals and the larger society, they invariably exert greater influence on the behaviour of individuals. The final level, public policy, refers to how regulatory policies, procedures, and laws affect health behaviours. These could include policies which contain behaviour incentives, both positive and negative, such as increased taxes on energy dense foods and subsidized prices for fruits and vegetables, and policies that promote programmatic resources, such as establishment of gyms and open spaces for physical activity.

In the preceding discussion, McLeroy et al. (1988) propose an ecological model that focuses attention on both individual and social environmental determinants of health behaviour. The model highlights the important role of interpersonal, institutional, community and public policy factors in determining behaviours. Further, the model sees appropriate changes in the social environment as essential in producing changes in individuals. Despite emphasising the unique contribution of each proposed dimension, the model fails to venture extensively into specific relationships and interactions between dimensions. Due to the premium the ecological model of health behaviour places on patterned behaviour of individuals, the model is considered unsuitable in this study.

PRECEDE-PROCEED Model

In contrast to the theories and models described in the preceding sections, the PRECEDE-PROCEED model's core motive is not to predict or explain the relationship among factors likely to be associated with an outcome of interest. Rather, the *raison d'être* of the model is to provide a structure for the systematic application of theory and previous research in assessing health problems, as well as planning and evaluating health programmes (Gielen, McDonald, Gary, & Bone, 2008). Thus, the model can be thought of as a road map which shows all the possible avenues for addressing a health problem, whereas theories can be seen as the specific directions to follow in addressing the health problem. The model analyses health problems by means of multiple causality assumption (Green & Kreuter, 2005), suggesting that programmes should target and address multiple factors, including individual, environmental, and social variables.

PRECEDE, represents the assessment component of the model, and was first developed in the 1970s by Green and Krueter (2005), for the purpose of research and assessment of health behaviours and health promotion projects. PRECEDE stands for Predisposing, Reinforcing, Enabling Constructs in Education Diagnosis and Evaluation (Green & Kreuter, 1992). The PRECEDE component is a diagnostic tool, based on the premise that just as diagnosis precedes treatment in medical practice, so should educational diagnosis precede intervention plans (Gielen et al., 2008). Prior to the development of the PRECEDE approach, health education programmes were often criticised for focusing too much on the implementation, rather than

strategically planning and designing such interventions to meet demonstrated needs.

In response to a growing need for more ecological approaches to help understand and address contextual determinants of health problems and related behaviours, the PROCEED component was added to the PRECEDE-PROCEED framework in 1991 (Green & Kreuter, 1992). PROCEED stands for Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development (Green & Kreuter, 1992). The PROCEED component is used as a tool for implementing and evaluating programmes. Together, the PRECEDE and PROCEED components constitute the PRECEDE-PROCEED model – which does not only allow for the systematic assessment of health problems, but also creates room for strategic planning, implementation and evaluation of health interventions. The PRECEDE-PROCEED model as shown in Figure 1, has since been revised to respond to widely appreciated elements of contemporary public health concerns (Green & Krueter, 2005).

The current version of the PRECEDE-PROCEED model has eight phases: phases one to four constitute the assessment and planning phases (PRECEDE), whereas phase five and phases six to eight represent the implementation and evaluation phases (PROCEED), respectively (Gielen et al., 2008). Phase one, social assessment, is concerned with the identification of social problems and priorities of the target population which factor into their quality of life.

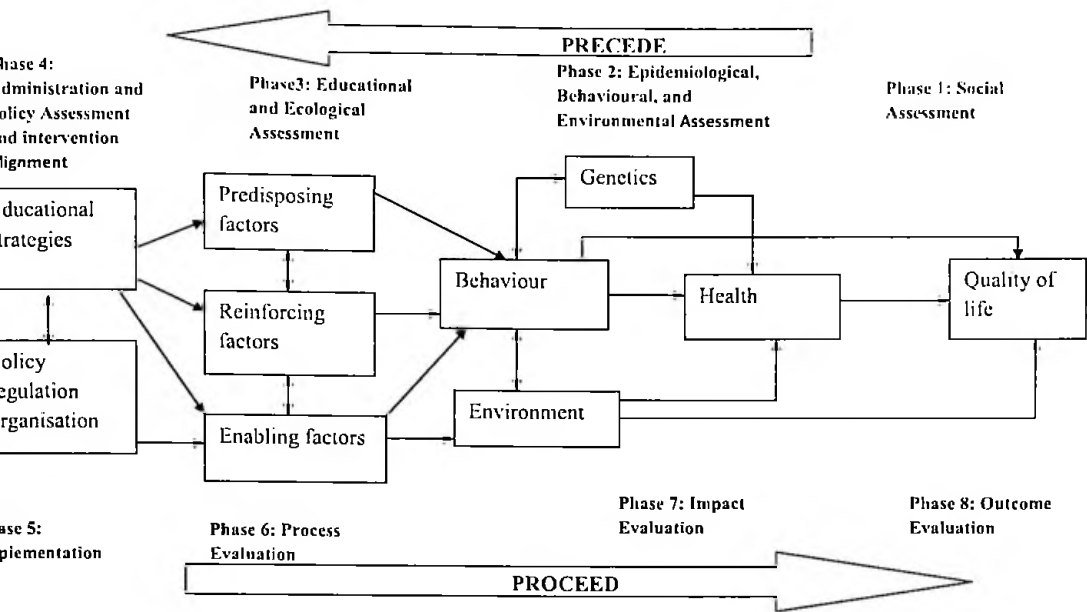


Figure 1: The PRECEDE-PROCEED Model

Source: Green and Krueter (2005)

Phase two consists of epidemiological, behavioural, and environmental assessments aimed at identifying specific health priorities, and uncovering their behavioural and environmental determinants. Here, the role of genetics in understanding health problems is factored into the assessment. Phase three involves undertaking educational and ecological assessments in order to identify variables that contribute to the behavioural and environmental determinants identified back in phase two. At this level of the assessment, three categories of factors are thought to contribute to health behaviour and behaviour change. These factors, classified as *predisposing*, *reinforcing*, and *enabling* factors collectively influence the likelihood of behaviour occurring (Green & Krueger, 2005).

Predisposing factors refer to those factors that either increase or decrease the likelihood of an event or behaviour occurring (e.g., demographic variables, knowledge, beliefs, values, attitudes etc). *Reinforcing factors* are the people and community factors which provide reward for the performance and maintenance of a behaviour or foster health environmental conditions (e.g., important others, community norms and values etc). *Enabling factors* include both new personal skills and resources which allow behaviour to be performed (e.g., health facility, media etc).

Phase four examines policies and programmes that may serve to promote behavioural or environmental change. The assessments conducted to this point would have helped in the design of a health promotion programme to address the health problem identified at the beginning. Phase five is where the programme is implemented. Phase six involves the process evaluation to

determine the extent to which the programme was implemented according to laid down protocols.

Phase seven involves impact evaluation to assess change in predisposing, reinforcing, and enabling factors, as well as in the behavioural and environmental factors. Finally, outcome evaluation determines the effect of the programme on health and quality-of-life indicators. Generally, it is required that measurable objectives are set at each step of the PRECEDE-PROCEED model to serve as milestones against which accomplishments can be evaluated (Green & Krueger, 2005).

Despite its wide usage in varied arrays of settings and for numerous health problems with considerable success, the PRECEDE-PROCEED model is not without challenges. Because the model is heavily data-driven, its full application, particularly the PROCEED component, may require greater financial and human resources, technical skill, and time which are not always available (Gielen et al., 2008). This could potentially be frustrating for community planning teams interested in taking immediate action to address a problem. Nevertheless, the PRECEDE-PROCEED model is one of the useful models for systematically exploring and understanding the determinants of health problems, such as the one (overweight and obesity) considered in this study.

Conceptual Framework for the Study

Many of today's health problems and their associated behavioural risks are far too complex to be explained by a single unified theory or model. Consequently, one of the most critical challenges confronting health

researchers and professionals is how to apply theories or models in addressing the underlying behavioural risk and protective factors often associated with contemporary public health problems, such as overweight and obesity (Gielen et al., 2008).

Most often than not, researchers are torn between choosing from either theories or models that address health problems from the people's perspective (behavioural change theories) or the ones that focus on the environmental perspective (social ecological theories). A more efficient and pragmatic way out of such dilemma, as suggested by some scholars, is combining both perspectives.

In view of this, the PRECEDE-PROCEED model was adapted as the conceptual framework for this thesis. This choice was inspired by its robustness and systematic ecological approach to health problems. This choice is also premised on the greater flexibility the model offers, in terms of providing plenty of leeway and touch points at all levels for applying theories or previous research in studying health problems.

The model allows one to skip steps or change the order of factors, thereby tailoring it down to suite the phenomenon or local context (Gielen et al., 2008). The PRECEDE-PROCEED model is useful because it is a logical model that provides room for a comprehensive assessment of the multiple factors which contribute to contemporary public health problems such as obesity. Furthermore, it offers an algorithm that links causal assessment, intervention planning and evaluation into one overarching framework.

Considering that this thesis is more focused on providing insights into the problem of overweight and obesity among women in Ghana, and not on

designing, implementing and evaluation a health program or intervention. phase 4 of the PRECEDE component and all the phases (5-8) of the PROCEED component are deemed to be beyond the scope of the present study.

The authors of the model, Green and Krueter (2005), recognize that most often than not, health problems and community priorities can be predetermined from data sources and the growing body of literature. In view of this, the social assessment phase of the model is often omitted (Gielen et al., 2008; Cole & Horacek, 2009), as in the case of the current study. With the health and quality of life consequences associated with overweight and obesity identified from the literature (phase one), this study is limited in scope to phases two and three of the PRECEDE component of the model as shown in Figure 2. Another adaptation made to the model to suit the purpose of this study has to do with the selection of variables based on available data.

The second phase of the model is concerned with uncovering the behavioural and environmental determinants of health problems. It also factors in the role genetics plays in understanding health problems. In adapting this phase of the model, the component on genetics was dropped given that the data used for this study do not contain genetic markers for assessing overweight and obesity in Ghana.

The selection of factors feeding into the various components of the conceptual framework is informed by some of the constructs in the theories reviewed in the preceding sections, coupled with the review of previous literature on the subject matter. Thus, the background factors of the women

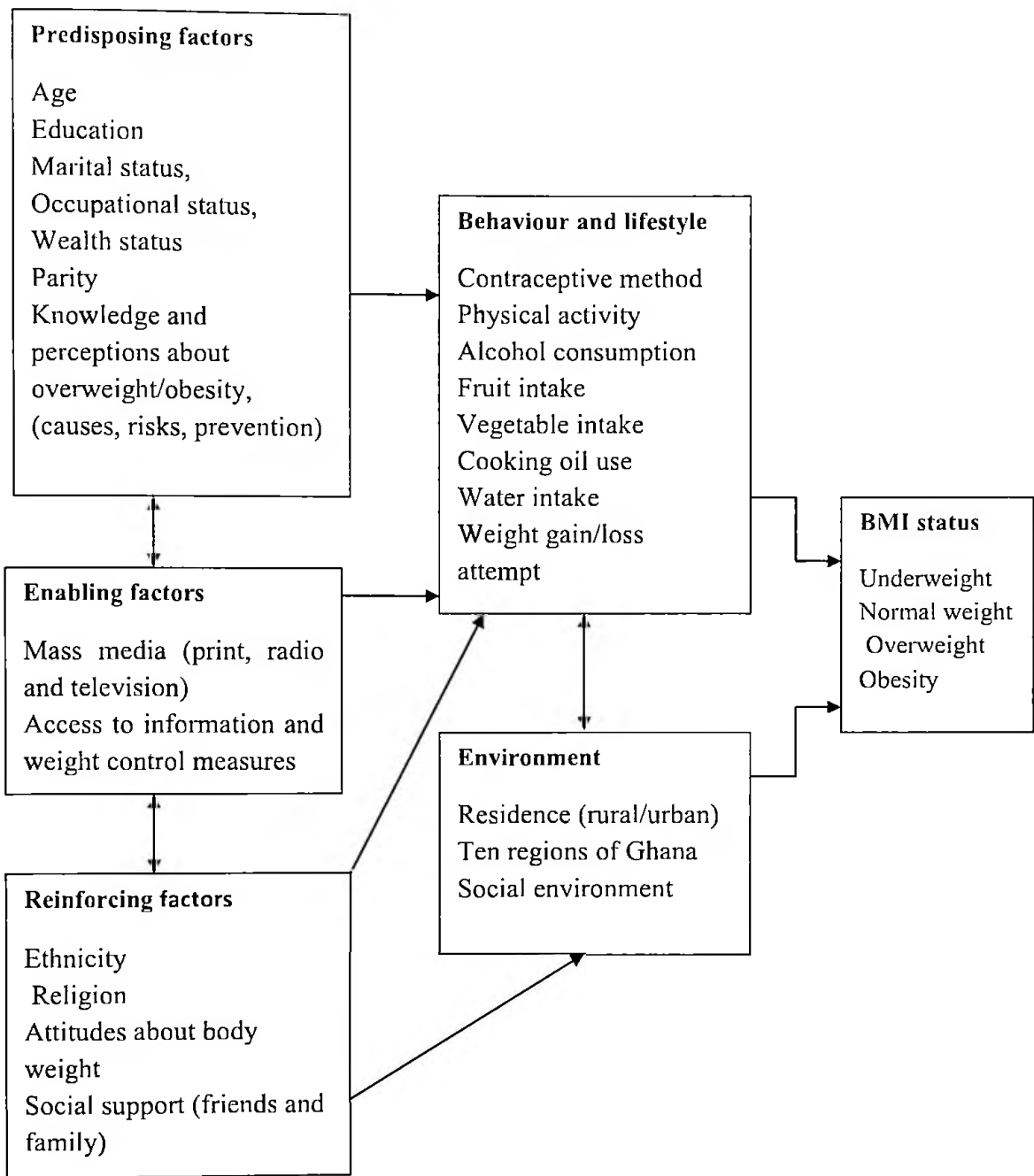


Figure 2: Conceptual Framework for the study

Source: Adapted from Green and Krueter (2005)

based on the available data were conceptualized to feed into the components of the framework. Residence setting (rural/urban) and region (the 10 administrative regions of Ghana) were the environmental factors considered in the framework. Contraceptive method use, days of physical activity per week, alcohol consumption per week, days of fruits, and vegetable intake per week, cooking oil use and glasses of water intake per week were considered in the framework as behaviours that may determine one's weight status.

In the third phase, the model identifies three categories of factors that contribute to health related behaviour. These factors: *predisposing*, *reinforcing*, and *enabling*: collectively influence the likelihood of behaviour or event occurring. In this study, factors considered as predisposing factors include age, highest education, marital status, occupational status, wealth status and parity. Factors captured as enabling factors in this study are the three channels of mass media (print, radio and television) because they serve as reliable sources of information on health that might influence behavioural and lifestyle choices related to overweight and obesity.

The role of socio-cultural factors in determining people's perception of body weight and for that matter overweight and obesity in many parts of sub-Saharan Africa cannot be overemphasized (Mavoia et al., 2010; Renzaho, 2004). Ethnicity and religion are considered as reinforcing factors and proxies for assessing possible socio-cultural influences in this study. Understanding these three categories of factors allows for the identification of priorities and provides a basis for where to focus efforts when developing interventions for overweight and obesity.

As shown in Figure 2, a woman's background factors (such as age, highest education, marital status, occupational status, wealth status and parity) in concert with the kind of information she receives through the mass media, as well as prevailing socio-cultural norms could influence her likelihood of engaging in behaviours that might result in the development or otherwise of overweight and obesity. Such behaviours and factors (background, media and socio-cultural) are also dependent on the kind of environment (rural/urban and region) a woman might be residing in.

Considering that overweight and obesity have myriad determinants operating together, this framework allows maximum flexibility and helps in the application of concepts or theories in ways that are most useful in understanding the problem. As such, the framework serves as a guide in the assessment of some factors using complimentary qualitative data.

CHAPTER FOUR

RESEARCH METHODOLOGY

Introduction

This chapter discusses the overall approach to the study processes, starting with a brief profile of Ghana, the main study area. This is followed by the philosophical assumptions underpinning the study. Next, the research design that aligns with the philosophical underpinning for the study is discussed, followed by the types and sources of data used for the study. Each data type is discussed with details covering the various procedures used in collecting and managing each data considered. The aforementioned issues are now set out and discussed in detail in the following sections.

Socio-Demographic and Health Profile of Ghana

Ghana is located along the West African coast of the Gulf of Guinea, eight degrees north of the equator with a 539 km long coastline. Ghana occupies an estimated total land area of 238,533sq km, and extends inland from the Gulf of Guinea. Ghana is bordered by Togo to the east, Burkina Faso to the north and La Cote d'Ivoire to the west.

Ghana Statistical Service (2013) estimated Ghana's population from the 2010 Population and Housing Census to be over 24.2 million and a male to female sex ratio of 95:100. Ghana's population can best be described as youthful, with about 41.3% of the population aged less than 15 years and 5.3% older than 64 years. Life expectancy is estimated at 60 years. The population

living in urban areas increased from 32% in 1984 to 44% in 2000. and by 2010, an estimated 51% of the population lived in urban areas.

In terms of regional distribution of Ghana's population, Ashanti Region has the greatest share of the population (19.5%), while Upper West Region has the least share of the population (2.8%). The population is made up of several ethnic groups, with the Akan constituting the largest ethnic group (47.5%). This is followed by the Mole-Dagbon (16.6%), Ewe (13.9%), Ga-Dangme (7.4%), Guan (3.7%), Gurma (5.7%), Grusi (2.5%), and Mande-Busanga (1%). Other non-specific tribes make up the remaining population in the country (Ghana Statistical Service, 2013).

Ghana is dominated by people who identify themselves with the Christian religion (71.2%) – Pentecostal/Charismatic (28.3%), Protestant (18.4%), Catholic (13.1%) and Other Christian (11.4%). Those who identify with the Islamic and Traditional faith constituted 17.6% and 5.2% respectively. Less than one percent of people in Ghana do not identify themselves with any religious faith. As of 2010, about 42% of the population aged 12 years and older had never married, whereas 43% and 5% of the population under references were married and widowed respectively (Ghana Statistical Service, 2013).

Over the past three decades, Ghana's educational system has undergone several restructuring, with some improvements. About 74% of the population 11 years and older is literate, with a higher proportion among males (80%) than females (68.5%). According to the Ghana Statistical Service (2013), about 56% of the population 6 years and above have had basic education, while about 8% have had education beyond the secondary level.

Educational attainment at the basic level is, however, almost the same for both males and females at 56% and 55% respectively.

With regards to the country's level of economic activity, the absolute numbers in the economically active population (15 years and older) almost doubled between 1984 (5.6 million) and 2010 (10.9 million). Proportion wise, about 43.9% of the population aged 15 years and older was economically active as of 2010. The proportions of the economically active population were about the same for males (43.7%) and females (44.0%). Agriculture, including forestry and fishing, remains the single largest employing sector of the economy, accounting for about 42%, followed by services and sales (21%), and craft and related trade (15.2%) (Ghana Statistical Service, 2013).

In 2011, the economic status of Ghana was revised from being a low income to a lower-middle income country. This followed the discovery of oil in commercial quantities in 2007 and the subsequent production of oil in 2011. The recent production of oil in Ghana led analysts in the World Bank to revise upwards the country's gross domestic product (GDP), spurring hopes for greater strides in the fight against poverty (Mustonen, 2012).

The country's efforts towards becoming a middle income country are partly dependent on continuously having a strong and healthy human capital, since a healthy population is vital in a country that aspires to improve productivity, and ultimately development. In recent years, the health status of Ghanaians has improved relatively (Ghana National Commission for UNESCO, 2010). Nonetheless, the burden of diseases is still high, with communicable diseases predominating while at the same time non-communicable diseases are increasing rapidly.

Ghana is therefore confronted with fighting morbidity at two fronts. For instance, out of the total mortality numbers, the communicable, maternal, perinatal and nutritional conditions account for about 53%, and non-communicable diseases (NCDs) such as diabetes mellitus, asthma, hypertension and other cardiovascular diseases are estimated to account for about 39% of all deaths and the remaining 8% deaths occur due to injuries (Ministry of Health [MOH], 2012).

Much of the rapidly increasing burden of NCDs in Ghana is attributed to globalization, rapid unplanned urbanization, population ageing, and lifestyle changes such as, decreasing physical activity, and increasing consumption of unhealthy foods. Such lifestyle changes have increased the prevalence of risk factors including overweight and obesity, raised blood pressure among others (WHO, 2011).

Cognisant of the ongoing epidemiological transition that the country is going through, with increasing prevalence of NCDs and continuing high levels of infectious diseases, several measures have been initiated to help stem the situation. As part of efforts to tackle and improve outcomes of specific communicable and non-communicable diseases, the Ghana Health Service (GHS) has created several units to facilitate health service delivery. These include National Malaria Control Programme (NMCP), National Tuberculosis Control Programme (NTP), National AIDS Control Programme (NACP), and National Buruli Ulcer Control Programme. To improve child health outcomes, the Expanded Programme on Immunization (EPI), and the Nutrition and Malaria Control for Child Survival have also been established.

A unit responsible for tackling NCDs has also been established at the Ministry of Health (MOH). Some seed funding has been made available to the unit for treatment and control, prevention and health promotion, as well as surveillance, monitoring and evaluation. Additionally, a national health reporting system for reporting NCD cause-specific mortality and morbidity, and their risk factors has been set up (MOH, 2012; WHO, 2014).

As part of its proactive effort to reduce the incidence of preventable diseases in Ghana, the current health policy – the 2006 Health sector policy, which has the theme “Creating wealth through health” – has seen some restructuring with greater emphasis on health promotion and the prevention of ill-health than curative strategies (MOH, 2008). In that regard, the MOH adopted the concept of “Regenerative Health and Nutrition (RHN)” with the aim to promote regenerative health in the country through the promotion of healthy eating, food safety, regular exercise, drinking potable water, rest, improving environmental sanitation, improving personal hygiene, and mother and child care practices that would help eliminate the many diseases that impact negatively on the health and well-being of Ghanaians (GSS et al., 2009).

In lieu of these developments, there is continued commitment to advance health equity at all levels of decision making (district, regional and national), and across all sectors whose work concerns the health of the population. This includes the call for relevant research to equip policy makers with the right information on issues that need to be addressed as far as health is concerned.

Research Philosophy

Although largely hidden, philosophical ideas or assumptions often influence the conduct of research. Such assumptions have been referred to by some authors as worldviews (Lhermitte, 1950), while others prefer to call them paradigms (Lincoln & Guba, 2009) or broadly conceived research methodologies (Bryman, 2008). Irrespective of the term used, these ideas, beliefs or assumptions that guide research, according to Creswell (2007), border on the nature of reality (the ontology issue), the relationship between the researcher and that which is being researched (the epistemology issue), the influence or otherwise of values (the axiological issue), and the research process itself (the methodological issue).

The beliefs or assumptions held by the researcher about the issues of ontology, epistemology, axiology and methodology vary depending on whether the researcher uses a subjective or objective approach to the research. In line with this viewpoint, the positivist and interpretivist paradigms have dominated the social science research enterprise for several decades. Positivist assumptions describe epistemologies which seek to objectively measure, explain and predict what happens in the social world by searching for regularities and causal relationships between the constituents. Hence, positivists subscribe to a deterministic philosophy in which causes probably determine effects or outcomes (Creswell, 2007, 2009).

Positivist research is reductionist in nature because it focuses on reducing ideas into small, discrete sets of ideas to test hypothesis and research questions. Thus, quantitative methodology is employed in data collection and analyses to develop numeric measures of observations, reflecting traditional

research approaches used in the natural sciences (Creswell, 2012). The theoretical bases of positivist philosophy, particularly its perception of social reality and methods have been questioned by critics. Mainly critics have argued that by reducing people to numbers, the positivists downplay the relevance of understanding the actual lived experiences of research subjects, but rather restricts research subjects to the interest of the researcher (Creswell, 2012).

As a consequence of criticisms concerning the reductionist nature of the mathematical and statistical methods used by positivists, the interpretivist research paradigm emerged. Also called social constructivist philosophy, this perspective holds the assumption that the social world is essentially relativistic and can only be understood from the point of view of the individuals directly involved in and experiencing the phenomenon being studied (Creswell, 2012). In other words, it asserts that individuals construct subjective meanings of their experiences, which the researcher can only understand by occupying the frame of reference of the individual involved in the action.

The interpretivists researcher relies on the varied and multiple meanings of the research participants in order to look for complexity of views rather than narrowing meanings into categories or ideas (as in positivist philosophy). Thus, interpretive research philosophy employs qualitative research methods in data collection and analysis. To the interpretivist, social science is a rather subjective than an objective enterprise and therefore does not generate objective knowledge of any kind. Hence, laws and underlying regularities in the social world are not of relevance.

The inclination of most social science research either towards the positivist or interpretivist philosophies have generated an unending debate among researchers, specifically as to which philosophy or paradigm is more appropriate. While the debate is on-going, there seems to be some consensus among researchers that none of the paradigms supersedes the other. In more contemporary times, the new thinking in terms of research philosophy is towards a middle ground between subjective or interpretive and objective or positivist philosophies.

This alternative philosophical perspective which is referred to as pragmatist philosophy or pragmatism focuses on employing “what works,” using diverse approaches, giving primacy to the importance of the research problem and question, and valuing both objective and subjective knowledge (Morgan, 2007). It takes a dialectical stance, thereby, bridging positivist and interpretivist philosophies of social science research (Greene, 2007). Pragmatism does not commit to any one system of philosophy and reality; hence, individual researchers have the freedom to choose from a wide array of methods, techniques, and procedures of research that best suit the needs and purposes of the phenomenon under study.

As a new research foundation in social sciences, pragmatism allows for the researcher to maximise the strengths of both the positivist and interpretivist philosophies while at the same time minimizing their weaknesses (Creswell & Clark, 2011). Based on its dialectical nature, the premium it places on the research problem and the application of all approaches available to understand the problem, pragmatism was adopted as the underlying philosophy behind the current study. Typical of most social and health

problems, overweight and obesity are multi-factorial health problems that traverse policies, organizations, families, and individuals.

As a result, studies on overweight and obesity have taken a multidisciplinary approach involving the perspectives of demographers, anthropologist, epidemiologist, psychologist among others. This study was no exception, and thus applied a pluralistic perspective to understanding the problem of overweight and obesity among women in Ghana, which is reflective of the pragmatic philosophy. Thus, the underlying assumption of this study was that the problem of overweight and obesity among women in Ghana can be better understood through both the subjective and objective worldviews.

Consequently, in line with the positivist perspective, it was assumed that overweight and obesity is a real health concern among women in Ghana that requires measurable evidence to establish its pervasiveness and facilitate comparison of groups, as well as determine its (probable) causal factors to facilitate the possibility of generalization to the population of women. From the interpretivist lenses on the other hand, it was also assumed that women have their individual perceptions and subjective meanings concerning body weight and by extension overweight and obesity. The perceptions and meanings women have about overweight and obesity are believed to be varied and constructed out of their interaction with others over time within the context of socio-cultural norms.

The above assumptions meant that the current study could not be committed to any one system of philosophy. Thus, pragmatism provided a

philosophical basis for this research, and offered the freedom to synergise aspects of both the positivist and interpretivist philosophies.

Research Design

In tandem with the pragmatic philosophical assumptions underpinning the study, the mixed methods design was employed to serve as a guide and to provide a focus for this study. In that regard, the mixed method research design sufficed as an alternative; allowing for the application of both quantitative and qualitative methods, in combination, in order to provide a holistic understanding of overweight and obesity among women in Ghana.

As an alternative to either quantitative or qualitative approaches, mixed methods design has the singular advantage of being able to enrich a phenomenon in ways that one form of data cannot allow. Thus, qualitative and quantitative data are combined to triangulate and corroborate findings, enhancing one phase of the study by adding a second method of data collection, and thereby allowing multiphase or longitudinal studies to gather qualitative and quantitative data sequentially or simultaneously (Creswell & Clark, 2011; Sogunro, 2002). Mixed methods design also helps to eliminate or minimize key plausible alternative explanations for conclusions drawn from the research, and clarify divergent aspects of a phenomenon under study (Johnson & Turner, 2003). In light of these reasons, a mixed methods design suited this study as a whole, as well as its individual aspects.

Based on the reasons for mixing methods, Creswell (2012) identified six mixed method strategies that guide and shape procedures for research. These are: convergent (or parallel or concurrent) design, exploratory

sequential design, explanatory sequential design, embedded design, transformative design and multiple phase design. After considering the various characteristics, as well as the strengths and weakness of each design, the explanatory sequential mixed method design was deemed suitable for the current study. Otherwise referred to as a two-phase model. this design involves initially collecting quantitative data and then following on with the collection of qualitative data to help explain or elaborate on the quantitative results.

The rationale for the explanatory sequential mixed approach is for the quantitative data and results to provide a general picture of the research problem, while more analysis, specifically from qualitative data is used to refine, extend, or explain the general picture. In the sequence, the quantitative data basically informs the approach for collecting the qualitative data. The refinement provided by the qualitative data could result from the need to: explore a few typical cases, probe a key result in more detail, or follow up with outlier or extreme cases. Typically, the researcher presents these studies in two phases, with each phase clearly identified in headings in the report (Creswell, 2012).

Adopting the explanatory sequential mixed method design allowed for the quantitative data sources to inform the collection of qualitative data, with the view to providing a richer perspective to the study. Consequently, each data source targeted specific issues relating to overweight and obesity among women in Ghana. The quantitative data identified statistically significant predictors of overweight or obesity among women; whereas, the qualitative

sequential design, explanatory sequential design, embedded design, transformative design and multiple phase design. After considering the various characteristics, as well as the strengths and weakness of each design, the explanatory sequential mixed method design was deemed suitable for the current study. Otherwise referred to as a two-phase model. this design involves initially collecting quantitative data and then following on with the collection of qualitative data to help explain or elaborate on the quantitative results.

The rationale for the explanatory sequential mixed approach is for the quantitative data and results to provide a general picture of the research problem, while more analysis, specifically from qualitative data is used to refine, extend, or explain the general picture. In the sequence, the quantitative data basically informs the approach for collecting the qualitative data. The refinement provided by the qualitative data could result from the need to: explore a few typical cases, probe a key result in more detail, or follow up with outlier or extreme cases. Typically, the researcher presents these studies in two phases, with each phase clearly identified in headings in the report (Creswell, 2012).

Adopting the explanatory sequential mixed method design allowed for the quantitative data sources to inform the collection of qualitative data, with the view to providing a richer perspective to the study. Consequently, each data source targeted specific issues relating to overweight and obesity among women in Ghana. The quantitative data identified statistically significant predictors of overweight or obesity among women; whereas, the qualitative

data explored perceptions of women within the context of their social environment.

In contrast, the exploratory sequential mixed methods design begins the sequence with the collection or analyses of qualitative data to explore a phenomenon, and then follows up with the collection of quantitative data to explain relationships found in the qualitative data. In view of this, the exploratory sequential design was not an option for this study. The convergent design was also not adopted in this case because this design involves the simultaneous collection of both quantitative and qualitative data, merging the data, and using the results to understand a research problem.

Similarly, the embedded design was not used because, unlike in the present study, one form of data plays a secondary supportive role to the other form of data. Thus, the researcher gives priority to the major form of data collection and secondary status to the supportive form of data collection. The transformative mixed methods design was also ruled out since this study does not employ a transformative framework or lens with the intent to address a social issue for a marginalized or underrepresented population based on race, disability, or sexual orientation (gay or lesbian) (Creswell & Clark, 2011; Mertens, 2010).

Again, the current study did not examine the problem of overweight and obesity through a series of phases or separate studies; neither did it address a set of incremental research questions that seek to advance one programmatic research objective. Hence, the multiphase mixed methods design equally did not also resonate with the purpose of this study.

Therefore, the two-phase design provided an opportunity to obtain different, but complementary data on overweight and obesity among women in Ghana. Mixing of the quantitative and qualitative approaches combines the strengths and weaknesses of each method; thereby, enhancing rigor in the study. Although relatively new, mixed methods research is increasingly generating significant interest in the research community; and has been applied in many fields of research (Dattilio, Edwards, & Fishman, 2010; Morell & Tan, 2009; Yoshikawa, Weisner, Kalil, & Way, 2008).

Related to the current study, mixed methods designs have been applied in studies on healthy lifestyle behaviours (Tashiro, 2002), physical activity and diet (Brett, Heimendinger, Boender, Morin, & Marshall, 2002) among others.

Ethical Considerations

Prior to the start of the study, ethical approval was sought from the Ghana Health Service Ethical Review Committee (GHS-ERC), and approval was subsequently granted. Hence, ethical considerations for the study were in full compliance with the GHS-ERC. Written consent was obtained from all participants. Participants were informed that the interviews would be tape recorded and that their identity would remain strictly confidential. Their names were not shared with other participants or individuals outside the study.

The anonymity of individuals was protected by assigning participants identification numbers for the interview. Participants were informed and assured of their rights to refuse to answer any questions during the interviews. Those who chose not to participate were respected and thanked for their choice without any form of penalty. Beneficence, justice, needs, and values of

the participants were ensured. Although in some cases (particularly very obese participants) the subject matter produced some emotional responses, participants appeared to not have experienced any distress that would require any psychological treatment.

All data were kept on a password protected computer. In addition the digital tape recorder, interview notes, list of participants, consent forms, and any hard copies of documents that may lead to the identification of participants were safely locked in a secure location that is only accessible to the investigator.

Quantitative Data

The quantitative data were drawn from secondary sources, specifically, the 2003 and 2008 rounds of Ghana Demographic and Health Surveys (GDHS). The women's data sets were requested online from <http://www.measuredhs.com>, the official DHS website. Upon approval, the data sets were downloaded in STATA format for further processing according to the purpose of the study.

The 2003 and 2008 GDHS datasets contain large nationally representative data collected by the Ghana Statistical Service (GSS) and Ghana Health Service (GHS) in collaboration with MEASURE DHS. Both the 2003 and 2008 surveys are, respectively, the fourth and the fifth in a series of national level population and health survey conducted as part of the global Demographic and Health Surveys (DHS) programme. The surveys were designed to provide data to monitor the population and health situation in Ghana as a follow-up of the 1988, 1993 and 1998 GDHS surveys. The 2003

and 2008 GDHS survey like other DHS surveys were based on a cross-sectional design in order to ensure that representative samples of the population were obtained.

Both surveys utilized a two-staged stratified sampling procedure, with the first stage involving the selection of clusters using systematic sampling based on probability proportional to population size. This was based on an updated master sampling frame constructed from the 2000 Population and Housing Census, purposely to produce separate estimates for key indicators for each of the 10 regions of Ghana. To ensure representativeness, the second stage involved the systematic sampling of the households listed in each cluster (GSS et al., 2009; Ghana Statistical Service (GSS), Noguchi Memorial Institute for Medical Research (NMIMR), 2004).

In the 2003 GDHS survey, a nationally representative survey of 5,691 women age 15-49 and 5,015 men age 15-59 from 6,251 households were conducted, while in 2008, total of 4,916 women age 15-49 and 4,568 men age 15-59 from 6,141 households were interviewed. A total of 412 clusters were covered throughout Ghana in both the 2003 and 2008 surveys. Clusters were selected using systematic sampling with probability proportional to size. In both cases, data collection took place over a three-month period. The 2003 survey took place from late July to late October, whereas the 2008 survey took place from early September to late November of the same year (GSS et al., 2004, 2009).

Although five GDHS surveys (1988, 1993, 1998, 2003 and 2008) have been conducted since the inception of DHS surveys in Ghana, the decision to use the 2003 and the 2008 surveys for this study was mainly data driven.

Apart from the 2003 and 2008 GDHS surveys which collected anthropometric data for all categories of women across the country, the earlier surveys (1988, 1993, and 1998) limited the collection of such data to only women who had had children 5 years prior to the surveys. This excluded other women in their reproductive ages who had not yet initiated childbearing prior to the surveys.

Consequently, the 2003 and 2008 GDHS surveys were chosen for this study to enable easy comparability of socio-demographic predictors of overweight and obesity across a representative sample of women groups in their reproductive ages across Ghana. Choosing both surveys also allowed for the identification of patterns or trends over the two survey periods. According to GSS et al. (2009), while most of the nutritional status indicators for women age 15-49 remained stable between 2003 and 2008, overweight or obese increased from 25% to 30% over the same period, thereby, providing impetus for further analysis as done in the current study.

Apart from being the most recent edition of GDHS, the 2008 survey in particular had questions bordering on behavioural antecedent to overweight and obesity. All respondents interviewed in the GDHS 2008 were asked a series of questions on vigorous physical activity, hours of rest including naps and sleep both during day and night, and average consumption of water, fruits and vegetables. Unlike in the preceding surveys, these questions were incorporated, in part, to assess the Regenerative Health and Nutrition (RHN) programme initiated by the Ministry of Health in 2006 to help reduce the increasing burden of non-communicable diseases in Ghana (GSS et al., 2009). Hence, the 2008 survey enabled the estimation of behavioural factors

associated with overweight or obesity across women groups in Ghana in this study.

In all, both GDHS (2003 and 2008) datasets, like all others, provided a large and rich pool of data on various socio-demographic, behavioural and anthropometric characteristics for further analysis in congruence with the purpose of this. The savings in terms of time and cost can also not be overemphasized.

Analytical Sample

Anthropometric data of women were collected for all eligible women who were interviewed in both the 2003 and 2008 rounds of the GDHS survey. A total of 5691 and 4916 women were interviewed in 2003 and 2008, respectively. As shown in Figure 3, this was further stratified according to the two main groups of women (childbearing and non-childbearing) considered in accordance with the purpose of the study. As typically done in obesity studies, pregnant women and lactating mothers were excluded from the study sample to avoid biased anthropometric estimates. Women with incomplete anthropometric information were also excluded from the sample.

The final sample for analysis, therefore, consisted of 4711 (childbearing women, 3252; non-childbearing women, 1459) and 4075 (childbearing women, 2671; non-childbearing women, 1405) women from the 2003 and 2008 GDHS datasets, respectively.

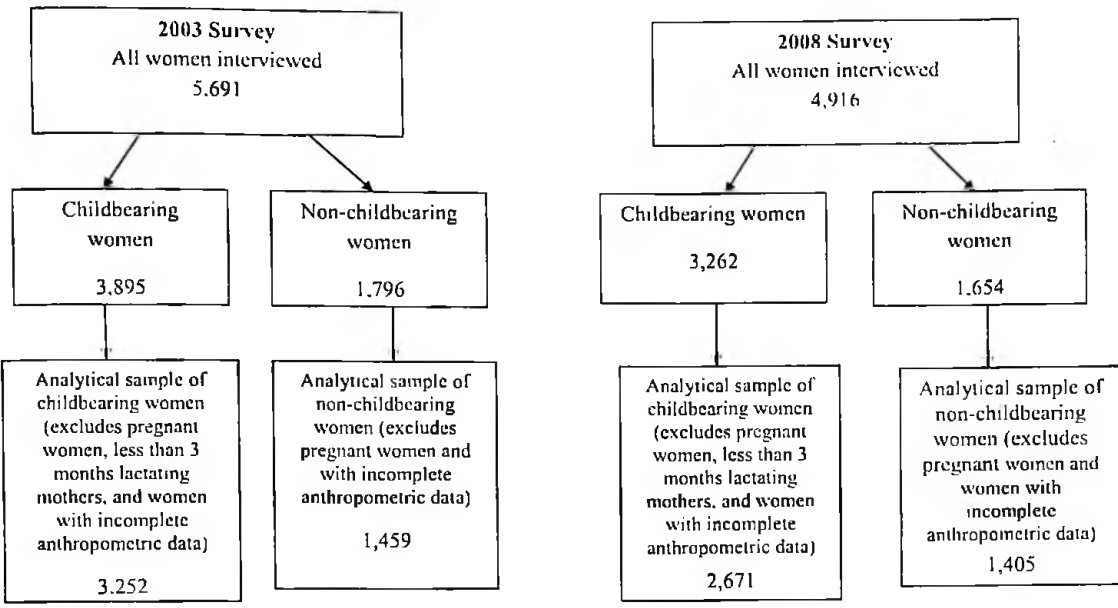


Figure 3: Selection of Analytical Sample

Definition of Variables

Dependent Variable

Anthropometric data on weight and height measures of each respondent of both the 2003 and 2008 GDHS surveys were collected. One nutritional status indicator that was computed based on these data was the BMI. Defined as weight in kilograms divided by the square of height in meters, the BMI is used to measure thinness or obesity based on standard WHO (1997) cut offs (underweight, BMI < 18.5 kg/m²; normal weight, BMI 18.5-25 kg/m²; overweight, BMI of 25-29.9 kg/m²; and obese BMI > 30 kg/m²).

The dependent variable for the study was, therefore, derived from the BMI data of women that were interviewed in both surveys. The data had two implied decimal place which had to be divided by 100 to produce the typical BMI estimates. Using the WHO standard cut off of BMI of 25.0 and above to indicate overweight or obesity, a binary outcome was generated as the dependent variable (overweight or obesity) for this study. Women with BMI of 25.0 or above were considered as overweight or obese and coded “1”, while those below the BMI of 25.0 were considered otherwise and coded “0”. All cases with missing data were excluded.

This classification was mainly data related. Preliminary analysis based on BMI indicated traces of asymmetry, particularly for those within the obese (BMI > 30 kg/m²) category. It was more prudent to merge the overweight and obese categories in order to obtain more robust estimates. Secondly, a BMI threshold of at least 25 kg/m² has been identified to be associated with an

elevated risk of mortality and NCD morbidities (WHO, 2015). Thus, this classification still allowed for the estimation of the problem of excess body weight. Since the underweight ($\text{BMI} < 18.5 \text{ kg/m}^2$) and normal weight ($18.5\text{-}25 \text{ kg/m}^2$) were not the prime focus of this study, collapsing the two categories did not present any foreseeable challenges to the estimations thereof.

Independent Variables

Characteristics of the women from the two surveys were conceptualised as independent variables. In accordance with the conceptual framework guiding the study, the independent variables were then grouped into predisposing; enabling; reinforcing; environmental; and behavioural factors. Predisposing factors included age, highest education, marital status, occupational status, wealth status and parity. The three main forms of mass media (print, radio and television) in Ghana were considered as enabling factors; while ethnicity and religion were the factors considered as reinforcing factors.

Environmental factors included residence setting (rural/urban) and region (the 10 administrative regions of Ghana). The behavioural factors considered were contraceptive method use, days of physical activity per week, alcohol consumption per week, days of fruits, and vegetable intake per week, cooking oil use and glasses of water intake per week. These groups of factors as stipulated by the conceptual framework operate and interact at various levels to determine an individual's risk of becoming overweight or obese.

Where necessary, some of the independent variables were transformed or recoded in order to make the analysis manageable and to facilitate

comparison across the two survey years and women groups. To that regard, age was grouped using a ten year interval: 15-24, 25-34, 40-44, and 45+. Highest education was based on the highest level completed by each respondent and was grouped into four categories: no education, primary, middle/Junior secondary school (JSS) and secondary/higher education. Three categories were created for marital status: never married, married/cohabiting (those married and those living together), and previously married (divorced/widowed).

Occupational status was grouped thematically into five categories: unemployed, professional/managerial, sales/trade, agricultural and manual. The DHS wealth quintile approach for measuring household wealth was adopted as a proxy for the wealth status categories: poorest, poorer, middle, rich and richest. Based on the number of children a woman had, parity was grouped into: 1-3, 4-6, and 7+. Exposure to mass media was broken into print (newspaper or magazine), radio and television. Each channel of mass media was categorized into three: no exposure, moderate exposure (at least once a week) and high exposure (almost every day).

With regards to ethnicity, the four major ethnic groups (Akan, Ga/Adangme, Ewe, Mole-Dagbani) in Ghana were maintained, while minority groups including Guans, Gruma, Mande, Grussi and other unspecified groups were grouped together as "Others". Broad group classification was used as a basis to categorize religion into; Catholic, Protestants, Pentecostal/Charismatic, Muslim, Traditional and no religion. To take into account the effect of urbanization, residence setting was categorized into rural and urban. For region of residence, all the ten administrative regions (Western,

Central, Greater-Accra, Volta, Eastern, Ashanti, Brong-Ahafo, Northern, Upper West and Upper East) of Ghana were considered.

In terms of the behavioural factors considered in the study, contraceptive methods use was grouped into: none, modern and traditional. Days of physical activity per week, days of fruits in take per week, and days of vegetable in take per week were each put into three categories: none, 1-3, and 4-7; whereas alcohol consumption per week was grouped into: none, once and twice+. Palm oil, fortified vegetable oil (including “frytol”), other vegetable oil, shea butter, and other oils were the classifications for type of cooking oil use. Glasses of water intake per week were grouped into: <6, 6-7, and 8+.

Analytical Strategies

In analysing data collected using complex survey designs such as in the case of DHS, it is always important to take into consideration the survey design so as to obtain unbiased point estimates and accurate confidence intervals (Eltinge, Parsons, & Jang, 1997; Sukasih & Ave, 1989). With an in-built feature for estimating accurate standard errors where the sample has been drawn using clusters, stratification and unequal weights use, STATA 11.0 software was deemed appropriate and used for all analyses of quantitative data in this study. In order to ensure representativeness and to correct for non-response, all the data used in this study were weighted. The complex survey design was also taken into consideration in the analyses, using the SVY command in Stata.

This study mainly focused on two groups of women: childbearing women, and non-childbearing women. For the purpose of this study, a

childbearing woman was conceptualized as any woman who reported that she had given birth to and/or still had live child/children at the time of the survey; while a non-childbearing woman was conceptualized as any woman who reported that she had never given birth to a child/children at the time of the survey (GSS et al., 2009). In view of this, all analyses were stratified according to the two women groups. Given that the core analytical strategy in this study focused on two groups of women, childbearing and non-childbearing, the models were run separately for both groups within each survey year. The analyses were conducted in two phases, in line with the objectives of the study.

The first phase of the analyses sought to assess the socio-demographic determinants of overweight or obesity. Both the 2003 and 2008 GDHS surveys were utilized at this phase to enable comparison across the two women groups and both surveys. The second phase sought to assess the behavioural determinants of overweight or obesity, however, such data was not captured in the 2003 survey. For this reason, only the 2008 dataset was utilized in the second phase of the analyses. Nonetheless, the dataset was still useful for comparison patterns between the two women groups.

Univariate, bivariate and multivariate analyses were the three levels of analytical strategies employed in this study. At the univariate level, descriptive statistics were used to analyse and present results of all variables considered in the study. Frequencies, percentages, mean and standard deviation were the main statistical tools used in the analyses at this level. The bivariate level analyses involved the use of cross-tabulations between each of the various independent variables and the dependent outcome of interest (overweight or

obesity). Chi-square test of independence was used to estimate the relationships between the two sets of variables at this stage of the analyses. In order to estimate the nature, strength and direction of association between the independent variables (socio-demographic, and behavioural factors) of interest and the dependent variable (overweight or obesity), it was necessary to use multivariate analysis in the final level of analyses.

For the multivariate analysis, binary logistic regression was the main statistical tool used to estimate the nature and strength of associations between the independent variables and the dependent variable. The choice of this regression was mainly driven by the fact that the dependent variable (overweight or obesity) was constructed as a binary outcome. Binary logistic regression is a robust regression option that does not necessarily require independent variables to be normally distributed, or have equal variance in each group. Likewise the dependent variable needs not be normally distributed. In addition, it does not assume a linear relationship between the independent and dependent variables.

With the conceptual framework of the study as a guide, four binary logistic regression models (Models 1, 2, 3 and 4) were ran sequentially in order to estimate the socio-demographic factors associated with overweight or obesity among women in Ghana. The first model featured the socio-demographic factors (age, highest education, marital status, occupational status, wealth status and parity), which were conceptualized as predisposing factors. The sequence followed in accordance with the conceptual framework with enabling factors (print, radio and television media) in model 2; reinforcing factors (ethnicity and religion) in model 3; and environmental

factors (residence setting and region) in the final model. The variables were included in that sequence to examine their various effects, and whether or not they alter the magnitude and direction of the effects of the socio-demographic factors on overweight or obesity.

Similarly and still driven by the underlying conceptual framework, five binary logistic regression models (Models 1, 2, 3, 4 and 5) were ran sequentially in order to estimate the behavioural factors associated with overweight or obesity among women in Ghana. However, in this series, the first model featured the behavioural factors (contraceptive method use, days of physical activity per week, alcohol consumption per week, days of fruits, and vegetable intake per week, cooking oil use and glasses of water intake per week) under consideration. In model 2, environmental factors (residence setting and region) were tailored in, followed by predisposing factors (age, highest education, marital status, occupational status, wealth status and parity) in model 3; enabling factors (print, radio and television media) in model 4; and reinforcing factors (ethnicity and religion) in model 5.

The final models in each sequence of binary logistic regression models were used to assess and interpret the overall effects of both the socio-demographic factors, and the behavioural factors on overweight or obesity among women in Ghana.

Qualitative Data

In order to understand the issue of overweight and obesity more broadly, primary qualitative data were collected using in-depth interviews with various women. Concordant with the research design (explanatory sequential

mixed method) guiding the study, the intention was for the qualitative data was to elaborate on some of the observations that emanated from the quantitative analyses, and to explore in detail issues that could not be covered using quantitative data (Creswell, 2009, 2012). In-depth interviews were used because it was important to understand in detail the meanings, experiences, and perspectives of the women themselves concerning issues that have to do with overweight or obesity.

Study Areas

The selection of study areas for the qualitative study was inspired by the explanatory sequential mixed methods research design adopted to guide the study. As indicated earlier, in this design, qualitative data collection is often based on and/or follows analyses of quantitative data. In that light, the Greater-Accra and the Northern regions were selected on purpose for conducting interviews with women. The two regions were chosen based on the results (see Table 3) of the quantitative data analyses of this study.

From the analyses of the quantitative data, Greater-Accra Region consistently had the highest prevalence of overweight or obesity across the two women groups in the two surveys. This region happens to be the home region of the Ga/Adangbe, which was also the ethnic group with the highest prevalence of overweight or obesity from the quantitative results. Again using the results of the quantitative analysis as a basis, the Northern region was selected because it had low prevalence of overweight or obesity.

The Northern Region is home to the Mole-Dagbani ethnic group which recorded the lowest prevalence of overweight or obesity in the analyses. More

so, it was observed from the multivariate analyses that the Northern Region was the only region with consistently significant lower odds of women being overweight or obese. The above factors provided sufficient justification for selecting the two regions in an attempt to explore issues that could not be explored using quantitative data.

For ease of survey implementation, the Accra metropolis was selected as proxy for the Greater Accra region. In order to explore the influence of lifestyle changes associated with urbanization and modernisation, Accra was purposely chosen since it is the capital city and largest urban centre in Ghana. Accra was also chosen because studies have consistently reported higher prevalence of hypertension in Accra and have linked the problem to obesity (Amoah, 2003a; Awuah, Anarfi, Agyemang, Ogedegbe, & Aikins, 2014). More specifically, two (Labone and Teshie) communities within the Accra metropolis were selected for the study. Labone, a high-class urban housing area was chosen in contrast to Teshie, a lower-class indigenous community of Accra (Amoah, 2003a).

As the capital of the Northern Region (and perhaps northern Ghana), Tamale is described as Ghana's third city and the fastest growing city in West Africa. Due to its central location in Northern Ghana, Tamale serves as a hub for all administrative and commercial activities in the Northern Region. Its diverse population mainly reflects that of the Mole-Dagbani people found in the three northern regions (Upper West, Northern, and Upper East) of Ghana. With the Northern Region recording some of the lowest rates of overweight or obesity from the results, Tamale was deemed a suitable proxy to explore in depth the views of women on the phenomenon under study.

Sampling Technique

A purposeful sampling method was employed because the method uses predetermined criteria, allowing for adequate information to be provided by respondents so as to ensure rich or detailed data (Morse, 2005). Considering that this aspect of the study was not intended to be generalizable, but rather to describe (in-depth) the perceptions of women, the purposive sampling approach ensured that participants relevant to the study were chosen. Inclusion criteria were: (a) female age 15-49; (b) Ga/Adangbe or Mole-Dagbani and resident in respective study areas; (c) speak English; (d) willing to offer consent and participate in 45-60 minute audio taped interviews; (e) willing to have anthropometric measurements taken. To avoid biases in anthropometric measurements and possible inconveniences, pregnant and lactating women were excluded from this aspect of the study.

No sample size was assigned a-priori, hence, participants were recruited until saturation was reached (Griffin, 2000). Saturation occurs in in-depth studies when no new themes emerge or when responses from the participants do not vary substantially from earlier responses. Nonetheless, theoretical limits for determining saturation for qualitative studies differ. According to Creswell (1999), 25 participants could lead to saturation in phenomenological studies. Others have observed much smaller participants could lead to saturation. For instance, Guest (2006) indicates that six interviews could be sufficient for the development of meaningful themes and interpretations of qualitative data. In this study, saturation was reached after interviewing a total of 36 women (19 from Accra and 17 from Tamale) who suited the stipulated criteria for recruitment into the study.

Method of Data Collection

Interviews were conducted as the method of collecting primary qualitative data for the study. On a continuum, interviews can range in structure, from “unstructured” to highly “structured” (Harrell & Bradley, 2009). For the purpose of this study, semi-structured interviews were used to permit a deeper coverage of some of the issues identified from the quantitative analysis, as well as pertinent themes identified in the literature concerning overweight and obesity.

This method was also used because it provides the respondent with the flexibility to express their definition of issues, while at the same time providing an opportunity for a detailed account of their opinions, attitudes and experiences concerning the phenomenon being discussed (in this case overweight and obesity). In addition, the semi-structured interview method allows respondents to provide responses that reflect both the historical and present social situation, as well as the values held by their society (DiCicco-Bloom & Crabtree, 2006; Harrell & Bradley, 2009).

Research Instrument

Considering that the semi-structured interview method of data collection was chosen for the qualitative aspect of the study, an interview guide was developed as the instrument for the purpose. The development of the interview guide was informed by the objectives of the study, extant literature on the subject and the results of the quantitative data analyses. The first section of the interview guide was designed to collect some background information of the participants. Such background information included: age.

level of formal education, marital status, ethnicity, occupation, and number of children. Additional space was provided in this section to record anthropometric measures of height and weight of participants.

The second section consisted of open ended questions that sought to explore the main issues of interest of the study. Five thematic areas were covered in this section: meaning and definition of overweight and obesity; possible causes and implications of overweight and obesity; attitudes relating to overweight and obesity; body size perceptions and preferences; and practices relating to weight gain/loss. The last section of the guide sought to explore the closing thoughts of the participants.

Pre-testing of Interview Guide

Pretesting was conducted on eleven (11) women in Cape Coast in the Central region of Ghana out of convenience. Secondly, as the nearest large urban centre to Accra, there is some level of diffusion of city (Accra) lifestyles into Cape Coast. These participants were similar to the target population. In an effort to improve the interview guide, the participants were asked: 1) what does the question mean to you?; 2) is there a better way of asking it?; and 3) do you understand this question? Thinking and talking aloud were additional pretesting strategies employed. The pre-testing helped in modification or dropping of some of the questions. It also helped in estimating the amount of time for the interviews.

Data Collection Procedure

The recruitment strategy used was mainly the canvassing method. In each study site, the researcher would walk around looking out for women who suited the criteria for inclusion. The canvassing was done bearing in mind the need to recruit women with varied weight statuses in order to obtain varied views and experiences on overweight and obesity. Once a potential participant was identified, the researcher explained his role and the purpose of the study, while at the same time attempting to build rapport. Interested potential participants were asked to determine the date, time and venue of their convenience for interviews.

As typically done in qualitative research, all interviews were conducted by the researcher after obtaining informed consent from each participant. Participants were reminded of their rights outlined in the consent form and assigned an identification number to assure anonymity before each interview began. All interviews were held in a convenient location for the participant. The participants were encouraged to feel free to express their opinions on the various issues that would be discussed. They were also assured that their responses were very important and that there were no wrong or right answers.

The interviews were conducted privately with each lasting approximately 45-60 minutes. To make the participants feel at ease to express their views, a casual style was employed during the interviews. During the interviews, the aim was to exhaust the question routes in one thematic area before moving on to the next. However, some level of flexibility was allowed to cater for spontaneous but valuable additions or digressions by participants. Unrelated topics were raised in some cases but participants were politely

steered back to the main issue without truncating the flow. Probes were very valuable in eliciting depth of details in the interviews. The 'uh-huh' probe, the silent probe, and the echo probe (Bernard, 2012) were mostly used to that effect. All interviews were audio-recorded so that attention could be paid to non-verbal cues such as fidgeting, hesitations or long pauses. Notes were also taken during the interviews; however, these were rather sketchy.

To explore their subjective versus objective assessments of their weight status based on BMI classification, the weight of each participant was measured at the end of each interview. A digital heavy duty floor scale was used. Participants were each requested to remove any objects from their pockets and also their shoes or sandals, watches and jewellery in order to obtain unbiased measures. They were then requested to step on the scale and remain still while the reading was taken. The measurements were taken to the nearest kilogram.

Similarly, measurements of height were taken from each participant using a foldable stadiometer. Each participant had to remove their shoes and stand barefoot with their back and legs straight and eyes looking straight ahead for the measurements to be taken to the nearest centimetre.

Data Analyses

Analysis began from the time the initial interview was conducted. This was done in order to familiarize with the kind of data being generated and to help improve questions or ask questions in different ways so as to improve the quality of data. The six steps prescribed by Creswell (2009) were followed in the analysis procedure. At the first step, the audio recordings were transferred

onto Windows Media player to enable easy control of audio playback. Each recording was played back and transcribed verbatim using Microsoft Word 2007. Control of the audio playback ensured accurate transcriptions of the interviews. This was followed by the second step where each transcript was read line-by-line to ensure the transcript was credible. All of the transcripts were reviewed multiple times to familiarize with the data. This was done while making reference to field notes where necessary.

The coding process began with the third step. Codes were written in the margin of each transcript and organised into categories using terms from the actual language of the participants (Creswell, 2009). In the fourth step, recurrent codes were used to develop themes and subthemes, which became the major headings in the results. The fifth step involved connecting the codes, themes and subthemes to ensure consistency. Relevant quotes were extracted from the transcripts to illustrate and shed light on the themes discussed to represent the findings. The final step involved interpretation of the data.

Data Quality Concerns

Data quality concerns in qualitative research revolve around trustworthiness. Trustworthiness of qualitative research has to do with the extent to which the findings are representative of the reality of the experiences reported in the study (Lietz & Zayas, 2010; Lincoln & Guba, 2009). Thus, various approaches were employed in this study to guard against bias and improve trustworthiness of findings.

Credibility deals with ensuring accurate description of participants' views. One way to ensure this is through member checking, which involves

CHAPTER FIVE

SOCIO-DEMOGRAPHIC FACTORS ASSOCIATED WITH OVERWEIGHT AND OBESITY AMONG WOMEN IN GHANA

Introduction

Overweight and obesity remain threats to the health and wellbeing of populations in the developed world, but increasingly so in developing countries in recent decades. Developing countries in particular are therefore faced with fighting infectious morbidities, as well as obesity related morbidities such as cardiovascular disease, diabetes, cancers among others (WHO, 2015). A myriad of factors have been identified as propellers of the increasing prevalence of overweight and obesity in developing countries including rapid urbanization and westernization. Nonetheless, to address overweight and obesity, it becomes necessary to identify at risk population sub-groups for targeted and easy deployment of strategies of remedy.

This chapter discusses the socio-demographic factors associated with overweight or obesity among women in Ghana by focusing on two population groups of women: childbearing women and non-childbearing women. The reason is to determine how various socio-demographic factors affect the development of overweight and obesity among women, as well as how these factors compare across the two sub-groups of women. The overall aim is to extend the frontiers of our understanding of overweight and obesity among women in Ghana.

The analyses for this chapter draws on data from the two most recent rounds (2003 and 2008) of the GDHS, which are nationally representative

samples of Ghanaian women in their reproductive ages (15-49). Such nationally representative data provides an opportunity for studying socio-demographic factors associated with overweight or obesity across a broad spectrum of women in Ghana to aid in the development of more tailored interventions. The choice of the two survey rounds provides room for observing consistency or otherwise of patterns over the survey periods.

The rest of this chapter proceeds with a description of the general background socio-demographic characteristics of women with complete information for the purpose of this study, followed by BMI distributions of women. Next, bivariate associations between various socio-demographic factors and overweight or obesity are assessed. Finally, results of multivariate logistic regression models to estimate the odds of overweight or obesity by various categories of socio-demographic factors are presented.

Socio-Demographic Characteristics of Respondents

This section describes various socio-demographic characteristics of childbearing and non-childbearing women aged 15-49 years who had complete information for the purpose of this study. Table 1 shows socio-demographic characteristics of each of the women groups by year of survey. In both 2003 and 2008, there were more childbearing women in the age groups above 24 years, whereas more non-childbearing women were below 24 years. For example, in 2008, 85% of childbearing women were in the age group above 24 years compared with 84% in the 15-24 age group.

Characteristic	Childbearing (N = 3252)		Non-childbearing (N=1469)		Childbearing (N = 2672)		Non-childbearing (N=1405)	
	n	%	n	%	n	%	n	%
Age								
15-24	523	16.0	1248	85.0	408	15.3	1179	83.9
25-34	1234	38.0	175	11.9	951	35.6	184	13.1
35-44	1053	32.4	40	2.7	926	34.7	38	2.7
45+	442	13.6	6	0.4	387	14.4	4	0.3
Highest education								
No education	1315	40.4	166	11.3	880	32.9	87	6.2
Primary	659	20.3	282	19.2	616	23.1	225	16.0
Middle/JSS	1055	32.4	710	48.3	924	34.6	679	48.3
Secondary/higher	223	6.9	311	21.2	252	9.4	414	29.5

Marital Status									
Never married	109	3.4	1258	85.6	147	5.5	1246	88.7	
Married/cohabiting	2745	84.4	171	11.7	2158	80.8	135	9.6	
Previously married	398	12.2	40	2.7	367	13.7	24	1.7	
Occupation									
Unemployed	291	9.0	770	52.4	225	8.4	747	53.2	
Professional/Managerial	249	7.7	183	12.5	288	10.8	240	17.0	
Sales/trade	884	27.0	212	14.4	975	36.5	189	13.5	
Agricultural	1348	41.5	128	8.7	965	36.1	106	7.5	
Manual	480	14.8	176	12.0	219	8.2	123	8.8	
Wealth status									
Poorest	855	26.3	195	13.3	643	24.1	207	14.7	
Poorer	642	19.7	177	12.0	550	20.6	197	14.0	
Middle	599	18.4	214	14.6	513	19.2	251	17.9	
Richer	569	17.5	347	23.6	548	20.5	336	23.9	

	587	18.1	536	36.5	418	15.6	414	29.5
Residence setting								
Rural	1167	35.9	877	59.7	1059	39.6	775	55.2
Urban	2085	64.1	592	40.3	1613	60.4	630	44.8
Region of residence								
Western	305	9.4	155	10.5	249	9.3	120	8.5
Central	217	6.7	95	6.5	196	7.3	81	5.7
Greater Accra	412	12.7	333	22.6	297	11.2	275	19.6
Volta	272	8.4	120	8.2	239	8.9	109	7.7
Eastern	305	9.4	137	9.3	277	10.4	149	10.6
Ashanti	504	15.5	252	17.2	448	16.8	262	18.7
Brong Ahafo	379	11.7	149	10.1	260	9.7	97	6.9
Northern	360	11.0	76	5.2	247	9.3	105	7.5
Upper West	268	8.2	82	5.6	204	7.6	81	5.8
Upper East	230	7.0	70	4.8	255	9.5	126	9.0

Ethnicity

Akan	1407	43.2	717	48.8	1187	44.4	647	46.0
Ga/Adangbe	257	7.9	132	9.0	160	6.0	108	7.7
Ewe	404	12.4	201	13.7	346	13.0	176	12.5
Mole-dagbani	636	19.6	197	13.4	581	21.7	258	18.4
Others	548	16.9	222	15.1	398	14.9	216	15.4

Religious affiliation

Catholic	477	14.7	273	18.6	384	14.4	225	16.0
Protestants	490	15.1	290	19.7	364	13.6	248	17.7
Pentecostal/Charismatic	1344	41.3	651	44.3	1198	44.8	652	46.4
Muslim	567	17.4	214	14.6	428	16.0	224	15.9
Traditional	151	4.6	14	1.0	178	6.7	30	2.1
No religion	223	6.9	27	1.8	120	4.5	26	1.9

Print media exposure

No exposure	2853	87.7	935	63.7	2366	88.6	789	56.2
-------------	------	------	-----	------	------	------	-----	------

Moderate exposure	347	10.7	459	31.3	270	10.0	542	38.6
High exposure	52	1.6	75	5.0	36	1.4	74	5.2
Radio exposure								
No exposure	503	15.5	174	11.8	475	17.8	193	13.7
Moderate exposure	1310	40.2	575	39.1	872	32.6	499	35.5
High exposure	1439	44.3	720	49.1	1325	49.6	713	50.8
Television exposure								
No exposure	1695	52.1	394	26.8	1282	48.0	359	25.5
Moderate exposure	1002	30.8	574	39.1	710	26.5	463	33.0
High exposure	555	17.1	501	34.1	680	25.5	583	41.5
Parity								
1 - 3	1893	58.2	-	-	2010	75.2	-	-
4 - 6	1127	34.7	-	-	491	18.4	-	-
7+	232	7.1	-	-	171	6.4	-	-

With regards to educational attainment, non-childbearing women were better educated than childbearing women in both 2003 and 2008. Seven in ten non-childbearing women had educational attainment beyond the primary level compared to about four in ten childbearing women in both 2003 and 2008. Between the two surveys, educational attainment seems to have improved dramatically in both groups of women.

Given the close association of marriage with childbirth, a majority of childbearing women reported being in marital unions in the two surveys while the opposite was the case for non-childbearing women. Between the two surveys, there seems to have been some occupational mobility, particularly among childbearing women. The percentage of childbearing women in agricultural and manual occupations decreased, respectively, from 41% and 15% in 2003 to 36% and 8% in 2008. On the other hand childbearing women in sales/trade and professional/managerial increased, respectively, from 27% and 8% in 2003 to 37% and 11% in 2008. However, more than half of non-childbearing women were unemployed in both 2003 and 2008.

In terms of household wealth status, childbearing women seem to be more economically disadvantaged than non-childbearing women, both in 2003 and 2008. In both years, about four in ten childbearing women were in the two poorest wealth quintiles compared with about two in ten non-childbearing women. Overall, the wealth status of women in both groups improved slightly between 2003 and 2008. Residence setting varied between the two women groups across the two survey periods, with childbearing and non-childbearing women dominating urban and rural settings, respectively. In both 2003 and

2008, over a third of childbearing women were resident in urban settings while more than half of non-childbearing women were resident in rural settings.

The highest proportion of childbearing women was drawn from the Ashanti Region and the lowest from the Central Region in both 2003 and 2008. On the contrary, the highest proportion of non-childbearing women was drawn from the Greater-Accra Region in 2003 and 2008. In terms of ethnicity, the Akan group was preponderant. With the exception of Ga-Adangbe, the Akan group accounted for more than twice all other ethnic groups in 2003 and 2008 and across the women groups. Almost all the women were affiliated with one religious group or the other, with a greater proportion of them affiliated with Pentecostal/Charismatic denominations in both surveys. Overall, in both surveys (2003 and 2008) and women groups (childbearing and non-childbearing), there were more Christian religious groups, compared with other religious groups.

Perhaps as a reflection of educational attainment, frequency of exposure to print media was much lower among childbearing women than non-childbearing women in both surveys. For example, 1.4% of childbearing women had high exposure to print media compared with 5.3% of non-childbearing women in 2008. By contrast, non-childbearing women had high exposure to radio than childbearing women. In the most recent survey (2008), about 87% of non-childbearing women had moderate to high exposure to radio compared with 83% of childbearing women. Again, the pattern of television exposure was similar to that of print media between 2003 and 2008 for both women groups.

Given that the two women groups were stratified based on their childbearing status, parity is reported for only childbearing women in this study. The percentage of childbearing women who had 1-3 children increased by 17% from 2003 and 2008. Overall, the proportion of women with higher parities reduced between the two surveys.

Prevalence of Overweight or Obesity

Childbearing women on the average had a higher BMI than non-childbearing women, with general increases in the BMI of women between 2003 and 2008, as indicated in Table 2. In 2003, the mean BMI of childbearing women was about 23.4 (± 4.8) compared with 21.9 (± 3.6) for non-childbearing women, increasing to 24.0 (± 5.0) and 22.2 (± 3.9) for childbearing and non-childbearing women, respectively.

Based on the WHO BMI classifications, a similar pattern was observed for the prevalence of overweight and obesity for the two groups of women in both surveys. More than a quarter (27%) of childbearing women were overweight or obese compared with 15% on non-childbearing women in 2003. By 2008, about a third (34%) of childbearing women were overweight or obese while that of non-childbearing women increased to about 18%.

Socio-Demographic Predictors of Overweight or Obesity

This section explores socio-demographic factors that might determine overweight and obesity among women in Ghana. The first part of this section reports on bivariate level analysis and uses chi-square test to examine the

Table 2: Mean and Percentage Distribution of BMI of Women, 2003 and 2008

Characteristic	Women groups -2003				Women groups -2008			
	Childbearing		Non-Childbearing		Childbearing		Non-Childbearing	
	(N = 3252)	(N=1469)	(N = 2672)	(N=1405)	Mean (s.d)	Mean (s.d)	Mean (s.d)	Mean (s.d)
BMI categories	Mean (s.d)	Mean (s.d)	Mean (s.d)	Mean (s.d)	n	n	n	n
Underweight	23.4 (4.8)	21.9 (3.6)	24.0 (5.0)	22.2 (3.9)	283	183	196	168
Normal/healthy	8.7	12.5	7.3	12.0	2091	1066	1582	991
Overweight	17.6	12.0	22.4	13.7	572	176	598	193
Obese	9.4	3.0	11.1	3.8	306	44	296	53
Overweight or Obese	27.0	15.0	33.5	17.5	878	220	894	246

associations between socio-demographic characteristics of women and overweight and obesity. The analysis stratifies women according to their respective groups (childbearing women and non-childbearing women) for the purpose of this study between the 2003 and 2008 GDHS surveys. The second part reports on further analysis conducted using multivariate logistic regression models to estimate association between socio-demographic characteristics and overweight or obesity.

Table 3 shows the proportion of overweight or obese women in each respective group by socio-demographic factors including age, education, marital status, occupation, wealth status, residence setting, region of residence, ethnicity, religion, media exposure and parity. The results reveal that with the exception of print media exposure, religion and parity, in each women group, socio-demographic factors are significantly associated with overweight and obesity, in both 2003 and 2008. The proportion of overweight and obesity in each women group generally increased with age up to the 35-44 age groups, with higher proportions recorded among non-childbearing than childbearing women in each age group between 2003 and 2008. In 2008, the proportion of overweight or obesity among childbearing women increased from 13% in the 15-24 age group to 40% in the 35-44 age group; while for non-childbearing women it increased from 14% to 47% in the same age groups, respectively.

Comparing the two women groups between the two surveys, education seems to have a stronger effect on overweight or obesity for childbearing women than non-childbearing women. For instance, in 2003, more than half

Table 3: Overweight or Obesity by Socio-Demographic Characteristics of Women, 2003 and 2008

Characteristic	Women groups – 2003				Women groups – 2008			
	Childbearing		Non-childbearing		Childbearing		Non-childbearing	
	%	N = 3252	%	N = 1469	%	N = 2672	%	N = 1405
Age								
15-24	11.9	523	11.5	1248	12.8	408	13.6	1179
25-34	25.5	1234	29.1	175	34.8	951	35.9	184
35-44	34.8	1053	57.5	40	39.9	926	47.4	38
45+	30.5	442	33.3	6	36.7	387	50.0	4
P-value	0.000		-		0.000		-	
Highest Education								
No education	14.5	1315	10.8	166	18.9	880	16.1	87
Primary	28.1	659	9.9	282	33.8	616	12.4	225
Middle/JSS	35.9	1055	13.4	710	41.1	924	14.6	679
Secondary/higher	55.2	223	25.4	311	55.6	252	25.4	414

Table 3 continued

P-value	0.000	0.000	0.000	0.000	0.000
Marital Status					
Never married	12.8	109	12.5	1258	1246
Married/cohabiting	27.0	2745	27.5	171	135
Previously married	30.7	398	40.0	40	24
P-value	0.001		0.000	0.006	0.000
Occupation					
Unemployed	26.1	291	11.0	770	747
Professional/Managerial	46.6	249	23.5	183	240
Sales/trade	43.2	884	24.5	212	189
Agricultural	12.4	1348	5.5	128	106
Manual	28.5	480	18.8	176	123
P-value	0.000		0.000	0.000	0.000

Table 3 continued

Wealth status									
Poorest	7.8	855	3.6	195	11.5	643	6.8	207	
Poorer	15.4	642	3.4	177	19.6	550	8.1	197	
Middle	22.0	599	5.1	214	30.0	513	10.8	251	
Richer	37.8	569	18.2	347	50.9	548	23.2	336	
Richest	62.2	587	24.8	536	66.8	418	26.8	414	
P-value	0.000		0.000		0.000				0.000
Residence setting									
Rural	16.4	2085	7.9	592	21.5	1613	10.6	630	
Urban	45.9	1167	19.7	877	51.8	1059	23.1	775	
P-value	0.000		0.000		0.000				0.000
Region of residence									
Western	32.8	305	14.8	155	38.6	249	19.2	120	
Central	28.6	217	25.3	95	41.8	196	12.4	81	
Greater Accra	61.4	412	24.9	333	58.6	297	26.6	275	

Table 3 continued

Volta	25.4	272	8.3	120	38.5	239	10.1	109
Eastern	29.8	305	10.2	137	39.7	277	22.8	149
Ashanti	30.6	504	16.7	252	38.0	448	19.5	262
Brong Ahafo	23.0	379	8.7	149	21.9	260	12.4	97
Northern	8.1	360	2.6	76	19.0	247	6.7	105
Upper West	6.7	268	6.1	82	16.7	204	13.6	81
Upper East	6.5	230	5.7	70	12.6	255	11.1	126
P-value	0.000			0.000	0.000			0.000
Ethnicity								
Akan	32.7	1407	16.6	717	40.9	1187	17.2	647
Ga/Adangbe	46.3	257	19.7	132	38.8	160	31.5	108
Ewe	31.4	404	12.9	201	39.6	346	17.1	176
Mole-dagbani	11.3	636	9.1	197	19.8	581	12.0	258
Others	18.3	548	14.0	222	23.6	398	18.5	216
P-value	0.000			0.042	0.000			0.000

Table 3 continued

Religious affiliation									
Pentecostal/Charismatic	34.0	1344	15.4	651	38.6	1198	15.8	652	
Catholic	22.6	477	12.1	273	27.1	384	19.1	225	
Protestants	34.7	490	17.9	290	42.3	364	19.4	248	
Muslim	20.8	567	15.0	214	28.7	428	19.2	224	
Traditional	6.0	151	7.1	14	15.2	178	20.0	30	
No religion	7.2	223	7.4	27	20.0	120	11.5	26	
P-value		0.000		0.000		0.000		0.620	
Print media exposure									
No exposure	23.1	2853	12.4	935	31.2	2366	14.8	789	
Moderate exposure	51.0	347	18.1	459	51.1	270	19.9	542	
High exposure	78.9	52	28.0	75	52.8	36	28.4	74	
P-value		0.000		0.332		0.000		0.002	

Table 3 continued

Radio exposure

No exposure	12.9	503	10.3	174	21.3	475	11.4	193
Moderate exposure	25.5	1310	14.6	575	31.4	872	14.4	499
High exposure	33.3	1439	16.4	720	39.2	1325	21.3	713
P-value	0.000		0.127		0.000		0.000	

Television exposure

No exposure	16.1	1695	5.6	394	20.2	1282	11.1	359
Moderate exposure	31.0	1002	14.5	574	38.7	710	16.0	463
High exposure	53.0	555	23.0	501	52.9	680	22.6	583
P-value	0.000		0.000		0.000		0.000	

Parity

1 to 3	27.6	1893	-	-	30.9	2010	-	-
4 to 6	26.0	1127	-	-	38.9	491	-	-
7+	27.2	232	-	-	48.5	171	-	-

of childbearing women who had attained secondary level education and above were overweight or obese compared with one quarter of non-childbearing women. A similar pattern was observed in 2008 with slight variations. In terms of marital status, overweight or obesity was more likely among previously married women in 2003, with higher proportions among non-childbearing women (40%) than childbearing women (31%). By 2008, overweight or obesity among previously married childbearing women increased by 10%, while for non-childbearing women higher proportions were observed among those in marital unions.

With regards to occupation, in 2003, overweight or obesity was more likely among childbearing women in professional/managerial jobs and more likely among non-childbearing women sales/trade than their counterparts in agricultural occupations. The results for 2008, however, contrasted that of 2003, with overweight or obesity more likely among childbearing women in sales/trade than those in agricultural occupations. In the same year (2008), overweight or obesity did not differ between those in professional/managerial and sales/trade occupations for non-childbearing women.

Wealth status appears to have a strong positive effect on overweight or obesity, with the proportions among childbearing women more than doubling those of non-childbearing women across the wealth quintiles, in both 2003 and 2008. For example, in the most recent survey (2008), over a third of childbearing women in the richest wealth quintile compared with approximately a quarter of non-childbearing women in the same group were overweight or obese. Overall, the proportions of overweight or obesity across wealth quintiles for each group of women increased between 2003 and 2008.

The results in Table 3 indicate that overweight or obesity significantly varied by residence setting. The proportions in urban settings more than doubled those of rural settings in each group of women, and generally increased between the 2003 and 2008. Overweight or obesity also varied significantly by region of residence between the two women groups. Among childbearing women, proportion of overweight or obesity ranged from 7% in the Upper East Region to 61% in the Greater Accra Region in 2003; while among non-childbearing women it ranged from 3% in the Northern Region to 25% in the Greater Accra and Central Regions. Almost the same pattern is observed for 2008. Apart from the Western and Central Regions, overweight or obesity generally increased in each women group between 2003 and 2008 for all regions.

With the exception of Akan childbearing women in 2008, overweight or obesity was more likely among the Ga/Adangbe than all other ethnic group in both women groups and surveys. In terms of religious affiliation, Protestants were more likely to be overweight or obese compared with other religious groups in both women groups and surveys, except for non-childbearing women in 2008. Across all three media indicators, the likelihood of being overweight or obese increased with level of exposure among both childbearing and non-childbearing women, in 2003 and 2008. For instance, for childbearing women in 2008, overweight or obesity increased from 20% among those with no exposure to television to 53% among those with high exposure. As expected, overweight and obesity increased with parity.

The association between socio-demographic factors and overweight or obesity was further assessed using multivariate level analysis. With a

conceptual framework of the study as a guide, a sequence of four (4) binary logistic regression models were run separately for each women group and survey year. The aim was to estimate the odds of overweight or obesity by each of the respective categories of the socio-demographic factors considered in this study. Model 1 featured socio-demographic factors considered as predisposing factors. Enabling factors were added in Model 2, followed by reinforcing and environmental factors in Models 3 and 4, respectively. The results are shown separately for women groups in 2003 (Table 4) and 2008 (Table 5).

In Model 1, in 2003 and 2008, a significant positive association was found between overweight or obese and all respective age categories for childbearing women. Except for women age 45 years and above, the pattern observed for non-childbearing women was similar to that observed for childbearing women in both surveys. Overweight or obesity significantly varied with educational attainment across the two surveys and women groups. However, for those with secondary or higher education in 2008, overweight or obese was significantly associated positively with all categories of educational attainment among childbearing women.

In the same model (1), among the two women groups in 2003, overweight or obesity was significantly associated positively with being married/cohabiting and previously married, compared with never being married. The results for model 1 in 2003 indicate a significant positive association between overweight or obesity and both groups of women in

Table 4: Multivariate Logistic Regression Results on Socio-Demographic Predictors of Overweight or Obesity, 2003

Characteristic	Non-childbearing women							
	Childbearing women				Non-childbearing women			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	OR	OR	OR	OR	OR	OR	OR	OR
	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]
Age								
15-24	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
25-34	2.362** [1.66,3.35]	2.332** [1.63,3.32]	2.378** [1.66,3.39]	2.468** [1.72,3.53]	1.720* [1.11,2.66]	1.867** [1.20,2.89]	1.867** [1.19,2.90]	1.820** [1.16,2.85]
35-44	3.858**	3.771**	3.866**	4.015**	4.266**	4.644**	4.952**	5.377**
45+	3.542** [2.38,5.25]	3.357** [2.60,5.45]	3.465** [2.66,5.61]	3.705** [2.76,5.83]	1.408 [1.99,9.122]	1.363 [2.08,10.35]	1.327 [2.15,11.38]	1.172 [2.28,12.64]
Highest education								
No education	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Primary	1.699** [1.26,2.29]	1.656** [1.23,2.22]	1.412* [1.03,1.92]	1.348 [0.98,1.84]	1.003 [0.50,1.98]	0.938 [0.47,1.85]	0.908 [0.45,1.80]	0.936 [0.47,1.86]

Table 4 continued

Middle/JSS	1.474**	1.372*	1.179	1.182	0.88	0.87	0.825	0.852
	[1.12,1.93]	[1.03,1.81]	[0.86,1.60]	[0.86,1.61]	[0.47,1.62]	[0.46,1.62]	[0.43,1.55]	[0.45,1.59]
Secondary/higher	1.821**	1.411	1.171	1.189	1.471	1.585	1.525	1.547
	[1.15,2.86]	[0.84,2.34]	[0.69,1.98]	[0.68,2.05]	[0.76,2.81]	[0.75,3.32]	[0.72,3.23]	[0.72,3.29]
Marital status								
Never married	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Married/cohabiting	3.284**	3.449**	3.516**	3.552**	2.303**	2.406**	2.341**	2.692**
	[1.75,6.16]	[1.81,6.56]	[1.86,6.63]	[1.86,6.77]	[1.44,3.68]	[1.51,3.81]	[1.47,3.70]	[1.69,4.27]
Previously married	2.593**	2.782**	2.770**	2.636**	4.147**	4.312**	4.189**	4.675**
	[1.37,4.90]	[1.45,5.33]	[1.45,5.28]	[1.37,5.06]	[1.83,9.35]	[1.90,9.75]	[1.87,9.35]	[2.06,10.59]
Occupation								
Unemployed	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Professional/managerial	1.173	1.078	1.058	1.058	1.25	1.271	1.282	1.287
	[0.78,1.75]	[0.72,1.61]	[0.70,1.58]	[0.69,1.60]	[0.78,1.98]	[0.80,2.01]	[0.80,2.03]	[0.80,2.06]
Sales/trade	1.419*	1.415*	1.337	1.333	1.491	1.464	1.500	1.412
	[1.01,1.98]	[1.01,1.97]	[0.95,1.86]	[0.95,1.86]	[0.95,2.33]	[0.92,2.33]	[0.93,2.41]	[0.88,2.25]
Agricultural	0.638*	0.634*	0.606**	0.591**	1.231	1.292	1.373	1.39
	[0.44,0.90]	[0.44,0.89]	[0.42,0.85]	[0.41,0.84]	[0.48,3.14]	[0.51,3.24]	[0.52,3.56]	[0.51,3.74]

Table 4 continued

	0.91	0.905	0.87	0.82	1.163	1.183	1.212	1.124
Manual	[0.62,1.33]	[0.61,1.32]	[0.59,1.27]	[0.55,1.22]	[0.70,1.93]	[0.71,1.94]	[0.73,2.00]	[0.66,1.88]
Wealth status								
Poorest	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Poorer	1.623*	1.599*	1.346	1.177	0.866	0.767	0.741	0.574
	[1.11,2.35]	[1.09,2.32]	[0.92,1.96]	[0.81,1.71]	[0.26,2.88]	[0.21,2.74]	[0.20,2.71]	[0.14,2.24]
Middle	2.261**	2.183**	1.881**	1.588*	1.463	1.212	1.164	0.977
	[1.54,3.31]	[1.47,3.22]	[1.27,2.77]	[1.08,2.33]	[0.51,4.17]	[0.39,3.68]	[0.38,3.55]	[0.31,3.06]
Richer	4.028**	3.683**	3.143**	2.350**	5.558**	4.311**	4.282**	3.383*
	[2.75,5.89]	[2.46,5.50]	[2.12,4.64]	[1.51,3.64]	[2.17,14.18]	[1.61,11.49]	[1.60,11.40]	[1.15,9.90]
Richest	9.571**	8.107**	6.850**	4.325**	8.055**	5.457**	5.641**	4.227*
	[6.41,14.28]	[5.23,12.55]	[4.46,10.50]	[2.62,7.128]	[3.16,20.50]	[1.98,15.00]	[2.02,15.71]	[1.36,13.13]
Parity								
1 to 3	Ref	Ref	Ref	Ref	-	-	-	-
4 to 6	0.914	0.925	0.94	0.938	-	-	-	-
	[0.71,1.16]	[0.72,1.18]	[0.73,1.20]	[0.73,1.19]	-	-	-	-
7+	1.38	1.416	1.352	1.335	-	-	-	-
	[0.90,2.09]	[0.93,2.15]	[0.88,2.06]	[0.87,2.03]				

Table 4 continued

Print media exposure

No exposure	-	Ref	-	Ref	-	Ref	Ref	Ref
Moderate exposure	-	1.162	1.123	1.165	1.123	0.77	0.755	0.743
	-	[0.84,1.60]	[0.81,1.55]	[0.84,1.60]	[0.81,1.55]	[0.53,1.11]	[0.52,1.08]	[0.51,1.07]
High exposure	-	2.252*	2.333*	2.327*	2.333*	1.108	1.063	1.041
	-	[1.07,4.69]	[1.04,5.19]	[1.06,5.07]	[1.04,5.19]	[0.55,2.19]	[0.53,2.11]	[0.52,2.05]

Radio exposure

No exposure	-	Ref	-	Ref	-	Ref	Ref	Ref
Moderate exposure	-	1.21	1.131	1.144	1.131	0.898	0.934	1.052
	-	[0.86,1.69]	[0.79,1.60]	[0.81,1.61]	[0.79,1.60]	[0.52,1.54]	[0.53,1.63]	[0.59,1.85]
High exposure	-	1.19	1.069	1.098	1.069	0.599	0.621	0.695
	-	[0.83,1.69]	[0.74,1.54]	[0.76,1.57]	[0.74,1.54]	[0.34,1.05]	[0.34,1.11]	[0.38,1.26]

Television exposure

No exposure	-	Ref	-	Ref	-	Ref	Ref	Ref
Moderate exposure	-	1.075	1.014	1.046	1.014	1.925*	1.929*	1.661
	-	[0.84,1.37]	[0.79,1.30]	[0.81,1.36]	[0.79,1.30]	[1.06,3.47]	[1.06,3.49]	[0.92,2.98]
High exposure	-	1.256	1.177	1.2	1.177	2.662**	2.637**	2.247**
	-	[0.92,1.71]	[0.85,1.61]	[0.88,1.63]	[0.85,1.61]	[1.48,4.78]	[1.46,4.75]	[1.23,4.08]

Table 4 continued

Ethnicity									
Akan	-	-	Ref	-	-	-	Ref	-	Ref
Ga/Adangbe	-	-	1.619*	1.247	-	-	1.065	-	1.079
	-	-	[1.10,2.37]	[0.83,1.86]	-	-	[0.63,1.79]	-	[0.61,1.89]
Ewe	-	-	1.107	1.101	-	-	0.764	-	0.891
	-	-	[0.80,1.52]	[0.75,1.59]	-	-	[0.43,1.34]	-	[0.48,1.62]
Mole-Dagbani	-	-	0.604*	1.257	-	-	0.682	-	0.995
	-	-	[0.39,0.91]	[0.78,2.00]	-	-	[0.32,1.41]	-	[0.45,2.20]
Others	-	-	0.875	1.094	-	-	0.752	-	0.783
	-	-	[0.58,1.31]	[0.70,1.70]	-	-	[0.40,1.38]	-	[0.39,1.57]
Religious affiliation									
Pentecostal/Charismatic	-	-	Ref	Ref	-	-	Ref	-	Ref
Catholic	-	-	0.847	0.862	-	-	1.537	-	1.564
	-	-	[0.62,1.14]	[0.63,1.17]	-	-	[0.92,2.55]	-	[0.93,2.62]
Protestants	-	-	0.883	0.9	-	-	1.102	-	1.132
	-	-	[0.67,1.14]	[0.69,1.17]	-	-	[0.72,1.67]	-	[0.74,1.71]
Muslim	-	-	0.985	1.018	-	-	1.392	-	1.622
	-	-	[0.66,1.46]	[0.67,1.54]	-	-	[0.68,2.83]	-	[0.75,3.46]

Table 4 continued

Traditional	-	0.393*	0.469	-	-	0.909	0.812
	-	[0.16,0.95]	[0.19,1.13]	-	-	[0.19,4.19]	[0.17,3.87]
No religion	-	0.430**	0.453*	-	-	1.327	1.609
	-	[0.22,0.80]	[0.24,0.83]	-	-	[0.33,5.31]	[0.40,6.44]
Residence setting							
Rural	-	-	Ref	-	-	-	Ref
Urban	-	-	1.102	-	-	-	0.898
	-	-	[0.81,1.49]	-	-	-	[0.57,1.39]
Region							
Western	-	-	Ref	-	-	-	Ref
Central	-	-	0.823	-	-	-	2.229**
	-	-	[0.50,1.35]	-	-	-	[1.21,4.09]
Greater Accra	-	-	1.308	-	-	-	1.276
	-	-	[0.83,2.04]	-	-	-	[0.76,2.14]
Volta	-	-	0.645	-	-	-	0.662
	-	-	[0.35,1.16]	-	-	-	[0.26,1.68]

Table 4 continued

Eastern	-	-	0.799	-	-	-	0.767
	-	-	[0.52,1.22]	-	-	-	[0.36,1.60]
Ashanti	-	-	0.682	-	-	-	1.19
	-	-	[0.44,1.03]	-	-	-	[0.65,2.14]
Brong Ahafo	-	-	0.698	-	-	-	0.586
	-	-	[0.44,1.10]	-	-	-	[0.27,1.26]
Northern	-	-	0.250**	-	-	-	0.176*
	-	-	[0.13,0.46]	-	-	-	[0.043,0.71]
Upper West	-	-	0.226**	-	-	-	0.744
	-	-	[0.10,0.51]	-	-	-	[0.20,2.71]
Upper East	-	-	0.269**	-	-	-	0.491
	-	-	[0.11,0.63]	-	-	-	[0.068,3.54]
Constant	0.0122**	0.0103**	0.0160**	0.0249**	0.0225**	0.0215**	0.0209**
	[0.01,0.02]	[0.00,0.02]	[0.01,0.03]	[0.01,0.06]	[0.01,0.05]	[0.01,0.05]	[0.01,0.05]
N	3252	3252	3252	3252	1469	1469	1469

95% confidence intervals in brackets, * p<0.05, ** p<0.01

sales/trade occupations, and by contrast a significant negative association with their childbearing counterparts in agricultural occupations. In 2008, none of the occupation categories was significantly associated with overweight or obesity among childbearing women. However, among non-childbearing women in the same year, overweight or obesity was significantly associated positively with being in sales/trade and professional/managerial occupations.

The results show a positive significant association between wealth status and overweight or obesity, and this seems to be sustained between 2003 and 2008. Among childbearing women, overweight or obesity was significantly associated with all wealth status categories in both surveys, except the poorer wealth quintile in 2008. On the other hand, among non-childbearing women, the association between overweight or obesity was significant only for the two higher (richer and richest) wealth quintiles, and this association was sustained between 2003 and 2008.

With the exception of childbearing women with secondary/higher and non-childbearing women in sale/trade in 2003, the addition of media exposure (print, radio and television) as enabling factors in Model 2 neither changed the direction nor significance of associations found between the socio-demographic factors and overweight or obesity in the previous model (1) for both women groups and surveys. However, the strength of association either increased or reduced marginally for the predictors identified in Model 1. For example, in 2008, among childbearing women, the odds of being overweight or obese among those aged 35-44 increased from about 5.3 ($p<0.01$) in Model 1 to 5.8 ($p<0.01$) in Model 2, while the odds reduced from about 8.1 ($p<0.01$) to 6.5 ($p<0.01$) the same respective models.

Despite their small moderating effect on the socio-demographic factors in Model 1, the three forms of media exposure varied significantly across the women groups and surveys in terms of their association with overweight or obesity. In 2003, overweight or obesity was significantly associated positively with childbearing women having high exposure to print media, but significantly associated inversely with non-childbearing women having high radio exposure. Overweight or obesity was also significantly more likely among non-childbearing women with high television exposure in 2003. The above associations between overweight or obesity and media exposure were, however, not statistically significant in 2008. Rather, childbearing women with high television exposure were more associated with overweight or obesity in 2008.

In Model 3, ethnicity and religion were included as reinforcing factors. In terms of ethnicity, overweight or obese was significantly more associated with childbearing women of the Ga/Adangbe and Ewe ethnic groups in 2003 and 2008, respectively. By contrast, overweight or obese was significantly less associated with childbearing women of the Mole-Dagbani ethnic group in 2003. With regards to religion, in 2003, significant lower associations were observed between overweight or obesity and childbearing women of Traditional religion and those with no religious affiliation. Among non-childbearing women, overweight or obese was positively associated with Catholics in both 2003 and 2008, as well as Muslims and Traditionalists in 2008.

Table 5: Multivariate Logistic Regression Results on Socio-Demographic Predictors of Overweight or Obesity, 2008

Characteristic	Childbearing women				Non-childbearing women			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]
Age								
15-24	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
25-34	3.879** [2.58,5.83]	4.054** [2.68,6.11]	4.109** [2.72,6.18]	4.157** [2.74,6.29]	1.782** [1.16,2.73]	1.776** [1.15,2.72]	1.797** [1.16,2.77]	1.677* [1.08,2.60]
35-44	5.385** [3.38,8.57]	5.818** [3.65,9.25]	5.828** [3.67,9.24]	5.710** [3.57,9.12]	2.722* [1.25,5.89]	2.643* [1.21,5.74]	2.820** [1.28,6.19]	2.575* [1.17,5.63]
45+	4.883** [3.01,7.90]	5.234** [3.21,8.51]	5.190** [3.18,8.45]	5.099** [3.09,8.39]	1.904 [0.26,13.5]	1.671 [0.23,12.0]	2.211 [0.30,16.1]	2.058 [0.25,16.81]
Highest Education								
No education	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Primary	1.456* [1.06,1.98]	1.444* [1.06,1.96]	1.358 [0.97,1.89]	1.339 [0.95,1.88]	0.829 [0.40,1.70]	0.803 [0.39,1.64]	0.876 [0.41,1.85]	0.821 [0.38,1.75]

Table 5 continued

Middle/JSS	1.315*	1.303	1.205	1.237	0.851	0.795	0.888	0.839
	[1.00,1.72]	[0.99,1.71]	[0.88,1.65]	[0.90,1.69]	[0.46,1.56]	[0.42,1.49]	[0.45,1.75]	[0.42,1.67]
Secondary/higher	1.408	1.475	1.372	1.413	0.967	0.861	0.94	0.949
	[0.91,2.16]	[0.91,2.36]	[0.84,2.23]	[0.85,2.32]	[0.50,1.84]	[0.42,1.76]	[0.43,2.01]	[0.43,2.05]
Marital status								
Never married	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Married/cohabiting	0.765	0.747	0.728	0.792	1.246	1.242	1.265	1.332
	[0.48,1.21]	[0.46,1.19]	[0.45,1.16]	[0.48,1.29]	[0.78,1.98]	[0.77,1.99]	[0.77,2.05]	[0.81,2.17]
Previously married	0.923	0.914	0.893	0.989	1.036	1.03	1.085	1.024
	[0.53,1.59]	[0.52,1.59]	[0.51,1.56]	[0.56,1.74]	[0.39,2.71]	[0.39,2.71]	[0.41,2.85]	[0.39,2.64]
Occupation								
Unemployed	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Professional/managerial	1.129	1.119	1.12	1.098	2.476**	2.475**	2.534**	2.509**
	[0.71,1.77]	[0.70,1.78]	[0.69,1.80]	[0.67,1.78]	[1.67,3.66]	[1.65,3.69]	[1.68,3.81]	[1.64,3.82]
Sales/trade	1.338	1.31	1.306	1.223	2.622**	2.655**	2.772**	2.869**
	[0.90,1.97]	[0.88,1.94]	[0.87,1.95]	[0.81,1.82]	[1.69,4.06]	[1.70,4.12]	[1.77,4.32]	[1.81,4.53]

Table 5 continued

Agricultural	0.748	0.736	0.739	0.731	1.593	1.593	1.414	1.617
	[0.47,1.17]	[0.46,1.16]	[0.46,1.18]	[0.45,1.17]	[0.79,3.19]	[0.79,3.18]	[0.65,3.04]	[0.76,3.40]
Manual	0.809	0.773	0.778	0.722	1.671	1.672	1.672	1.818
	[0.46,1.39]	[0.44,1.33]	[0.44,1.35]	[0.41,1.27]	[0.92,3.00]	[0.92,3.03]	[0.92,3.03]	[0.99,3.33]
Wealth status								
Poorest	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Poorer	1.299	1.219	1.174	0.997	1.119	1.102	1.116	1.038
	[0.88,1.91]	[0.82,1.79]	[0.77,1.77]	[0.66,1.50]	[0.53,2.33]	[0.53,2.29]	[0.52,2.36]	[0.47,2.27]
Middle	2.128**	1.935**	1.878**	1.469	1.404	1.382	1.531	1.564
	[1.44,3.13]	[1.29,2.88]	[1.23,2.86]	[0.94,2.29]	[0.65,2.98]	[0.61,3.11]	[0.63,3.68]	[0.62,3.92]
Richer	4.673**	3.968**	3.887**	2.942**	3.207**	3.091**	3.382**	3.149**
	[3.14,6.95]	[2.58,6.09]	[2.48,6.09]	[1.79,4.82]	[1.68,6.10]	[1.53,6.23]	[1.56,7.30]	[1.41,7.03]
Richest	8.136**	6.522**	6.520**	4.639**	3.430**	3.297**	3.551**	3.360**
	[5.12,12.9]	[3.88,10.96]	[3.81,11.15]	[2.55,8.42]	[1.78,6.60]	[1.59,6.83]	[1.61,7.80]	[1.43,7.89]
Parity								
1 to 3	Ref	Ref	Ref	Ref	-	-	-	-
4 to 6	1.138	1.14	1.149	1.145	-	-	-	-
	[0.89,1.44]	[0.89,1.45]	[0.90,1.46]	[0.89,1.46]	-	-	-	-

Table 5 continued

7+	1.188	1.217	1.238	1.235	-	-	-	-
	[0.75,1.86]	[0.77,1.92]	[0.78,1.95]	[0.77,1.95]	-	-	-	-
Print media exposure								
No exposure	-	Ref	Ref	Ref	-	Ref	Ref	Ref
Moderate exposure	-	0.802	0.787	0.758	1.069	1.008	0.999	0.999
	-	[0.55,1.15]	[0.54,1.13]	[0.52,1.10]	[0.72,1.57]	[0.68,1.49]	[0.67,1.48]	[0.67,1.48]
High exposure	-	0.887	0.883	0.758	1.076	0.949	1.015	1.015
	-	[0.39,1.97]	[0.38,2.01]	[0.33,1.73]	[0.57,2.03]	[0.50,1.77]	[0.53,1.93]	[0.53,1.93]
Radio exposure								
No exposure	-	Ref	Ref	Ref	-	Ref	Ref	Ref
Moderate exposure	-	0.892	0.879	0.899	0.918	0.974	0.895	0.895
	-	[0.63,1.25]	[0.62,1.23]	[0.63,1.28]	[0.54,1.53]	[0.57,1.65]	[0.51,1.55]	[0.51,1.55]
High exposure	-	1.026	1.006	1.042	1.221	1.359	1.231	1.231
	-	[0.73,1.42]	[0.71,1.41]	[0.73,1.48]	[0.70,2.11]	[0.77,2.38]	[0.68,2.20]	[0.68,2.20]
Television exposure								
No exposure	-	Ref	Ref	Ref	-	Ref	Ref	Ref
Moderate exposure	-	1.311	1.308	1.268	0.969	0.983	0.92	0.92
	-	[0.99,1.73]	[0.98,1.73]	[0.95,1.68]	[0.55,1.68]	[0.56,1.71]	[0.52,1.59]	[0.52,1.59]

Table 5 continued

High exposure	-	1.431*	1.473*	1.481*	-	0.976	1.048	1.005
	-	[1.03,1.99]	[1.05,2.05]	[1.05,2.07]	-	[0.56,1.69]	[0.59,1.83]	[0.58,1.74]
Ethnicity								
Akan	-	-	Ref	Ref	-	-	Ref	Ref
Ga/Adangbe	-	-	0.881	0.803	-	-	2.522**	2.481**
	-	-	[0.5581.39]	[0.50,1.28]	-	-	[1.51,4.19]	[1.36,4.51]
Ewe	-	-	1.385*	1.129	-	-	1.151	1.386
	-	-	[1.02,1.86]	[0.77,1.65]	-	-	[0.67,1.96]	[0.73,2.61]
Mole-Dagbani	-	-	0.91	1.217	-	-	0.802	0.961
	-	-	[0.59,1.40]	[0.69,2.13]	-	-	[0.46,1.37]	[0.46,1.99]
Others	-	-	0.851	0.959	-	-	1.37	1.572
	-	-	[0.57,1.26]	[0.63,1.45]	-	-	[0.77,2.43]	[0.86,2.86]
Religious affiliation								
Pentecostal/Charismatic	-	-	Ref	Ref	-	-	Ref	Ref
Catholic	-	-	0.929	1.021	-	-	2.075**	2.052**
	-	-	[0.67,1.28]	[0.73,1.41]	-	-	[1.32,3.26]	[1.29,3.26]
Protestants	-	-	1.165	1.181	-	-	1.275	1.308

Table 5 continued

	-	[0.86,1.57]	[0.87,1.60]	-	-	[0.84,1.92]	[0.86,1.98]
Muslim	-	0.978	0.964	-	-	1.730	1.900*
	-	[0.68,1.39]	[0.65,1.42]	-	-	[0.95,3.15]	[1.02,3.52]
Traditional	-	0.971	0.971	-	-	3.218	3.471*
	-	[0.55,1.71]	[0.54,1.72]	-	-	[0.87,11.8]	[1.05,11.48]
No religion	-	0.995	1.06	-	-	1.416	1.362
	-	[0.60,1.64]	[0.63,1.76]	-	-	[0.43,4.64]	[0.41,4.50]
Residence setting							
Rural	-	-	Ref	-	-	-	Ref
Urban	-	-	1.360*	-	-	-	1.115
	-	-	[1.02,1.81]	-	-	-	[0.72,1.71]
Region							
Western	-	-	Ref	-	-	-	Ref
Central	-	-	1.114	-	-	-	0.573
	-	-	[0.67,1.83]	-	-	-	[0.23,1.41]
Greater Accra	-	-	0.775	-	-	-	0.724
	-	-	[0.50,1.20]	-	-	-	[0.37,1.38]

Table 5 continued

Volta	-	-	-	1.072	-	-	-	0.491
	-	-	-	[0.62,1.84]	-	-	-	[0.19,1.26]
Eastern	-	-	-	0.985	-	-	-	1.165
	-	-	-	[0.63,1.53]	-	-	-	[0.57,2.37]
Ashanti	-	-	-	0.662*	-	-	-	0.869
	-	-	-	[0.44,0.99]	-	-	-	[0.46,1.61]
Brong Ahafo	-	-	-	0.462**	-	-	-	0.713
	-	-	-	[0.30,0.69]	-	-	-	[0.30,1.66]
Northern	-	-	-	0.551*	-	-	-	0.274**
	-	-	-	[0.32,0.93]	-	-	-	[0.10,0.72]
Upper West	-	-	-	0.438*	-	-	-	0.969
	-	-	-	[0.22,0.86]	-	-	-	[0.33,2.80]
Upper East	-	-	-	0.377**	-	-	-	0.674
	-	-	-	[0.20,0.68]	-	-	-	[0.27,1.63]
Constant	0.0465**	0.0448**	0.0487**	0.0634**	0.0560**	-	-	0.0394**
	[0.024,0.087]	[0.023,0.086]	[0.022,0.10]	[0.027,0.14]	[0.024,0.12]	[0.023,0.13]	[0.010,0.079]	[0.013,0.11]
N	2672	2672	2672	2672	1405	1405	1405	1405

95% confidence intervals in brackets. * p<0.05, ** p<0.01

With the exception of some categories of educational attainment, occupation and wealth status, the inclusion of religion and ethnicity in Model 3 had no remarkable effects on the significant associations found between the categories of socio-demographic characteristics in Model 2 and overweight or obesity. The significant positive association between childbearing women with middle/JSS education and overweight or obesity observed in the previous model (2) became statistically insignificant in Model 3 for both 2003 and 2008. Similarly, poorer childbearing women and those in sales/trade no longer became significantly associated with overweight or obesity in 2003, when ethnicity and religion were included in model 3.

In the final model (Model 4), after adjusting for enabling factors (media exposure: print media, radio and television), reinforcing factors (ethnicity and religion) and environmental factors (residence setting and region of residence), the association found between ethnicity and overweight or obesity in the previous model (3) for childbearing women in both 2003 and 2008 became statistically insignificant. In addition, the strength of association improved between overweight or obesity and the significant categories (Muslim and Traditional) of religious affiliation among non-childbearing women.

The following interpretation of the nature of association between socio-demographic factors and overweight or obesity among the respective groups of women in Ghana is based on the results of the full model (model 4). Age had a significant positive association with overweight or obesity across all categories in both women groups in 2003 and 2008, except for non-childbearing women age 45 years and above. The highest odds were found

among women in age 35-44 resulting in an inverted U-shaped relationship between age and overweight or obesity among women in Ghana. For example, in 2008, the odds of being overweight or obese for childbearing women were about 4 times ($p<0.01$) higher for those age 25-34, 6 times ($p<0.01$) higher for those age 35-44 and 5 times ($p<0.01$) higher for those age 45+ compared with those age 15-24.

The impact of education was more evident for childbearing women than their non-childbearing counterparts. A significant positive association was found across all categories of marital status for both women groups in 2003. Compared with never married women, the odds of being overweight or obese for childbearing women were about over three times (3.5, $p<0.01$) higher and more than two times (2.6, $p<0.01$) higher than those who were married/cohabiting and previously married, respectively. A similar pattern was observed for non-childbearing women in the same year (2003), although, this time, previously married non-childbearing women had the highest probability (4.7, $p<0.01$) of being overweight or obese.

Significant variations were found between the two groups of women and between the two surveys when estimating the association between occupation and overweight or obesity. For childbearing women, in 2003, those in agriculture were about 0.6 times ($p<0.01$) less likely to become overweight or obese, compared with their unemployed counterparts. On the other hand, in 2008, non-childbearing women in professional/managerial and sales/trade were more than twice ($p<0.01$) as likely as those unemployed to be overweight or obese.

Another consistent factor over the two survey periods for the two respective groups of women was wealth status. In 2003 and 2008, with reference to those in the poorest wealth quintile, the odds of being overweight or obese among childbearing women were significantly higher for those from the middle to richest quintiles. This ranged from about 1.5 times ($p < 0.01$) higher for those in the middle quintile to over 4 times ($p < 0.01$) higher for those in the richest quintile. For non-childbearing women, those in the two upper (richer and richest) wealth quintiles were more than three times ($p < 0.01$) likely than those in the poorest quintile to be overweight or obese in both 2003 and 2008.

With regards to mass media exposure, childbearing women with high exposure to print media (2.3, $p < 0.05$) in 2003 and television (1.5, $P < 0.05$) in 2008 had greater odds of being overweight or obese compared with those with no exposure to both media. Among non-childbearing women in 2003, those who had high exposure to television were more than twice ($p < 0.01$) likely to be overweight or obese. The 2008 results reveal that non-childbearing women who belong to the Ga/Adangbe ethnic group were over two times (2.5, $p < 0.01$) more likely to be overweight or obese than the Akan group.

Religious differences in overweight or obesity were observed between childbearing and non-childbearing women in 2003 and 2008. In the former (2003), whereas childbearing women with no religion (0.45, $p < 0.01$) and those affiliated with Traditional religion (0.47, $p < 0.10$) had significantly lower odds of being overweight or obese, their non-childbearing counterparts of Catholic faith (1.6, $p < 0.10$) had higher odds of being overweight or obese compared, with the reference category (Pentecostal/Charismatic). The results

in 2008 were in sharp contrast to those of 2003, with significant associations found for only non-childbearing women. Compared with Pentecostal/Charismatic Christians, the odds of being overweight or obese became over three times (3.5, $p < 0.05$) higher for non-childbearing women of the Tradition religion.

Spatial variations in overweight or obesity were found between women in the two groups and surveys. In 2008, urban childbearing women (1.4, $p < 0.05$) were significantly more likely than their rural counterparts to be overweight or obese. With Western Region as the reference category, childbearing women in the Ashanti, Northern, Upper West, and Upper East Regions were significantly less likely to be overweight or obese in both 2003 and 2008. Among non-childbearing women, apart from those in the Central Region being about twice more likely to be overweight or obese in 2003, only those in the Northern Region were significantly less likely to be overweight or obese in both 2003 and 2008 with reference to the Western Region. It is worth noting that both groups of women in the Northern Region were significantly less likely to be overweight or obese in both surveys.

Discussion

Using the 2003 and the 2008 GDHS data, the socio-demographic factors associated with overweight or obesity among childbearing and non-childbearing women were examined in this chapter. In general, the prevalence of overweight or obesity in Ghana increased among the two women groups over the five year period between 2003 and 2008, with disproportionately higher rates among childbearing women compared with non-childbearing

women. The increased prevalence is consistent with recent studies on overweight and obesity in Ghana (Dake et al., 2011; Dake, 2013), as well as the rising epidemic of overweight and obesity globally and in low and middle income countries such as Ghana (WHO, 2015).

In addition, the higher prevalence found among childbearing women compared with non-childbearing women generally supports the existing literature on the role of excess weight gain associated with pregnancy and childbirth among women (Gupta, 2012). Should the current trend of overweight and obesity among women persist, Ghana is likely to face health challenges including increased prevalence of obesity related morbidities, increased pregnancy related complications, as well as general and maternal mortality.

Further analysis using a series of separate logistic regression models for each women group in each year revealed different combinations of socio-demographic factors significantly associated with overweight or obesity for each women group and year of survey. While some factors were found to be significantly associated with overweight or obesity irrespective of women group or year of survey, others were significantly associated with overweight or obesity in particular women groups between the two survey years. Yet still, some socio-demographic factors were significantly associated with overweight or obesity among particular women groups in particular years.

In this study, age was consistently found to be significantly associated with overweight or obesity across both women groups and survey years. An inverted U-shaped relationship was found between age and overweight or obesity, with higher probabilities among women in the 35-44 age group. This

finding mimics the expected body weight changes as people grow throughout the aging process. Following rapid growth during childhood and adolescence, body weight usually increases for women during adulthood and decreases in older age (Abdulai, 2010; Morley, 2007).

Again, childbearing women aged 35-44 recorded the highest probability of being overweight or obese from the results of the 2008 data analyses. Most women who initiate childbearing often reach the peak of their childbearing career within the 35-44 age bracket, which could explain why women age 35-44 had the highest odds of being overweight or obese. As such women in this age category would have been exposed to numerous periods of gestation and postpartum associated changes in diet and physical activity patterns as were alluded to, and supported by evidence from the in-depth interviews.

Another socio-demographic factor that was consistently found to be associated with overweight or obesity was wealth status. Whether in the form of material resources or income, wealth status provides a means for individuals to seek the ideal body size expectations of their society. In developing countries where people are expected to prove their high wealth status or success by putting on weight, wealthier people are more at risk of overweight or obesity. As expected and consistent with previous studies (Mattah et al., 2013; Dake et al, 2011) in Ghana, the current study found high probabilities of overweight or obesity across the women groups and survey years as wealth status increased, particularly for those in the richer and richest wealth quintiles.

In developing countries, higher wealth status increases one's ability to consume more food, particularly 'so called' westernised foods and beverages, thereby; fulfilling society's expectations on one hand and increasing their risk of overweight or obesity on the other hand (Monteiro et al., 2004). In contrast, studies in more developed countries often show an inverse relation between wealth status and overweight or obesity, mainly as a result of greater social pressure for women to remain slim. Thus, unlike in the case of less developed countries, wealthier people in more developed countries are able to afford more nutritious foods that are less fatty and have greater opportunities (such as gyms) for engaging in exercises to promote their physical fitness (McLaren, 2007).

A significant positive association was uniquely found between marital status and overweight or obesity from the results in 2003, irrespective of the childbearing status of women. The literature suggests that marriage may be associated with body weight either through the selection of individuals into and out of marital states, or through social causation where particular marital states influence body weight (Jeffery & Rick, 2002). In many African cultures, both the selection and social causation hypotheses tend to be at play, thereby increasing the risk of overweight or obesity among women. In one breath, a fat woman is perceived as beautiful, healthy and more prestigious which may increase her chances of being selected into the state of marriage; while in another breath, changes in social obligations, roles, and expectations (e.g childbearing) associated with marriage often lead to increased food consumption and decreased time for physical activity (Sobal et al., 2009).

These hypotheses seem to support the high probabilities of overweight or obesity found among both those who were currently married/cohabiting and those previously married across both women groups in 2003. These findings on marital status and overweight or obesity are corroborated by previous studies (Amoah, 2003b; Dake et al., 2011; Rguibi & Belahsen, 2006) in Ghana. Nonetheless, some research in Ghana suggest that socio-cultural perceptions about fatness associated with beauty and marriage are slowly changing (Duda, et al., 2006), which may explain the rather sharp contrast between the results of 2003 and 2008.

Depending on the level of work-related physical activity, occupation could either be a risk or protective factor associated with overweight or obesity. Particularly in developing countries, low-status jobs usually involve more physical activities and are protective against overweight or obesity than high-status jobs which usually involve relatively low physical activities and constitute risk for overweight or obesity (Bell et al., 2004). As expected, in this study, women in agricultural occupations were significantly less likely to be overweight or obese, but this was found only among childbearing women in 2003. Similarly, overweight or obesity was significantly more likely among women in professional/managerial occupations, but uniquely so among non-childbearing women in 2008.

Although the findings are consistent with Abdulai (2010), the results on the relationship between occupation and overweight or obesity could be a reflection of broader structural changes on going in Ghana. As societies shift from being based on primary to secondary to tertiary production with increasing levels of incomes and industrialisation, more and more people shift

from occupations that require high amounts of physical labour such as agriculture to those that require less physical labour (Wells, 2012). Ghana has moved from a low income to a middle income country within the last decade, and this could probably explain the disparities in overweight or obesity between the various occupations. Again, the results in Table 1 show increases in the proportion of women in professional/managerial and sales/trade occupations, and decreases in the proportion of women in agricultural occupations between 2003 and 2008, lending credence to this fact.

High exposure to print media and television were found in this study to be significantly more associated with overweight or obesity, however, the associations were not consistent across the women groups and survey years. While overweight or obesity was found to be more likely among childbearing and non-childbearing women with high exposure to print media and television respectively in 2003, only childbearing women with high exposure to television were more likely to be overweight or obese in 2008. Although the disparities between the two women groups and surveys seem unclear, the consistency of high television exposure between the two surveys draws attention to the well documented association between obesity and television exposure.

The more time people spend on watching television, the more likely they are to gain weight or become overweight or obese (Thorp, Owen, Neuhaus, & Dunstan, 2011). Television viewing promotes overweight or obesity by displacing the amount of time spent on physical activity, and through the one's exposure to advertisement or marketing of high caloric foods which influence diet patterns (Strasburger, 2011). Among childbearing

women in particular, practices such as kin support and care for new mothers during the immediate postpartum period (de-Graft, 2014) may increase the amount of free time for television viewing among childbearing women. However, these assumptions may be limited by the fact that this study could not ascertain the content that such women were exposed to. Probably, the amount and content of exposure to media messages is one research area that needs to be explored further.

Certain components of religious theologies have diverse prescriptions on lifestyle practices (Grossman & Parrett, 2011) which may discourage weight gain among believers. For instance, depriving the body of food, avoiding gluttony or abstaining from alcohol and smoking is analogous to purity and high religiosity in most religious theologies (Kim et al., 2003). Ironically, a number of studies (Ferraro, 1998; Kim et al., 2003) have shown a positive relationship between religion and overweight or obesity. The results from this study were not entirely different from previous studies. Overweight or obesity was significantly more probable among Catholic, Muslim and Traditionalist, but only for non-childbearing women in 2008.

The varied results on religion between 2003 and 2008 in this study could be an indication of the sweeping effects of rapid urbanisation across all population sub-groups in Ghana in recent times, coupled with the pervasive westernisation of diets that have led to increased consumption of fried, fatty and sugary foods (de-Graft, 2014). Nonetheless, the differences between the two women groups could be due to the existence of underlying confounders. For instance, the results (Table 1) show that more non-childbearing women are younger and unmarried, thus, they may desire larger body sizes to enhance

their chances in the marriage market. For such women also, the religious group may well serve as a pool of possible suitors and a source of religious favour from the Almighty.

Previous studies have found overweight or obesity to be more associated with urban than rural dwellers (Mattah et al., 2013; Pawloski et al., 2012). In this study, the most at risk group for overweight or obesity in urban setting was childbearing women in 2008. This finding suggests that the relationship between urban living and overweight or obesity may not be straightforward in all cases. Nevertheless, this could be partially explained by the fact that more childbearing women than non-childbearing women resided in urban than rural areas (see Table 1). Apart from the fact that childbearing women are at risk of obesity associated with childbirth, conceivably also is the fact that such women in urban areas may have increased access to cheap foods with high content of fat and sugars. Due to additional responsibilities of child care, they may also be walking less and using motor transport more often, as typically done in urban areas (Caballero, 2007; Dake et al., 2011).

As in the case of urban residence, relationship between ethnicity and overweight or obesity may not be as straightforward as in previous research in Ghana (Amoah, 2003b; Biritwum et al., 2005; Duda et al., 2007; Mattah et al., 2013). In this study, significant higher odds of overweight or obesity were found only among non-childbearing Ga/Adangbe women in the 2008 survey. Earlier studies (Mattah et al., 2013, Dake et al., 2011) using the same data set (GDHS), however, revealed that overweight or obesity was more associated with the Ewe ethnic group. The contrast in results of the current study from

the earlier ones could be due to the stratification of women into two groups (childbearing vs non-childbearing) as opposed to previous studies.

Nonetheless, it is conceivable that non-childbearing Ga/Adangbe women still hold on to the age old socio-cultural perceptions of body image that favour overweight or obesity. Another likely explanation could be their staple diet (kenkey) and sedentary life style of the predominantly Ga/Adangbe people (Biritwum et al., 2005) The Ga/Adangbe people are located in the Greater Accra region, which is the most urbanised region in Ghana. As often observed in urban settings, this ethnic group is also more likely to be exposed to the consumption of more fried, fatty and sugary foods, while at the same time having reduced opportunity for physical activity.

The results on spatial predictors of overweight or obesity were rather mixed, with low probabilities among the significant spatial predictors except the Central region which had high probabilities in 2003. The significant lower odds of overweight or obesity found in the three northern regions (Northern, Upper West and Upper East) could be attributed to the fact that these regions are among the poorest in the country, and are predominantly rural farming communities (Ghana Statistical Service, 2014).

Perhaps the high availability and consumption of fruit and vegetables in the Forest Zone of Ghana (Amo-Adjei & Kuni-Kyereme, 2015) accounts for the low probability of overweight or obesity found among women in Brong Ahafo and Ashanti regions. Another explanation could be the fact that the two regions are also noted for having less sedentary occupations of agriculture and mining.

CHAPTER SIX

BEHAVIOURAL FACTORS ASSOCIATED WITH OVERWEIGHT AND OBESITY AMONG WOMEN IN GHANA

Introduction

Among the multiplicity of factors identified to be associated with the increasing prevalence of overweight and obesity, behavioural factors are considered the most proximal, which strongly influence the energy balance equation and the subsequent development of overweight and obesity or otherwise. These factors, including physical activity, fruit and vegetable intake, alcohol consumption, are also considered the most modifiable factors that could easily be targeted for the promotion of healthy body weights at both the individual level and community levels.

This chapter focuses on the behavioural or lifestyle practices of Ghanaian women with the view to estimating their effect on overweight and obesity. The chapter draws on data from the most recent round (2008) of the GDHS. As mentioned in the previous chapter, this is a nationally representative sample of Ghanaian women in their reproductive ages (15-49). The 2008 GDHS dataset is used mainly because this was the only round of GDHS survey in Ghana that collected information on behavioural and lifestyle practices of Ghanaian women as part of assessing the regenerative health and nutrition of Ghanaians.

The chapter begins with descriptive statistics of behavioural characteristics of women, followed by a bivariate assessment of various behavioural factors of overweight or obesity. Finally, as stipulated in the

conceptual framework for the study, results of multivariate logistic regression models to estimate the risk of overweight and obesity by various behavioural factors are presented. In line with the aim of the study, the results are stratified according to the two main women groups (childbearing and non-childbearing) considered in this study.

Behavioural Characteristics of Women

In this section, various behavioural characteristics of childbearing and non-childbearing women aged 15-49 are described. Table 6 shows that 60% of childbearing women compared with 87% of non-childbearing women reported not using modern contraception. The use of modern contraceptive methods was, however, higher among childbearing women (34%) compared with non-childbearing women (8%). About one out of every two childbearing and non-childbearing women did not engage in any rigorous physical activity in the seven days preceding the survey.

Given that alcohol consumption among women is generally frowned upon in the Ghanaian society, as expected, women in both groups reported low consumption of alcohol, and even more so among non-childbearing women. For instance, less than 10% of non-childbearing women consumed alcoholic beverages compared with about 18% of childbearing women.

Fruit intake was generally high among both women groups, but more so among non-childbearing women. About half of non-childbearing women reported consuming fruits 4-7 days/week compared with 45% of childbearing women. Similarly, vegetable consumption was generally high; however, more

Table 6 continued

Days of vegetable intake per week				
None	93	3.5	37	2.6
1-3	1261	47.2	729	51.9
4-7	1318	49.3	639	45.5
Cooking oil use				
Palm oil	1336	50.0	605	43.1
Fortified vegetable oil	608	22.7	459	32.7
Other vegetable oil	175	6.6	105	7.5
Shea butter	518	19.4	200	14.2
Other oils	34	1.3	35	2.5
Glasses of water intake per week				
<6	1631	61.1	1027	73.1
6-7	529	19.8	224	15.9
8+	512	19.1	154	11.0

childbearing women (49%) reported they consumed vegetables, most days (4-7) of the week compared to non-childbearing women (46%).

Palm oil was the most commonly used oil for cooking purposes for both women groups, followed by fortified vegetable oil. Specifically, more childbearing (50%) compared with non-childbearing (43%) women reported using palm oil; while more non-childbearing (33%) compared with childbearing (23%) reported using fortified vegetable oil. More childbearing than non-childbearing women consumed the recommended minimum of 8 glasses of water per day.

Behavioural Predictors of Overweight or Obesity among Women in Ghana

This section presents the bivariate associations between the behavioural characteristics discussed in the previous section and overweight or obesity, using Pearson's chi-square to test statistical significance. Further analyses were conducted using multivariate logistic regression models to estimate the association between behavioural characteristics and overweight or obesity. As shown in Table 7, for both childbearing and non-childbearing women, overweight or obesity was significantly ($p < 0.05$) associated with all the behavioural factors considered in the study, except days of physical activity per week, alcohol consumption per week, and days of vegetable intake per week.

Among childbearing women, about a third each of those who used no contraception and those who used modern contraception compared with 29% of their counterparts who used traditional contraceptive methods were overweight or obese. For non-childbearing women, however, more than one quarter each of those who used modern and traditional methods compared with 16% of those who used no contraception were overweight or obese.

While overweight or obesity seems to reduce as the number of days of rigorous physical activity increased for childbearing women, almost the reverse was the case for non-childbearing women. For example, overweight and obesity ranged from about 37% among childbearing women who engaged in no physical activity in the last seven days preceding the survey to about 29% among those who did so for 4-7 days a week. For non-childbearing women, this ranged from 17% among those who did not engage in physical

Table 7: Overweight or Obesity by Behavioural Characteristics of Women, 2008

Characteristic	Women groups – 2008			
	Childbearing		Non-childbearing	
	%	N = 2672	%	N = 1405
Contraceptive method				
None	34.0	1602	16.0	1216
Modern	33.5	896	27.1	118
Traditional	28.7	174	26.8	71
P-value	0.000		0.001	
Days of physical activity per week				
None	36.5	1343	16.5	709
1-3	32.5	576	18.6	431
4-7	28.8	753	18.5	265
P-value	0.000		0.605	
Alcohol consumption per week				
None	33.6	2187	16.6	1306
Once	33.5	242	29.0	62
Twice+	32.1	243	29.7	37
P-value	0.894		0.006	
Days of fruit intake per week				
None	21.3	394	8.1	111
1-3	34.7	1076	17.1	595
4-7	36.4	1202	19.3	699
P-value	0.000		0.015	

Table 7 continued

Days of vegetable intake per week				
None	28.0	93	16.2	37
1-3	35.3	1261	16.7	729
4-7	32.1	1318	18.5	639
P-value	0.119		0.687	
Cooking oil use				
Palm oil	34.0	1336	14.9	605
Fortified vegetable oil	49.7	608	24.7	459
Other vegetable oil	38.9	175	19.2	105
Shea butter	11.0	518	7.0	200
Other oils	35.3	34	27.3	35
P-value	0.000		0.000	
Glasses of water intake per day				
<6	29.9	1631	15.5	1027
6-7	35.4	529	22.3	224
8+	42.7	512	23.4	154
P-value	0.000		0.007	

activity to 19% among those who engaged in physical activity 4-7 days a week.

Counter intuitively, alcohol consumption seemed to reduce the likelihood of childbearing women being overweight or obese, whereas for non-childbearing women, it significantly increased their likelihood of becoming overweight or obese. Overweight or obesity reduced from 37%

among childbearing women who consumed no alcohol to about 32% among their counterparts who consumed alcohol twice or more a week. On the contrary, the proportion of overweight or obese childbearing women increased from 17% to about 30% for those who consumed no alcohol at all to those who did so twice or more a week, respectively.

Fruit intake is known to negatively impact the development of overweight or obesity in individuals and populations. Counter intuitively, the number of days of fruit intake per week increased the likelihood of becoming overweight or obese in both groups of women. Comparing the two groups, however, childbearing women are disproportionately affected. A similar pattern is observed when comparing the association between vegetable intake per week and overweight or obesity among the two women groups. While 28% (childbearing) and 16% (non-childbearing) of women who did not consume vegetables in the last week preceding the survey were overweight or obese, this was the case for 32% (childbearing) and 19% (non-childbearing) of women who consumed vegetables 4-7 days per week.

Overweight and obesity varied by the type of cooking oil used in each women group. Women in each group who used fortified vegetable cooking oil had the highest proportion (childbearing women: 50% and non-childbearing women 25%) of being overweight or obese. The lowest proportions (childbearing women: 11% and non-childbearing women 7%) of overweight or obesity were among women who used shea butter cooking oil. Overweight or obesity increased among women as the number of glasses of water intake per day increased. Among childbearing women, this ranged from about 30% for those who took in <6 glasses per day to 43% for those who took in 8+

glasses of water per day. Similarly, among non-childbearing women, overweight or obesity ranged from 16% for those who took in <6 glasses per day to 23% for those who took in 8+ glasses of water per day.

As in the case of socio-demographic factors in the previous chapter, multivariate regression analysis were conducted to estimate the nature of association between behavioural factors and overweight or obesity among childbearing and non-childbearing women in Ghana. In accordance with the conceptual framework for the study, a series of binary logistic regression models were run separately for the respective women groups.

Based on the five categories of factors identifiable in the conceptual framework, five (5) models were estimated starting with behavioural factors (Model 1) which included contraceptive use, physical activity, alcohol consumption, fruit intake, vegetable intake, cooking oil use, and water intake. To adjust for the effect of other categories of factors specified in the framework, environmental factors were added in Model 2, followed by predisposing factor in Model 3, enabling factors in Model 4 and reinforcing factors in Model 5.

The results as shown in Model 1 of Table 8 indicate that overweight or obesity had a significant association with contraceptive use, alcohol consumption, cooking oil use and water intake for both childbearing and non-childbearing women. The significant odds of being overweight or obese were generally higher for non-childbearing women compared with their childbearing counterparts. Compared with women who did not use contraception, childbearing women who used modern methods (1.39, $p < 0.01$)

Table 8: Multivariate Logistic Regression Results on Behavioural Predictors of Overweight or Obesity, 2008

		Childbearing women					Non-childbearing women				
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
		OR	OR	OR	OR	OR	OR	OR	OR	OR	OR
		[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]
Contraceptive method											
None	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Modern	1.39]**	1.38]**	1.349*	1.359*	1.355*	1.793*	1.724*	1.379	1.37	1.422	
	[1.11,1.74]	[1.08,1.76]	[1.03,1.76]	[1.03,1.77]	[1.03,1.77]	[1.12,2.84]	[1.07,2.77]	[0.82,2.32]	[0.81,2.31]	[0.83,2.41]	
Traditional	1.307	1.294	1.196	1.205	1.217	1.906*	1.876*	1.865*	1.847	1.769	
	[0.89,1.91]	[0.88,1.90]	[0.81,1.76]	[0.81,1.78]	[0.82,1.79]	[1.02,3.55]	[1.00,3.51]	[1.00,3.46]	[0.97,3.49]	[0.91,3.42]	
Day of physical activity per week											
None	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	
1-3 days	0.873	1.002	1.046	1.028	1.033	1.302	1.305	1.371	1.383	1.385	
	[0.68,1.10]	[0.78,1.27]	[0.80,1.36]	[0.78,1.34]	[0.79,1.35]	[0.95,1.77]	[0.95,1.79]	[0.97,1.92]	[0.98,1.95]	[0.97,1.97]	
4-6 days	0.837	0.981	1.044	1.035	1.043	1.263	1.264	1.253	1.27	1.332	
	[0.66,1.05]	[0.77,1.24]	[0.80,1.35]	[0.79,1.34]	[0.80,1.35]	[0.82,1.92]	[0.81,1.96]	[0.80,1.95]	[0.81,1.98]	[0.84,2.09]	

Table 8 continued

Alcohol consumption per week									
	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
None	1.404*	1.405	1.341	1.29	1.331	2.010*	2.132*	1.827*	1.861*
Once	[1.00,1.90]	[0.98,2.02]	[0.93,1.93]	[0.88,1.87]	[0.91,1.93]	[1.15,3.50]	[1.16,3.89]	[1.02,3.26]	[1.03,3.35]
Twice+	1.316	1.484*	1.467*	1.451	1.517*	3.894**	3.594**	2.656*	2.590
	[0.94,1.82]	[1.04,2.10]	[1.01,2.12]	[0.99,2.11]	[1.02,2.24]	[1.75,8.61]	[1.62,7.95]	[1.14,6.18]	[0.99,6.76]
Days of fruit intake per week									
	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
None	1.075	0.851	0.779	0.771	0.774	1.905	1.743	1.861	1.85
1-3 days	[0.76,1.51]	[0.60,1.19]	[0.53,1.13]	[0.52,1.13]	[0.52,1.13]	[0.90,4.02]	[0.81,3.72]	[0.78,4.43]	[0.73,4.66]
4-7 days	1.037	0.899	0.754	0.74	0.739	1.941	1.85	1.942	1.897
	[0.72,1.48]	[0.63,1.27]	[0.51,1.10]	[0.49,1.09]	[0.50,1.09]	[0.93,4.04]	[0.87,3.93]	[0.83,4.53]	[0.77,4.64]
Days of vegetable intake per week									
	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
None	1.177	1.396	1.354	1.313	1.343	0.76	0.773	0.637	0.612
1-3 days									

Table 8 continued

4-7 days	1.123	1.473	1.481	1.43	1.449	0.914	0.894	0.756	0.702	0.726
	[0.69,1.99]	[0.82,2.35]	[0.79,2.29]	[0.76,2.25]	[0.77,2.31]	[0.28,2.04]	[0.29,2.05]	[0.21,1.86]	[0.20,1.78]	[0.19,1.91]
Cooking oil use										
Palm oil	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Fortified vegetable oil										
	1.856**	1.598**	1.227	1.225	1.229	1.931**	1.668**	1.385	1.383	1.348
	[1.47,2.33]	[1.26,2.01]	[0.96,1.56]	[0.95,1.56]	[0.96,1.57]	[1.38,2.68]	[1.16,2.39]	[0.93,2.04]	[0.93,2.05]	[0.90,2.01]
Other vegetable oil										
	1.514*	1.761**	1.725**	1.772**	1.762**	1.513	1.535	1.375	1.408	1.31
	[1.05,2.18]	[1.20,2.58]	[1.15,2.57]	[1.17,2.67]	[1.17,2.64]	[0.84,2.71]	[0.81,2.87]	[0.73,2.57]	[0.74,2.66]	[0.69,2.45]
Shea butter										
	0.276**	0.93	1.431	1.505	1.457	0.418**	0.54	0.858	0.855	0.918
	[0.18,0.40]	[0.50,1.72]	[0.82,2.48]	[0.84,2.67]	[0.837,2.53]	[0.22,0.79]	[0.25,1.14]	[0.34,2.13]	[0.34,2.11]	[0.35,2.35]
Other oils	1.151	1.201	1.302	1.271	1.304	2.119	1.962	1.523	1.501	1.422
	[0.52,2.51]	[0.51,2.81]	[0.45,3.74]	[0.453,.56]	[0.47,3.61]	[0.96,4.63]	[0.88,4.33]	[0.67,3.42]	[0.67,3.35]	[0.65,3.09]

Table 8 continued

Glasses of water intake per day

<6	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
6-7	1.184	1.123	1.046	1.026	1.028	1.438	1.418	1.280	1.267	1.228		
	[0.92,1.51]	[0.86,1.46]	[0.78,1.39]	[0.77,1.36]	[0.77,1.37]	[0.99,2.06]	[0.98,2.04]	[0.88,1.85]	[0.87,1.82]	[0.84,1.78]		
8+	1.580**	1.570**	1.446**	1.459**	1.460**	1.678*	1.767*	1.416	1.417	1.428		
	[1.21,2.05]	[1.21,2.03]	[1.09,1.90]	[1.10,1.92]	[1.10,1.93]	[1.09,2.58]	[1.16,2.68]	[0.92,2.16]	[0.93,2.15]	[0.93,2.19]		
Residence setting												
Rural	-	Ref	Ref	Ref	Ref	-	Ref	Ref	Ref	Ref	Ref	Ref
Urban	-	2.860**	1.336*	1.342*	1.346*	-	1.736**	1.13	1.133	1.133	1.133	1.133
		[2.25,3.63]	[1.00,1.77]	[1.01,1.78]	[1.00,1.79]	-	[1.15,2.61]	[0.71,1.78]	[0.71,1.78]	[0.71,1.78]	[0.71,1.78]	[0.71,1.80]
Region												
Western	Ref	Ref	Ref	Ref	Ref	-	Ref	Ref	Ref	Ref	Ref	Ref
Central	-	1.065	1.115	1.071	1.086	-	0.668	0.624	0.615	0.623		
		[0.66,1.70]	[0.66,1.86]	[0.63,1.80]	[0.64,1.83]	-	[0.27,1.62]	[0.25,1.55]	[0.24,1.54]	[0.25,1.54]		
Greater Accra		0.882	0.595*	0.588*	0.625*	-	0.964	0.82	0.841	0.668		
		[0.57,1.36]	[0.38,0.92]	[0.37,0.91]	[0.39,0.98]	-	[0.54,1.70]	[0.45,1.49]	[0.46,1.53]	[0.34,1.30]		
Volta	-	0.735	0.936	0.96	0.941	-	0.442	0.521	0.544	0.488		
		[0.46,1.16]	[0.57,1.51]	[0.58,1.57]	[0.52,1.70]	-	[0.18,1.04]	[0.23,1.16]	[0.24,1.21]	[0.18,1.27]		

Table 8 continued

Eastern	-	0.903	0.933	0.885	0.922	-	1.17	1.276	1.316	1.066
	-	[0.59,1.36]	[0.60,1.43]	[0.56,1.37]	[0.58,1.45]	-	[0.60,2.24]	[0.65,2.50]	[0.67,2.57]	[0.51,2.19]
Ashanti		0.660	0.629*	0.609*	0.611*	-	0.819	0.776	0.786	0.828
	-	[0.43,1.00]	[0.41,0.95]	[0.40,0.92]	[0.40,0.92]	-	[0.45,1.47]	[0.41,1.43]	[0.42,1.45]	[0.44,1.54]
Brong Ahafo		0.331**	0.427**	0.405**	0.402**	-	0.675	0.739	0.727	0.684
	-	[0.21,0.51]	[0.27,0.65]	[0.26,0.62]	[0.26,0.62]	-	[0.32,1.39]	[0.31,1.73]	[0.30,1.73]	[0.28,1.65]
Northern		0.299**	0.427**	0.409**	0.392**	-	0.334*	0.396*	0.414*	0.271*
	-	[0.17,0.50]	[0.25,0.72]	[0.24,0.69]	[0.21,0.702]	-	[0.13,0.81]	[0.15,0.99]	[0.16,1.05]	[0.098,0.74]
Upper West		0.281**	0.297**	0.296**	0.275**	-	0.865	0.864	0.925	0.753
	-	[0.13,0.59]	[0.15,0.56]	[0.15,0.57]	[0.12,0.59]	-	[0.36,2.07]	[0.35,2.11]	[0.38,2.23]	[0.25,2.26]
Upper East		0.236**	0.254**	0.245**	0.234**	-	1.002	1.004	1.066	0.747
	-	[0.12,0.45]	[0.13,0.48]	[0.12,0.46]	[0.11,0.48]	-	[0.40,2.49]	[0.39,2.54]	[0.42,2.68]	[0.25,2.16]
Age		-	Ref	Ref	Ref	-	-	Ref	Ref	Ref
15-24	-	-	-	-	-	-	-	-	-	-
25-34	-	-	3.814**	4.010**	4.028**	-	-	1.588*	1.588*	1.602*
	-	-	[2.51,5.79]	[2.63,6.11]	[2.64,6.14]	-	-	[1.02,2.47]	[1.01,2.48]	[1.02,2.51]
35-44	-	-	4.953**	5.389**	5.366**	-	-	2.270*	2.185*	2.424*
	-	-	[3.07,7.98]	[3.34,8.69]	[3.33,8.63]	-	-	[1.07,4.80]	[1.01,4.69]	[1.11,5.29]

Table 8 continued

Occupation	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Unemployed	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Professional/managerial	1.007	1.005	1.004	1.004	1.005	1.004	1.004	1.005	1.004	1.005	1.004	1.005	1.004	1.005
	[0.63,1.60]	[0.62,1.62]	[0.61,1.63]	[0.61,1.63]	[0.62,1.62]	[0.61,1.63]	[0.61,1.63]	[0.62,1.62]	[0.61,1.63]	[0.62,1.62]	[0.61,1.63]	[0.62,1.62]	[0.61,1.63]	[0.62,1.62]
Sales/trade	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.19	1.162	1.169	1.169	1.162	1.169	1.169	1.162	1.169	1.162	1.169	1.162	1.169	1.162
	[0.80,1.75]	[0.78,1.72]	[0.78,1.73]	[0.78,1.73]	[0.78,1.72]	[0.78,1.73]	[0.78,1.73]	[0.78,1.72]	[0.78,1.73]	[0.78,1.72]	[0.78,1.73]	[0.78,1.72]	[0.78,1.73]	[0.78,1.72]
Agricultural	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.715	0.704	0.711	0.711	0.704	0.711	0.711	0.704	0.711	0.704	0.711	0.704	0.711	0.704
	[0.45,1.12]	[0.44,1.11]	[0.44,1.12]	[0.44,1.12]	[0.44,1.11]	[0.44,1.12]	[0.44,1.12]	[0.44,1.11]	[0.44,1.12]	[0.44,1.11]	[0.44,1.12]	[0.44,1.11]	[0.44,1.12]	[0.44,1.11]
Manual	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.709	0.672	0.673	0.673	0.672	0.673	0.673	0.672	0.673	0.672	0.673	0.672	0.673	0.672
	[0.40,1.23]	[0.38,1.17]	[0.38,1.18]	[0.38,1.18]	[0.38,1.17]	[0.38,1.18]	[0.38,1.18]	[0.38,1.17]	[0.38,1.18]	[0.38,1.17]	[0.38,1.18]	[0.38,1.17]	[0.38,1.18]	[0.38,1.17]
Wealth status	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poorest	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poorer	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.159	1.105	1.067	1.067	1.105	1.067	1.067	1.105	1.067	1.105	1.067	1.105	1.067	1.105
	[0.75,1.78]	[0.71,1.70]	[0.68,1.66]	[0.68,1.66]	[0.71,1.70]	[0.68,1.66]	[0.68,1.66]	[0.71,1.70]	[0.68,1.66]	[0.71,1.70]	[0.68,1.66]	[0.71,1.70]	[0.68,1.66]	[0.71,1.70]
Middle	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.787*	1.654*	1.595	1.595	1.654*	1.595	1.595	1.654*	1.595	1.654*	1.595	1.654*	1.595	1.654*
	[1.11,2.85]	[1.02,2.68]	[0.97,2.59]	[0.97,2.59]	[1.02,2.68]	[0.97,2.59]	[0.97,2.59]	[1.02,2.68]	[0.97,2.59]	[1.02,2.68]	[0.97,2.59]	[1.02,2.68]	[0.97,2.59]	[1.02,2.68]
Richer	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3.960**	3.435**	3.290**	3.290**	3.435**	3.290**	3.290**	3.435**	3.290**	3.435**	3.290**	3.435**	3.290**	3.435**
	[2.43,6.45]	[2.02,5.81]	[1.92,5.61]	[1.92,5.61]	[2.02,5.81]	[1.92,5.61]	[1.92,5.61]	[2.02,5.81]	[1.92,5.61]	[2.02,5.81]	[1.92,5.61]	[2.02,5.81]	[1.92,5.61]	[2.02,5.81]

Table 8 continued

Richest	-	-	6.313**	5.169**	4.944**	-	-	2.646 [±]	2.818*	3.118*
	-	-	[3.55,11.23]	[2.73,9.75]	[2.61,9.36]	-	-	[1.18,5.92]	[1.19,6.63]	[1.27,7.65]
Parity										
1 to 3	-	-	Ref	Ref	Ref	-	-	-	-	-
4 to 6	-	-	1.103	1.106	1.112	-	-	-	-	-
	-	-	[0.86,1.41]	[0.86,1.41]	[0.86,1.42]	-	-	-	-	-
7+	-	-	1.111	1.142	1.175	-	-	-	-	-
	-	-	[0.70,1.75]	[0.71,1.81]	[0.73,1.88]	-	-	-	-	-
Print media exposure										
No exposure	-	-	Ref	Ref	-	-	-	-	Ref	Ref
Moderate exposure	-	-	0.728	0.733	-	-	-	-	1.074	1.009
	-	-	[0.49,1.07]	[0.49,1.08]	-	-	-	-	[0.72,1.60]	[0.66,1.52]
High exposure	-	-	0.814	0.802	-	-	-	-	1.006	0.915
	-	-	[0.34,1.91]	[0.33,1.90]	-	-	-	-	[0.51,1.97]	[0.46,1.79]
Radio exposure										
No exposure	-	-	Ref	Ref	-	-	-	-	Ref	Ref
Moderate exposure	-	-	0.894	0.891	-	-	-	-	0.779	0.813
	-	-	[0.62,1.28]	[0.62,1.27]	-	-	-	-	[0.44,1.35]	[0.45,1.44]

Table 8 continued

High exposure	-	1.045	1.036	-	-	1.052	1.152
		[0.73,1.49]	[0.72,1.48]			[0.58,1.90]	[0.63,2.10]
Television exposure							
No exposure	-	Ref	Ref	-	-	Ref	Ref
Moderate exposure	-	1.284	1.291	-	-	0.96	0.969
High exposure	-	[0.96,1.70]	[0.97,1.71]	-	-	[0.53,1.71]	[0.54,1.73]
	-	1.428*	1.451*	-	-	0.873	0.949
	-	[1.01,2.00]	[1.03,2.03]	-	-	[0.48,1.57]	[0.52,1.71]
Ethnicity							
Akan	-	-	Ref	-	-	-	Ref
Ga/Adangbe	-	-	0.767	-	-	-	2.268**
			[0.48,1.22]				[1.22,4.20]
Fwe	-	-	1.054	-	-	-	1.332
	-	-	[0.71,1.56]	-	-	-	[0.69,2.56]
Mole-Dagbani	-	-	1.18	-	-	-	0.972
	-	-	[0.69,1.99]	-	-	-	[0.44,2.11]
Others	-	-	0.975	-	-	-	1.66
	-	-	[0.64,1.47]	-	-	-	[0.88,3.10]

Table 8 continued

Religious affiliation									
Pentecostal/Charismatic	-	-	-	-	-	-	-	-	Ref
Catholic	-	-	-	-	-	-	-	-	2.002** [1.23,3.25]
Protestants	-	-	-	-	-	-	-	-	1.365 [0.91,2.03]
Muslim	-	-	-	-	-	-	-	-	Ref 1.902* [1.02,3.53]
Traditional	-	-	-	-	-	-	-	-	3.001* [0.85,10.5]
No religion	-	-	-	-	-	-	-	-	1.445 [0.43,4.77]
Constant	0.218**	0.0444**	0.0453**	0.0436**	0.0505**	0.0490**	0.0334**	0.0351**	0.0203**
	[0.11,0.42]	[0.01,0.10]	[0.017,0.11]	[0.016,0.11]	[0.016,0.15]	[0.014,0.16]	[0.01,0.15]	[0.01,0.160]	[0.00,0.100]
N	2672	2672	2672	2672	1405	1405	1405	1405	1405

95% confidence intervals in brackets, * p<0.05, ** p<0.01

were more likely to be overweight or obese, while for non-childbearing women overweight or obesity was more likely among those who used modern methods (1.79, $p<0.01$), as well as those who used traditional methods (1.90, $p<0.01$).

Among both women groups, the odds of being overweight or obese were higher for those who consumed alcohol compared to those who did not. For instance, with reference to non-childbearing women who did not consume alcohol, the odds of being overweight or obese were approximately two and four times more among those who consumed alcohol once/week (2.01, $p<0.05$), and among those who consumed alcohol twice or more/week (3.89, $p<0.01$), respectively.

In the Model (1), with reference to those who used palm oil, the odds of being overweight or obese were about two times higher among both childbearing (1.85, $p<0.01$) and non-childbearing (1.93, $p<0.01$) women who used fortified vegetable oil than palm oil; 1.5 ($p<0.05$) times higher among childbearing women who used other forms of vegetable oil, and two times (2.12, $p<0.10$) higher for non-childbearing women who used other oils. By contrast, those who used shea butter for cooking in both women groups (childbearing: 0.27, $p<0.01$; non-childbearing: 0.42, $p<0.01$) were less likely to be overweight or obese compared to those who used palm oil.

Again, the odds of being overweight or obese significantly increased as the number of glasses of water intake per day increased for both groups of women. Among childbearing women, for example, the odds of being overweight or obese were 1.59 ($p<0.01$) for those who took in 8+ glasses per compared with those who took in less than 6 glasses of water per day.

But for a few cases with marginal effects, the addition of environmental factors (residence setting and region of residence) in Model 2 changed neither the direction nor significance of associations found between behavioural factors and overweight or obesity observed in the previous model. Nonetheless, the significant association found between shea butter use and overweight or obesity in Model 1 became statistically insignificant for both childbearing and non-childbearing women. Similarly, in both women groups, those who consumed 6 or 7 glasses of water per day were no longer significantly associated with overweight or obesity.

In Model 2, significant higher odds of being overweight or obese were found among those in urban than rural setting for both women groups (childbearing: 2.86, $p < 0.01$; non-childbearing: 1.74, $p < 0.01$). In terms of region of residence, however, significant lower odds of being overweight or obese were found for childbearing women in Brong Ahafo, Northern, Upper west and Upper East Regions while such was the case for non-childbearing women in only the Northern Regions.

Adjusting for predisposing factors (age, educational attainment, marital status, occupation, wealth status and parity) and enabling factors (exposure to print, radio and television) in models 3 and 4 slightly reduced the odds ratios for most of the behavioural factors associated with overweight or obesity. More remarkably, in Models 3 and 4, alcohol consumption once/week was no longer significantly associated with overweight or obese among childbearing women, likewise non-childbearing women who used modern methods of contraception, and those who consumed 8+ glasses of water per day.

Equally, the use of fortified vegetable cooking oil was no longer significantly associated with overweight or obesity among both women groups. In addition, the significant association found between overweight or obesity and the use of other cooking oils by non-childbearing women could not be sustained in Models 3 and 4.

In the full model (5), after adjusting as well for the effect of reinforcing factors (such as ethnicity and religion), the odds of being overweight or obese were significantly higher (with reference to the respective categories) for childbearing women who used modern contraception (1.35, $p < 0.05$), consumed alcohol twice/more per week (1.52, $p < 0.05$), used other forms of vegetable cooking oil (1.76, $p < 0.01$), and took in 8+ glasses of water per day (1.46, $p < 0.01$). On the other hand, among non-childbearing women, overweight or obesity was significantly more likely among only those who consumed alcohol once/week (1.1.86, $p < 0.05$), as well as those who consumed alcohol twice or more/week (2.59, $p < 0.05$).

Discussion

This chapter examined behavioural determinants of overweight or obesity among women in Ghana. Unlike in the previous chapter, only the 2008 GDHS data was used for the analysis in this chapter mainly because the earlier DHS surveys did not collect information on behaviours and lifestyle practices of Ghanaian women. Nonetheless, the stratification of Ghanaian women according to whether they had ever given birth to children (childbearing) or never given birth to children (non-childbearing) was maintained in this chapter.

The results revealed a few behavioural factors to be significantly associated with overweight or obesity, with variations between childbearing and non-childbearing women. After adjusting for other covariates, the use of modern contraceptive methods was found to be significantly associated positively with overweight or obesity for childbearing women, but not for non-childbearing women. Weight gain is often cited as one of the major side effect of using modern contraceptives, particularly hormonal contraceptives (Grimes, Lopez, O'Brien, & Raymond, 2009), which could plausibly explain the positive relationship between modern contraceptive use and overweight or obesity found in this study.

With over 80% of married Ghanaian women currently using hormonal contraceptives including the pill, implant and injectables (Performance Monitoring and Accountability 2020 Project, 2013), it is conceivable to link the significant differences in overweight or obesity between childbearing and non-childbearing women who use modern contraception to the weight gaining effect of modern contraception (Grimes et al., 2009). As the results in Table 1 show, a greater preponderance of childbearing women than non-childbearing women were in marital unions, and may thus be using modern contraceptives for spacing or limiting of births.

The frequency of alcohol consumption per week was found to be more associated with being overweight or obesity for both childbearing and non-childbearing women. Alcohol serves as a significant source of dietary energy, accounting for nearly 10% of calories intake among adults who drink (Breslow & Smothers, 2005; Yeomans, 2010). Hence, alcohol consumption may contribute to overweight or obesity both by providing an extra energy

source, and by acting as catalyst to increase food intake through the stimulation of appetite (Breslow & Smothers, 2005).

In this study, the relationship between alcohol consumption and overweight or obesity, though positive, does not show a discernible pattern. For instance, while childbearing women who consume alcohol twice or more times a week were more associated with overweight or obesity, this was the case non-childbearing women who consumed alcohol either once a per week or twice or more per week.

Such inconsistency as seen in the current study perhaps resonates the fact that alcohol intake usually forms part of other broader lifestyle and social behaviours that may be associated with overweight or obesity (Almiron-Roig et al., 2003). Binge drinking which may be common among non-childbearing women in this case because they are relatively younger and freer than their childbearing counterparts (see Table 6) could partly explain the disparity in overweight or obesity found between the two women groups. Binge drinking increases the odds of being overweight or obese perhaps as a result of its association with an array of adverse behaviours including poor diet, unhealthy weight control, body dissatisfaction and sedentary behaviour (Nelson et al., 2009).

Associated with the on-going nutrition transition in many developing countries is the increased consumption of vegetable oils of all kinds (Kearney, 2010). Vegetable oils are known to be a major source of visible fats, contributing to more than half of the daily fat calories, and are thus associated with weight gain and increased risk of heart disease (Lakshmipriya et al., 2013; Shajithanoop, Periyasamy, & Rani, 2012). The use of other vegetables

oils was found in this study to significantly predict the development of overweight or obesity among childbearing women.

In Ghana, vegetable oil including frytol is the most preferred choice in urban areas (GSS et al., 2009). Given that more childbearing women were found to reside in urban settings from the results (see Table 1), coupled with the rampant poverty in such settings (Shajithanoop et al., 2012), such women may be resorting to the use of cheaply available vegetable oil with high fat content for cooking purposes. This finding is consistent with Shajithanoop et al., (2012) in their case control study of factors influencing obesity among semi-urban adults between 20 and 44 years of age.

Unlike the positive effect of sweetened beverage consumption on weight gain and overweight or obesity, increased water consumption is associated with weight loss and lower risk of overweight or obesity (Daniels & Popkin, 2010; Dennis et al., 2010). Thus, increasing daily water consumption is widely recognized as a weight loss strategy in the general public. Increased water intake could increase gastric distension and satiety, thereby reducing energy intake at the subsequent meal (Dennis et al., 2010). Recently, Pan, et al. (2013), in three separate large prospective cohorts of US women and men, found increasing intakes of water to be inversely associated with long-term weight gain.

Contrary to the existing evidence (Dennis et al., 2010; Pan et al., 2013) on the protective effect of water intake on weight gain, this study found that childbearing women who reported they consumed the Ghana Health Service recommended 8 or more glasses of water per day (GSS et al., 2009) were found to be more associated with overweight or obesity. This contrasting

finding could, however, be as a result of reverse causal association between water intake and overweight or obesity. It could be that, such women by virtue of their weight status resort to drinking more water as a weight reducing strategy. Given the cross-sectional nature of the current study, it is difficult to ascertain whether water intake is based on the weight status of such women or otherwise. Perhaps this is one area of study worth exploring further.

The nature of association between control factors classified as predisposing, enabling, reinforcing, and environment as shown in Table 8 were similar to the results in the previous chapter. This goes further to suggest strongly that the behavioural factors being considered in this chapter are to a large extent independently associated with overweight or obesity. Yet again, the associations found between overweight or obesity and age, occupation, wealth status, television exposure, ethnicity and religion in the previous chapter, may not be attributable to behavioural factors.

CHAPTER SEVEN

PERCEPTIONS OF WOMEN ABOUT OVERWEIGHT AND OBESITY

Introduction

Understanding overweight and obesity, and devising effective strategies to curb its rising prevalence requires an appreciation of both personal and social values, beliefs, attitudes and expected behaviours that influence body size preferences, as well as eating and activity patterns. This chapter seeks to bring to the fore the perspective of women relating to overweight and obesity through in-depth interviews with Ghanaian women from various backgrounds.

The chapter begins with a brief profile of the participants, followed by the findings under four major thematic areas: conceptualisation of overweight and obesity by women; views of women on possible causes of overweight and obesity; views of women on possible consequences of overweight and obesity; and perceptions of women on preferable body image for Ghanaian women. Extracts from the transcripts are included in the form of quotes to illustrate and illuminate the results being discussed.

Profile of Study Participants

As shown in Table 9, a total of 36 women drawn from the Greater Accra (19) and Northern (17) regions participated in the study. The mean age of the participants was 33 ± 9.2 . Their level of education ranged from none to university education, although they typically completed secondary level education. Ten of the women were married, two divorced while the rest were

Table 9: Profile of Interview Participants

Characteristic	Study area		
	Tamale (n=17)	Accra (n-19)	Total (N=36)
Age			
20-29	7	5	12
30-39	7	8	15
40+	3	6	9
Educational level			
No education	4	2	6
Primary	3	2	5
Middle/JSS	4	4	8
Secondary/higher	6	11	17
Marital Status			
Never married	11	13	24
Married	6	4	10
Divorced	0	2	2
Number of children			
None	9	8	17
1-3	4	7	11
4-6	4	4	8
BMI category			
Underweight	0	1	1
Normal weight	8	3	11
Overweight	3	5	8
Obese	6	10	16

never married. Most of the participants were mothers (19), with the number of children per mother ranging from 1 to 6.

The anthropometric measurements collected from the participants revealed that the average BMI was 33.5 ± 10 . With reference to the WHO BMI classifications, 16 of the participants were obese; 8 overweight; 11 normal weight and 1 in the underweight category.

Conceptualisation of Overweight and Obesity by women

Overweight and obesity were subjectively defined by the women in the study resulting in the emergence of varied views. In articulating their views, all the women in the study defined overweight or obesity as synonymous with being “fat”, “big”, “large-bodied”, or “huge”. A 31 year old obese woman stated:

Well, growing up, whenever you hear someone is overweight, you perceive the person as being, you know fat, very fat with a lot of body, as a Ghanaian would say. A lot of body or big body.

31years, obese

In their definitions, however, the respondents used each concept as a reference point in defining the other. Hence, they mostly ended up drawing distinctions between overweight and obesity, rather than defining each concept. The respondents distinguished between overweight and obesity in several ways. Some women made reference to standard measures for determining overweight and obesity such as body weight and body mass index

in their attempts to differentiate overweight from obesity. Hypothetical examples were used in most cases to articulate their understanding of overweight and obesity as illustrated by these three women:

For overweight it means the person has a BMI above 25. I know obesity that one too is having a BMI of above 30.

25 years, normal weight

Somebody who is fat or somebody who has more fat. Like if somebody who weighs 60kg after standing on the scale is considered overweight, then somebody who weighs maybe 120kg would be considered obese.

27 years, obese

Others tried establishing a difference between overweight and obesity using relative descriptions of the two concepts. While some of such women based their description more on a deviation from some “normal” or “expected” ideal such as age, others focused on relative differences in size to distinguish between being overweight and being obese;

Generally, if they say somebody is overweight, it means they are big, they are too big or you are bigger than the normal range, but in Ghana if they say someone is obese it means the person is even more than overweight.

31 years, obese

You know, overweight is that the person is probably above the normal or the expected range, with respect to probably age or whatever. When somebody is obese, the person appears to be so fat, you see the person to be like extraordinary. Yeah, extra--ordinarily fat.

47 years, obese

Overweight is just being a little bigger or a little fat than your usual weight, but being obese for me is being very fat.

29 years, overweight

Another way in which the women in the study expressed their view of overweight and obesity was by examining the extent to which one's weight begins to actually have effects on the performance of basic activities of day to day living, and general quality of life. Descriptions focused on how weight causes people to struggle in doing basic things such as walking and breathing. For instance:

Someone who is obese struggles to do things, like to get up, to walk, you get tired with every little thing you do. You are like two times the overweight person, so you get tired quickly.

25 years, underweight

Overweight is fat. Obese is like, a very fat person who has difficulty in breathing. The person kind of pants, you know when breathing or even walking.

26 years, normal weight

One woman who shared similar thoughts expanded further by highlighting certain psychological and medical effects that may differentiate obesity from being overweight, as follows:

Being overweight for me is just gaining a little bit of weight, just a little bit, but to be obese is to be very big where movement becomes a problem for you. You become very self-conscious because you are very big out of the ordinary. People easily notice you are big and for me that is obesity. Then you are likely to be hypertensive, you have issues with high blood pressure.

29 years, overweight

In addition, some of the participants focused on aesthetics of body proportion, shape and overall appearance in their definition of overweight and obesity. However, the nature of distribution of body fat in certain places, particularly the tummy area and buttocks, was the main emphasis in their descriptions. As a result, while some of their descriptions, in a sense, reflected approval and positive attitude towards overweight and obesity, other descriptions reflected the disapproval and negative attitudes towards

overweight and obesity. This was clearly intimated in a rather detailed narrative by a 30 year old normal weight woman in the following excerpt:

As for overweight or fat people we have different types. Some are fat but you can see that they 'look fine'. For such they don't have enlarged stomachs, their shape conforms to their body. And there are some who are fat but some parts of their body are big and other parts are small. We called all it "kosor ko bo". The top part of the body is usually big while the lower part is usually small, and the stomach too becomes enlarged.....And we have one which is hard to imagine. For that one, even the feet that are on the ground are huge. That is the last type of fatness that is in the world. So for that fatness, unless God Himself intervenes. There is no one in the world who wants such fatness. Even that kind of fatness, we don't have their clothes...

The ability of one to control their body weight was another criteria used by some women to distinguish overweight from obesity. This idea of controllability of body weight was used by an obese woman in an effort to buttress her earlier attempt to distinguish between overweight and obesity.

Ahuh, I would say someone who is obese cannot, you know, control their weight. If you can't control your weight that is

when you are obese, but if you are overweight, it means you are just big but you can control yourself.

31 years, obese

Overall, the BMI which relates body weight to height and its various classifications for determining the weight status of individuals was to a large extent not a familiar way of defining overweight and obesity. Respondents resorted to their own subjective inclinations in their attempt to define overweight or obesity.

Views of Women on Possible Causes of Overweight and Obesity

When asked about the possible factors that could result in the development of overweight and obesity in women, respondents mentioned several factors that could explain the phenomenon. From the shared views of the respondents, the factors were grouped under two major thematic areas: endogenous (heredity/genetics, maternal) factors and exogenous (diet/food habits, drugs, sex, contraception etc) factors. For each thematic group of factors identified, the respondents presented varied views.

Endogenous Factors

The energy balance theory is by far the most popular theory explaining the mechanism by which overweight and obesity occurs. Accordingly, overweight and obesity occur as a result of an imbalance in energy input in the form of food/caloric intake and expenditure in the form of physical activity (Rigby et al., 2009). Nonetheless, more than a century's worth of research

have shown and suggested that certain individuals or groups may have a genetic susceptibility for weight gain and the subsequent development of obesity.

In line with this, a section of the respondents had a strong assertion that overweight and obesity among women has to do more with genetics and heredity along family or kinship lines. They explained further that having such genes meant that becoming overweight or obesity was inescapable, and that one was bound to become overweight or obese no matter what efforts are put in place to prevent it. A respondent contended:

Hmmm...You know, genetically, some people are born that way; some people are born that way. I don't think anything at all you do can control it, you'll definitely get there. When you are younger, it will not show itself or manifest. But when you start working and a bit stable and comfortable, it will start coming out, you'll see that you'll be gaining weight. Some people complain at that point that they've not taken fatty stuff but are still gaining weight, it's genetic. And then I realize that some people too, their bodies have the tendency of retaining fat. So you might be eating late with, maybe your friend, but you'll be gaining weight while your friend will not be gaining weight. So genetically, some people are born like that no matter what, there is nothing you can do about it.

31 years, obese

This view of inescapable weight gain and helplessness about one's susceptibility to overweight and obesity stemming from genetic or hereditary factors was reiterated by another woman. Using her own experience as a classic case, she described how her weight kept increasing despite resorting to less food and more fruits and vegetables as:

Let me use myself as an example, some people feel that, when you are fat, you eat too much. But I think the tiniest girl in my house even takes more than I do. You get me? Now look at me, when I even drink air, I will be growing fat. My grandmother, whoever is in my family is fat, so if you don't control yourself and it gets out of hand, there is trouble. You know mostly I even take vegetables and fruits and I take in just a little food and after that, my oranges too to at least enhance digestion and all that. Yeah, I take that, but I think it has to do more with genetic factors.

47 years, obese

Related to the issue of helplessness and uncontrollability of weight gain leading to overweight or obesity on the basis of heredity and genetics, some women interpreted overweight and obesity as part of "God's creation". They felt that what a greater power (God) had already pre-determined; no one could do anything to alter it. One 33 year old obese woman who shared in this pre-deterministic world view acknowledged this possibility, stating:

It is just the way God created everybody, some are slim, others are overweight while others obese

In further support of this notion, others made reference to their birth weight as evidence of this pre-deterministic effect of God's creation. A 50 year old obese woman points to that effect:

Nothing made me fat. That's how I was created. At birth I weighed seven pounds and four ounces according to my weighing card. So mine is from birth.

In one of the northern interviews, another twist emerged regarding to the possible genetic or kinship links to overweight or obesity. A 40 year old obese woman seemed to be of the view that overweight or obesity could run along tribal lines. She indicated that this was similar to cases where some tribes are predominately light skinned, while other tribes are prone to albinism. She remarked:

Yes, being overweight sometimes comes from one's tribe. Yes it is tribal, it is also tribal like fair and dark people are. If a mother is not overweight or obese, the father will be or even the grandmother. Yes so it runs in tribes. Overweight or obesity is just a normal phenomenon to mankind and it is tribal so you can see someone who's overweight and know their tribe or how the person walks. So it is also tribal just

like albinos. Overweight doesn't just happen spontaneously, it follows tribe.

The women also identified pregnancy and childbearing as endogenous factors contributing to overweight and obesity among women. All the women who pointed to pregnancy and childbirth as a factor were reminiscent of their once “slim” bodies which they never imagined would become “fat”. Using herself as a reference case, one woman in her response stated:

I don't know how come I became like this, I was very slim so I didn't know I will ever become fat. I became fat after given birth to my two children I realise I was putting on weight when my second child was about 6 years.

36 years, obese

Apart from stating that pregnancy and childbearing causes one to eat more than usual, one 28 year old normal weight woman indicated without being specific that certain medications (capsules) given during antenatal care clinics accounted for her weight gain. She recounted how she only began to gain weight after taking the capsule:

You know when you are pregnant they give you some drugs to take. I believe the drugs make you to put on weight. I was taking that capsule and in my 5th to 6th month of pregnancy I realised I was gaining weight, and after birth .I gained even

more weight , my face became fat and I didn't like the way I looked. Even coming out for the one week celebration I was so shy of the way I looked.

Exogenous Factors

As stipulated in the energy balance theory, a high energy intake in the form of diet without an equivalent expenditure of this energy through physical activity results in energy storage in the form of fat leading to weight gain. Diet and physical activity are the key exogenous components of overweight and obesity that also happen to be very modifiable. The respondents identified dietary habits as one means through which people gain weight and become overweight or obese. They described the consumption of large quantities of food as a reason for weight gain. Specifically, eating fatty (eating rice and oil), sugary and junk (indomie noodles) foods frequently and in large quantities was described as eating “roughly” or “eating by heart”.

The timing of food intake was also considered an important factor that could result in overweight or obesity. Consuming certain foods (fufu and banku) described as “heavy” at night before bed time was thought to make the body bloat leading to overweight or obesity. This view was clearly summarised by one respondent:

It's just eating roughly, whatever they get, they just eat. Even at a late hour, you find them eating the kind of food that cannot digest by the time they go to sleep and right after eating, they sleep. Some people eat something like 'fufu' and

'banku', late and right after eating they go to sleep and that can bloat you. That one can even make your stomach stretch. For such fatness, the person doesn't check the diet.

30 years, normal weight

Overweight and obesity was also viewed to be as a result of people engaging in sedentary jobs and lifestyles characterised by little physical activity. This was described by others as the want for “so much comfort” by some people to the extent that even when eating they prefer to “relax” while doing so. To highlight this, one woman stated:

Hmmmm...some people are overweight probably due to their life style. You know with those who actually work in the offices, sometimes the sedentary way of life. They go to work in the morning, sit in a comfortable chair. Even as they are eating, they are sitting, then after that, no walking, nothing, then from the office into a car kind of. So you know not much exercise is being done to probably do away with what is consumed. It's one factor anyway.

25 years, normal weight

Alcohol consumption and the deliberate use of certain drugs or medication to induce weight gain was also mentioned as a factor. Blood tonics or syrups (“appetamin”, “gudapet” etc) which they referred to as “modga duro” in local parlance were noted as the commonly used methods. Some

women mentioned another very potent drug popularly known as “bisacortin” taken for the purposes of weight gain. They described it as just “some two small white pieces” originally meant for pigs. Still on the use of drugs to induce weigh gain, other women described how easy it was to just walk into a drug store and “they will mix the drugs for you.”

In another twist a 25 year old underweight woman shared her experience of how a woman whom she knew personally gained weight within two months of going to see a certain nurse to be given intravenous (IV) drug infusion. It emerged from the discussions that drug induced weight gain was more pervasive in the Northern Region, where it is equated with skin bleaching, and also an escape from negative attributes associated with thinness. One respondent narrated how her friends use drug to induce weight gain, saying:

I have friends who take certain drugs just to put on weight, just like how some people bleach, especially in this part of our world. So when you are skinny or when you are not like overweight, or you don't have enough body then it means either you are sick or you don't eat well or something like that. Some have that mentality, so they try to eat all sorts of foods or take drugs to put on weight. Yeah, there is this syrup they normally take, I have forgotten the name of that drug, I learnt when you take it you sleep and eat continuously. Some of them succeeded in gaining weight.

20 years, normal

Some women intimated that due to the presence of certain vital proteins and nutrients contained in sperms, a woman could potentially gain weight when a man “deposits” (semen) in her during normal sexual intercourse. Another pathway through which the mechanism works is for a woman to directly consume the semen orally during oral sex or through the withdrawal method.

Either way, they believed the woman’s body absorbs the essential proteins and other nutrients contained in the semen that subsequently would induce weight gain. In the following excerpt, one woman describes how her friends engage in frequent sex whenever they intend to gain weight:

I have heard stories that when you have sex and the sperms don't fertilize an egg, the woman's body absorbs certain proteins and other things in the sperm that makes you to put on weight. I know friends who believe it, so when they want to gain weight, they engage in more sex....During oral sex or just during normal sex, after penetration and all that, when the man let's say is about to “come” some of the women tend to swallow the sperms and that one also accounts for weight gain. I have heard from friends that that is what they do to put on weight...

25 years, normal weight

While acknowledging all the possible factors that could lead to weight gain as indicated by other women, some of the women were also of the view

that peace of mind, otherwise referred to in the local parlance as “ahoto” is the main determinant of overweight and obesity among women. Peace of mind in their view is the absence of stress or troubles that gets one thinking too much and unable to sleep at night.

With conviction on the role of peace of mind on weight gained, a 39 year old obese mother with two children described how she became thin because of a myriad of problems she encountered when her husband suddenly left her and her children. She further described how she began to gain weight after her pastor came to her rescue, and how she perceived herself to have lost some weight because her husband started worrying her again. She stated:

People who want to be fat sometimes take medicines to grow fat, others also have peace of mind, “ahoto”, others also say food make people fat, but with me, it's not food, but when you are not stressed and not thinking too much. For instance, I was with my husband when he suddenly left me and the children to go and stay with another woman...This made me very depressed. I became very thin, “me fonankasa”. But my pastor came to my rescue and I had a job and then I could afford food and other petty petty things, I was then able to sleep at night...Even I have slimed down a bit because after the man saw I had become fine he started worrying me again, he wants a comeback and that got me to thinking again. So with me I feel if you don't have worries you get fat.

39 years, obese

Although in this narrative, the respondent seems to have a very strong belief that her weight gain was as a result of her many problems, it is possible that her weight loss and subsequent weight gain were reflective of the period when she lacked of food and the period when food was more available to her. On the contrary, other women associated period of stress to weight gain, probably because they resorted to eating more as a way of relieving their stress.

Generally, overweight and obese women were more inclined toward mentioning endogenous factors as determinants of weight gain, whereas the responses of their normal weight counterparts leaned towards exogenous factors. Irrespective of their inclination, however, the respondents were open to the possibility of other determinants.

Nonetheless, a few of the women were of the view that overweight and obesity results from multiple combinations of both endogenous and exogenous factors acting together. The following narrative indicates how one such respondent admits to the multiple determining factors of overweight and obesity after failing to point out where exactly the problem stems from:

...before my mum gave birth she was cute like me. After giving birth, she became big. I don't think it was what she was eating. My sister hasn't given birth yet, but she is now fat, and we eat the same food, so I don't know where she gets hers from. Genetics? I don't know, but the food you eat, I am not sure. My family some are cute, some are big. No. I don't believe its food. We eat the same food. We eat the same food

and Pris would go to work without taking breakfast and when she comes back from work, she doesn't eat, she takes lunch, she doesn't eat as much as I do, I eat a lot. She sometimes says that when she is stressed up, she gains weight hmm. But I don't think its stress, because when I am stressed, I lose weight, a lot of weight. I only gain weight when I eat late and just a little. I think it is a bit of everything.

25 years, underweight

Views of Women on Possible Consequences of Overweight and Obesity

Overweight and obesity have been recognised to be among the leading contributors to morbidity and mortality globally (WHO, 2015). At the individual level, overweight and obesity can significantly reduce one's physical function and overall quality of life. When asked their views about some of the possible implications of being overweight and obese, respondents provided varied responses. The women cited a number of problems that have been classified in this study as medical and non-medical related consequences.

Medical Related Consequences

Among the general medical related problems cited by the respondents to be associated with overweight and obesity include joint aches and swollen feet, lower back pain, and problems with breathing. They explained that the excess fat in the body weakens one's body thereby exposing it to all kinds of "petty petty illnesses". One overweight woman described the frustration of her sisters saying:

I think when you are too fat it makes you sick, I have one sister who is fat, when she sits for a short time her feet gets swollen and it pains her. I also have another sister who is very fat, for her you can't even see her neck, she's always lying down and complaining of sickness. So I think when you are fat its sickness.

39 years, obese

Overweight and obesity are major risk factors for chronic non-communicable diseases such as hypertension, diabetes, stroke, among others. These conditions were not left out when respondents described some of the direct health implications of overweight and obesity:

Yes, high blood pressure I know that when it's an issue of fat deposit in blood veins. It can lead to stroke, I know they have increased risk of having heart attack or heart related diseases go up, diabetes and all that I know are related to one's weight so I know there are health complications.

29 years, overweight

Beside non-communicable diseases, in some of their descriptions, the respondents also made mention of some reproductive health problems associated with being overweight or obese. This was vividly intimated by one woman who described how her weight had affected her menses and how

overweight and obesity could lead to both primary and secondary infertility. She said:

Yes, there are some who have certain diseases because they are overweight. Yes even me because now that I'm overweight my blood pressure has risen and my menses have become very painful which wasn't the case when I was slim. I never knew what painful menses were, yes, but now my menses are very very painful. There are some too who can't conceive because they are overweight and some who have given birth but can no longer conceive because they are obese.

33 years, obese

Despite alluding to some of the health related implications of overweight and obesity, the respondents from the Northern Region were of the view that such problems could manifest depending on the source of one's overweight and obesity. They mostly agreed that overweight and obesity that occurred as a result of heredity or genetic factors would often have no health consequences.

According to them, such health consequences only occurred if one became overweight either by eating too much or taking drugs to gain weight. Some were of the view that, attempts to lose weight by those who become overweight or obese through heredity or genetic means, could rather trigger such health consequences. The following excerpt illustrates this view:

Yes if it happens that it is the tribal type it doesn't have any health issues but if it's the type we get through medications, it can sometimes be an issue and give you a disease but the normal obesity doesn't have diseases because it is in the tribe even if they try to lose weight it ends up giving them diseases because it is by nature.

40 years, obese

Non-Medical Related Consequences

The study participants also mentioned other concerns associated with overweight and obesity. These were non-medical in nature, but related more to other quality of life concerns including hindering physical performance in terms of the ease and alacrity with which to go about their daily activities. A 34 year old obese woman described fatigue as the only problem she has with her weight. She responded saying:

There are implications for being fat. Myself for instance, I get tired easily when I walk a little or when I do the least thing. I'd have to rest for a while. Apart from that I have no other challenges.

Another non-medical related problem that emerged quite often in the discussions had to do with sexual performance. Referring to this issue, one woman described it as a problem of "bedmatics". The women shared a common view that overweight and obesity do not make women perform very

well in bed with their partners, partly due to restrictions related to sexual positioning and access.

Related to this, some women explained that in extreme cases, overweight or obese women produce a bad smell during sexual intercourse making it difficult for their partners to enjoy the act. Insisting that she had no medical or health related problems associated with her weight status, another described her inability to insert her index finger into her vagina as her only weight related problem. She contended:

Well for me it doesn't give me any disturbances about my health, but I have only one worry, my index finger can't get deep inside my vagina, and it used not to be so. There are some of my friends who say it's a disease and others who say it is due to the overweight.

40 years, obese

Given the sensitive nature of her narrative, probing further to ascertain her reasons for wanting deeper access to her reproductive organ yielded no results.

Psychological problems bordering on low self esteem and self image dissatisfaction was also a shared non-medical concern in the discussions.

Sharing her view, one respondent said:

Psychological issues are also part. You see, it would start having a psychological effect on you. You see yourself in a mirror and you even start falling out of love with yourself

because you see your tummy, 'ei my tummy is big', you see your arms are big, you start losing your self esteem, let me put it that way.

31 years obese

It was commonly observed from the narratives concerning the possible consequences of excessive weight gain that respondents who were overweight or obese had the tendency to relate their own experiences to some of the problems they cited. On the other hand, their normal weight counterparts resorted to making references to the problems encountered by family relations and friends.

Nonetheless, a few women insisted that overweight and obesity posed no problems whatsoever. With emphasis on health related problems, they explained that illnesses do not discriminate according to body weight, and as such certain so-called healthy weight persons had more illnesses than so-called overweight and obese persons. Often using themselves as a case, they insisted that the notion of overweight or obesity being a risk factor for certain diseases is merely a perception. One of such respondents stated:

I don't think it has any health implications. It's all in your mind and how often you want to call things upon yourself. I think there is that perception because maybe people who are overweight get sick but me I don't get sick. There are slim people, yet they are carrying all sorts of sicknesses around.

27 years, obese

Perceptions of Women on Preferable Body Image for Ghanaian Women – “Not too Skinny, but not too Fat”

The consumption of energy dense diets and the lack of commensurable physical activity has been well understood to be the most common interplay of factors that result in overweight or obesity. Equally important are the attitudes and beliefs that influence the consumption of food and determine the level of physical activity of individuals. Related to this are the specific attitudes and beliefs about body image which may influence an individual's efforts and attempts at maintaining a certain body size.

Body image is defined as the way people perceive weight, body size and overall appearance. Such perceptions may influence diet and physical activity choices, which could consequently play an important role in both the development and prevention of overweight or obesity. Based on this reasoning, the study explored the perceptions of women regarding body image preference with the view to providing useful information for consideration in health intervention planning for obesity in Ghana.

Rather than make reference to any specific weight status category, respondents preferred to offer descriptions of the ideal body image for a Ghanaian woman. “Not too skinny, but not too fat” emerged from the interview discussions as the description for the preferred body image or size for the typical Ghanaian woman. This description was considered as the weight status which is “normal”, “medium size” or “in-between”. Their description of the ideal size for the Ghanaian women would be anywhere between the upper limits of healthy weight category and the mid-point of the

overweight category, if one were to classify their descriptions using conventional weight status classification with respect to BMI.

Their descriptions suggested that there was a general preference for a slightly above normal build, but not necessarily an obese image. As such, in many cases women reported often feeling pressured to aspire for such an image, as one underweight respondent narrated:

Ghanaians prefer women with, should I say body? Like, they want well-endowed women. When you are skinny, they tell you you are skinny, you should eat. Just yesterday at work, someone was telling me that I should eat. Three days ago, someone told me the same thing, but I eat, I just don't put on weight. So they prefer you being I don't want to say fat but a little big, yes! not skinny like me. I think that's the ideal, but that's not what I want, I don't prefer that. It's everywhere, that's why I say everywhere I go people ask me 'don't you eat?' It's like they prefer that, they prefer that. They prefer it when you are big.

25 years, underweight

From the interviews, the respondents seemed to be cognisant of western social norms of acceptable body size. As such, some were emphatic in attempting to draw a line between the western ideal and their description of “not too skinny, but not too fat” as ideal for the Ghanaian woman. A respondent emphasised, saying:

The ideal is not as slim as a white person but it should be normal.

27 years, normal weight

Considerations that centred on image and appearance were mentioned in the interviews as the reasons for which “not too skinny, but not too fat” should be the ideal image or size for the Ghanaian woman. As one respondent emphasised in the following excerpt, this image affords a woman enough “flesh” to fit well and look good when she puts on a dress:

If every woman like size 16, which means not too skinny and not too fat will be ideal. At least a woman must get a little flesh. This is because as a woman you need a little bit of flesh to fit well into your dress.

36 years, obese

This description of “not too skinny, but not too fat” goes beyond just having a “bit of flesh” to fit in a dress, but had to do more with having the right kind of flesh, in their right proportions, and in the right parts of the body, in order to have a nice body shape. Using football teams in the English premier league metaphorically, another respondent emphasised this assertion when expressing her discontentment with being slim:

'Eho na ho' (in-between) is okay, not too big and not too slim. Because too slim doesn't even appeal to me, a woman, I

don't know about men, but you see, with 'eho na ho' you get the arsenals, the chelseas and the man-U's at the right places, ...you see a little breast, a little buttocks, hips and then you are okay. Not too slim without, any shape and then not too big without shape.

33 years, overweight

Probing further, she explained that having the arsenals meant having the hips; having the chelseas meant having the buttocks, while having the man-U's referred to having very conspicuous breast. This description supports my earlier assertion that “not too skinny, but not too fat” describes a body weight status that may not be in consonance with the normal or healthy weight status using conventional BMI classifications.

Again, this description highlights the premium placed on having a body shape that gives one's hips, buttocks and breast prominence. In this regard, women who would otherwise be described as overweight or obese using conventional classifications are spared certain negative attributions often associated with their overweight or obese weight status, so long as their hips, buttocks and breast kept them in good shape. Using body contours, she explained this point further saying:

An African woman or Ghanaian woman should have enough flesh, but even that they define it by contours. It doesn't mean it should be out of shape oo. You can be big, but not out of shape. That's where the limit is. Out of shape means you

can't see the difference between upper body and a lower body, like you're straight, just being fat, round and all. You see, some people can be fat, but then you have all the, what they say the 'arsenals' and the 'chelseas' and the manU's at the right places, and then you look nice.

Another respondent shared similar sentiments, but stressed the need for one to maintain their stomach in order to keep in shape:

In-between is ideal, but even if you are fat, there should be some shape included, nice shape. Even for me, sometimes when I see some fat women with shape I admire it a lot because it makes them look good in their dresses. That one is good. But for you to be really disfigured by gaining weight, then you're out of the system. Even if you have weight, for your stomach, you should maintain your stomach.

30 years, normal weight

In the interviews, several respondents also cited practical issues that had to do with general discomfort and reduced mobility as the reason for which they thought “not too skinny, but not too fat” was the ideal image of the Ghanaian woman. To them this preferred ideal affords one the opportunity to go about doing things with relative ease, and not having to worry about other people's comments that are likely to puncture one's self-esteem. The following excerpts attest to that:

The person should have adequate weight, normal. She shouldn't be excessively overweight and not slim either. When the weight is adequate, they are able to do whatever they like but when you are overweight, it becomes a worry, you are always concerned about what your friends say...

25 years, normal weight

It should be the normal weight which is good. One like me sitting here, I don't want to be too fat and I don't want to be slim either. For the normal, the normal makes you feel free and fast in life.

27 years, obese

Although, the respondents overwhelmingly preferred “not too skinny, but not too fat” as ideal for the Ghanaian woman, a few others had contrary views regarding the ideal image for the Ghanaian woman. One respondent maintained that there should not be a one size fits all ideal, but rather every woman should choose her own ideal, so long as that ideal does not lead to any health implications. She stated:

Yes, it's more of so far as they are healthy, and it doesn't have any negative health implication for the person, any size is ok. Because some people are big but are healthy. So I don't think there should be just one size or a range of sizes that all Ghanaian women should fall into but I think once the

person is healthy. So there is no ideal for Ghanaian women. Every woman should choose their own ideal depending on the health implications.

29 years, overweight

Another contrary view focused more on relative benefits a male partner would enjoy depending on the size of a woman. According to one respondent, there should be no question of ideal body image or size. To her, the ideal is determined by extent to which a woman's partner enjoys her company. She contended:

Well, for me, everybody believes in themselves; a woman who is large-bodied and one that is not are clearly different. Yes, for me an ideal weight for a woman should be one that will make the husband enjoy being with her. So being overweight or slim does not mean that your husband will not enjoy you.

33 years, obese

From the interview discussions, it is fair to intimate that women in Ghana seem to be gradually shifting away from the historic preference for larger bodies. However, such shifts are still not close to those socially accepted in the western world.

Discussion

This chapter explored the views of women on important issues concerning overweight and obesity using semi-structured interviews with women from various demographic, social and cultural backgrounds. In addition, the women cut across the various weight status categories based on BMI classifications. As a follow on to initial analyses of quantitative data which sought to examine various socio-demographic and behavioural determinants of overweight or obesity, the results of this study, therefore, provide unique insights and elaborations on issues concerning overweight or obesity.

It was obvious from the analyses that the definitions and meanings given to overweight or obesity by the respondents in the study were based on their subjective interpretations of the phenomenon. Such interpretations focused mainly on relative differences in body size between an overweight and obese person or a deviation from some expected “normal” body size. Appearance, body fat distribution, controllability of body weight and effects of weight on health of the individual were other ways the respondent represented overweight and obesity. The BMI classifications for defining overweight or obesity was rarely used in defining overweight or obesity.

Based on similar observations, Sikorski et al. (2012) intimated that for lack of knowledge about BMI and related classifications, other means as mentioned in the current study are often used as representations of overweight or obesity. As suggested by Ayesu (2013) while studying overweight and obesity among women in Ghana, perhaps BMI was simply not familiar enough for the women to relate overweight or obesity with it. Obviously, interventions

aimed at preventing overweight or obesity would have to factor in ways of ensuring that BMI and other classifications for excessive weight are tailored to the understanding of the ordinary person.

Studies elsewhere have predominantly linked overweight and obesity to the consumption of more food and less exercise or physical exertion (Sikorski et al., 2012). By contrast, respondents in the current study expressed rather differentiated opinions on the possible factors that could result in the development of overweight or obesity. As reported in previous studies (Gonçalves et al., 2012), those who were overweight or obese cited various endogenous factors (genetics, heredity, family history, God's creation, and pregnancy and childbearing related factors) which they believed were beyond the control of the individual.

They were of the view that being predisposed to such endogenous factors meant that one could not escape the possibility of becoming overweight sooner or later. Much as the effects of such predispositions have been recognized, such beliefs could breed low self-efficacy for weight management and control among the women. Self-efficacy is one's belief in how capable they are to handle situations that affect their lives. Individuals with a low sense of self-efficacy doubt their own capabilities and avoid difficult tasks (Bandura, 2004). Based on this, such women become complacent and reluctant to take measures to control their own weight (Meisel & Wardle, 2014). It could as well be the case that the women cited endogenous factors as convenient excuses in order to avoid being blamed for their overweight or obese status (Ayesu, 2013). Hence, efforts should begin with the demystification of beliefs that could discourage weight loss efforts.

On the other hand, the factors cited by the respondents within the normal weight category were mainly exogenous (quantity, quality and timing of food intake, sedentary behaviours, drugs and other medications, peace of mind, among others). This attribution of overweight and obesity to external factors suggests that the normal weight respondents, unlike their overweight or obese counterparts, perceived the problem of overweight or obesity to be under the volitional control of the individual (Puhl & Heuer, 2009). Perceiving overweight or obesity to be highly under the control of the individual could be an indication of high self-efficacy for the prevention of overweight and obesity among such women. This could be a useful motivation for such women to voluntarily engage in behaviours and practices to prevent overweight or obesity.

Similar to previous research on the subject (Puoane, et al., 2010), respondents in the study were sufficiently knowledgeable about the variety of imminent health implications associated with being overweight or obese. During the interviews, participants commonly mentioned physical problems such as joint aches and swollen feet, and difficulties with breathing. Important non-communicable diseases such as hypertension, diabetes and heart diseases were frequently mentioned. Reproductive health problems of fertility and psychological issues of self-esteem and self-confidence were also not left out. Although respondents had a high perceived risk of health problems associated with overweight or obesity, cancers and other dermatological conditions and diseases (Yosipovitch, DeVore, & Dawn, 2007) were never mentioned in the interviews.

Apart from demonstrating their level of awareness of the health related factors linked with overweight or obesity, the respondents were equally emphatic about other implications which may impact on the overall quality of life of the individual. One of such is the negative implications of overweight or obesity on the sexual lives of affected persons and their partners. Perhaps, this is one area that requires further enquiry into. Nonetheless, own experiences and that of relatives and friends served as their main sources of information about obesity related problems, as observed elsewhere (Ayesu, 2013).

In this study, the women verbally acknowledged and recognized the dominant western norms of acceptable body size or weight, but despite their recognition of this, “not too skinny, but not too fat” was perceived as the preferable body size or image for a Ghanaian woman. “Not too skinny, but not too fat” was perceived by the women as slightly above the limits of the normal weight category (according to BMI), but not necessarily obese. This perception of preferable body size seemed to be very much influenced by prevailing socio-cultural norms about body size (Speaks, 2012) to the extent that some women felt pressured by friends and family to aspire for such a body image.

Respondents’ rationalization of “not too skinny, but not too fat” as the preferred body size and weight for the Ghanaian woman was based on: the need to have enough “flesh” to fit well and look good in cloths; body shape that gives prominence to hips, buttocks and breast; increased self-esteem; and relative ease with which to go about activities. These findings support previous research on the influence of socio-cultural perspectives on values of

ideal body size (Blixen, Singh, & Thacker, 2006; Speaks, 2012). Whereas there might be some evidence of shifts in the historic preference for large-bodied women (Duda et al., 2006), the findings indicate that such shifts may not necessarily be towards those of western ideals of acceptable body size.

CHAPTER EIGHT

ATTITUDES AND EXPERIENCES OF WOMEN ABOUT OVERWEIGHT AND OBESITY

Introduction

There is a developing appreciation of the need to understand attitudes associated with overweight and obesity, as well as the everyday experiences of people considered to be overweight or obese. Attitudes and experiences are often surrounded by prevailing social and cultural norms, which consequently influence the lifestyle choices of individuals with implications for the development of overweight or obesity.

With the view to informing public health interventions, this chapter presents results of interviews with Ghanaian women about prevailing attitudes concerning overweight and obesity. The experiences of some women relating to overweight and obesity are also presented. The themes presented in this chapter are as follows: attitudes of women related to overweight and obesity; weight gain and weight loss considerations and experiences of women; and self-weight status representation versus actual BMI categorisation.

Attitudes of Women Related to Overweight and Obesity

Studies have consistently shown that African Americans and sub-Saharan Africans prefer large body sizes than their white counterparts in the western world (Kumayika, 2008; Mavoia et al., 2010). As such, while sub-Saharan Africans are historically known to have a more positive view of being overweight or obese, their Western counterparts view being overweight or

obese with less positive regard. In this regard, attitudes concerning overweight and obese among women was explored in this study.

Contrary to expectations, mainly negative ascriptions were used by the respondents, irrespective of their weight status, to represent attitudes relating to overweight and obesity, particularly among the respondents from Accra. Descriptors such as “lazy” or “dull” were frequently attributed to overweight or obese persons. Using a classical example, one respondent vividly stated a classical case:

They are lazy, they very lazy , they are not able to control their weight, my friend for example can sit from morning till we close from class, she does not get up to do anything
21years, normal weight

Based on the difficulties overweight persons often have in terms of agility and physical movement, some respondents out of compassion attributed “suffering” with being overweight or obese. By sharp contrast, some other respondents expressed anger at the kind of food choices often made by some overweight or obese persons, particularly foods they perceived could possibly contribute to further weight gain. A 30 year old normal weight reported:

Sometimes you see some of them eating things that are high in cholesterol, so for me when I see such persons I get angry that they are killing themselves slowly. It's even worse when I see them drinking alcohol.

In a number of the narratives, the respondents saw overweight or obese women as ridiculous. A 25 year old underweight woman described how sometimes she is torn between laughing or not at a sight of the sheer size of some overweight persons. With laughter she stated:

When I was coming here I saw this woman she was really tough, when you look at her, 'waye obolo ooo', (she was very fat) and we laughed, we looked at her and then we laughed.

You just laugh, sometimes; sometimes too, you can't laugh.

You can't laugh, I don't know you just can't laugh.

25 years, underweight

Without admitting directly to being victims of negative attitudes towards overweight or obese persons, respondents who were themselves overweight or obese shared a common view that overweight and obese women are often times perceived with contempt and looked down upon partly because they are thought to lack self control when it comes to making food choices. They explained further that in some cases people around often make derogatory comments about their weight. This was stated more clearly by one respondent, saying:

People's perception is that these are people who do not have self-control. So when someone is overweight, it seems the person cannot control whatever the person eats so you look down upon...What happens usually is if one gains a little bit

of weight, people around start commenting on it and it's usually a bit derogatory. It doesn't often come as a complement that you are gaining weight or becoming fat. So it's not complementary, it puts some kind of pressure on you.

29 years, overweight

As in the excerpt, there seemed to be some undertones in the views of the overweight or obese respondents on the issue of negative attitudes held against overweight or obesity. Some of their narratives subtly suggested as though such negative attitudes and impressions espoused were contrary to their own initial expectations. Nonetheless, they seemed to have come to terms with the fact that perhaps positive attitudes once held towards overweight or obese women are becoming less desirable in recent times. One respondent described this sort of transitioning of sentiments towards overweight or obese persons in the following excerpt:

First it wasn't a problem because when you are gaining weight that's when people tell you that 'ei woho aye fe o', 'ei woho aye fe o'; that means you are gaining weight and you're becoming beautiful. That was what they would tell you at first, but now, these days, when you are gaining weight people are like 'ei err w'aye kese o, 'w'oye kese o'; meaning you've become fat, it's a negative thing now.

31 years, obese

In spite of the negative constructions associated with overweight and obesity, some respondents, more so those from the Northern Region held some positive attitudes about excessive weight gain. They mostly indicated that “rich people get fat” and that weight gain signifies wealth, good living and eating well. According to the respondents, overweight or obese women are occasionally ridiculed, but in a more jovial and playful sense.

From the discussions it emerged that thinness was rather understood to be associated with ill health or some other negative attribute of a women including having many male partners. This general positive impression about overweight and obesity is succinctly expressed in the following narrative:

Even though some make fun, but I guess it's ok. They don't usually care much about the fat ones, especially in Tamale here. Yeah, they don't usually care, it's rather about the reverse like when you are skinny, they like to talk about you like “this girl is sick or this girl is following more men, that's why she has become skinny” and all that. But then when you are putting on weight, they start to think of you are eating well, like they start to think that now you are doing well, you are putting on weight and you are eating better, or now you have someone taking care of you or good job, that kind of stuff. They just have this positive mind about it because you are now becoming overweight.

20 years, normal weight

Within the broader scheme of things, the narratives from the interviews suggest that the outer extremities of the weight status continuum may be undesirable and often treated with some level of contempt. However, it is unclear what the limits might be for these extreme ends of the continuum.

Weight Gain and Weight Loss Considerations and Experiences of Women

From the transcripts, it emerged that some respondents at one point or the other had considered gaining weight while others considered losing weight. Either way, their motivations and the measures employed to achieve the end of either gaining or losing weight varied.

Weight Gain Considerations and Experiences

Participants with a history of attempted weight gain were mostly those within the normal weight category. Perhaps cognisant of some of the existing (though dwindling) negative social perceptions often associated with thinness, their attempts at gaining weight was often as a result of dissatisfaction with being “skinny”. For some, being “skinny” was associated with ill health, hence, gaining weight was seen as a way of keeping in shape and maintaining good health. To achieve their aim, they commonly resorted to increasing food intake and the use of blood tonics or multivitamins. One respondent recounted:

Hhmm. Oh yes, I have. I looked very skinny and when you are very skinny, you are prone to disease. I noticed I was prone to malaria easily and I was having problems with my menstrual cycle because I couldn't flow well. I was always

below the normal HB (haemoglobin) level so I had to try and put on a bit of weight. That was the main reason. I used blood tonic and blood capsules, you know multivitamins, which made me eat a lot. Yes, it did increase.

26 years, normal weight

Central to deliberate attempts by this group of respondents to weight gain attempts was the influence of external factors within their social support network, particularly friends and family. Through teasing, name-calling and the use of negative attributions such as “skinny” from friends and peers made them feel pressured to do something to put on a little more weight that would measure to the acceptable body size. A respondent described how her friends used to tease her because she was considered slim, and how upon recommendation, she resorted to taking in ice kenkey daily in an effort to gain an acceptable body size. In disappointment, she recounted how her daily portion of ice kenkey did not succeed in helping her gain the expected weight:

That is when I was in secondary school, I was very slim and my friends used to make fun of me that I am slim and all that, so there was this ice kenkey I was told when you take it, it makes you put on weight. So in the morning I would go and buy it just to put on weight, but I still remained slim. I think that's all. That was the only thing I was doing but never gained weight.

20 years, normal weight

Again, the approval or otherwise of friends and peers was the benchmark for determining whether such deliberate attempts to gain weight were successful or not. In a number of cases, the respondent's perception of having successfully attained the desired weight status occurred when their peers and friends stopped complaining about their weight. This was illustrated by one respondent in the following narrative:

Yes, I have tried to gain weight before. When I started my internship, it was stressful so I lost a lot of weight. My friend saw me and told me that, "no you can't come to school looking like this, you are looking too skinny". Yes that is what she told me. So, I had to force to eat, I tried to eat a lot, I took some multivitamins. She didn't complain again so I guess it worked.

25 years, normal weight

The importance of social support network systems cannot be overemphasised in discussing deliberate attempts by some women to gain weight. In other instances, family members were very instrumental in attempts at ensuring that such women attained the minimum acceptable weight limits, especially following sudden weight loss from illness. In the following excerpt, one respondent described how much she appreciated her mother's effort at restoring her weight loss as a result of illness:

Oh yeah, but that was when I fell sick and lost weight. I had severe malaria and was admitted at the hospital. So I was taking blood tonic, to eat and grow big. The doctor prescribed blood tonic for me. Even when it finished, my mother went to buy some more for me. I was just taking the drugs and eating my mother's food. She was so helpful in the sense that whenever food is not ready and I tell her I am hungry, she would get me something to be eating.

27 years, normal weight

Although these women made deliberate efforts to gain weight, they seemed to do so only as a reaction to particular life events that exposed them to pressures concerning body size expectations from significant members within their social support network systems. In addition, despite intentional attempts to gain weight, these women seemed to have a certain level of control over their body weight, considering that most of them remained within the healthy weight category at the time of the interviews.

Weight Loss Considerations and Experiences

By sharp contrast, all the women in the overweight and obese category in their narratives had tried various strategies to lose their weight. The most common weight loss strategies employed by the women related to their dietary practices including fasting (abstaining from food) or skipping meals, reducing the quantity of food intake, consuming fruits and vegetables. Others resorted

to consuming only foods considered to be “light” such as tea, soups and porridge.

Lime or lemon was perceived as a very popular weight loss ingredient among the women who attempted to lose some weight. According to the women drinking lime or lemon mixed with tea and ginger drains the body of fat leading to weight loss. Herbal medications in the form of tea and various ointments and drugs were also among the common measures desperately employed by these women in their bid to lose weight. Although the efficacy of such desperate weight loss tactics could not be ascertained in this study, some of the women claimed to have seen some reduction in their weight. A 50 year old obese woman shared her experience of how she uses the lemon and ginger whenever she gains extra weight:

Oh I used to be fat but then I began taking ginger blended with some lemon. I would put half a tea-spoon into warm water every morning and drink. It helps burn a little fat. So now I've lost some weight. I haven't made the lemon mixture again after the last one; I'll begin again when I realize I'm gaining extra weight.

50 years, obese

Contrary to the apparent successes registered by some women upon using such unconventional weight loss measures, other women expressed their disappointment after trying various measures without success. One of such women narrates in the following excerpt:

Myself, I have tried several ways of losing weight but it doesn't work. I was told to mix lemon juice with Lipton and be drinking but it didn't work, one of my sisters also tried it but it didn't also work. They say it drains the water in the body, the water in the body makes us fat. There were times too that a certain drug was sold to us to smear on our tummies, it didn't work. I have bought several herbal medications and they also didn't work. These ones are not from drugstore; they are sold by the women who sell those herbal medication for potency and stuff like that.

39 years, obese

Of the women interviewed, only one respondent went on a “proper” weight loss programme or therapy in a bid to lose weight. She described where she sought this therapy as a private “wellness centre” where “they have various ways of helping you, or reversing your body to what it is supposed to be, because lifestyle and other things affect how the body is supposed to function”. Apart from going on a diet as part of her weight loss therapy, she was given certain proteins as “food replacements”. She narrated her typical daily therapy saying:

I'm on diet now and I'm on therapy, a lot of therapy. Now I have one complete Ghanaian meal a day. I'm saying Ghanaian because there are other meals, someone will eat fruits and tell you they've eaten. Aha so in the morning, I take what I've been

given, proteins, as food replacements. Oh it's food extract that satisfies the body, yet you get the nutrients in their right proportions, for the purpose of losing weight. So I take that one in the morning with tea, and then in the afternoon I have the meal, which is lunch; in the evening I take the proteins too, and that is it for me. In-between I can only take fruits and vegetables. In also do electrotherapy. Electrotherapy, basically, let me put it this way, there are machines that will vibrate the body, open the pores, to do what an exercise would have done.

31 years, obese

For her, the success of this therapy or programme was a matter of mind conditioning, "just like faith". She intimated:

Hmmm... I think so. It should be, just like faith, just like faith, people go to church expecting that God will do something for them. And so the same attitude, if they put you on diet and those therapies, you have to have faith in it and do whatever they ask you to do. And I think even if you're not seeing the results so much, your mind is telling you that you know there's progress.

In the interviews, physical activity or exercise did not emerge favourably as a weight loss measure by the respondents. They complained

about their inability to exercise due to pain associated with their weight or tiredness during physical exertion. The stress of work and lack of time was another factor as one respondent narrated:

The stress of work doesn't permit exercising. Now there are a lot of gyms around but it's for the elderly and managers who can afford to be going there because they have the luxury of time. I for one have to be at work latest by 7:30am and gets home like 7pm, what time will I have to go to the gym, and not be late for work

27 years, obese

The women who were overweight or obese mentioned a number of reasons for which they considered finding remedies for their excessive weight gain. Two specific issues emerged as their motivating factors for attempting to lose weight at one point or the other. The first motivation was the apparent health related consequences of being overweight or obese. Respondents expressed concerns about not wanting their weight to lead to illnesses. Hence, a physical manifestation of the implications of their excess weight was all it took for them to initiate weight loss strategies. A respondent recounted how she modified her diet as soon as it became apparent her weight was affecting her health:

The last time I intentionally tried losing weight I was feeling sharp pains and numbness in my right side. It can just come

now and if I am holding something the thing will fall. I had been experiencing pains through my chest. When I went for the lab test to be done, my lipid levels were all up there, so I decided to just watch what I was taking. Initially I avoided sugar, I avoided milk, I avoided tin fish and the oils, and I avoided shrimps because shrimps are very high in cholesterol and margarine, eggs, and I ate a lot of vegetables. Lettuce and carrots and tomatoes, cucumber, I minimized my bread intake, bread and pastries.

29 years, overweight

The other major motivation as indicated by the women for attempting to manage their weight was mostly for aesthetic reasons. For some, it was simply to fit into particular dresses, while for others it was the general dissatisfaction with their current physical appearance when compared with an old photo, an earlier point in time or compared with others. This issue of social comparison served as a driving force for initiating weight loss efforts. In the following narrative, a respondent indicates the effect of social comparison on her decision to lose weight:

When I came to the university, I felt I was growing too big, and then I saw one lady that was so fat in the class and I didn't like the way she was looking, so in a moment I just wanted to become slim. I saw some other slim ladies and I wished that I was like them, so I decided to be slim. I don't

know, I just wanted to become slim, then, I wouldn't take my breakfast, I would take my lunch and in the evening, I will take something just little. I was starving myself.

27 years, normal weight

Overall, the interviews suggest that the respondents desired to shed some more weight for various reasons by making all kinds of frantic efforts. Although some claimed to have seen some improvements in their weight loss efforts, they acknowledged the need for continued efforts.

Self-Weight Status Representation versus Actual BMI Categorisation

The respondents were asked to self-assess their body weight status during the interviews; this was followed by the collection of anthropometric measurements of heights and weights at the end of each interview. The anthropometric data collected was used to compute the BMI of each respondent for classification into the various weight categories (underweight; normal weight, overweight; and obese). This allowed for a comparison to be made between the self-perceived weight status of respondents and their actual weight status as measured by BMI in the analyses.

The comparison revealed that self-perceived weight status of all respondents within the normal weight range were concordant with their actual weight status based on BMI classification. However, the same cannot be said for the overweight and obese respondents interviewed in this study. Whereas some of the overweight or obese respondents had their self-perceived weight status being concordant with their actual weight status, others had distorted

perceptions about their weight status when compared with their actual weight status. Two sub-themes therefore emerged from the perceptions of the overweight and obese respondents: denial of body weight status, and acceptance of weight status.

Denial of Overweight or Obese Status

While these women had recorded BMIs which located them within the clinical categories of overweight and obesity, they would not identify themselves as overweight or obese. Rather, they perceived and described their weight status as “normal” or “neither slim nor fat”. In most cases, they justified their perception of having a “normal” weight status by referring to their lifestyle and dietary practices which they deemed healthy enough to promote their “normal” weight status. The following comment attests to that:

Hmmm, I would describe that I am a normal one, (laughter).

I am not so fat. I am normal. Yes. I take care of myself. I take care of my eating well and things, that's what makes me normal. For myself I don't normally eat foods that are oily. I don't usually like foods that are oily.

27 years, obese

In other instances, respondents qualified their self-perceived weight status by reporting their own criteria for determining their weight status including their general background factors as well as their status as mothers and its associated responsibilities. At the core of such claims was reference to

family members (mothers and grandmothers) having similar weight status as themselves, therefore, suggesting a cultural transfer of acceptance of their current weight status as “okay” or “fine”. This was illustrated by one respondent:

Am good, I'm ok, am fine, I don't see myself being overweight. I see myself as having the ideal weight for myself. Ideal by my own standards. Yes, by my height, by my background, by what I do, I'm ok. Yes, my mother is big, not too big, just about me, so my grandmother is just about me, so I am ok. As a mother I am not supposed to be skinny, I must eat good food to produce quality breast milk whenever I give birth. I don't think I am overweight.

29 years, overweight

Yet for some of the overweight and obese women, their distorted self-perceived weight status was influenced by their ability to go about their business without difficulty or hindrance associated with their body weight. One respondent simply put it this way:

For me I feel my weight is normal because I am able to do all that I want to do. I am not lazy, I am very hard working.

36years, obese

Acceptance of Overweight or Obese Status

Contrary to the symptoms of denial and distorted body weight status expressed by some of the women who would best be described as clinically overweight or obese, others in the same category acknowledged that their body weight was above the normal weight status.

Nonetheless, when describing their weight status, some respondents preferred to use terms which they considered to be “more polite” and which do not “make people feel bad about their size”. Perhaps to distance themselves from the somewhat negative connotations associated with excess body weight, terms such as “plus size”, “XL”, or “fat” were used to describe this weight status.

Almost all the women who acknowledged their excess weight status expressed dissatisfaction with it. They blamed it mostly on genetic factors; hence, they expressed the desire to lose weight mostly for health reasons, as one respondent narrated:

Oh for now am even overweight, yeah I am. In fact, I think I am obese, I am yeah. Hhmm, for me, I think it's the genes. You understand? So for me, that is what I think. Hhmm, because come to talk of eating habits, I'm just cautious of all these things and probably I need to do a little more exercise because I don't want to be so fat, because I don't want to fall sick due to my weight. I am not content with my current weight, so am seriously working on it seriously.

47 years, obese

A few others blamed it on childbirth, however, they placed their weight status within a much broader context of traditional social expectation and interpretations of body weight as symbolic of motherhood and wellbeing. A mother of two children stated:

I think I have become this fat because I gave birth. But it is better to get fat after you give birth because as a woman if you give birth and you remain slim it is seen as your husband does not take good care of you, you don't get proper and enough food to eat.

39 years, obese

Discussion

The chapter sought to contribute to the growing interest in research on attitudes related to the problem of overweight and obesity. It also provided insights into the experiences of overweight and obese women in Ghana. The findings offer important information on prevailing attitudes surrounding overweight and obesity in women, as well as the experiences of women concerning their body weight.

The evidence suggest that attitudes relating to overweight or obesity were rather mixed, and seemed to be influenced by the social context, as well as the weight status of the respondents. As reported in prior studies (Puhl & Heuer, 2009; Sikorski et al., 2012), some negative attitudes towards overweight or obese persons emerged, particularly from respondents drawn from Accra. Negative attributes such as “lazy”, “dull”, and “suffering” were commonly used to describe overweight or obese women. On the contrary,

positive attitudes towards overweight or obese women were largely held by respondents who were drawn from Tamale. As a matter of fact, thinness was rather viewed in negative light from the interviews in Tamale.

These finding could be accounted for by relative social constructions of body weight perceptions which reflect values, beliefs and expectations associated with the different study areas. Accra as the capital city is subject to various forms of western influences such as ideals that uphold thinness as the acceptable body size for women. The negative perceptions associated with overweight or obesity could simply be a reflection of prevailing city values associated with body weight.

Likewise, Tamale is socioeconomically disadvantaged compared with Accra. Hence, the positive attitudes toward overweight or obese women in Tamale could be symptomatic of communities in which large bodied women are deemed wealthier, healthier and more attractive (Puoane et al., 2010). Nonetheless, this relativity in attitudes towards overweight or obesity could be a reflection of shifts in body size preferences as suggested by Duda et al., (2006).

Further, the expected association between perceptions of individual controllability of weight status and negative attitudes was clearly exhibited by respondents within the normal weight category (Sikroski et al., 2012). Normal weight respondents were more inclined towards ascribing negative attribution to overweight or obese persons, which could be an indication of possible stigmatization. Contrary to Ayesu (2013), but consistent with Simkhada, Poobalan, Simkhada, Amalraj, and Aucott (2011), overweight or obese respondents were mostly reluctant to give negative attributions to themselves

and to overweight or obese persons in general. Hence, there were no indications of existing self-stigma among overweight or obese respondents. Self-stigmatisation is linked with the internalisation of negative attributes by stigmatised individuals, regarding them as fitting (Corrigan & Wassel, 2008).

It was realised from the data that respondents had histories and experiences of attempting to alter their body weight towards one direction or the other. Their motivations for doing so varied between those within the normal weight category and those overweight or obese. Prior research (Renzaho, 2004) has reported instances in certain parts of sub-Saharan Africa where pejorative descriptions depicting poverty, despair and deprivation were often given to women who were considered to be thin. To escape similar pejorative descriptions (“skinny” or “prone to illnesses” in the case of this study), normal weight respondents reported previous attempts to increase their body weight, with various degrees of successes.

By mainly resorting to increased caloric intake from consuming larger portions and the use of multivitamins or blood tonic, participants demonstrated some understanding of the basic underlying principles of weight management. Being of normal weight at the time of the interviews and indicating satisfaction with their current weight status, suggests that somehow they experienced the desired results. Nonetheless, such deliberate practices with the view of increasing weight should not be encouraged in an era when overweight or obesity is a global health problem. Here again, the role of peers and family members as important referent individuals of approval or disapproval (Montano & Kasprzyk, 2008) of such deliberate practices to that effect cannot be overemphasized. This finding is congruent with observation

from other studies (Befort et al., 2008; Hesse-Biber, Howling, Leavy, & Lovejoy, 2004). Thus, it appears that the sort of feedbacks (either positive or negative) one gets from friends or family are important in eliciting attitudes and behaviours that could either promote or prevent overweight or obesity.

On the contrary, some of the overweight or obese respondents had tried to lose weight by employing various strategies. In addition to sporadic dietary restrictions, the use of lime or lemon, ginger and tea were common techniques employed. Similar findings have been reported in previous studies (Ayesu, 2013; Mvo, Dick, & Steyn, 1999). That notwithstanding, resorting to such unconventional techniques (such as the use of lime, tea and ginger) without much attention to diet and physical activity is perhaps an indication of poor understanding of the physiological basis of weight reduction. Hence, limited successes were reported with such weight loss efforts. Failed attempts at losing weight due to lack of knowhow could dent self-efficacy for weight management, thereby discouraging future weight loss attempts altogether.

Due to pressure from their weight, overweight or obese persons often feel pains or aches and easily get fatigued making them unable to engage in physical activity or exercise as a weight loss technique (Nantel, Mathieu, & Prince, 2011; Schmalz, 2010). Similar experiences were attested to by the respondents in the study, and this explains why physical activity or exercise was hardly mentioned in the interviews as a measure employed in their weight loss attempts. Thus, feeling of pain, and fatigue counted as perceived barriers to weight loss attempts by the overweight or obese respondents in the study. These findings about the overweight or obese respondents suggest the possible occurrence of a vicious cycle which commences with a low sense of self-

efficacy to control weight and lack of knowhow, leading to failed attempts to lose weight, which further lowers perceived self-efficacy to lose weight.

It emerged that health was a major motivation for such weight loss attempts. According to Champion and Skinner (2008), people tend to be motivated to adopt healthy behaviours when they believe such action will decrease their chances of developing a disease. In that regard, a number of the respondents in the current study pointed to the direct or anticipated physical threat to their health as enough reason for them to want to lose weight.

This finding is consistent with Chang, Nitzke, Guilford, Adair, and Hazard (2008) who observed in their study that concern for health urged one overweight respondent to quickly modify her dietary regimen when she started experiencing sharp pain in her chest and numbness on one side of her body. Similarly, Befort et al., (2008) found that participants in their study shared similar sentiments about health as important motivation for wanting to lose weight.

For those who did not perceive their weight to be interfering with their day to day activities, and those with no immediate physical threat to their health as a result of their weight, their motivations for attempting weight loss were different. For such women, their dissatisfaction with their physical appearance compared with others or an old photo, or not being able to fit into particular clothes were the factors that pushed them to want to lose weight. These findings corroborate those found by Puoane et al., (2010) and Chang et al., (2008) in which it was noted that dissatisfaction with body image is linked with the desire to look good. The mismatch between the motivations to lose weight, and the strategies employed to attain the desired weight loss is

highlighted in this study. Therefore, public health efforts should emphasise the right strategies for weight management.

Some of the overweight or obese respondents correctly perceived their current weight status compared with their actual BMI categories. These respondents accepted that they had excess body weight. Although they conveniently blamed it on factors they perceived to be beyond their control, they expressed the desire and acknowledged the need to put in measures to reduce their weight. They were, however, not in favour of the terms “overweight” or “obese” which to them carried a negative connotation and impacted on their self-esteem. Rather, they suggested that terms such as “plus size” or “XL” were preferable and “more polite”. Speaks (2012) noted similar observations when studying African American women, and indicated that such flattering terms chosen by the participants had a huge impact on their positive self-worth or self-definition.

By sharp contrast, it emerged that some other overweight or obese respondents had distorted perceptions about their current weight status compared with the actual BMI categories. They perceived themselves to be “normal” or “neither slim nor fat”. A number of previous studies have found such underestimations of body weight or size to be common among women (Befort et al, 2008; Moore et al, 2010; Puoane et al, 2005). As Moore et al. (2010) suggested, such misrepresentations of body weight could mean that: the women are knowledgeable but ignorant about their own weight category; they are uninformed about their own weight category; or they are not knowledgeable about how overweight or obesity is categorized.

CHAPTER NINE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

Studies on overweight and obesity among women in their reproductive ages (15-49) in Ghana often generalize among all women, using parity as a covariate. Given that women who initiate childbearing compared with those who do not are more exposed to the risk of developing overweight or obesity due to retention of gestational weight gain, it was premised in this study that factors associated with overweight or obesity operate in fundamentally different ways among childbearing and non-childbearing women.

Based on this, the present study specifically sought to compare between childbearing and non-childbearing women; the socio-demographic, and behavioural factors associated with overweight or obesity. Further, the perceptions of women about overweight and obesity were explored in order to gain in-depth insight into important issues concerning the phenomenon. This required the application of the pragmatic perspective, which is based on practical reasonability, using diverse approaches, giving primacy to the research problem, and valuing both objective and subjective knowledge. This approach allowed for the understanding of the multi-factorial nature of the problem of overweight or obesity.

Consequently, the sequential explanatory mixed methods research design was employed to guide the legitimate application of both quantitative and qualitative techniques in studying overweight or obesity from a broader perspective. Hence, both quantitative and qualitative data sources were sought

irrespective of whether a woman had initiated the process of childbearing or not. However, childbearing women (27% in 2003; 34% in 2008) were disproportionately affected by overweight or obesity compared with non-childbearing women (2003, 15% in 2003; 18% in 2008).

The results on the socio-demographic factors showed some consistencies and variations in terms of the significant predictors of overweight or obesity across both women groups (childbearing and non-childbearing), and both surveys (2003 and 2008). Among both women groups and across both surveys, an inverted U-shaped relationship was found between age and overweight or obesity, with significant higher probabilities among women in the 35-44 age group. Similarly, overweight or obesity was found to significantly increase in the same direction with wealth status across both women groups and survey years, particularly for those in the richer and richest wealth quintiles.

Marital status was significantly associated with overweight or obesity across both women groups in 2003, but not 2008. The results revealed those who were currently married/cohabiting and those previously married had significant higher probabilities of being overweight or obese in 2003, irrespective of which women group (childbearing and non-childbearing) to which they belonged. The occupational status predictors of overweight or obesity were rather mixed. While childbearing women in agricultural occupations were significantly less likely to be overweight or obese in 2003, non-childbearing women in professional/managerial occupations were significantly more likely to be overweight or obese in 2008.

The results indicated a significant positive association between mass media exposure and overweight or obesity. However, there were variations between childbearing and non-childbearing women, and among the three mass media channels considered in the analyses. In 2003, overweight or obesity was found to be significantly more likely among childbearing and non-childbearing women with high exposure to print media and television respectively. In 2008, however, only childbearing women with high exposure to television were significantly more likely to be overweight or obese.

Analyses of the data showed that for non-childbearing women, religious affiliation (Catholic, Muslim and Traditionalist) and ethnicity (Ga/Adangbe) were significant positive predictors of overweight or obesity; whereas childbearing women in urban settings were significantly more likely to become overweight or obese. These results were significant only from the analyses of the 2008 data, but not so in the cases of the 2003 data.

Some spatial variations in the predictors of overweight or obesity were also found. Notably, only the Northern Region had significantly lower probabilities of overweight or obesity among both women groups and across both surveys. The significant lower odds of overweight or obesity were also found among childbearing women in the Upper West, Upper East, Brong Ahafo and Ashanti regions. Non-childbearing women in the Central Region were more likely to be overweight or obese, but only in 2003.

Behavioural factors associated with overweight or obesity based on only the 2008 data also revealed some consistencies and variations between childbearing and non-childbearing women. Alcohol consumption was found to be more associated with being overweight or obese for both childbearing and

obesity such as the effect of the phenomenon on the sexual lives of affected persons.

Both negative and positive attitudes were held by the women about overweight or obesity. Attributes such as “lazy”, “dull”, and “suffering” were commonly used to describe overweight or obese women, particularly among respondents recruited from Accra and those in the normal weight category. Respondents from Tamale used mainly positive attributes when referring to overweight or obese women. Related to the attitudes associated with overweight or obesity, most of the overweight or obese women had histories and experiences of weight loss attempts, while those in the normal weight category had previously tried to increase their body weight.

Either way, the motivations varied between those overweight or obese and those in the normal weight categories. The overweight or obese women pointed to health and dissatisfaction with their physical appearance or their inability to fit well in clothes as enough reason for previous attempts to lose weight; while the normal weight women were motivated by the need to avoid being described by their friends and family as “skinny” or “prone to illnesses”. Increased food intake and the use of multivitamins or blood tonic were the main measures employed by those who had attempted gaining weight. On the other hand, those who had attempted losing weight resorted to the use of dietary restrictions, lime or lemon, ginger, tea and food supplements or replacements.

Some of the women correctly perceived and acknowledged their overweight or obese weight status, but preferred to be described using terms such as “plus size” or “XL” instead of “overweight” or “obese”. It was

convenient for those who accepted their overweight or obese status to blame it on factors they perceived to be beyond their control. Despite this, they expressed the desire to put in efforts to reduce their weight. Some others had distorted perceptions about their overweight or obese status, as they perceived themselves to be “normal” or “neither slim nor fat”.

Despite recognizing the acceptable body size or weight status, the women perceived “not too skinny, but not too fat” as the preferable body size or image for a Ghanaian woman. This perception of preferable body size, which would be slightly above the upper limits of the normal weight category (according to BMI), but not necessarily obese seemed to be influenced more by socio-cultural traditions of body size norms. Some women felt pressured to aspire for such a body image, with their rationalisations based on: the need to have enough “flesh” to fit well and look good in clothes; body shape that gives prominence to hips, buttocks and breast; increased self-esteem; and relative ease with which to go about activities.

Evaluation of Conceptual Framework

The PRECEDE-PROCEED model, developed by Green and Krueger (2005), provided the overarching structure for this study on overweight and obesity among women in Ghana. Due to the greater flexibility the model offers for studying health problems in a variety of contexts, phases 2 and 3 of the PRECEDE component of the model were adapted to suite the scope of the study. These assessment components of the PRECEDE-PROCEED model provided the structure for applying constructs of behavioural and socio-

ecological theories in tandem with previous research in the selection of factors for assessing the problem of overweight or obesity among women in Ghana.

The epidemiological, behavioural and environmental assessment component provided basis for the selection and assessment of behavioural risk factors (contraceptive method use, days of physical activity per week, alcohol consumption per week, days of fruits, and vegetable intake per week, cooking oil use and glasses of water intake per week) of overweight or obesity among women in Ghana. These behavioural factors were compared between childbearing and non-childbearing women revealing similarities and differences between the two women groups.

Alcohol consumption was identified as a risk factor common to both women groups; whereas the use of modern contraception, the use of other vegetable oils for cooking and the consumption of eight or more glasses of water per day were identified as risk factors specific to childbearing women. This component of the model also guided the question routes used in the in-depth interviews which helped elicit information concerning such risk behaviours. In the interviews, the women revealed their knowledge of some of these behaviours, as well as their experiences in trying to modify some of these behaviours, particularly those relating to diet.

Again, the epidemiological, behavioural and environmental assessment component of the framework guided the selection and assessment of residence setting (rural/urban) and region (the 10 administrative regions of Ghana) as environmental factors that could influence overweight or obesity similarly or differently between childbearing and non-childbearing women. It emerged that, living in the Northern Region of Ghana was protective of overweight or

obesity among women in general, whereas the Upper West, Upper East, Brong Ahafo or Ashanti regions, and urban settings of Ghana were specifically protective for childbearing women. Subsequently, Greater Accra and Northern regions were selected as locations for qualitative studies upon environmental assessments were conducted, based on the conceptual framework using quantitative data.

The educational and ecological assessments component of the conceptual framework allowed for the conceptualising and organisation of background factors of women into predisposing factors (age, highest education, marital status, occupational status, wealth status and parity); reinforcing factors (ethnicity and religion); and enabling factors (print, radio and television exposure). Age and wealth status emerged as predisposing factors associated with overweight or obesity among both childbearing and non-childbearing women, while being in a professional/managerial occupation was identified as a predisposing factor associated with overweight or obesity for only non-childbearing women. In relation to predisposing factors, the framework guided the design of interview questions which subjectively assessed women's: knowledge about overweight and obesity, possible causes, and possible consequences; and weight gain and weight loss considerations and experiences.

Enabling and reinforcing factors were found to differ between childbearing and non-childbearing women in terms of their effects on overweight or obesity. High exposure to television was identified as an enabling factor with a positive effect on overweight or obesity, but only for childbearing women. The interviews also revealed that easy access to blood

tonics and multivitamins could serve as enabling factors of weight gain attempts for normal weight women. Furthermore, the interviews showed that lack of information or knowledge on effective weight loss strategies, and pain or fatigue due to excess weight could serve as negative enabling factors for weight loss attempts for overweight or obese women.

Affinity to Catholic, Muslim or Traditional religion, and Ga/Adangbe ethnicity were identified as reinforcing factors which positively affect overweight or obesity among non-childbearing women only. Given that reinforcing factors provide continuing reward or incentives for certain behaviours or outcomes (Green & Krueger, 2005), such factors were explored in the in-depth interviews with women. Results from the interviews suggested that feedback provided by friends and family members (social support), served as motivations for weight gain and weight loss attempts by normal weight and overweight or obese women, respectively. Likewise, direct impact of excess body weight on the health or day to day practical life considerations were identified as possible reinforcing factors for overweight or obese women's intentions and attempts at managing their weight.

In terms of the analyses of quantitative data, the conceptual framework provided a useful structure for running sequences of logistic regression models according to the objectives of the study. In particular, the framework provided enough flexibility to estimate the independent effects of both socio-demographic factors, and behavioural factors on overweight or obesity using logistic regression models.

In all, the conceptual framework provided a useful support for studying overweight or obesity among women in Ghana, by the application of

constructs from theories and literature synergistically using both quantitative and qualitative research methods. The conceptual framework has shown that there are some similarities and differences between childbearing and non-childbearing women, in terms of predisposing, enabling, reinforcing, environmental, and behavioural factors associated with overweight or obesity. Despite being an adaptation of the original PRECEDE-PROCEED model, the conceptual framework offered some level of the robustness and ecological approach to this study of overweight or obesity among women in the Ghanaian context.

Conclusions

Overweight or obesity has increased in prevalence between 2003 and 2008 among Ghanaian women in their reproductive ages (15-49 years), more so among those who have initiated the childbearing process. Some significant socio-demographic factors similarly predict overweight or obesity among both childbearing and non-childbearing women; whereas others disparately predict overweight obesity between the two women groups. The significant behavioural predictors of overweight or obesity disproportionately affect childbearing women in Ghana, compared with non-childbearing women.

Should this pattern continue, Ghana is likely to experience increases in health challenges from obesity related non-communicable morbidities (such as diabetes, hypertension, cancers, heart disease), as well as adverse maternal (gestational diabetes, hypertension in pregnancy, pre-term delivery) and infant outcomes (congenital fetal anomalies, stillbirth). Moreover, women going into childbearing while overweight or obese may have long-term implications for

increased childhood obesity in Ghana, thereby, multiplying the severity of the problem of overweight or obesity in the future.

Women in the interviews seem not to be conversant with the BMI and its classifications for defining weight status, compelling them to resort to their own subjective classifications of body weight in excess of expectation. Much as the women interviewed were knowledgeable about some important causal factors and imminent implication of overweight or obesity, such knowledge is yet to be translated into measures needed to prevent and manage overweight or obesity.

There also appears to be some level of weight status stereotyping with negative attitudes commonly held towards women in the lower and upper extremities of the body weight continuum, depending on the particular locality in which one resides, and weight status of the perpetrator of such stereotypical attitudes.

In addition, some overweight or obese women have the tendency of underestimating and living in denial of their weight status, while those who are conscious of their weight status tend to be sensitive to being referred to as overweight or obese.

Finally, social and cultural forces play a key role in determining how women construct acceptable body weight or size, thereby, translating them into the kind of choices they make about the weight status.

Recommendations

1. The findings of the study underscore the need for the Ministry of Health to massively scale-up their campaign efforts concerning healthy lifestyles for

the prevention and management of overweight or obesity, particularly among women. For the purposes of primary prevention, it would be more useful to target women early in their reproductive ages before they enter into childbearing. The education-entertainment concept as used in the case of HIV/AIDS, family planning and malaria prevention could be useful and appealing in that regard.

2. Equally, it would serve well for the Ghana Health Service to include weight management counselling as part of ante-natal care services for pregnant women. It has been proven that women usually have increased motivation to maximise their own health and that of their unborn child during pregnancy. Hence, the pregnancy period may represent an ideal opportunity to target lifestyle changes among women in order to minimise gestational weight retention, and the subsequent development of overweight or obesity among the children thereof in later years.
3. Additionally, findings of the study highlight the various population subgroups (for example women above 34 years, those in the high wealth quintiles, those in professional/managerial occupations among others) that are at risk, and could be targeted for intervention purposes. Hence, programme planners and managers at both the health promotion, and the non-communicable disease units of the Ministry of Health should take into consideration such population sub-groups when planning public health interventions to prevent obesity and its related morbidities.
4. The success of intervention measures aimed at preventing overweight or obesity would largely depend on the quality of health promotion messages disseminated to the public. Based on the evidence gathered through the in-

depth interviews, the Ministry of Health could revamp the Regenerative Health and Nutrition programme with messages tailored towards: improving knowledge about BMI for classifying health and unhealthy body weight; dissuading people from the use of ineffective weight management measures (e.g lime, ginger, tea), while emphasising healthy lifestyles and physical activity; reorienting people at the individual, family, community, and national towards accepting healthy BMI as the ideal body size; and ensuring that the potential for weight stigmatisation and discrimination is at least minimised.

5. The findings have established the importance of television in influencing overweight or obesity among women in Ghana, thereby, underscoring the relevance of television as a potential channel through which intervention programme messages could be routed. The Ministry of Health could collaborate with the Ghana Media Commission and the television broadcasters to design television programmes and shows based on the education-entertainment concept to promote overweight or obesity preventive lifestyle practices.
6. Likewise, the churches, mosques and shrines could serve as promising agencies through which the healthy weight campaign for overweight or obesity prevention can be routed. As was done in the case of HIV and AIDS campaigns, there is the need for Ministry of Health to bring board religious leaders in interventions efforts that aim to prevent overweight and obesity, as well as associated morbidities.
7. Overall, the sector-wide (SWAp) approach, where a number of ministries, departments and agencies are fused to engage in policy interventions

would be the most effective approach to dealing with the problem of overweight and obesity in Ghana. For instance, the Ministry of Health and Ghana Health Service could plan health promotion programmes or policies, whereas the Ministry of Education and the Ghana Media Commission could serve as implementers of such programmes or policies in schools and media outlets.

Strengths and Limitations of the Study

While the strengths of the study include: the use of two large nationally representative data sets for comparison, the stratification of women, and the complementary use of quantitative data with qualitative data in a mixed method design, there are a number of limitations that need to be acknowledged.

First, merging the overweight and obese categories based on BMI classifications due to data limitations made it impossible for the independent evaluation of women in each category in order to ascertain possible differences. Nonetheless, collapsing the overweight and obese categories is recognised and has widely been used locally and internationally for assessing unhealthy weight.

Second, there are limitations with respect to the use of primary qualitative data to elaborate and provide explanation for some of the associations found from the quantitative analyses. This stems from the fact that the quantitative data was collected from a group of women at a much earlier point in time, which is entirely different from the group of women the

primary qualitative data was collected on. Despite this, the mix of both sources of data provided some level of synergy for the study.

Finally, the transferability of results based on the qualitative data is limited as far as generalising for all women in Ghana is concerned. That notwithstanding, some useful insights about the perceptions and experiences of women concerning overweight and obesity have been highlighted.

Contributions to Knowledge

This study is about the first to have explored the determinants of overweight or obesity in Ghana with particular emphasis on the fundamental differences inherent between two women groups (childbearing and non-childbearing women) in their reproductive ages (15-49). The study therefore, adds to the ever widening discourse on overweight and obesity among women. More specifically, the study revealed significant predictive factors associated with overweight or obesity which have shared pathways between childbearing and non-childbearing women; as well as predictive factors that operate in fundamentally different pathways between the two women groups.

Existing studies on overweight or obesity in Ghana had previously speculated on the possible explanations to some of the relationships they found between various factors and overweight or obesity among women. By mixing quantitative and qualitative methods, the study contributed knowledge by providing empirical qualitative elaborations for explaining some relationships which hitherto were largely speculative.

Recommendations for Further Research

The secondary cross-sectional data sourced from GDHS was useful in providing a means to evaluate the association of various factors with overweight or obesity among women. This also provided an opportunity to compare changes over a five year interval (2003 to 2008). Nonetheless, longitudinal studies would provide the best means to directly observe population cohorts of women over a prolonged period for assessing the pathways through which the various factors operate. This is one approach worth exploring in future research on overweight or obesity in Ghana, provided there are available resources.

This study explored the problem of overweight or obesity using anthropometric data on weights and heights of women from nationally representative data (GDHS). Similar anthropometric data were not collected on men in the surveys. Given the increasing nature of this global phenomenon, there is equally the need for future studies to collect similar nationally representative data on men for comprehensive analyses and comparison.

In the interviews, some women were very emphatic about the effects of overweight or obesity on the sexual lives of both women and their partners. Further studies are required to provide more detailed insights into the impacts of overweight or obesity on the sexual health of women in Ghana.

- Albright, C. L., Pruitt, L., Castro, C., Gonzalez, A., Woo, S., & King, A. C. (2005). Modifying physical activity in a multiethnic sample of low-income women: one-year results from the IMPACT (Increasing Motivation for Physical Activity) project. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, 30(3), 191-200.
- Alfonsi, G., Conway, M., & Pushkar, D. (2011). The lower subjective social status of neurotic individuals: Multiple pathways through occupational prestige, income, and illness. *Journal of Personality*, 79(3), 619-642.
- Allan, H. T. (2008). Ethnicity, race and health in a multicultural environment: foundations for better epidemiology, public health and health care. *Bulletin of the World Health Organization* (Vol. 86). retrieved from <http://doi.org/10.2471/BLT.07.047589> on 26th November, 2014.
- Almiron-Roig, E., Chen, Y., & Drewnowski, A. (2003). Liquid calories and the failure of satiety: How good is the evidence? *Obesity Reviews*, 4(4), 201-212.
- Al-Sendi, A. M., Shetty, P., & Musaiger, A. O. (2004). Body weight perception among Bahraini adolescents. *Child: Care, Health and Development*, 30(4), 369-376.
- Alves, C., Alves, L., & Lunet, N. (2009). Prevalence and determinants of cervical cytology use in an urban sample of Portuguese women. *European Journal of Cancer Prevention*, 18(6), 482-488.
- Amo-Adjei, J., & Kumi-Kyereme, A. (2015). Fruit and vegetable consumption by ecological zone and socioeconomic status in Ghana. *Journal of Biosocial Science*, 47(05), 613-631.

- Amoah, A. G. B. (2003a). Hypertension in Ghana: A cross-sectional community prevalence study in Greater Accra. *Ethnicity and Disease*, 13(3), 310-315.
- Amoah, A. G. B. (2003b). Socio-demographic variations in obesity among Ghanaian adults. *Public Health Nutrition*, 6(8), 751-757.
- Annesi, J. J., & Whitaker, A. C. (2010). Psychological factors associated with weight loss in obese and severely obese women in a behavioral physical activity intervention. *Health Education & Behavior: The Official Publication of the Society for Public Health Education*, 37(4), 593-606.
- Arif, A. A., & Rohrer, J. E. (2005). Patterns of alcohol drinking and its association with obesity: data from the Third National Health and Nutrition Examination Survey, 1988-1994. *BioMed Central Public Health*, 5, 126.
- Aubin, H.-J., Farley, A., Lycett, D., Lahmek, P., & Aveyard, P. (2012). Weight gain in smokers after quitting cigarettes: Meta-analysis. *British Medical Journal*, 345(2), e4439-e4445.
- Averett, S., & Korenman, S. (1999). Black-white differences in social and economic consequences of obesity. *International Journal of Obesity and Related Metabolic Disorders: Journal of the International Association for the Study of Obesity*, 23(2), 166-173.
- Averett, S. L., Sikora, A., & Argys, L. M. (2008). For better or worse: Relationship status and body mass index. *Economics & Human Biology*, 6(3), 330-349.
- Awuah, R. B., Anarfi, J. K., Agyemang, C., Ogedegbe, G., & Aikins, A. de-G. (2014). Prevalence, awareness, treatment and control of hypertension in

- urban poor communities in Accra, Ghana. *Journal of Hypertension*, 32(6), 1203-1210.
- Ayanian, J. Z., Block, J. P., He, Y., Zaslavsky, A. M., & Ding, L. (2009). Psychosocial stress and change in weight among US adults. *American Journal of Epidemiology*, 170(2), 181-192.
- Ayers, J. W., Hofstetter, C. R., Irvin, V. L., Song, Y., Park, H. R., Paik, H. Y., & Hovell, M. F. (2010). Can religion help prevent obesity? Religious messages and the prevalence of being overweight or obese among Korean women in California. *Journal for the Scientific Study of Religion*, 49(3), 536-549.
- Ayesu, E. (2013). *Prevalence, perception and sociodemographic determinants of overweight and obesity among Ghanaian women* (unpublished masters thesis). University of Ghana, Accra.
- Babones, S. (2010). Income, education, and class gradients in health in global perspective. *Health Sociology Review*, 19(1), 130-143.
- Ball, K., & Crawford, D. (2005). Socio-economic status and weight change in adults: a review. *Social Science & Medicine*, 60(9), 1987-2010.
- Baltrus, P. T., Everson-rose, S. A., Lynch, J. W., Raghunathan, T. E., & Kaplan, G. A. (2007). Socio-economic position in childhood and adulthood and weight gain over 34 years: The Alameda county study. *Annals of Epidemiology*, 17(8), 608-614.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26.

- Benkeser, R. M., Biritwum, R., & Hill, A. G. (2012). Prevalence of overweight and obesity and perception of healthy and desirable body size in urban, Ghanaian women. *Ghana Medical Journal*, 46(2), 66-75.
- Bernard, H. (2012). *Social research methods: Qualitative and quantitative approaches*. Thousand Oaks CA: Sage.
- Berrios, X., Koponen, T., Huiguang, T., Khaltaev, N., Puska, P., & Nissinen, A. (1997). Distribution and prevalence of major risk factors of noncommunicable diseases in selected countries: The WHO Inter-Health Programme. *Bulletin of the World Health Organization*, 75(2), 99-108.
- Biritwum, R., Gyapong, J., & Mensah, G. (2005). The epidemiology of obesity in Ghana. *Ghana Medical Journal*, 39(3), 82-85.
- Bittner F. H., Diamond, J., Myers, R., & Gill, J. M. (2008). Perception, intention, and action in adolescent obesity. *Journal of the American Board of Family Medicine : JABFM*, 21(6), 555-561.
- Bleich, S., Cutler, D., Murray, C., & Adams, A. (2007). *Why is the developed world obese?* (No. w12954). Cambridge, MA: National Bureau of Economic Research.
- Blixen, C. E., Singh, A., & Thacker, H. (2006). Values and beliefs about obesity and weight reduction among African American and Caucasian women. *Journal of Transcultural Nursing*, 17(3), 290-297.
- Blokstra, a, Burns, C. M., & Seidell, J. C. (1999). Perception of weight status and dieting behaviour in Dutch men and women. *International Journal of Obesity and Related Metabolic Disorders*, 23(1), 7-17.
- Bloom, D. E., Cafiero, E. T., Jané-Llopis, E., Abrahams-Gessel, S., Bloom, L. R., & Fathima, S. (2011). *The global economic burden of*

- noncommunicable diseases*. Geneva, Switzerland: World Economic Forum.
- Borders, T. F., Rohrer, J. E., & Cardarelli, K. M. (2006). Gender-specific disparities in obesity. *Journal of Community Health, 31*(1), 57-68.
- Bosu, W. K. (2012). A comprehensive review of the policy and programmatic response to chronic non-communicable disease in Ghana. *Ghana Medical Journal, 46*(Suppl. 2), 69-78.
- Breslow, R. A., & Smothers, B. A. (2005). Drinking patterns and body mass index in never smokers: National Health Interview Survey, 1997-2001. *American Journal of Epidemiology, 161*(4), 368-376.
- Brett, J. A., Heimendinger, J., Boender, C., Morin, C., & Marshall, J. A. (2002). Using ethnography to improve intervention design. *American Journal of Health Promotion, 16*(6), 331-340.
- Brodersen, N. H., Steptoe, A., Boniface, D. R., & Wardle, J. (2007). Trends in physical activity and sedentary behaviour in adolescence: Ethnic and socioeconomic differences. *British Journal of Sports Medicine, 41*(3), 140-144.
- Bronfenbrenner, U. (2001). *The bio-ecological theory of human development*. Ontario: Philpapers Foundation.
- Bronfenbrenner, U., & Morris, P. A. (2007). *The bio-ecological model of human development*. Hoboken, NJ: John Wiley & Sons, Inc.
- Bryman, A. (2008). *Social Research Method*. University of Wisconsin at Whitewater. London: Oxford university Press.
- Burgard, S., Stewart, J., & Schwartz, J. (2003). *Occupational status*. San Francisco: University of California.

- Caballero, B. (2007). The global epidemic of obesity: An overview. *Epidemiologic reviews*, 29(1), 1-5.
- Caballero, B. (2005). A nutrition paradox-underweight and obesity in developing countries. *The New England Journal of Medicine*, 352(15), 1514-1516.
- Castro, L. C., & Avina, R. L. (2002). Maternal obesity and pregnancy outcomes. *Current Opinion in Obstetrics and Gynecology*, 14(6), 601-606.
- Cecchini, M., Sassi, F., Lauer, J. A., Lee, Y. Y., Guajardo-Barron, V., & Chisholm, D. (2010). Tackling of unhealthy diets, physical inactivity, and obesity: Health effects and cost-effectiveness. *The Lancet*, 376(9754), 1775-1784.
- Chang, C. T., Chang, K. H., & Cheah, W. L. (2009). Adults' perceptions of being overweight or obese: A focus group study. *Asia Pacific Journal of Clinical Nutrition*, 18(2), 257-264.
- Chang, M. W., Nitzke, S., Guilford, E., Adair, C. H., & Hazard, D. L. (2008). Motivators and barriers to healthful eating and physical activity among low-income overweight and obese mothers. *Journal of the American Dietetic Association*, 108(6), 1023-1028.
- Chapman, I. (2007). *Obesity in old age*. Basel: Karger.
- Champion, V. L., & Skinner, C. S. (2008). *The health belief model*. San Francisco, CA: Jossey-Bass.
- Chiolero, A., Faeh, D., Paccaud, F., & Cornuz, J. (2008). Consequences of smoking for body weight, body fat distribution, and insulin resistance. *Am J Clin Nutr*, 87(4), 801-809.

- Christakis, N. A., & Fowler, J. H. (2007). The spread of obesity in a large social network over 32 years. *The New England Journal of Medicine*, 357(4), 370-379.
- Cline, K. M. C., & Ferraro, K. F. (2006). Does religion increase the prevalence and incidence of obesity in adulthood? *Journal for the Scientific Study of Religion*, 45(2), 269-281.
- Cole, R. E., & Horacek, T. (2009). Applying PRECEDE-PROCEED to develop an intuitive eating nondieting approach to weight management pilot program. *Journal of Nutrition Education and Behavior*, 41(2), 120-126.
- Conley, D., & Glauber, R. (2006). Gender, body-mass, and socio-economic status: New evidence from the PSID. *Advances in Health Economics and Health Services Research*, 17, 253-275.
- Conner, M., Norman, P., & Bell, R. (2002). The theory of planned behaviour and healthy eating. *Health Psychology*, 21(2), 194-201.
- Corrigan, P. W., & Wassel, A. (2008). Understanding and influencing the stigma of mental illness. *Journal of Psychosocial Nursing and Mental Health Services*, 46(1), 42-48.
- Crăciun, C., & Băban, A. (2008). The role of self-efficacy, past habits, and action plans in children's eating habits. *Cogniție Creier Comportament*, 12(2), 205-218.
- Crawford, P. B., Story, M., Wang, M. C., Ritchie, L. D., & Sabry, Z. I. (2001). Ethnic issues in the epidemiology of childhood obesity. *Pediatric Clinics of North America*, 48(4), 855-878.

- Creswell, J. W. (1999). *Mixed-method research: Introduction and application. Handbook of educational policy*. San Diego: Academic Press.
- Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Thousand Oaks, CA: Sage.
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Thousand Oaks CA: Sage.
- Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Boston: Pearson Education Inc.
- Creswell, J. W., & Clark, P. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage.
- Cummins, S., & Macintyre, S. (2006). Food environments and obesity: Neighbourhood or nation? *International Journal of Epidemiology*, 35(1), 100-104.
- Cutler, D. M., & Lleras-Muney, A. (2006). *Education and health: Evaluating theories and evidence* (No. 12352). Cambridge, MA: National Bureau of Economic Research.
- Dake, F. A. (2013). Obesity among Ghanaian women: Past prevalence, future incidence. *Public Health*, 127(6), 590-592.
- Dake, F. A., Tawiah, E. O., & Badasu, D. M. (2011). Socio-demographic correlates of obesity among Ghanaian women. *Public Health Nutrition*, 14(7), 1285-1291.
- Daniels, M. C., & Popkin, B. M. (2010). Impact of water intake on energy intake and weight status: A systematic review. *Nutrition Reviews*, 68(9), 505-521.

- Dattilio, F. M., Edwards, D. J. A., & Fishman, D. B. (2010). Case studies within a mixed methods paradigm: Toward a resolution of the alienation between researcher and practitioner in psychotherapy research. *Psychotherapy, 47*(4), 427-441.
- de Gonzalez, A., Hartge, P., Cerhan, J. R., Flint, A. J., Hannan, L., Maclnnis, R. J., ...& Beeson, W. L. (2010). Body-mass index and mortality among 1.46 million white adults. *New England Journal of Medicine, 363* (23), 2211-2219.
- de-Graft, A. A. (2014). Food beliefs and practices during pregnancy in Ghana: Implications for maternal health interventions. *Healthcare for Women International, 35*, 954-972.
- Dennis, E. A., Dengo, A. L., Comber, D. L., Flack, K. D., Savla, J., Davy, K. P., & Davy, B. M. (2010). Water consumption increases weight loss during a hypocaloric diet intervention in middle-aged and older adults. *Obesity (Silver Spring, Md.), 18*(2), 300-307.
- DiCicco-Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. *Medical Education, 40*(4), 314-321.
- Dinsa, G. D., Goryakin, Y., Fumagalli, E., & Suhrcke, M. (2012). Obesity and socioeconomic status in developing countries: A systematic review. *Obesity Reviews, 13*(11), 1067-1079.
- Doku, D. T., & Neupane, S. (2015). Double burden of malnutrition: Increasing overweight and obesity and stall underweight trends among Ghanaian women. *BioMed Central Public Health, 15*(1), 670.

- Duda, R. B., Jumah, N. A., Hill, A. G., Seffah, J., & Biritwum, R. (2006). Interest in healthy living outweighs presumed cultural norms for obesity for Ghanaian women. *Health and Quality of Life Outcomes*, 4(1), 44.
- Duda, R. B., Jumah, N. A., Hill, A. G., Seffah, J., & Biritwum, R. (2007). Assessment of the ideal body image of women in Accra, Ghana. *Tropical Doctor*, 37(4), 241-244.
- Ebbeling, C. B., Pawlak, D. B., & Ludwig, D. S. (2002). Childhood obesity: Public health crisis, common sense cure. *The Lancet*, 360(9331), 473-482.
- Edomwonyi, N. P., & Osaigbovo, P. E. (2006). Incidence of obesity in parturients scheduled for caesarean section: Intra-operative complications, management and outcome. *East African Medical Journal*, 83(4), 112-119.
- Eisenberg, D., & Quinn, B. C. (2006). Estimating the effect of smoking cessation on weight gain: An instrumental variable approach. *Health Services Research*, 41(6), 2255-2266.
- Elo, I. T. (2009). Social Class Differentials in Health and Mortality: Patterns and Explanations in Comparative Perspective. *Annual Review of Sociology*, 35(1), 553-572.
- Eltिंगe, J., Parsons, V., & Jang, D. (1997). Differences between complex-design-based and IID-based analyses of survey data: Examples from Phase I of NHANES III. *Stats*, 19, 3-9.
- Erikson, R., & Goldthorpe, J. H. (1987). Commonality and variation in social fluidity in industrial nations. Part II: The model of core social fluidity applied. *European Sociological Review*, 3(2), 145-166.

- Estabrooks, P. A., Lee, R. E., & Gyurcsik, N. C. (2003). Resources for physical activity participation: Does availability and accessibility differ by neighborhood socioeconomic status? *Annals of Behavioural Medicine* 25(2), 100-104.
- Faber, M., & Kruger, H. S. (2005). Dietary intake, perceptions regarding body weight, and attitudes toward weight control of normal weight, overweight, and obese black females in a rural village in South Africa. *Ethnicity and Disease*, 15(2), 238-245.
- Faeh, D., & Faeh, D. (2007). Prevalence of overweight and obesity in rural and urban settings of 10 European countries. *Health (San Francisco)*, 44, 442-446.
- Fentem, P. H., & Mockett, S. J. (1998). Physical activity and body composition: What do the national surveys reveal? *International Journal of Obesity and Related Metabolic Disorders*, 22(Suppl. 2), S8-S14.
- Ferraro, K. F. (1998). Firm believers? Religion, body Weight, and well-being. *Review of Religious Research*, 39(3), 224.
- Fidler, J. A., West, R., van Jaarsveld, C. H. M., Jarvis, M. J., & Wardle, J. (2007). Does smoking in adolescence affect body mass index, waist or height? Findings from a longitudinal study. *Addiction*, 102(9), 1493-1501.
- Finkelstein, E. A., Trogdon, J. G., Cohen, J. W., & Dietz, W. (2009). Annual medical spending attributable to obesity: Payer-and service-specific estimates. *Health Affairs*, 28(5), 822-825.
- Finucane, M. M., Stevens, G. A., Cowan, M. J., Danaci, G., Lin, J. K., Paciorek, C. J., ... Ezzati, M. (2011). National, regional, and global

- trends in body-mass index since 1980: Systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9.1 million participants. *The Lancet*, 377(9765), 557-567.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behaviour: An introduction to theory and research*. Reading: Addison Wesley.
- Flegal, K. M. (2012). Prevalence of obesity and trends in the distribution of body mass index among US adults, 1999-2010. *Journal of the American Medical Association*, 307(5), 491-498.
- Fogelholm, M., & Kukkonen-Harjula, K. (2000). Does physical activity prevent weight gain: A systematic review. *Obesity Reviews*, 1(2), 95-111.
- Fogelholm, R., Murros, K., Rissanen, a, & Avikainen, S. (2005). Admission blood glucose and short term survival in primary intracerebral haemorrhage: A population based study. *Journal of Neurology, Neurosurgery, and Psychiatry*, 76(3), 349-353.
- Frisancho, A. R. (2000). Prenatal compared with parental origins of adolescent fatness. *American Journal of Clinical Nutrition*, 72(5), 1186-1190.
- Fujishiro, K., Xu, J., & Gong, F. (2010). What does "occupation" represent as an indicator of socioeconomic status?: Exploring occupational prestige and health. *Social Science and Medicine*, 71(12), 2100-2107.
- Gardner, G., & Halweil, B. (2000). Overfed and underfed: The global epidemic of malnutrition. *Worldwatch Institute*, 150, 1-68.
- Gardner, R. E., & Hausenblas, H. A. (2004). Understanding exercise and diet motivation in overweight women enrolled in a weight-loss program: A prospective study using the theory of planned behavior. *Journal of Applied Social Psychology*, 34, 1353-1370.

Ghana National Commission for UNESCO. (2010). *Health: Building a healthy nation*. Accra, Ghana: Ghana National Commission for UNESCO.

Ghana Statistical Service. (2014). *Ghana Living Standards Survey round 6: Poverty Profile in Ghana 2005-2013*. Accra, Ghana: Ghana Statistical Service.

Ghana Statistical Service. (2013). *2010 Population and Housing Census: National Analytical Report*. Accra, Ghana: Ghana Statistical Service

Ghana Statistical Service. (2011). *2010 Population and Housing Census: Preliminary Report*. Accra, Ghana: Ghana Statistical Service

Ghana Statistical Service (GSS), Ghana Health Service (GHS), & ICF Macro (IM). (2009). *Ghana Demographic and Health Survey 2008*. Accra, Ghana: GSS, GHS and ICF Macro.

Ghana Statistical Service (GSS) Noguchi Memorial Institute for Medical Research (NMIMR) and ORC Macro. (2004). *Ghana Demographic and Health Survey 2003*. Calverton, Maryland: GSS, NMIMR and ORC Macro.

Gielen, A. C., McDonald, E. M., Gary, T. L., & Bone, L. R. (2008). Using the PRECEDE-PROCEED Model to Apply Health Behavior Theories. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds). *Health behaviour and health education: Theory, research, and practice* (pp. 407-432). San Francisco, CA: Jossey-Bass Inc.

Glanz, K., Lewis, F., & Rimer, B. (1997). *Health behaviour and health education: Linking theory, research, and practice*. San Francisco, CA: Jossey-Bass Inc.

- Glanz, K., Rimer, B. K., & Viswanath, K. (2008). *Health behaviour and health education: Theory, research, and practice*. San Francisco, CA: Jossey-Bass Inc.
- Gonçalves, H., González, D. a., Araújo, C. P., Muniz, L., Tavares, P., Assunção, M. C., ... Hallal, P. C. (2012). Adolescents' perception of causes of obesity: Unhealthy lifestyles or heritage? *Journal of Adolescent Health, 51*(Suppl. 6), 98-15.
- Green, L., & Kreuter, M. (2005). *Health program planning: An educational and ecological approach* (4th ed.). New York: McGraw-Hill.
- Green, L., & Kreuter, M. (1992). Planned approach to community health as an application of PRECEED and an inspiration for PROCEED. *Journal of Health Education, 23*(3), 37-41.
- Greene J. (2007). *Mixed methods in social inquiry*. San Francisco, CA: Jossey-Bass Inc.
- Griffin, C. (2000). Grounded in grounded theory? *PsycCritiques, 45*(4), 124-127.
- Grimes, D. A., Lopez, L. M., O'Brien, P., & Raymond, E. G. (2009). Progestin-only pills for contraception. In D. A. Grimes (Ed.), *Cochrane database of systematic reviews*. Chichester, UK: John Wiley & Sons.
- Grivetti, L. (2001). Psychology and cultural aspects of energy. *Nutrition Reviews, 59*(1 Pt 2), S5-S12.
- Grossman, P. J., & Parrett, M. B. (2011). Religion and prosocial behaviour: A field test. *Applied Economics Letters, 18*(6), 523-526.
- Guest, G. (2006). How many interviews are enough?: An experiment with Data Saturation and Variability. *Field Methods, 18*(1), 59-82.

Gunderson, E. P. (2009). Childbearing and obesity in women: Weight before, during, and after pregnancy. *Obstetrics and Gynecology Clinics of North America*, 36(2), 317-332.

Gupta, S. (2012). Independent and combined association of parity and short pregnancy with obesity and weight change among Indian women. *Health*, 04(05), 271-276.

Harrell, M. C., & Bradley, M. A. (2009). *Data collection methods. Semi-structured interviews and focus groups*. Santa Monica, CA: Rand National Defense Research Institute.

Hankey, C. R., Eley, S., Leslie, W. S., Hunter, C. M., & Lean, M. E. J. (2004). Eating habits, beliefs, attitudes and knowledge among health professionals regarding the links between obesity, nutrition and health. *Public Health Nutrition*, 7(2), 337-343.

Hansen, W. L., Blau, P. M., Duncan, O. D., & Tyree, A. (1968). The american occupational structure. *American Sociological Review*. Retrieved from <http://doi.org/10.2307/2092400> on 22nd September, 2014.

Hanson, K. L., Sobal, J., & Vermeulen, F. M. (2014). Social selection and social causation in marriage and health: Longitudinal evidence of body weight change. *Marriage & Family Review*, 50(5), 373-394.

Hanson, M. D., & Chen, E. (2007). Socio-economic status and health behaviors in adolescence: A review of the literature. *Journal of Behavioural Medicine*, 30(3), 263-285.

Harman-Boehm, I., Blüher, M., Redel, H., Sion-Vardy, N., Ovadia, S., Avinoach, E., ... Rudich, A. (2007). Macrophage infiltration into omental versus subcutaneous fat across different populations: Effect of regional

- adiposity and the comorbidities of obesity. *Journal of Clinical Endocrinology and Metabolism*, 92(6), 2240-2247.
- Harris, J. L., Pomeranz, J. L., Lobstein, T., & Brownell, K. D. (2009). A crisis in the marketplace: How food marketing contributes to childhood obesity and what can be done. *Annual Review of Public Health*, 30, 211-225.
- He, K., Hu, F. B., Colditz, G. A., Manson, J. E., Willett, W. C., & Liu, S. (2004). Changes in intake of fruits and vegetables in relation to risk of obesity and weight gain among middle-aged women. *International Journal of Obesity and Related Metabolic Disorders*, 28(12), 1569-1574.
- Hesse-biber, S. N., Howling, S. A, Leavy, P., & Lovejoy, M. (2004). Racial identity and the development of body image issues among African-American adolescent girls. *The Qualitative Report*, 9(1), 49-79.
- Higgins, V., & Dale, A. (2013). Ethnic differences in sports participation in England. *European Journal for Sport and Society*, 10(3), 215-239.
- Hill, T. D., Angel, J. L., Ellison, C. G., & Angel, R. J. (2005). Religious attendance and mortality: An 8-year follow-up of older Mexican Americans. *The Journals of Gerontology*, 60(2), S102-S109.
- Hill, T. D., Burdette, A. M., Angel, J. L., & Angel, R. J. (2006). Religious attendance and cognitive functioning among older Mexican Americans. *The Journals of Gerontology*. 61(1), 3-9.
- Hou, X., Jia, W., Bao, Y., Lu, H., Jiang, S., Zuo, Y., ... Xiang, K. (2008). Risk factors for overweight and obesity, and changes in body mass index of Chinese adults in Shanghai. *BioMed Central Public Health*, 8, 389.
- Howard, B. V, Manson, J. E., Stefanick, M. L., Beresford, S. A., Frank, G., Jones, B.,... Prentice, R. (2006). Low-fat dietary pattern and weight

- change over 7 years: The Women's Health Initiative Dietary Modification Trial. *Journal of the American Medical Association*, 295(1), 39-49.
- Hoyt, A. L., Rhodes, R. E., Hausenblas, H. A., & Giacobbi, P. R. (2009). Integrating five-factor model facet-level traits with the theory of planned behavior and exercise. *Psychology of Sport and Exercise*, 10(5), 565-572.
- Hughes, J., Stead, L., & Lancaster, T. (2003). Antidepressants for smoking cessation. In D. A. Grimes (Ed.), *Cochrane database of systematic reviews* (pp. 1-145). Chichester, UK: John Wiley & Sons, Ltd.
- International Food Information Council Foundation (IFICF). (2010). *Finding balance: Understanding how calories work*. Washington, DC: IFICF
- Jackson, J. E., Doescher, M. P., Jerant, A. F., & Hart, L. G. (2005). A national study of obesity prevalence and trends by type of rural county. *Journal of Rural Health*, 21(2), 140-148.
- James, D. C. S., Pobe, J. W., Oxidine, D., Brown, L., & Joshi, G. (2012). Using the health belief model to develop culturally appropriate weight-management materials for African-American women. *Journal of the Academy of Nutrition and Dietetics*, 112(5), 664-670.
- Jamison, D. (2006). *Disease and mortality in sub-Saharan Africa*. World Bank Publications.
- Janghorbani, M., Amini, M., Gouya, M. M., Delavari, A., Alikhani, S., & Mahdavi, A. (2008). Nationwide survey of prevalence and risk factors of prehypertension and hypertension in Iranian adults. *Journal of Hypertension*, 26(3), 419-426.

Jeffery, R. W., & Rick, A. M. (2002). Cross-sectional and longitudinal associations between body mass index and marriage-related factors. *Obesity Research*, 10(8), 809-815.

Johnson, F., & Wardle, J. (2011). Socio-economic status and obesity: Epidemiology and explanations. *Epidemiologic Reviews*, 24(12), 893-893.

Johnson, B. & Turner, L. A. (2003). Data collection strategies in mixed methods research. In C. Tashakkori, A. & Teddlie (Eds.), *Handbook of mixed methods in social and behavioural research* (pp.345-363). Thousand Oaks CA: Sage Publications.

Jokela, M., Elovainio, M., & Kivimäki, M. (2008). Lower fertility associated with obesity and underweight: The US national longitudinal survey of youth. *American Journal of Clinical Nutrition*, 88(4), 886-893.

Jordan, P. J., Nigg, C. R., Norman, G. J., Rossi, J. S., & Benisovich, S. V. (2002). Does the transtheoretical model need an attitude adjustment? *Psychology of Sport and Exercise*, 3(1), 65-83.

Kearney, J. (2010). Food consumption trends and drivers. *Philosophical Transactions of the Royal Society of London*. 365(1554), 2793-2807.

Keats, S., & Wiggins, S. (2014). Future diets: Implications for agriculture and food prices. United Kingdom: The Overseas Development Institute (ODI).

Kelly, T., Yang, W., Chen, C.-S., Reynolds, K., & He, J. (2008). Global burden of obesity in 2005 and projections to 2030. *International Journal of Obesity*, 32(9), 1431-1437.

- Kelsey, R. (1954). Occupational status. *Peabody Journal of Education*, 32(2), 83-89.
- Khan, M. M. H., & Kraemer, A. (2009). Factors associated with being underweight, overweight and obese among ever-married non-pregnant urban women in Bangladesh. *Singapore Medical Journal*, 50(8), 804-813.
- Kilian, W. (2008). Health and health education in Baden-Württemberg. *Das Öffentliche Gesundheitswesen*, 52, 33-35.
- Kim, K. H., Sobal, J., & Wethington, E. (2003). Religion and body weight. *International Journal of Obesity and Related Metabolic Disorders*, 27(4), 469-477.
- Kimani-Murage, E. W., Kahn, K., Pettifor, J. M., Tollman, S. M., Klipstein-Grobusch, K., & Norris, S. A. (2011). Predictors of adolescent weight status and central obesity in rural South Africa. *Public Health Nutrition*, 14(6), 1114-1122.
- Klauer, J., & Aronne, L. J. (2002). Managing overweight and obesity in women. *Clinical Obstetrics and Gynecology*, 45(4), 1080-1088.
- Knecht, S., Reinholz, J., & Kenning, P. (2007). The spread of obesity in a social network. *The New England Journal of Medicine*, 357(18), 1866-1867.
- Kolčić, I. (2012). Double burden of malnutrition: A silent driver of double burden of disease in low- and middle-income countries. *Journal of Global Health*, 2(2), 20-23.
- Kortt, M. A., & Dollery, B. (2012). Religion and BMI in Australia. *Journal of Religion and Health*, 53(1), 1-12.

- Kruger, J., Ham, S. A., & Prohaska, T. R. (2009). Behavioral risk factors associated with overweight and obesity among older adults: the 2005 National Health Interview Survey. *Preventing Chronic Disease, 6*(1), A14.
- Kruk, J. (2009). Physical activity and health. *Asian Pacific Journal of Cancer Prevention, 10*(5), 721-728.
- Kumanyika, S. K. (2008). Environmental influences on childhood obesity: Ethnic and cultural influences in context. *Physiology and Behavior, 94*(1), 61-70.
- Lake, A. A., Townshend, T. G., & Albanides, S. (2010). *Obesogenic environments :Complexities, perceptions and objective measures*. New York: Wiley-Blackwell.
- Lakshmpriya, N., Gayathri, R., Praseena, K., Vijayalakshmi, P., Geetha, G., Sudha, V., ... Mohan, V. (2013). Type of vegetable oils used in cooking and risk of metabolic syndrome among Asian Indians. *International Journal of Food Sciences and Nutrition, 64*(2), 131-139.
- Lapane, K. L., Lasater, T. M., Allan, C., & Carleton, R. A. (1997). Religion and cardiovascular disease risk. *Religion, 36*(2), 155-164.
- Lazzer, S., Bedogni, G., Lafortuna, C. L., Marazzi, N., Busti, C., Galli, R., ... Sartorio, A. (2010). Relationship between basal metabolic rate, gender, age, and body composition in 8,780 white obese subjects. *Obesity (Silver Spring, Md.), 18*(1), 71-78.
- Ledoux, T. A., Hingle, M. D., & Baranowski, T. (2011). Relationship of fruit and vegetable intake with adiposity: A systematic review. *Obesity Reviews, 12*(501), e143-150.

- Leung, M. M., Agaronov, A., Grytsenko, K., & Yeh, M. C. (2012). Intervening to reduce sedentary behaviors and childhood obesity among school-age youth: A systematic review of randomized trials. *Journal of Obesity*, 1-14.
- Lewthwaite, B. (2011). Applications and utility of Urie Bronfenbrenner's Bio-ecological theory. *Manitoba Education Research Network*, 4, 1-109.
- Lhermitte, J. (1950). *Varieties of chronic insomnia and their treatment*. *Le Progres medical* (4th ed.). Boston: Pearson Education, Inc.
- Lietz, C. A., & Zayas, L. E. (2010). Evaluating qualitative research for social work practitioners. *Advances in Social Work*, 11(2), 188-202.
- Lincoln, Y. S., & Guba, E. G. (2009). *The only generalization is: There is no generalization*. London, United Kingdom: SAGE
- Livesey, G., Taylor, R., Hulshof, T., & Howlett, J. (2008). Glycemic response and health--a systematic review and meta-analysis: Relations between dietary glycemic properties and health outcomes. *The American Journal of Clinical Nutrition*, 87(1), 258S-268S.
- Lloyd-Richardson, E., & Lucero, M. (2008). The relationship between alcohol use, eating habits and weight change in college freshmen. *Eating Behaviours*, 9(4), 504-508.
- Lopez, A. D., Mathers, C. D., Ezzati, M., Jamison, D. T., & Murray, C. J. (2006). Global and regional burden of disease and risk factors, 2001: Systematic analysis of population health data. *The Lancet*, 367(9524), 1747-1757.

- Martorell, R., Khan, L. K., Hughes, M. L., & Grummer-Strawn, L. M. (1998). Obesity in Latin American women and children. *Journal of Nutrition*, 128(9), 1464-1473.
- Mattah, P. A., Kumi-Kyereme, A., Druye, A. A., & Osei, B. G. (2013). Predictors of overweight and obesity among women in Ghana. *Open Obesity Journal*, 5, 72-81.
- Matus, J. L. (2000). Disease, desire, and the body in victorian women's popular novels (review). *Victorian Studies*, 42(3), 503-505.
- Mauro, M., Taylor, V., Wharton, S., & Sharma, A. M. (2008). Barriers to obesity treatment. *European Journal of Internal Medicine*, 19(3), 173-180.
- Mavoa, H., Kumanyika, S., & Renzaho, A. (2010). Socio-cultural issues and body image. *Preventing Childhood Obesity*, 138.
- McAlister, A. L., Perry, C. L., & Parcel, G. S. (2008). How individuals, environments, and health behavior interact: Social cognitive theory. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education theory research and practice* (pp. 165-184). San Francisco, CA: Jossey-Bass Inc.
- McLaren, L. (2007). Socioeconomic status and obesity. *Epidemiologic Reviews*, 29(1), 29-48.
- McLaren, L., & Kuh, D. (2004). Women's body dissatisfaction, social class, and social mobility. *Social Science and Medicine*, 58(9), 1575-1584.
- McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly*, 15(4), 351-377.

- Meisel, S. F., & Wardle, J. (2014). Responses to FTO genetic test feedback for obesity in a sample of overweight adults: A qualitative analysis. *Genes and Nutrition*, 9(1), 1-4.
- Mendez, M. A., Monteiro, C. A., & Popkin, B. M. (2009). Overweight exceeds underweight among women in most developing countries. *American Society for Clinical Nutrition*, (81), 714-721.
- Merrill, R. M., & Thygeson, A. L. (2001). Religious preference, church activity, and physical exercise. *Preventive Medicine*, 33(1), 38-45.
- Mertens, D. M. (2010). Transformative mixed methods research. *Qualitative Inquiry*, 16(6), 469-474.
- Miilunpalo, S., Nupponen, R., Laitakari, J., Marttila, J., & Paronen, O. (2000). Stages of change in two modes of health-enhancing physical activity: methodological aspects and promotional implications. *Health Education Research*, 15(4), 435-448.
- Mirowsky, J., & Ross, C. E. (2004). *Education, social status, and health*. New York: Transaction Publishers.
- Mishra, G. D., Ball, K., Dobson, A. J., Byles, J. E., & Warner-Smith, P. (2002). Which aspects of socio-economic status are related to health in mid-aged and older women? *International Journal of Behavioral Medicine*, 9(3), 263-285.
- Ministry of Health (MOH). (2008). *Regenerative health and nutrition training of trainers; facilitators guide*. Accra, Ghana: MOH
- Ministry of Health (MOH). (2012). *National policy for the prevention and control of chronic non-communicable diseases in Ghana*. Accra, Ghana: MOH

- Mokhtar, N., Elati, J., Chabir, R., Bour, a, Elkari, K., Schlossman, N. P., ...
Aguenaou, H. (2001). Diet culture and obesity in northern Africa.
Journal of Nutrition, 131(3), 887S-892S.
- Montaño, D., & Kasprzyk, D. (2008). Theory of reasoned action, theory of
planned behaviour, and the integrated behavioral model. In K. Glanz, B.
K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education
theory research and practice* (pp. 67-96). San Francisco, CA: Jossey-
Bass Inc.
- Monteiro, C. A., Conde, W. L., & Popkin, B. M. (2001). Independent effects
of income and education on the risk of obesity in the Brazilian adult
population. *Journal of Nutrition*, 131(3), 881S-886S.
- Monteiro, C., Moura, E., Conde, W., & Popkin, B. (2004). Socio-economic
status and obesity in adult population of developing countries: A review.
Bulletin of the World Health Organization, 82, 940-946.
- Moore, S. E., Harris, C., & Wimberly, Y. (2010). Perception of weight and
threat to health. *Journal of the National Medical Association*, 102(2),
119-124.
- Morell, L., & Tan, R. J. B. (2009). Validating for use and interpretation: A
mixed methods contribution illustrated. *Journal of Mixed Methods
Research*, 3(3), 242-264.
- Morgan, D. L. (2007). Paradigms lost and pragmatism regained:
Methodological implications of combining qualitative and quantitative
methods. *Journal of Mixed Methods Research*, 1(1), 48-76.
- Morley, J. E. (2007). Weight loss in older persons: New therapeutic
approaches. *Current Pharmaceutical Design*, 13(35), 3637-3647.

- Morse, J. M. (2005). Fostering qualitative research. *Qualitative Health Research, 15*(3), 287-288.
- Musaiger, A. O. (2011). Overweight and obesity in eastern mediterranean region: Prevalence and possible causes. *Journal of Obesity, 2011*, 1-17.
- Mustonen, L. (2012). *INDEPTH Training & Research Centres of Excellence (INTREC)*. Accra, Ghana: INDEPTH.
- Mvo, Z., Dick, J., & Steyn, K. (1999). Perceptions of overweight African women about acceptable body size of women and children. *Curationis, 22*(2), 27-31.
- Nahal, S. (2012). *Globesity – the global fight against obesity*. North Carolina: BofA Merrill Lynch.
- Nam, S. (2013). The effects of religious attendance and obesity on health by race/ethnicity. *Osong Public Health and Research Perspectives, 4*(2), 81-88.
- Nantel, J., Mathieu, M. E., & Prince, F. (2011). Physical activity and obesity: Biomechanical and physiological key concepts. *Journal of Obesity, 2011*, 1-10.
- National Institute of Health (NIH). (1998). *Overweight and obesity statistics*. Bethesda (MD): National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK).
- National Obesity Observatory. (2012). Adult obesity and socio-economic status. Retrieved from <http://www.noo.org.uk/uploads> on 21st, 2015.
- Nelson, M. C., Lust, K., Story, M., & Ehlinger, E. (2009). Alcohol use, eating patterns, and weight behaviors in a university population. *American Journal of Health Behavior, 33*(3), 227-237.

- Nohr, E. A., Vaeth, M., Baker, J. L., Sørensen, T. I. A., Olsen, J., & Rasmussen, K. M. (2009). Pregnancy outcomes related to gestational weight gain in women defined by their body mass index, parity, height, and smoking status. *American Journal of Clinical Nutrition*, 90(5), 1288-1294.
- Nooyens, A. C. J., Visscher, T. L. S., Verschuren, W. M. M., Schuit, A. J., Boshuizen, H. C., van Mechelen, W., & Seidell, J. C. (2009). Age, period and cohort effects on body weight and body mass index in adults: The Doetinchem cohort study. *Public Health Nutrition*, 12(6), 862-870.
- Oddo, V. M., Rah, J. H., Semba, R. D., Sun, K., Akhter, N., Sari, M., ... Kraemer, K. (2012). Predictors of maternal and child double burden of malnutrition in rural Indonesia and Bangladesh. *American Journal of Clinical Nutrition*, 95(4), 951-958.
- Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States, 1999-2004. *Journal of the American Medical Association*, 295(13), 1549-1555.
- Palmeira, A. L., Branco, T. L., Martins, S. C., Minderico, C. S., Silva, M. N., Vieira, P. N., ... Teixeira, P. J. (2010). Change in body image and psychological well-being during behavioral obesity treatment: Associations with weight loss and maintenance. *Body Image*, 7(3), 187-193.
- Pan, A., Malik, V. S., Hao, T., Willett, W. C., Mozaffarian, D., & Hu, F. B. (2013). Changes in water and beverage intake and long-term weight

- changes: Results from three prospective cohort studies. *International Journal of Obesity*, 37(10), 1378-85.
- Pasquali, R., Pelusi, C., Genghini, S., Cacciari, M., & Gambineri, A. (2003). Obesity and reproductive disorders in women. *Human Reproduction Update*, 9(4), 359-372.
- Pawloski, L. R., Curtin, K. M., Gewa, C., & Attaway, D. (2012). Maternal-child overweight/obesity and undernutrition in Kenya: A geographic analysis. *Public Health Nutrition*, 15(11), 2140-2147.
- Peckmann, J., Gischler, E., Oschmann, W., & Reitner, J. (2001). An early carboniferous seep community and hydrocarbon-derived carbonates from the Harz Mountains, Germany. *Geology*, 29(3), 271-274.
- Pepino, M. Y., & Mennella, J. A. (2014). Cigarette smoking and obesity are associated with decreased fat perception in women. *Obesity*, 22(4), 1050-1055.
- Performance Monitoring and Accountability 2020 (PMA2020) Project, Kwame Nkrumah University of Science and Technology (KNUST). (2013). *Detailed indicator report: Ghana 2013*. Baltimore: PMA2020.
- Petersen, R. C. (2004). Mild cognitive impairment as a diagnostic utility. *Journal of Internal Medicine*, 256, 183-94.
- Pisinger, C., & Jorgensen, T. (2007). Weight concerns and smoking in a general population: The Inter99 study. *Preventive Medicine*, 44(4), 283-289.
- Popkin, B. M. (2006). Technology, transport, globalization and the nutrition transition food policy. *Food Policy*, 31(6), 554-569.

- Popkin, B. M. (2010). Recent dynamics suggest selected countries catching up to US obesity. *American Journal of Clinical Nutrition*, 91(1), 284S-288S.
- Popkin, B. M., Adair, L. S., & Nizer, S. W. (2012). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews*, 70(1), 3-21.
- Poterico, J. A., Stanojevic, S., Ruiz-Grosso, P., Bernabe-Ortiz, A., & Miranda, J. J. (2012). The association between socioeconomic status and obesity in Peruvian women. *Obesity*, 20(11), 2283-2289.
- Prentice, A. M. (2006). The emerging epidemic of obesity in developing countries. *International Journal of Epidemiology*, 35(1), 93-99.
- Prochaska, J. O. (2008). Decision making in the transtheoretical model of behavior change. *Medical Decision Making*, 28(6), 845-849.
- Prochaska, J. O., Redding, C. A., & Evers, K. E. (2008). The transtheoretical model and stages of change. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health Behavior and Health Education: Theory, Research and Practice* (pp. 97-121). San Francisco, CA: Jossey-Bass Inc.
- Proper, K. I., Cerin, E., Brown, W. J., & Owen, N. (2007). Sitting time and socio-economic differences in overweight and obesity. *International Journal of Obesity* (2005), 31(1), 169-176.
- Puhl, R. M., & Heuer, C. A. (2009). The stigma of obesity: A review and update. *Obesity (Silver Spring, Md.)*, 17(5), 941-964.
- Puoane, T., Fourie, J., & Shapiro, M. (2005). 'Big is beautiful'-an exploration with urban black community health workers in a South African township. *South African Journal of Clinical Nutrition*, 1, 6-15.

- Puoane, T., Tsolekile, L., & Steyn, N. (2010). Perceptions about body image and sizes among black African girls living in Cape Town. *Ethnicity and Disease, 20*(1), 29-34.
- Rainwater, D. L., Mitchell, B. D., Comuzzie, A. G., VandeBerg, J. L., Stern, M. P., & MacCluer, J. W. (2000). Association among 5-year changes in weight, physical activity, and cardiovascular disease risk factors in Mexican Americans. *American Journal of Epidemiology, 152*(10), 974-982.
- Rasmussen, F., Johansson, M., & Hansen, H. O. (1999). Trends in overweight and obesity among 18-year-old males in Sweden between 1971 and 1995. *Acta Paediatrica, 88*(4), 431-437.
- Ref'at, A. (2011). Estimated intakes of fats, cholesterol, fiber, sodium, calcium, potassium, and magnesium in Jordan. *Australian Journal of Basic and Applied Sciences, 5*(12), 3171-3178.
- Renzaho, A. M. (2004). Fat, rich and beautiful: Changing socio-cultural paradigms associated with obesity risk, nutritional status and refugee children from sub-Saharan Africa. *Health & Place, 10*(1), 105-113.
- Renzaho, A., & Mellor, D. (2010). Applying socio-cultural lenses to childhood obesity prevention among African migrants to high-income western countries: The role of acculturation, parenting and family functioning. *International Journal of Migration, Health and Social Care, 6*(1), 34-42.
- Rguibi, M., & Belahsen, R. (2006). Fattening practices among Moroccan Saharawi women. *Eastern Mediterranean Health Journal, 12*(5), 619-624.

- Rhodes, R. E., & Courneya, K. S. (2003). Relationships between personality, an extended theory of planned behaviour model and exercise behaviour. *British Journal of Health Psychology*, 8(1), 19-36.
- Richard, L., Gauvin, L., & Raine, K. (2011). Ecological models revisited: Their uses and evolution in health promotion over two decades. *Annual Review of Public Health*, 32, 307-326.
- Rigby, N., Leach, R., Lobstein, T., Huxley, R., & Kumanyika, S. (2009). Epidemiology and social impact of obesity. In G. Williams & G. Frubeck (Eds.) *Obesity: Science to practice* (pp. 21-39). Chichester, UK: John Wiley & Sons, Ltd.
- Riley, W. T., Rivera, D. E., Atienza, A. A., Nilsen, W., Allison, S. M., & Mermelstein, R. (2011). Health behavior models in the age of mobile interventions: Are our theories up to the task? *Translational Behavioral Medicine*, 1(1), 53-71.
- Samuelson, G. (2004). Global strategy on diet, physical activity and health. *Scandinavian Journal of Nutrition*, 48(2), 57-57.
- Saxena, A. K. (2006). Emerging global epidemic of obesity: The renal perspective. *Annals of Saudi Medicine*, 26(4), 288-295.
- Schmalz, D. L. (2010). "I feel fat": Weight-related stigma, body esteem, and BMI as predictors of perceived competence in physical activity. *Obesity Facts*, 3(1), 15-21.
- Schomerus, G., Angermeyer, M. C., Matschinger, H., & Riedel-Heller, S. G. (2008). Public attitudes towards prevention of depression. *Journal of Affective Disorders*, 106(3), 257-263.

- Schütze, M., Schulz, M., Steffen, a, Bergmann, M. M., Kroke, A., Lissner, L., & Boeing, H. (2009). Beer consumption and the “beer belly”: Scientific basis or common belief? *European Journal of Clinical Nutrition*, 63(9), 1143-1149.
- Shajithanoop, S., Periyasamy, T., & Rani, M. V. U. (2012). Demographic variations influence obesity in a semi-urban cohort of Tamil Nadu , South India. *Journal of Life Sciences*, 4(2), 87-95.
- Sidik, S. M., & Rampal, L. (2009). The prevalence and factors associated with obesity among adult women in Selangor, Malaysia. *Asia Pacific Family Medicine*, 8(1), 2.
- Siega-Riz, A. M., Evenson, K. R., & Dole, N. (2004). Pregnancy-related weight gain--a link to obesity? *Nutrition Reviews*, 62(7 Pt 2), S105-S111.
- Siero, F. W., Broer, J., Bemelmans, W. J., & Meyboom-de Jong, B. M. (2000). Impact of group nutrition education and surplus value of Prochaska-based stage-matched information on health-related cognitions and on Mediterranean nutrition behavior. *Health Education Research*, 15(5), 635-647.
- Sikorski, C., Riedel, C., Lupp, M., Schulze, B., Werner, P., König, H. H., & Riedel-Heller, S. G. (2012). Perception of overweight and obesity from different angles: A qualitative study. *Scandinavian Journal of Public Health*, 40(3), 271-277.
- Simkhada, P., Poobalan, A., Simkhada, P. P., Amalraj, R., & Aucott, L. (2011). Knowledge, attitude, and prevalence of overweight and obesity among civil servants in Nepal. *Asia-Pacific Journal of Public Health*, 23(4), 507-517.

- Slovin, S. F., Galsky, M. D., & Busam, K. (2006). Violaceous exanthem as a manifestation of metastatic prostate cancer in skin. *Urology*, 67(2), 420.
- Sobal, J. (1991). Obesity and socioeconomic status: A framework for examining relationships between physical and social variables. *Medical Anthropology*, 13(3), 231-247.
- Sobal, J., & Hanson, K. L. (2011). Marital status, marital history, body weight, and obesity. *Marriage & Family Review*, 47(7), 474-504.
- Sobal, J., Hanson, K. L., & Frongillo, E. A. (2009). Gender, ethnicity, marital status, and body weight in the United States. *Obesity (Silver Spring, Md.)*, 17(12), 2223-2231.
- Sobal, J., & Stunkard, A. J. (1989). Socioeconomic status and obesity: A review of the literature. *Psychological Bulletin*, 105(2), 260-275.
- Sogunro, O. A. (2002). Selecting a quantitative or qualitative research methodology : An experience. *Educational Research Quarterly*, 26, 3-10.
- Sosnaud, B., Brady, D., & Frenk, S. M. (2013). Class in name only: Subjective class identity, objective class position, and vote choice in American presidential elections. *Social Problems*, 60(1), 81-99.
- Speakman, J. R. (2007). A nonadaptive scenario explaining the genetic predisposition to obesity: The "predation release" hypothesis. *Cell Metabolism*, 6(1), 5-12.
- Speaks, P. (2012). *Describing cultural perceptions of weight & perceived body size with obese african american women* (Doctoral thesis). Arizona: University of Arizona.
- Srivastava, N., Lakhan, R., & Mittal, B. (2007). Pathophysiology and genetics of obesity. *Indian Journal of Experimental Biology*, 45(11), 929-936.

- Stam-Moraga, M. C., Kolanowski, J., Dramaix, M., De Backer, G., & Kornitzer, M. D. (1999). Socio-demographic and nutritional determinants of obesity in Belgium. *International Journal of Obesity and Related Metabolic Disorders*, 23(Suppl. 1), 1-9.
- Stanley, J. C. (2009). The regulation of energy balance. *Lipid Technology*, 21(5-6), 124-126.
- Stevens, G. A., Singh, G. M., Lu, Y., Danaei, G., Lin, J. K., Finucane, M. M., ... Ezzati, M. (2012). National, regional, and global trends in adult overweight and obesity prevalences. *Population Health Metrics*, 10(1), 22. <http://doi.org/10.1186/1478-7954-10-22>.
- Strasburger, V. (2011). Children, adolescents, obesity, and the media. *Pediatrics*, 128(1), 201-208.
- Strecher, V. J., & Rosenstock, I. M. (1997). *The health belief model*. Cambridge: Cambridge University Press.
- Subramanian, S. V, & Smith, G. D. (2006). Patterns, distribution, and determinants of under- and overnutrition: A population-based study of women in India. *The American Journal of Clinical Nutrition*, 84(3), 633-640.
- Sukasih, A. S., & Ave, M. (1989). Evaluation of inferential performance through confidence bounds for power curves. *Joint Statistical Meetings*, 3, 3384-3389.
- Swinburn, B. A., Sacks, G., Hall, K. D., McPherson, K., Finegood, D. T., Moodie, M. L., & Gortmaker, S. L. (2011). The global obesity pandemic: Shaped by global drivers and local environments. *The Lancet*, 378(9793), 804-814.

- Tagoe, H. A., & Dake, F. A. (2011). Healthy lifestyle behaviour among Ghanaian adults in the phase of a health policy change. *Globalization and Health*, 7, 7.
- Tashiro, J. (2002). Exploring health promoting lifestyle behaviors of Japanese college women: Perceptions, practices, and issues. *Health Care for Women International*, 23(1), 59-70.
- Terence, W. G., & Schlam, T. R. (2004). The transtheoretical model and motivational interviewing in the treatment of eating and weight disorders. *Clinical Psychology Review*, 24(3), 361-378.
- Thomsen, M., & Nordestgaard, B. G. (2014). Myocardial infarction and ischemic heart disease in overweight and obesity with and without metabolic syndrome. *Journal of American Medical Association (Internal Medicine)*, 174(1), 15-22.
- Thorp, A. A., Owen, N., Neuhaus, M., & Dunstan, D. W. (2011). Sedentary behaviors and subsequent health outcomes in adults. *American Journal of Preventive Medicine*, 41(2), 207-215.
- Togo, P., Osler, M., Sørensen, T. I., & Heitmann, B. L. (2001). Food intake patterns and body mass index in observational studies. *International Journal of Obesity and Related Metabolic Disorders*, 25(12), 1741-1751.
- Tohill, B. C., Seymour, J., Serdula, M., Kettel-Khan, L., & Rolls, B. J. (2004). What epidemiologic studies tell us about the relationship between fruit and vegetable consumption and body weight. *Nutrition Reviews*, 62(10), 365-374.
- Tremblay, A., Doucet, E., & Imbeault, P. (1999). Physical activity and weight maintenance. *International Journal of Obesity*, 23(Suppl. 3), s50-s54.

- Tweed, J. O., Hsia, S. H., Lutfy, K., & Friedman, T. C. (2012). The endocrine effects of nicotine and cigarette smoke. *Trends in Endocrinology & Metabolism*, 23(7), 334-342.
- Tzotzas, T., Vlahavas, G., Papadopoulou, S. K., Kapantais, E., Kaklamanou, D., & Hassapidou, M. (2010). Marital status and educational level associated to obesity in Greek adults: Data from the national epidemiological survey. *BoiMed Central Public Health*, 10(1), 732.
- Ulijaszek, S. J., & Lofink, H. (2006). Obesity in biocultural perspective. *Annual Review of Anthropology*, 35(1), 337-360.
- Van der Sande, M. A. B. (2003). Cardiovascular disease in sub-Saharan Africa: A disaster waiting to happen. *Netherlands Journal of Medicine*, 61(2), 32-36.
- Van Dyck, D., Cardon, G., Deforche, B., Owen, N., Sallis, J. F., & De Bourdeaudhuij, I. (2010). Neighborhood walkability and sedentary time in Belgian adults. *American Journal of Preventive Medicine*, 39(1), 25-32.
- Van Sluijs, E. M. F., McMinn, A. M., & Griffin, S. J. (2008). Effectiveness of interventions to promote physical activity in children and adolescents: systematic review of controlled trials. *British Journal of Sports Medicine*, 42(8), 653-657.
- Venter, F. C., Walsh, C. M., Slabber, M., & Bester, C. J. (2009). Body size perception of African women 25-44 in Mangaung. *Journal of Family Ecology and Consumer Sciences/Tydskrif Vir Gesinsekologie En Verbruikerswetenskappe*, 37(1), 16-32.

- Vioque, J., Weinbrenner, T., Castelló, A., Asensio, L., & Garcia de la Hera, M. (2008). Intake of fruits and vegetables in relation to 10-year weight gain among Spanish adults. *Obesity (Silver Spring, Md.)*, 16(3), 664-670.
- Wang, Y., Beydoun, M. A., Liang, L., Caballero, B., & Kumanyika, S. K. (2008). Will all Americans become overweight or obese? Estimating the progression and cost of the US obesity epidemic. *Obesity (Silver Spring, Md.)*, 16(10), 2323-2330.
- Wang, Y. C., McPherson, K., Marsh, T., Gortmaker, S. L., & Brown, M. (2011). Health and economic burden of the projected obesity trends in the USA and the UK. *The Lancet*, 378(9793), 815-825.
- Wardle, J., & Griffith, J. (2001). Socioeconomic status and weight control practices in British adults. *Journal of Epidemiology and Community Health*, 55(3), 185-190.
- Wardle, J., Waller, J., & Jarvis, M. J. (2002). Sex differences in the association of socio-economic status with obesity. *American Journal of Public Health*, 92(8), 1299-1304.
- Webbink, D., Martin, N. G., & Visscher, P. M. (2010). Does education reduce the probability of being overweight? *Journal of Health Economics*, 29(1), 29-38.
- Wells, J. C. K. (2012). Obesity as malnutrition: The role of capitalism in the obesity global epidemic. *American Journal of Human Biology*, 24(3), 261-276.
- World Health Organization (WHO). (1995). Physical status: The use and interpretation of anthropometry. Report of a WHO expert committee. *World Health Organization Technical Report Series*, 854, 1-452.

- World Health Organization. (1997). *Preventing and managing the global epidemic*. Geneva, Switzerland: WHO.
- World Health Organization. (2010). *Global status report on noncommunicable diseases*. Geneva, Switzerland: WHO
- World Health Organization. (2011). Noncommunicable diseases country profiles. Retrieved from <http://www.who.int/nmh> on 22nd July, 2015.
- World Health Organization. (2014). Global database on body mass index. Retrieved from <http://apps.who.int/bmi/index.jsp> on 23rd July, 2015.
- World Health Organization. (2015). Obesity and overweight. Retrieved from <http://www.who.int/mediacentre/factsheets/fs311/en/> on 17th July, 2015.
- Withrow, D., & Alter, D. A. (2011). The economic burden of obesity worldwide: A systematic review of the direct costs of obesity. *Obesity Reviews, 12*(2),131-141.
- Yankauer, A. (1984). *Prevention and the public health*. Oxford, UK: Oxford University Press.
- Yeomans, M. R. (2010). Physiology and behaviour alcohol , appetite and energy balance : Is alcohol intake a risk factor for obesity? *Physiology & Behaviour, 100*(1), 82-89.
- Yeomans, M. R., Caton, S., & Hetherington, M. M. (2003). Alcohol and food intake. *Current Opinion in Clinical Nutrition and Metabolic Care, 6*(6), 639-644.
- Yoshikawa, H., Weisner, T. S., Kalil, A., & Way, N. (2008). Mixing qualitative and quantitative research in developmental science: Uses and methodological choices. *Developmental Psychology, 44*(2), 344-354.

- Yosipovitch, G., DeVore, A., & Dawn, A. (2007). Obesity and the skin: Skin physiology and skin manifestations of obesity. *Journal of the American Academy of Dermatology*, 56(6), 901-916.
- Zafon, C. (2007). Oscillations in total body fat content through life: An evolutionary perspective. *Obesity Reviews*, 8(6), 525-530.
- Zamboni, M., Mazzali, G., Zoico, E., Harris, T. B., Mcigs, J. B., Di Francesco, V., ... Bosello, O. (2005). Health consequences of obesity in the elderly: A review of four unresolved questions. *International Journal of Obesity* (2005), 29(9), 1011-1029.
- Ziraba, A. K., Fotso, J. C., & Ochako, R. (2009). Overweight and obesity in urban Africa: A problem of the rich or the poor?. *BioMed Central Public Health*, 9(1), 465.

APPENDICES

A-Consent Form

UNIVERSITY OF CAPE COAST
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF POPULATION AND HEALTH

CONSENT FORM FOR STUDY ON OVERWEIGHT AND OBESITY AMONG WOMEN IN GHANA

General Information about the Research

Hello! My name is Derek Anamaale Tuoyire and I am a student at the University of Cape Coast conducting a research study for my PhD. This study seeks to understand the views of women and health professionals on overweight and obesity. Information you provide would help in the documentation and understanding of the things that influence overweight and obesity among women in Ghana.

Procedures

You are kindly invited you to take part in this research project to enable us find answers to some questions bordering on overweight and obesity. If you accept, you would be required to participate in an interview. If you do not wish to answer any of the questions posed during the interview, you may say so and the interviewer will move on to the next question. The interview will take place at an agreed upon place and no one else but the interviewer will be

present. As part of the process I would like to tape-record our conversation, which would later be transcribed verbatim only for the purposes of research. However the recording will be treated as confidential and will not bear any identification of yours. The expected duration of the interview is between 20 to 35 minutes.

Possible Risks, Discomforts and Benefits

There are no foreseeable risks or discomforts to you as a participant. However, if you have any reservations about some of the questions or have any discomfort, you have every right to refuse to answer that specific question or terminate the discussion. Similarly, there will be no immediate personal benefits to you as a respondent. The findings are expected to be used for academic purposes and also contribute to programme or policy interventions on overweight and obesity control.

Confidentiality

We will protect information about you to the best of our ability. You will not be named in any of the reports that will be generated from this study. Where verbatim statements will be stated, such quotations will be anonymised.

Compensation

There is no monetary compensation for your participation in this study. However, drinking water or soft drinks may be provided during our discussions.

Voluntary Participation and Right to Leave the Research

Your participation in this project is entirely voluntary and it is your right to withdraw at any point. Nonetheless, your full participation is highly encouraged.

Contacts for Additional Information

You may contact the following for further clarification: Prof. Akwasi Kumi-Kyereme (0244255234), Department of Population and Health, University of Cape Coast, Cape Coast, Ghana; or Hannah Frimpong (0243235225/0507041223), GHS-Ethical Review Committee, Research and Development Division, Adabraka-Accra, Ghana.

I have read the forgoing information or it has been read to me and I have understood the conditions. I have had the opportunity to ask questions for further clarification to my satisfaction. I consent voluntarily to participate in this study and I understand that I have the right to withdraw from the study at any point in time.

Respondent's Signature/thumprint: **Date:**

Witness' Signature/thumprint: **Date:**

Interviewer's Signature: **Date:**

Interviewer's Name:

B-Interview Guide

UNIVERSITY OF CAPE COAST
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF POPULATION AND HEALTH

OVERWEIGHT AND OBESITY AMONG WOMEN IN GHANA

INTERVIEW GUIDE FOR WOMEN

Background of Participant:

Age:

Level of formal education:

Marital status:

Ethnicity:

Occupation:

Number of children:

1. When you hear that somebody is overweight, what comes to mind? [**Probe for particular meaning; probe for description**]
2. When you hear that somebody is obese, what comes to mind? [**Probe for particular meaning; probe for description**]
3. In your opinion, how does it happen that some people are overweight or obese, yet others are not?
4. Are there any health complications for overweight persons? How about obese persons?
5. What do people in your locality think or say about persons considered to be overweight or obese? What attributes are they ascribed? [**Probe for associated reasons**]
6. In your opinion do you think a person can have control over his/her own body weight? [**Probe for reasons and measures**]
7. What body size/weight would you consider ideal for women? [**Probe for reasons and how to attain preferred body ideal for women**]

8. How would you describe yourself in terms of body size/weight? [probe for reasons for description and current body size/weight satisfaction]
9. What do you think accounts for your current body size/weight?
10. a) Have you ever intentionally tried to gain weight?
b) Have you ever intentionally tried to lose weight? [15a & 15b: Probe for reasons and the outcome of such efforts]
11. a) Would you consider gaining weight now or in the future?
12. b) Would you consider losing weight now or in the future? [16a & 16b: Probe for reasons, measures to employ and anticipated outcomes]
13. How would you assess your weight prior to and after marriage (for single women ask for their anticipated assessment)? [Probe for what accounts for changes, if any]
14. How would you assess your weight prior to and after childbirth? (for non-childbearing women probe for their anticipated assessment) [Probe for what accounts for changes, if any]

Closing thoughts

Is there anything else related to overweight and obesity that would like to talk about?

C-Ethical Approval

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

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



*My Ref. :GHS-ERC: 3
Your Ref. No.*

Research & Development Division
Ghana Health Service
P. O. Box MB 199
Accra
Tel: +233-302-681109
Fax - 233-302-695124
Email: Frimpong@ghsmaiil.org Hannah.

28th May, 2015

Tuoyire Derek Anamaale
C/o Department of Population & Health
Faculty of Social Sciences
University of Cape Coast
Cape Coast, Ghana

ETHICS APPROVAL - ID NO: GHS-ERC: 06/01/15

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol titled:

"Overweight and Obesity among Women in Ghana"

This approval requires that you inform the Ethics Review Committee (ERC) when the study begins and provide Mid-term reports of the study to the Ethics Review Committee (ERC) for continuous review. The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Please note that any modification without ERC approval is rendered invalid.

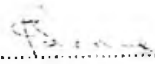
You are also required to report all serious adverse events related to this study to the ERC within seven days verbally and fourteen days in writing.

You are requested to submit a final report on the study to assure the ERC that the project was implemented as per approved protocol. You are also to inform the ERC and your sponsor before any publication of the research findings.

Please note that this approval is given for a period of 12 months, beginning May 28th 2015 to 27th May 2016

However, you are required to request for renewal of your study if it lasts for more than 12 months.

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

SIGNED.....

DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra