

UNIVERSITY OF THE WESTERN CAPE

Faculty of Community and Health Sciences

Doctoral Thesis

**AN INTERVENTION PROGRAMME FOR MANAGEMENT
OF OVERWEIGHT AND OBESE NIGERIANS IN LAGOS
STATE, NIGERIA**



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ABSTRACT

Over the past decades there has been a global increase in the prevalence of overweight and obesity. The increase in the prevalence of overweight and obesity leads to surging of associated co-morbidities of overweight and obesity in low/medium income countries which eventually overburdens the vulnerable health systems threatens by malnutrition and communicable diseases in low/medium income countries. The designed interventions to curb overweight/obesity in high income countries might be inappropriate to apply in low income countries, such as Nigeria, due to the different cultural norms and values regarding types of food, and physical activity. The overall aim of this study is to design an intervention that will be culturally appropriate for overweight and obesity management among Nigerians.



The convergent parallel mixed method design specifically was used in this study. This involves simultaneous timing of carrying out both quantitative and qualitative strands of mixed methods during the same phase of the research process, prioritizes the methods equally, and keeps the strands autonomous during analysis and then mixes the results during overall implementation/execution. The population for the quantitative part was Nigerians residing within sixteen enumeration areas of Alimosho Local Government area of Lagos State, Nigeria. Overweight and obese Nigerians as well as traditional healers and healthcare professionals were purposely selected for the qualitative phase. Delphi study was the last phase of study which involved recruitment of healthcare professionals in the management of overweight and obesity.

A sample size of 2250 was projected and approached for this while 1571 consented and participated in the study. This gave a response rate of 69.82%. About 51.2% of the sample population was male and 48.8% female. The mean age of the total sample was 35.36(SD =11.66). Using BMI, the prevalence of overweight/obesity was 42.3% using BF%, the prevalence of body fatness was 39.2% of which 62.5% were females. Data analysis shows strong positive correlation between other measures of body fatness (.694 to .872) except WHR with low but positive relationships between BF% (.184), BMI (.280), WC (.495), and negative relationships with HC (-.077) and BAI (-.076). Gender, marital status and age are predictors of overweight and obesity among Nigerians.

Type of diet, meal timing, reduced physical activity and genetic factor were perceived as the causes of overweight and obesity. Diet therapy, an increase in physical activity and the use of herbs were various ways perceived to assist in reducing excess body weight. Among the challenges faced by overweight and obese Nigerians were lack of time for exercise because of the nature of their jobs, lack of recreational facilities, lack of motivations and support from family members to reduce weight, lack of money and poor/lack of knowledge to reduce weight.

Experts unanimously agreed that the content of a culturally appropriate intervention should be individualised and to include physical activity/exercise, diet therapy, education and self-monitoring. There was a unanimous decision that the intervention should be done for a duration of 12 weeks at health facility and should be held for between 1-2 times per week if holding at community (excluding community/ public health facility) for 12 weeks in total. In

addition, experts agreed that the use of media such as television, radio, weekly newspapers and magazines should be used for preventive campaigns.

10 Keywords: Overweight, obesity, culturally, physical activity, diet, adiposity, weight, non-communicable, perception, intervention.



DECLARATION

I hereby declare that “**AN INTERVENTION PROGRAMME FOR MANAGEMENT OF OVERWEIGHT AND OBESE NIGERIANS IN LAGOS STATE, NIGERIA**” is my own work, that it has not been submitted, or part of it, for any degree of examination at any other university, and that I acknowledged all the sources I used and quoted in this study.

Mukadas O. Akindele

Signature.....

Witness.....

Supervisors

Prof JS Phillips

Dr Ehimario Igumbor



DEDICATION

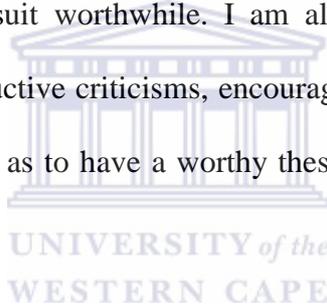
This piece is dedicated to my beloved wife and children for their continuous supports, prayers, commitments and understanding during my sojourn in South Africa. I also like to dedicate the thesis to my mum and all children of Alh K.O. Akindele (RIP) for motivating me always.



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Bismillaah ar-Rahman ar-Raheem

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Al hamdu liLlaahi Rabbil ‘alameen

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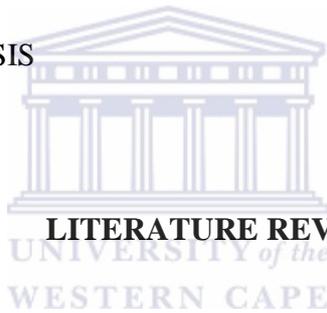
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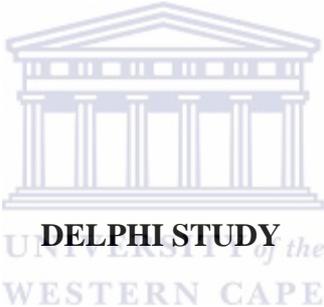
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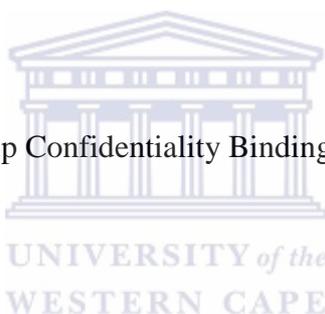
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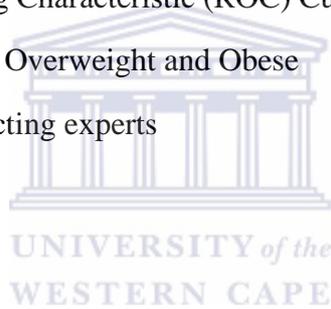


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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

This chapter provides an overview on the public health problems related to overweight and obesity. The factors contributing to overweight and obesity in different environments are also discussed. The aims of the study are outlined. The significance of the study elucidates the urgent need to curb the menace of overweight and obesity by designing interventions that are peculiar /appropriate to Nigerians. Definition of terms, abbreviations and the outline of the thesis form the latter part of this chapter.

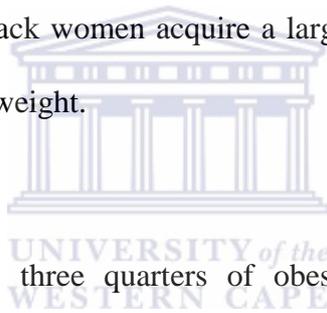


1.2 BACKGROUND

Overweight and obesity, a global epidemic affects an estimated 1.3 billion people (WHO, 2005). Overweight and/or obesity have become major health problems in low and high income countries and the prevalence has increased over the past decades in both adults and children. The prevalence in high income countries, for example USA, is as high as 26.6% in men and 32.2% in women above the age of 20 years (WHO, 2005). Obesity usually develops in childhood, and excess adiposity generally continues into adulthood (Pecoraro *et al*, 2003). The problems of overweight and obesity could be seen as less pressing in the low and middle income countries because of the overwhelming effects of under nutrition, infectious diseases and poverty.

The rise in global overweight and obesity epidemic results from environmental and behavioural changes which are brought about by economic development, modernisation and urbanisation. The

epidemiological transition witnessed in the high income countries which was accompanied by non-communicable diseases (NCDs) is now witnessed in the low and middle income countries of Africa and Asia (WHO, 2005). The major contributing factor is the obesogenic environment where with increased urbanisation fatty foods become increasingly accessible and physical activity levels decrease (Simkhada *et al.*, 2011). In addition socio-cultural reasons can be adduced for the increase in the prevalence of overweight and obesity in sub-Saharan Africa. In the Western world social stigmatisation against obesity and a widespread (though usually unsuccessful) obsession with trying to remain lean have probably helped limit to some extent the rate of rise in obesity while in many developing countries this psychological brake has been absent (Prentice, 2006). Kruger, Puoane, Senekal and van der Merwe (2005) reported that in comparison to white women, some groups of Westernised and non-Westernised black women acquire a larger ideal body size and they are more accepted in the society by being overweight.

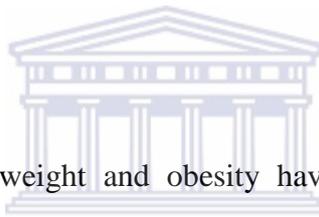


The WHO projected that by 2025 three quarters of obese population globally would be in low/medium income countries and recently about 20-50% of urban population in sub-Saharan African countries are classified as either overweight or obese (Sodjinou *et al.*, 2008; WHO, 2004). Although low SES and poor neighbourhood have been associated with a higher degree of obesity and chronic NCDs in high income countries, studies in Africa showed strong positive association between obesity and high SES (Fezeu *et al.*, 2006; Christensen *et al.*, 2008). There has been an unprecedented rate in the increase of migration of people from rural to urban areas and cities in Africa in search of greener pastures. These neophyte rural migrants to urban and cities are unfortunately exposed to cheap fatty and high energy food and reduced physical activity which increases the chances of being overweight and obese.

The array of acute and chronic health disorders associated with excess body weight has become a burden to the society, not only because of its adverse effects on the health-related quality of life of people (Muennig, Lubetkin, Jia and Franks, 2006; Anandacoomarasamy, Caterson, Leibman, et al., 2009) of its people but also by incurring substantial costs to the individuals affected and to society because of increased health-care costs and lost productivity. The rising prevalence of obesity and obesity-related diseases and treatment complications has exacerbated health-care cost inflation (Finkelstein et al., 2008). Previous studies have shown that obese individuals incurred 25%-52% higher medical care costs than individuals with normal weight (Thomson and Wolf, 2001). In a study by Bilger, Finkelstein, Kruger, Tate and Linnan (2013), it was reported that clinically significant reduction in weight among overweight and obese employees prevented short term deterioration of health related quality of life (HRQOL) and there was improvement in their productivity. WHO (2009) reported that the risk of coronary heart disease, ischaemic stroke and Type II diabetes grows steadily with increasing body mass, as do the risks of cancers of the breast, colon, prostate and other organs and that chronic overweight contributes to osteoarthritis – a major cause of disability. Population-based studies of osteoarthritis have consistently shown that overweight individuals are at higher risks of developing osteoarthritis than underweight or normal weight individuals (Felson, 1996). Osteoarthritis of the joints arises from excessive loading of the joint as a result of excess body weight. This is usually seen in weight bearing joints of lower limbs. It was also reported by WHO (2009) that globally, 44% of diabetes burden, 23% of ischaemic heart disease burden and 7–41% of certain cancer burdens are attributable to overweight and obesity. In both South-East Asia and Africa, 41% of deaths caused by high body mass index occur under age 60, compared with 18% in high-income countries (WHO, 2009).

Studies have reported that overweight and obese adults are at an increasing risk for high blood pressure, high blood cholesterol, cardiovascular disease, diabetes, breast cancer, gall bladder disease,

depression, joint disease, and other related problems (Niswender, Clegg, Morrison, Morton & Benoit, 2004; Satcher, 2002). Increase in the prevalence of obesity has been shown to be associated with an overall increase in the comorbidity from NCDs (Flegal, Graubard, Willaimson and Gail, 2007). These associations appear to be especially true for those with central obesity which is a core component of the metabolic syndrome (Alberti et al., 2009) and with increased CVD and obesity-related cancer mortality (Flegal, Graubard and Gail, 2007). Data from the Global Burden of Disease Study suggest that excess body weight is the sixth most important risk factor contributing to the total worldwide disease burden (Ezzati *et al*, 2002). In the United States, such is the increasing prevalence of overweight and obesity that a study suggests that poor diet and physical inactivity will surpass cigarette smoking as the main preventable cause of mortality (Mokdad, Marks, Stroup & Gerberding, 2004).



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The economic implications of overweight and obesity have been documented in high income countries. There is an inverse relationship between overweight/obesity and production and performance. An overweight or obese person has reduced spontaneous movement, reduction in overall physical activity, physical functioning and reduction in overall productivity which ultimately affects the economy of the country. Overweight and obesity also place a big burden on the health facility because of associated risk factors. In a systematic review of the economic burden of obesity worldwide, Withrow and colleagues (Withrow & Alter, 2011) concluded that obesity accounted for 0.7-2.8% of the US total health-care costs, and that obese individuals had medical costs 30% higher than those with normal weight. Between 1987 and 2001, the combination of rising obesity prevalence and increased spending on obese people has been estimated to account for 27% of the growth in US healthcare (Thorpe, Florence, Howard & Joski, 2004) and this has been projected to double every decade to account for 16-18% of total US healthcare expenditure by 2030 (Wang, Beydoun, Liang, Caballero, Kumanyika, 2008). These are applicable in low/medium income

countries of sub Saharan Africa. van der Merwe (2006) reported that obesity contributes 7% to overall lost of productivity costs of employers in South Africa due to the fact that obese individuals make more use of sick leave time because of chronic illness and work related injuries that might arise from being obese. Although there are no studies on the burden of these diseases in Nigeria, extrapolating from the global burden of diseases indicates that it may likely have more adverse effects on middle-aged less-privileged people (Maiyaki & Garbati, 2014).

Weight reduction helps to reduce the risk and severity of most of the conditions that are associated with obesity, requiring as little as 5% to 10% weight loss (CDC, 2003). Prospective studies of weight loss by obese persons have not demonstrated improvements in long-term morbidity and mortality but weight reduction have been shown to lower risk factors for several cardiovascular, pulmonary and cancer conditions (McTigue, Haris, Hemphill *et al*, 2003). Considerable advances have been made in dietary, exercise, behavioural, pharmacologic and Bariatric surgical approaches to successful long-term management of obesity. Lifestyle interventions remain the cornerstone of the treatment of obesity, but adherence is poor and long-term success is modest because of significant barriers, both on the part of affected individuals and health care professionals responsible for the treatment. Pharmacotherapy and Bariatric surgery are useful adjuncts for improving the health outcomes of overweight people, but, for a variety of reasons, these modalities of treatment are not widely adopted (Lau, Douketis, Morrison, Hramiak & Ehud Ur, 2007).

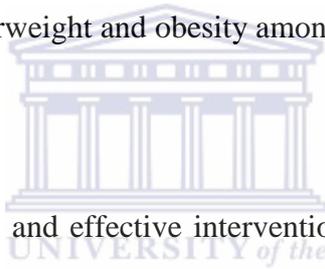
Literatures have shown that incorrect weight misperception can result in large numbers of overweight and obese individuals failing to understand the need for weight control or losing weight (Matthiessen et al., 2013). This will eventually affect intervention in overweight prevention, control and management. Weight misperception has been reported in literature among the youths and adults

of different countries. High prevalence of weight misperception has been reported among youth living in Pakistan, a developing country, with 42.4% overall weight misperception seen in the total youth population (Saleem, Ahmed, Mulla, Harder & Abbas, 2013). High prevalence of weight misperception is also noticed in Spain (Jauregal-Lobera et al., 2011) USA (Park, 2011) and China (Xu et al., 2011).

Ethnic and racial differences in body weight perception have been reported in the literature. Non-Hispanic Blacks and Mexican Americans who are overweight/obese have been found to view themselves as underweight and incorrectly perceived themselves to be at the recommended weight (Dorsey, Eberhardt & Ogden, 2009). Also, Duncan et al., (2011) also reported that nearly one-quarter of the US sample of overweight and obese adults misperceived their body weight. It has been reported that South African men and women have inaccurate perception of their body weight. Puoane et al, (2002) reported that 9.7% men and 22.1% women of all races and ages perceive themselves as overweight, whereas 29.2% of men and 56.6% of women are actually overweight. Little is known about weight misperception among overweight/obese individuals in Nigeria. This study was carried out to determine the prevalence of weight misperception among overweight/obese adults in a developing country, Nigeria.

Overweight and obesity are also prevalent in Nigeria and it has been projected to increase in both men and women over the next ten years from 29% to 39% and 39% to 49% respectively by 2015 (WHO, 2005). However, the WHO country profiles of 2011 for Nigeria shows that 4.6% and 8.4% of Nigerian males and females are obese (WHO, 2011). In a recent study by Amole, Ola-Olorun and Odeigah (2013), it was reported that the prevalence rate of overweight and obesity was 25% and 14.8% respectively in a semi-urban area of Ogbomosho while Akarolo-Anthony, Willet, Spiegelman

and Adebamowo (2014) reported a higher overall prevalence of overweight and obesity of 64% (m=57%, f=74%) among visitors and staff of a government worksite in Abuja. Furthermore, in a study carried out by Wahab, Sani, Yusuf, Gbadamosi, Gbadamosi and Yandutse (2011), prevalent rate of 53.3% and 21% were reported for overweight and obesity with higher prevalence among females in comparison to males. However, the overall crude prevalence rate of 20.8% and 8.4% were reported in rural communities in South-west Nigeria (Adebayo, et al, 2014). Chukwuonye et al (2013) reported in a systematic review that the prevalence of overweight and obesity in Nigeria ranged between 20.3%-35.1% and 8.1%-22.2% respectively. It is thus clear that greater efforts/steps should be taken to reduce the current rising rates of obesity through rigorous evaluation and assessment of body compositions of adult Nigerians which will further reduce the cardiovascular and musculoskeletal consequences of overweight and obesity among Nigerians.



To design and implement a potential and effective intervention for prevention and management of overweight and obesity, the WHO emphasises the importance of considering social, cultural, political, physical and structural influences for overweight and obesity management (WHO, 2000) since human beings have different cultures and norms. In an attempt to combat overweight, obesity and other NCDs, NCD prevention and control programmes were established as early as 1989-1990 by the Nigerian government. With the support of WHO, a new comprehensive NCD policy was formulated in 2002 which focuses on prevention, identification of risk factors and strengthening of four centers of medical excellence to cope with people with disabilities (WHO, 2003). In addition, an intersectoral committee on physical activity and health was established with strategies including advocacy, health promotion, health education, community mobilisation, intersectoral collaboration, training and capacity-building and integration of NCD prevention and management into primary healthcare. Though a further NCD survey in six geopolitical zones of Nigeria was planned, however, lack of funds and political will in some areas were obstacles to further progress. Nigeria needs

support to convince politicians and policy-makers of the benefits of NCD prevention activities and to raise awareness in the population (WHO, 2003). Furthermore, the Nigerian government provided funds for prevention, control, surveillance, monitoring, evaluation and treatment of overweight and obesity and other NCDs as well as national health reporting system that includes NCD cause-specific mortality, NCD morbidity and NCD risk factors (WHO, 2011). However, as with many programmes at both government and non-governmental levels, there is often a failure to measure impact and effectiveness, or to make adequate provision for implementation.

For effective intervention in prevention of the epidemic of overweight and obesity, the context in which unhealthy behaviours occur should also be taken into consideration. These include socio-economic, cultural and environmental factors. Behaviours must be understood within the context of the cultural values in which they occur, reinforcing values which promote positive behaviours while discouraging negative ones (Puoane, Matwa, Bradley & Hughes, 2006). This poses an unanswered question: will interventions for prevention and management of overweight and obesity designed for Americans be applicable to Nigerians overweight and obese adults? Suffice to say that various therapeutic interventions designed for the prevention and management of overweight and obesity for the Americans/ British might not be applicable to Nigerians because of multi-ethnic nature of Nigeria.

1.3 STATEMENT OF THE PROBLEM

There is an increase in the prevalence of non-communicable diseases like cardiovascular diseases, obesity, Type II diabetes mellitus and certain type of cancers in both low and high income countries. Overweight and obesity have become a worldwide phenomenon affecting all strata of our life in our

society. Overweight and obesity are associated with a large number of clinical problems associated with excess adipose tissue like osteoarthritis, sleep apnea and psychological problems and those associated with metabolic effects of increased adiposity such as coronary heart disease, hypertension, Type II diabetes mellitus and certain types of cancer like endometrial, colon, gall bladder and prostate, to mention but a few.

The increasing prevalence of overweight and obesity calls for appropriate and urgent intervention to prevent deleterious effects on the economic and health status of average Nigerians, and Nigeria as a whole, bearing in mind the presence of poor health facilities. The language we speak and cultural affiliations play a role on many levels of healthcare delivery among which are families' ability to recognise illness, seek care, give relevant and accurate histories, understand diagnoses, and comply with treatment and follow-up (Taveras, Durousseau & Flores, 2004; Taveras, 2004). Acceptable body image and concept of weight normalcy differ between people and are dictated by cultural beliefs and practices and to a larger extent affected by SES and dietary habits of diverse ethnic affiliations (Pinhey, Rubenstein & Colfax, 1997). The WHO emphasises the importance of considering social, cultural, political, physical and structural influences for overweight and obesity management to design and implement a potential and effective intervention for prevention and management of overweight and obesity since human beings have different cultures and norms (WHO, 2000). For effective intervention in the prevention of the epidemic of obesity, the context in which unhealthy behaviours occur should also be taken into consideration. These include socio-economic, cultural and environmental factors. Furthermore, behaviour must be understood within the context of the cultural values in which they occur, reinforcing values which promote positive behaviours while discouraging negative ones (Puoane, Matwa, Bradley & Hughes, 2006). Culturally appropriate care could entail nutritional counselling that provides alternatives within families' cultural framework (Peña, Dixon & Taveras, 2012) and the whole community as a whole. Hence,

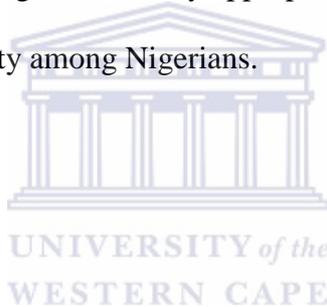
interventions for prevention and management of overweight and obesity designed in a different cultural environment might not be applicable to Nigerians.

1.4 RESEARCH QUESTION

What are the features that should be included in a culturally appropriate intervention programme for prevention and management of overweight and obesity in Nigeria?

1.5 OVERALL AIM

The overall aim of this study is to design a culturally appropriate intervention for the prevention and management of overweight and obesity among Nigerians.



1.6 SPECIFIC OBJECTIVES

The specific objectives of this study are:

Phase I: To gather baseline information regarding overweight and obesity among Nigerians.

- To determine the prevalence of overweight and obesity among Nigerians.
- To determine the specific risk factors associated with overweight and obesity.

Phase II: To find the best evidence regarding effective intervention programmes for the prevention and management of overweight and obesity through a review of literature.

Phase III: To design a culturally appropriate intervention programme for the prevention and management of overweight and obesity among Nigerians.

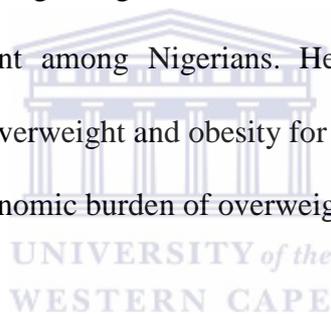
Phase IV: To reach consensus on the content of the intervention programme.

1.7 SIGNIFICANCE OF THE STUDY

The high prevalence of overweight and obesity, combined with their concomitant health risks, makes it a particularly relevant worldwide public health challenge. Rise in global overweight and obesity epidemic has been said to result from environmental and behavioural changes which are brought about by economic development, modernisation and urbanisation. The major contributing factor is the obesogenic environment where with increased urbanisation fatty foods become increasingly accessible and physical activity decreases (Simkhada *et al*, 2011). Overweight and obesity are precursors for many health problems. It has been reported that overweight and obese adults are at an increasing risk for high blood pressure, high blood cholesterol, cardiovascular disease, diabetes, breast cancer, gall bladder disease, depression, joint disease, and other related problems (Niswender, Clegg, Morrison, Morton & Benoit, 2004; Satcher, 2002). Weight reduction helps to reduce the risk and severity of most of the conditions that are associated with overweight and obesity, requiring as little as 5% to 10% weight loss (CDC, 2003). In high income countries the risk factors for overweight/obesity include older age, the African-American race, family history, lifestyle behaviours, lower SES, and presence of co-morbid diseases like hypertension, depression Type II diabetes mellitus, heart disease and osteoarthritis (Christe *et al*, 2010). While in low and middle income countries there is an increase in the risk of being overweight and obese when there is an improvement in economy of the country combines with aforementioned risk factors. Economic implications of overweight and obesity have been documented in high income countries. There is an inverse relationship between overweight/obesity and production and performance. An overweight/obese person has reduced spontaneous movement, reduction in overall physical activity, physical functioning and reduction in overall productivity which ultimately affects the economy of

the country. Also, it places a big burden on the health system. These are applicable in low and medium income countries like Nigeria.

Health and economic implications of overweight and obesity have been explored in literature. Several steps have been taken in high income countries to combat the menace of overweight and obesity in terms of dietary advice, increase in physical activity, health promotion and provision of non-obesogenic environment. All these are designed to suit the culture and norms of overweight and obese persons in high income countries. Our cultures and norms shape the way we think, react and accept whatever comes our way. Interventions for overweight and obesity management should be tailored to suit the norms and cultural values of those the intervention is intended for. The results of this study could generate information regarding an intervention that will be culturally appropriate for overweight and obesity management among Nigerians. Hence, there is a need to design an intervention for the management of overweight and obesity for overweight and obese Nigerians. This will further reduce the health and economic burden of overweight and obesity in Nigeria.



1.8 DEFINITION OF TERMS

Chronic diseases of lifestyle: Chronic diseases of lifestyle (CDL) are a group of diseases that share similar risk factors because of exposure, over many decades, to unhealthy diets, smoking, lack of exercise, and possibly stress (MRC).

Non-communicable diseases: Non-communicable diseases (NCDs), also known as chronic diseases, are not passed from person to person. They are of long duration and generally slow progression (WHO, 2013).

Overweight: Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Overweight is defined as BMI greater than or equal to 25kg/m^2 while obesity is defined as BMI greater than or equal to 30kg/m^2 . Using BMI, adults are further classified as follows:

Obesity, class I = BMI 30-34.9

Obesity, class II = BMI 35-39.9

Obesity, class III = BMI ≥ 40

Sedentary: this is work or activities in which an individual spends a lot of time sitting down or not moving (Hornby, 2000).

Physical activity: any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level that enhances life (CDC, 2011).

Moderate physical activity: activities that take moderate physical effort and make you breathe somewhat harder than normal (IPAQ, 2001).

Vigorous physical activity: activities that take hard physical effort and make you breathe much harder than normal (IPAQ, 2001).

1.9 ABBREVIATIONS

WHO - World Health Organisation

NCDs - Non-communicable Diseases

SES - Socio-economic Status

BMI - Body Mass Index

BAI - Body Adiposity Index

BF% - Body Fat Percentage

WHR- Waist to Hip Ratio

PA- Physical Activity

MET- Metabolic Equivalent

Low GI - Low Glucose Index

1.10 OUTLINE OF THE THESIS

Chapter One provides an overview on the public health problems relating to overweight and obesity. The factors contributing to overweight and obesity in different environments are also discussed. The aims of the study are outlined. The significance of the study elucidates the urgent need to curb the menace of overweight and obesity by designing interventions that are appropriate to Nigerians. Definition of terms, abbreviations and the outline of the thesis form the latter part of this chapter.

Chapter Two presents an extensive literature review was carried to report the current trend in the prevalence of overweight and obesity, associated risk factors of overweight and obesity globally and in Sub-Saharan Africa. Detailed accounts of the use of physical activity, diet, behavioural, drug and surgery in the management of overweight and obesity as well as advantages and disadvantages of each of these are provided. The last part of this chapter is the theoretical framework that forms the basis of this study.

Chapter Three provides all methodological steps taking toward achieving the objectives of this study. This chapter gives a detailed description of the methodology employed in conducting this

study. A broad description of the research setting, population, study design, data collection procedures as well as data analysis are all explained. Ethical considerations pertaining to the study are also outlined.

Chapter Four contains the results from the quantitative data analysis in an attempt to answer the first specific objective of this study, i.e. to gather baseline information regarding overweight and obesity among Nigerians. This chapter will provide an overview of the socio-demographic profile, the physical measurements and health related variables of the study sample. Secondly, the prevalence of the overweight and obesity and the factors associated with it will be described. Lastly, the perception of body weight of the individuals who are overweight will be described.

Chapter Five contains the results of the thematic analysis of the focus group discussions which was one of the steps taken towards designing an intervention for overweight and obesity Nigerians. The focus group discussions focused on various factors that lead to overweight and obesity, diseases that usually arise from overweight and obesity, ways of managing overweight and obesity as well as those challenges encountered by the participants that prevented them from reducing their weight.

Chapter Six explores the steps taken in carrying out the Delphi study, a consensus method. This chapter focuses on methodology, data analysis, data interpretation and summary of the chapter.

Chapter Seven focuses on pulling together the results of various phases of this study to achieve the primary aim of the study by discussing issues that emanated from each phase of the study.

Conclusions were drawn and limitations and recommendations were highlighted.

CHAPTER TWO

LITERATURE REVIEW

2 INTRODUCTION

An extensive literature review was carried to report the current trend in the prevalence of overweight and obesity, associated risk factors of overweight and obesity globally and in Sub-Saharan Africa. Detailed accounts of the use of physical activity, diet, behavioural, drug and surgery in the management of overweight and obesity as well as advantages and disadvantages of each of these are provided. The last part of this chapter is the theoretical framework that forms the basis of this study.

2.1 EPIDEMIOLOGY OF OVERWEIGHT AND OBESITY

Obesity is the accumulation of adipose tissue to excess and to an extent that impairs both physical and psychosocial health and well-being (James, 2004). An estimated 315 million people worldwide are obese (James, 2004). Overweight and obesity have a global epidemic with an estimated 1.3 billion people overweight or obese (WHO, 2005). The prevalence of obesity in Western and Westernising countries has doubled over the past decade, with 20% of males and 25% of females now classified as obese in the United States (Caterson & Gill, 2002). Up to double these numbers of the American adult population are overweight. The prevalence has increased over the past decades in adults and children. Its prevalence in developed countries, e.g. USA, is as high as 26.6% in men and 32.2% in women above age 20 years (WHO, 2005). Obesity usually develops in childhood, and excess adiposity generally continues into adulthood (Pecoraro, 2003). The problems of overweight and obesity could be seen as less pressing in the developing countries because of the overwhelming effects of under nutrition, infectious diseases and poverty. However, obesity and its co morbidities have negative effects on many people which leads to overburden of existing health facilities.

In Nigeria, chronic diseases are projected to account for 24% of all deaths. Overweight and obesity are part of the chronic diseases in Nigeria and it has been projected that the prevalence of obesity is expected to increase in both men and women from 29% to 39% and 39% to 49% respectively by 2015 (WHO, 2005). WHO country profiles (2011) for Nigeria shows 4.6% and 8.4% of Nigerian males and females are obese (WHO, 2011). The prevalence of abdominal obesity among adult population in a Yoruba speaking town is 33.8% (men=8.9%; women=53.8%) out of 400 subjects who participated in the study, the result of which is due to sedentary lifestyles (inactivity) and consumption of high-energy food (Amole, Ola-Olorun, Odeigah & Adesina, 2011). In another study in which 317 subjects participated, 41 (13.1%) of the subjects were obese, 58 (18.5%) were overweight while 21 (6.7%) were underweight. Out of forty-one (13.1%) subjects that had obesity 30 (11.2%) were males and 11 (22.0%) were females. Overweight occurred in 58 (18.5%) of subjects, of whom 49 (18.6%) were males and 9 (18.4%) were females. Underweight on the other hand occurred in 21 (6.7%) of subjects, of whom 16 (6.1%) were males and 5 (10.0%) were females (Bakari, Onyemelukwe, Sani, Aliyu, Hassan & Aliyu, 2007). Obese and overweight individuals are at higher risk of having hypertension than non-obese.

Several factors can be adduced to increase in the prevalence of overweight and obesity in developing countries. Caballero (2001) reported that biological and environmental factors are the major factors responsible for the increase in the prevalence of obesity in developing countries. This is shown in Table 2.1 below. Early nutrition injury (undernutrition), metabolic programming and gene-mediated adaptation are biological factors responsible for an increase in the prevalence of overweight and obesity while demographic changes (reduction in infant mortality, increase in life expectancy and urbanisation), lifestyle changes (lower energy expenditure labour, mechanisation, television and

sedentary activities) and dietary changes (fast food culture, increase in energy density of diets and more meals consumed outside home) are ecological factors responsible for an increase in obesity in low/medium income countries. Epidemiologic studies have shown an association between childhood under-nutrition and adult obesity and related chronic degenerative diseases. Among the Brazilian population of Rio de Janeiro, Sichieri et al., ((2000) reported that nutritional stunting is associated with risk of obesity and abdominal fatness in women. Similar findings were reported in both genders in South Africa (Popkin, Richrds & Monteiro, 1996) and Senegal (Benefice, Garnier, Simondon & Malina, 2001). Proponents of the link between early malnutrition and later obesity suggest that energy deficiency triggers a series of metabolic and hormonal changes that put the individual at higher risk of excess body fat accumulation (Caballero, 2001).

Table 2.1 Factors associated with obesity in developing countries.

| | |
|---|--|
| Biological factors | |
| <ul style="list-style-type: none"> • Early nutritional injury • Metabolic programming • Gene-mediated adaptation | |
| Ecological factors | |
| <ul style="list-style-type: none"> • Demographic changes • Lifestyle changes • Dietary changes | <ul style="list-style-type: none"> ○ Reduction in infant mortality ○ Increase in life expectancy ○ Urbanization ○ Lower energy expenditure labour ○ Mechanization, automation ○ Television and sedentary activities ○ Fast-food culture ○ Increase in energy density of diets(>% fat) ○ More meals consumed outside home |

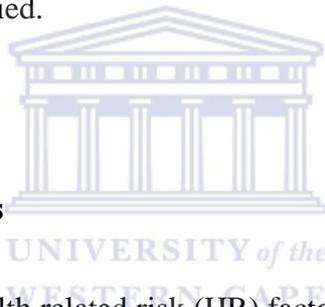
Caballero (2001)

This review on the epidemiology of overweight and obese calls for greater attention by health experts in developing countries because of the increase in the prevalence of overweight and obesity. Developing countries are faced with double problems of communicable diseases and non-communicable diseases despite the inadequate health infrastructures. While fighting communicable diseases, low income countries should put more effort into fighting under-nutrition and stunting among their children so as to reduce the incidence and prevalence of adult obesity and also curbing

adult obesity prevalence. Therefore, greater effort/steps should be taken to reduce the current rising rates of obesity through rigorous evaluation and assessment of body compositions of adults Nigerians.

2.2 RISK FACTORS ASSOCIATED WITH DEVELOPMENT OVERWEIGHT AND OBESITY

The positive energy balance underlying obesity is generally attributed to reduced physical activity, excessive caloric intake, and high dietary lipid intake (Chaput et al, 2009). Prevention and management programme will be successful if the risk factors associated with development of overweight and obesity can be identified.



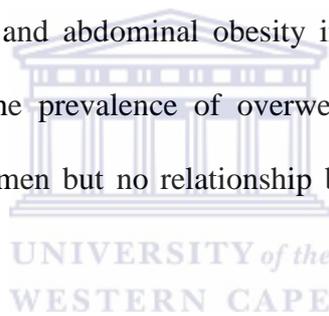
2.2.1 Socio-economic Risk Factors

Socio-economic status (SES) and health related risk (HR) factors are associated with overweight and obesity. Many epidemiological studies have been done regarding the SES and HR risk factors in high and low income countries. Marital status, gender, age, employment status and highest educational levels are the components of SES, while alcohol consumption, cigarette smoking, physical activity, blood sugar and blood pressure are components of health related risk factors for overweight and obesity.

In high income countries, SES has been reported to have an inverse relationship with overweight and obesity. The studies of Wang et al., (2007) and Hanson and Chen (2007 [in US and Proper et al., (2007) and Spinks et al., (2006) in Australia show inverse relationships between SES and overweight and obesity in the high income countries. In the high income countries, a higher BMI in persons with

lower SES has been shown to be correlated to knowledge restriction and access to healthy food and safe recreational activities, less interest in weight control, socioeconomic advancement discrimination and control standards of physical effectiveness (Kaplan & Keil, 1993).

In middle and low income countries, there is an inverse of findings regarding the relationship between SES and overweight and obesity. The prevalence of overweight and obesity is higher in those with high SES and urban dwellers. In India, Reddy, Rao and Reddy (2002) observed that coronary risk factors such as hypercholesterolemia, hypertriglyceridemia and sedentary lifestyle were more prevalent among those within higher SES groups and in Cameroun, Fezeu et al., (2006) reported that, after adjusting for age, leisure time physical activity, alcohol consumption and tobacco smoking, the prevalence of obesity and abdominal obesity increased with quartiles of household amenities in both genders, while the prevalence of overweight, obesity and abdominal obesity increased with occupancy levels in men but no relationship between any marker of adiposity and educational level.



The relationship between SES and obesity in low income countries, like Nigeria, is inconsistent, inconclusive and controversial. Mbada, Adedoyin and Odejide, (2009) concluded that there is an inverse relationship between weight and BMI, and that subjects in low SES class had higher prevalence of obesity. They posited that low level of education and poverty among individuals in the lower SES may have been responsible for the inverse relationship between SES and overweight and obesity. In a more recent study, Chukwuonye et al., (2013) showed that educational status is a predictor of obesity among women, while income was found to be a predictor of obesity among all respondents. The risk of being obese were found to be 31% or higher among women with higher educational status (odds ratio = 1.31; 95% confidence interval = 1.09–1.57; $P = 0.004$). On the other hand, higher income level was found to increase the risk of obesity by 57%, 60%, and 35% among

men, women, and all participants, respectively. However, studies by Mbada, Adedoyin and Odejide (2009) and Chukwuonye et al., (2013) were conducted in areas where predominantly Yoruba and Igbo tribes reside. This might make their findings not generalisable for Nigerians.

2.2.2 Health Related Risk Factor

Among health related risk factors associated with the development of overweight and obesity that have been identified are high lipid and alcohol intake (Tremblay, Buemann, Thériault & Bouchard, 1995), low calcium and micronutrient intakes (Jacqmain, Doucet, Després, Bouchard & Tremblay, 2003), dietary restraint behaviour (Drapeau, Provencher, Lemieux *et al.*, 2003), high disinhibition and susceptibility to hunger behaviour (Provencher, Drapeau, Tremblay, Després & Lemieux, 2003), low vigorous physical activity (Yoshioka, Doucet and St-Pierre, 2001), and short sleeping duration (Chaput, Després, Bouchard & Tremblay, 2008). Cigarette smoking, age, alcohol consumption and physical activity are health related risk factors associated with overweight and obesity among rural and urban dwellers in China, although no significant difference in overweight and obesity between urban northern China and rural southern China (Reynolds et al, 2007). Also, among the economically active South African population, Senekal, Steyn and Nel (2003) reported that low physical activity levels and an overweight father/mother as risk factors for overweight and obesity development. Furthermore, high levels of sitting and reclining time, cholesterol and high blood pressure were significantly associated with overweight and obesity among Vietnamese adults but current smoking and sedentary leisure time was significantly negatively associated with this status in men (Trinh, Nguyen, Phongsavan, Dibley & Bauman, 2009). While looking at the risk factors associated with development of overweight and obesity in children of different racial backgrounds, Urrutia-Rojas et al (2008) observed that frequent use of sweet and sugar sweetened drinks, which increased the odds of obesity nearly three fold are specific risk factors seen in African American children. In Caucasian children, the risk of obesity increased two-fold as a result of frequent consumption of snacks with a

high fat content and in Hispanic children, physical inactivity and frequent consumption of multiple serving of fruit, increased the risk of obesity approximately two-fold and 68% respectively.

This literature reviews reveal socio-economic and health related risk factors that are mostly modifiable. Development and implementation of programmes in high and low income countries that will enhance increase physical activity participation, promote healthy, balanced diets and maintain and manage excess body are highly indicated. These programmes should be implemented nationally to have larger coverage.

2.3 OVERWEIGHT AND OBESITY CO MORBIDITIES

Overweight and obesity are major health problems in developed and developing countries. They are associated with increased morbidity that usually result from chronic non-communicable diseases like Type II diabetes mellitus, cardiovascular and cerebrovascular diseases, digestive disorders and certain type of cancers. The non-fatal but debilitating health problems associated with obesity include respiratory difficulties, chronic musculoskeletal problems, skin problems and infertility while the more life-threatening problems fall into four main areas: CVD problems; conditions associated with insulin resistance such as Type II diabetes mellitus; certain types of cancers, especially hormonally related and large-bowel cancers and gallbladder disease (WHO, 2003).

The health risks associated with overweight and obesity are metabolic syndrome, Type II diabetes mellitus, hypertension, coronary artery disease, stroke, cancers and osteoarthritis. In a systematic review and meta-analysis by Guh, Zhang, Bansback, Amarsi, Birmingham and Anis (2009), it was reported that strong and positive associations with obesity were found with the incidence of Type II diabetes, all cancers except oesophageal and prostate cancer, all cardiovascular diseases, asthma, gallbladder disease, osteoarthritis and chronic back pain and that obesity defined by BMI was also

most strongly associated with the incidence of Type II diabetes in females. In a rural northeast China, Guo et al., (2014) reported that overweight and obese participants had significantly higher risks to develop pre-hypertension, hypertension, high LDL-C and low HDL-C compared with normal weight participants, while abdominal obesity was associated with increased risks of diabetes and high TG after adjusted for multiple factors. Shukla, Kumar and Singh (2014) assessed co-morbidities of obesity in five different countries (BRICS) in different stages of economic development. The acronym BRICS stands for Brazil, Russia, India, China and South Africa. They reported that overweight/obesity was positively associated with hypertension and diabetes in all the five countries except Brazil and that obesity was also positively associated with arthritis and angina in China, Russia and South Africa. In comparison, overweight/obesity was not associated with stroke and depression in any of the four countries.

The aforementioned co-morbidities from overweight and obesity shows that low income countries need to implement with plans to fight overweight and obesity. While high income countries might have the necessary machineries to curb obesity, the reverse is the case in low income countries, as the presence of communicable diseases still poses a challenge to their fragile health sector.

2.4 MANAGEMENT OF OVERWEIGHT AND OBESITY

Overweight and obesity are now prevalent health problems that are chronic and progressive in nature. Various studies have shown that overweight and obesity are major causes of co-morbidities, among which are including Type II diabetes, cardiovascular diseases, various cancers and other health problems, which can lead to further morbidity and mortality (Brown, Fujioka, Wilson & Woodworth, 2009; Guh, Zhang, Bansback, Amarsi, Birmingham, & Anis, 2009). Aside from the health consequences of overweight and obesity, the economic sequelae are overwhelming and have raised considerable interest in high and medium income countries. The direct and indirect cost estimated obesity-related costs range is between 0.09% and 0.61% of Western European countries'

total annual domestic income (Müller-Riemenschneider, Reinhold, Berghöfer & Willich (2008). The total costs associated with obesity accounted for 1.2% gross domestic product (GDP) in the United States, (Yach, Stuckler & Brownell, 2006) while in China, the total medical cost attributable to overweight and obesity was estimated at about 2.74 billion US dollars and these accounted for 3.7% of national total medical costs in 2003 (Zhao, Zhai, Hu, Wang, Yang, Kong & Chen (2008).

The economic burden of obesity in low to medium countries, from that of the high and medium income countries might not be different. Curtailing the menace of overweight and obesity requires steps that will be all encompassing. A variety of effective lifestyle modification options exist for the management of overweight and obese patients, which are dietary therapy approaches such as low-calorie diets and lower-fat diets, behavioural therapy, altering physical activity patterns, pharmacotherapy, surgical interventions and combinations of these techniques. Diet therapy is better predicted by estimation of the patient's energy expenditure based on the overweight and obese person's sex, age, weight, and crude classification of exercise patterns (Lean and James, 1986). This approach, together with an individualised diet with an energy deficit of 500–600 kcal (2.09–2.51 MJ), is almost universally used in longer-term trials and has been identified in Cochrane analyses as one of the best options (Haslam, Philip & James, 2005). A lower energy intake triggers the drive to eat, and a standard diet of 1000 kcal or 1200 kcal (4.18 MJ or 5.02 MJ) puts heavier patients under greater physiological stress.

2.4.1 Pharmacological Management of Overweight and Obesity

In response to an increase in the prevalence of overweight and obesity globally and the associated health and economic consequences, the use of pharmaceutical products for overweight and obesity management has become more widely and commonly/numerous used. Although lifestyle

modification has always been advocated as the initial treatment for the management of overweight and obesity, adjunctive pharmacotherapy is advocated indicated in overweight and obesity individuals with BMI ≥ 30 or 27-29.9 with medically complicated obesity (Lau et al., 2000), and especially if lifestyle changes have failed to produce weight loss within 6 months (NHLBI, 2000). Realistic goals of pharmacologic treatment include the loss of 5% to 10% of initial body weight and long-term maintenance at a reduced body weight. Treatment guidelines suggest that if an individual patient does not lose at least 2 kg in the first 4 weeks of pharmacotherapy, he or she is unlikely to benefit from continued treatment with that medication (NHLBI, 2000). However, patients who are unresponsive to one agent may respond well to another agent.

Drugs that usually prescribed in the management of overweight and obesity can be broadly divided into two categories - appetite suppressants and lipase inhibitors - on the basis of their putative mechanisms of action. Centrally acting appetite suppressant drugs used in the treatment of obesity fall into two broad pharmacological categories; those which act via brain catecholamine pathways and those which act via serotonin pathways. Among the former group, amphetamine and phenmetrazine are no longer recommended because of their stimulant properties and addictive potential (Silverstone, 1992). Appetite depressants have been shown to reduce appetite and lower food intake, thereby helping obese patients more easily keep to a low calorie diet and lose weight. They all have some sympatho-mimetic and stimulant properties. Anorectic drugs which promote serotonin neurotransmission have no such stimulant or sympathomimetic properties. They are fenfluramine, together with its recently introduced dextrorotatory stereoisomer dexfenfluramine, and fluoxetine. They reduce appetite and food intake and are effective in the treatment of obesity ((Silverstone, 1992).

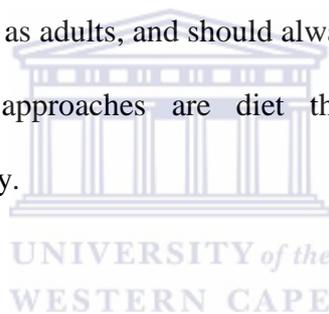
Pharmacotherapies have demonstrated a significant though modest decrease in weight compared to placebos over 1-2 years. Unfortunately weight loss following pharmacological intervention is not sustained when therapy is discontinued with individuals regaining some or all of the weight that was originally lost. Obesity is often considered a chronic disease, hence it requires long-term therapy. Weight loss through pharmacotherapy is not usually sustained after discontinuation of the drugs with overweight/obese individuals regaining all or some of the lost weight. Gokcel, Gumurdulu, Karakose, Melek, Tanaci & Bascil (2002) examined randomly assigned 150 women into sibutramine group, orlistat group, or metformin group. They found out that at six months, all the three groups reported statistically and clinically significant weight loss of about 8 to 13 kg and that the sibutramine-treated group lost about 4 to 5 kg more than the other two groups. However, in a meta-analysis done by Li et al., (2005) summary of the results for each drug does not support a hypothesis that any one drug is more effective than the others when compared with the placebo, since the difference among drugs in placebo corrected mean weight loss at one year is only about 1 to 2 kg and that none of the three drugs had long lasting effects on weight reduction after 1 year. Aside from the fact that there is a lack of sufficient evidence on the long lasting effects of drug therapy for overweight and obesity management, there are lots of concerns regarding the safety of pharmacotherapy in obesity treatment. Serious safety concerns have resulted in the withdrawal of some drugs that had originally received market approval, whilst other drugs have been abandoned during Phase III evaluation. An increase in psychiatric disorders following Phase III studies (RIO-Europe, RIO-North America, RIO-Diabetes & RIOLipids) with rimonabant treatment resulted in its withdrawal from the European market two years after its approval (Ioannides-Demos, Loretta Piccenna & John, 2011).

To achieve better weight loss, it has been advised that there should be combination of pharmacotherapy or non-pharmacotherapy in terms of lifestyle modifications (diet, increase in

physical activity and behavioural modifications). Recently, published guidelines recommend lifestyle modification as the initial treatment for obesity and suggest that adjunctive drug treatment is considered in patients with a body mass index ≥ 30 or 27-29.9 with medically complicated obesity (Lau, Douketis, Morrison, Hramiak, Sharma & Ur, 2006). Neff and Aronne (2007), reported that for many obese patients, effective long-term weight management through medical means will probably require a multi-pronged approach, including lifestyle changes and combination therapy with two or more pharmacologic agents targeting different regulatory pathways

2.4.2 Non-pharmacological management of Overweight and Obesity

Non-pharmacological approaches have been advised to be the foundation of all overweight and obesity treatments in children as well as adults, and should always be considered as first-line therapy. Among the non-pharmacological approaches are diet therapy, increased physical activity, behavioural modifications and surgery.



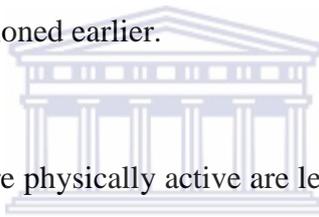
- **Diet Therapy**

The use of diet as a treatment for the management of overweight and obesity has been thoroughly researched by scientists. A carbohydrate-restricted diet and a calorie and fat restricted diet are diet therapy ways through which overweight and obesity are managed. A low-glycemic index (GI) diet has been proposed as a novel treatment for obesity recently. The glycemic index is a measure of how quickly blood glucose levels (blood sugar) rise after consuming a particular type of food. A food that falls under higher GI digests quickly and easily absorbs into the bloodstream, thereby increasing the blood sugar while food with lower GI takes a longer time to digest and absorb into the bloodstream thereby resulting in low glycemic glucose. There is considerable public interest in the differences between carbohydrate-restricted diet and a calorie and fat restricted diet.

In a study by Samaha et al., (2003), severely obese subjects with a high prevalence of diabetes and metabolic syndrome lost more weight in a six-month period on a carbohydrate-restricted diet than on a fat-and calorie-restricted diet. Also, severely obese subjects on a carbohydrate-restricted diet had a greater decrease in triglyceride levels than subjects in a fat-restricted diet and non-diabetic severely obese subjects on a low-carbohydrate diet had greater increases in insulin sensitivity, and subjects with diabetes on a carbohydrate restricted diet had a greater improvement in glyceamic. The same observation was reported by Spieth et al., (2000) on the use of low glyceamic diet in the management of paediatric obesity. In a multi-centre, randomised, controlled trial, the results demonstrate that the low-carbohydrate, high-protein, high-fat Atkins diet produced greater weight loss (an absolute difference of approximately 4 percent) than a conventional high-carbohydrate, low-fat diet for up to six months, but that the differences do not persist at one year. The magnitude of weight loss at six months in the low-carbohydrate group approximates that achieved by standard behavioural (Wadden & Foster, 2000) and pharmacologic (Yanovski & Yanovski, 2002) treatments. These weight losses are particularly noteworthy because the diet was implemented in a self-help format and subjects had little contact with health professionals. The lack of a statistically significant difference between the groups at one year is most likely due to greater weight regain in the low-carbohydrate group and the small sample size. This data suggests that long-term adherence to the low-carbohydrate Atkins diet may be difficult. In a two-year dietary intervention randomised controlled trial, Shai et al., (2008) reported that Mediterranean and low-carbohydrate diets are good and effective options to the low-fat diet for weight loss and appear to be just as safe as the low-fat diet. Aside from producing weight loss in moderately obese group of participants, the low-carbohydrate and Mediterranean diets had some beneficial metabolic effects, a result suggesting that these dietary strategies might be considered in clinical practice and that diets might be individualised according to personal preferences and metabolic needs.

- **Physical Activity**

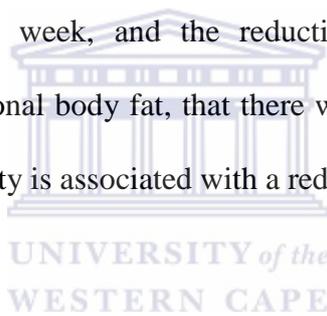
Physical activity (PA) can be defined as any bodily movement that is produced by contraction of skeletal muscles that results in energy expenditure and also produces health benefits. Physical activity in daily life can be categorised into occupational, sports, conditioning, household, or other activities (Caspersen, Powell & Christenson, 1985) that leads to energy expenditure and employment of skeletal muscles. The role of PA as one of the strategies to maintain good health has been explored extensively in the research world. Physical activity has been found to afford its followers health benefits like a reduction in blood glucose, cholesterol, increase in muscle strength, improvement in cardiopulmonary functions and mental health. It is pertinent to point out that the dosage, duration, frequency, intensity, and type of physical activity, needs to be adjusted in order to have the various health benefits mentioned earlier.



Studies have shown that those who are physically active are less likely to gain weight over time than those who are not. Schmitz et al., (2000) studied weight changes over a ten-year period in Coronary Artery Risk Development In Young Adults (CARDIA). After calculating the number of exercise units for each participant on the basis of a twelve-month history of participating in thirteen different physical activities, they found that change in physical activity was inversely correlated with change in body weight in all race (black and white) and sex sub-groups (men vs. women). Williamson et al., (1993) examined ten-year changes in body weight in subjects studied in the first National Health and Nutrition Examination Survey. They found that low levels of physical activity and recreation were strongly related to weight gain in both men and women. Recreational activity was inversely related to body weight. Men and women in the low activity group were three to four times more likely than the more active group to experience weight gain.

The use of PA alone for obesity management shows that it is an effective intervention for weight management. Ross et al., (2000) reported comparable weight losses of 7.6kg in energy restriction and

energy expenditure groups respectively after comparing the effect of a 700kcal/d energy deficit on three months weight when produced via reduction in energy intake versus an increase in energy expenditure (exercise). The effect of PA in weight reduction has been reported to be more felt in short time duration physical activity intervention. Ross and Jansen (2001) reported in an evidence-based systematic review of the dose–response relation between physical activity and total and regional body fat loss, that weight loss was greater with short-term physical activity interventions (≤ 16 weeks) than with long-term interventions (> 26 weeks) (0.18 kg per week v. 0.06 kg per week) (Ross & Janssen, 2001). This effect could be explained in part by the higher energy expenditure (2200 kcal per week v. 1000 kcal per week) with short term regimens. Ross and Jansen (2001) also reported a dose–response relation was also observed between the amount of physical activity, expressed as energy expended per week, and the reduction of total adiposity in short-term interventions but with regard to regional body fat, that there was insufficient evidence to determine whether an increase in physical activity is associated with a reduction in abdominal obesity.



- **Behavioural Modifications**

Behavioural treatment is defined as an approach used to help individuals develop a set of skills to achieve a healthier weight and it is more than helping people to decide what to change; it is helping them identify how to change (Foster, Makris & Bailer, 2005). Historically, behavioural approaches to the treatment of obese individuals emerged in the 1960s with theoretical application of the principles of operant conditioning to the “act of putting food in one’s mouth developed by Ferster, Nurnberger, and Levitt’s (1962). The goal of behavioural treatment is to help obese patients identify and modify eating, activity, and thinking habits that contribute to their excess weight (Wadden & Foster, 2000). It was then believed that obese persons suffered from maladaptive eating and exercise habits that can be corrected using the application of learning principles (Wing, 1992). Behavioural intervention for obesity management is characterised by directional goal, process oriented treatment

and advocacy of small rather than large changes in the expected treatment outcomes (Wadden & Foster, 2000).

The application of learning theory with respect to the modification of maladaptive eating behaviours by better environmental control (e.g., stimulus control, storing food out of sight, using smaller dishes etc.), and/or by utilising behavioural methods of assessment and self-control (e.g., self-monitoring, chewing slowly, leaving food on the plate, etc.) (Stunkard & Berthold, 1985) was the earliest behavioural approaches to the treatment of obesity. More recent behavioural formulations have been advanced to incorporate the fact that obesity is a complex phenomenon influenced by a variety of genetic, physiological, psychological, and social factors (Brownell & Wadden, 1992). To this end, behavioural treatment programmes have become ever more sophisticated, targeting behaviours other than eating per se. Stuart (1967) reported the successful implementation of out-patient behavioural treatment among eight obese adults after combining Ferster's operant procedure (Ferster, Nurnberger & Levitt, 1962), and respondent techniques and besides Stuart (1967) intervention was individualised. Behavioural treatment for obesity has been found to reduce body weight by 10% during the first six months of intervention, but without continued contact, however, patients generally regain one-third of this weight within one year, and usually experience a complete regain within five years (Wadden & Foster, 2000), whereas continued contact between obese subject and the practitioner further enhances maintenance of lost weight (Perri, McAllister, Gange, Jordan, McAdoo & Nezu, 1988) or even reduce the weight further. In general, the literature clearly indicates that behavioural treatment programmes provide a potent means of producing clinically significant weight loss (i.e., weight loss accompanied by a reduction in weight-related health risk factors) (Blackburn, 1995; Goldstein, 1992). The results from Klein, Sheard, Sunyer et al., (2004) show that the benefits of lifestyle modification used alone for inducing clinically and statistically significant

weight loss and that subjects treated by lifestyle modification alone had significantly greater weight loss than those who received sibutramine alone during the first eighteen weeks.

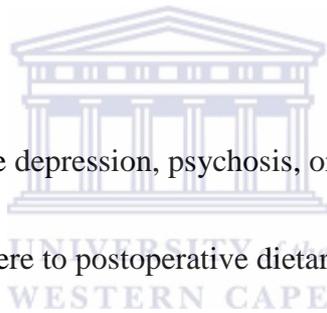
In an attempt to identify the psychological characteristics assessed by ego states that promote behaviour modification by obese patients, Saito et al., (2009) reported that the A ego state of obese patients, which is related to their self-monitoring skill, and the FC ego state of them, which is related to their autonomy, were increased and furthermore, the negative aspects of the FC ego state related to optimistic and instinctive characteristics inhibited the behaviour modification, while the A ego state represented objective self-monitoring skills that may have contributed to weight loss.

- **Surgical Interventions**

In response to the relatively poor durable weight loss experienced by patients undergoing medical treatment for morbid obesity, the demand for weight loss surgery has greatly increased in recent years (Schneider & Mun, 2005). This rather dramatic general context of conservative treatment of obesity, as well as an increasing prevalence of obesity over the past decades, prompted the search for a more radical and effective treatment of obesity, such as offered by bariatric surgery (Kolanowski, 1979). The surgical interventions performed to manage obesity are collectively referred to as bariatric surgery. Historically, the first type of bariatric surgery, jejunoileal, was performed by Dr Richard Varco (Minnesota) in 1953, specifically to induce weight loss from malabsorption (Vest, Heneghan, Schauer & Young, 2013). Several bariatric operations were introduced in the past four decades, encompassing a spectrum from primarily restrictive, to combined restrictive/malabsorptive, to purely malabsorptive operations. Roux-en-Y gastric bypass is currently the most commonly performed operation for treating morbid obesity, representing approximately 70% to 75% of all bariatric procedures (Smith, Schauer & Nguyen, 2011).

According to the National Institute of Health and International Diabetes Federation the indications for bariatric surgery are:

- Unsuccessful weight loss with dietary and exercise interventions
- BMI ≥ 40 kg/m²
- BMI 35–39.9 kg/m² with ≥ 1 comorbidities such as Type II diabetes mellitus, hypertension, or obstructive sleep apnea
- Per International Diabetes Federation criteria, BMI 30–34.9 kg/m² with Type II diabetes mellitus and failure to achieve glycaemic treatment targets with an optimal medical regimen
- Acceptable operative risk
- Psychosocially stable with no active depression, psychosis, or substance abuse
- Well-motivated patient, able to adhere to postoperative dietary restrictions.



Bariatric surgery is currently the best-established and most successful approach for sustained weight loss in patients with morbid obesity and with unsuccessful weight loss post non-surgical interventions. Sjostrom, Lissner and Wadel et al., (1997) reported a ten-year outcome data from the observational Swedish Obese Subjects (SOS) study that showed marked benefits in patients treated surgically compared with matched control subjects treated medically, including recovery from diabetes, lipid abnormalities, sleep apnea, and quality of life. In a recent meta-analysis of randomised controlled trials of Bariatric versus non-surgical treatment for obesity Gloy et al., (2013) reported that individuals allocated to bariatric surgery lost more body weight (mean difference -26 kg (95% confidence interval -31 to -21) compared with non-surgical treatment, had a higher remission rate of Type II diabetes (relative risk 22.1 (3.2 to 154.3) in a complete case analysis; 5.3

(1.8 to 15.8) in a conservative analysis assuming diabetes remission in all non-surgically treated individuals with missing data) and metabolic syndrome (relative risk 2.4 (1.6 to 3.6) in complete case analysis; 1.5 (0.9 to 2.3) in conservative analysis), greater improvements in quality of life and reductions in medicine use (no pooled data) and that plasma triglyceride concentrations decreased more (mean difference -0.7 mmol/L (-1.0 to -0.4)) and high density lipoprotein cholesterol concentrations increased more (mean difference 0.21 mmol/L (0.1 to 0.3)).

Bariatric surgery is associated few complications despite huge successes reported post intervention. Gloy et al., (2013) reported iron deficiency anaemia (15% of individuals undergoing mal-absorptive bariatric surgery) and re-operations (8%) as few of the complications of bariatric surgery. The peri-operative mortality and early complications from Bariatric surgery are extremely low, and the expected improvement in health considerably reduces the risk-to-benefit ratio (Kolanowski, 1997). The Canadian Medical Association (CMA, 2007) divided complications that usually arise from bariatric surgery into mild moderate and severe depending on the duration after the surgery. Nausea/vomiting and self-resolving impairment in renal function are the mild and immediate complications while generalised overall risk of mortality from post-operative day thirty to two years is severe and late complication of Bariatric surgical interventions.

It can be concluded that overweight and obesity management can only be carried out and successful with combination of diet, exercise therapy, behavioural modifications. Pharmacological intervention can also be employed but the adverse effects of the medicine should be put into consideration. However, surgical intervention becomes the option only if all non-surgical intervention fails and when the excess weight becomes serious health problems. Also, for low income countries overweight and obese individuals, affordability of surgical intervention might a big problem because

it has been shown that most of the overweight and obese individuals in low income countries are of low socio-economic status.

2.5 WEIGHT PERCEPTION AMONG OVERWEIGHT AND OBESE SUBJECTS

Weight perception is the concept of how an individual perceives his/her weight appropriateness. Self-perceived weight has been documented to have positive associations with effective weight-control and weight-loss behaviours in adults (Wardle, Haase & Steptoe, 2006). Appropriate weight perception is of utmost importance as this would stimulate the need to reduce weight by individuals who are either overweight or obese. In a few instances, overweight/obese individuals do misperceive their body weight. This misperception of weight can be a hindrance to the prevention, control and management of overweight and obesity (Kuchleard & Variy, 2003; Chuang and Lee, 2010). Weight misperception is the discordance between an individual's actual weight status and the perception of his/her weight which can be divided into body weight under-estimation and body weight over-estimation. Weight under-estimation is a situation in which an overweight individual considers himself/herself underweight whereas he/she is overweight while weight over-estimation is when an individual with normal/underweight considers himself/herself as overweight using body mass index (Park, 2011). Weight misperception has been a public health concern since it can result in large numbers of overweight and obese individuals failing to understand the need for weight control or losing weight (Matthiessen et al., 2013). Intention and attempt to lose weight have been shown to be associated with the way how one perceives body weight. This will eventually affect intervention towards overweight prevention, control and management. According to Lemon, Rosal, Zapka, Borg and Andersen (2009) individuals who perceive themselves to be overweight are more likely to intend and attempt to lose weight.

Weight misperception has been reported in literature among the youth and adults of different countries. High prevalence of weight misperception has been reported among the youth in Pakistan, a developing country, with 42.4% overall weight misperception seen in the total youth population (Saleem, Ahmed, Mulla, Harder & Abbas, 2013). High prevalence of weight misperception is also noticed in Spain (Jauregal-Lobera et al., 2011) USA (Park, 2011) and China (Xu et al., 2011). Cogan, Bhalla, Sefa-Dedeh and Rothblum (1996) reported differences in the body weight perception and attractiveness between Ghanaian students and US students. Students in Ghana rate a larger body size as the ideal for male and female while reverse is the case for US students. Non-Hispanic Blacks and Mexican Americans who are overweight/obese have been found to view themselves as underweight and incorrectly perceived themselves to be at the recommended weight (Dorsey, Eberhardt & Ogden, 2009). Results of the study of Paeratakul, White, Williamson, Ryan, and Bray (2002) shows that white women were most likely to report that they were overweight and black men were least likely to report that they were overweight and that perception of overweight was generally higher in Hispanic men and women compared with black men and women. Also, Duncan et al., (2011) also reported that nearly one-quarter of the US sample of overweight and obese adults misperceived their body weight. A comprehensive approach with efficient identification of social, cultural, and environmental factors that give rise to obesity tolerance in blacks may provide potential targets for intervention to ameliorate weight misperception and the prevalence of excess weight in blacks (Hendley, Zhao, Coverson, Din-Dzietham, Morris, Quyyumi et al., 2011).

Literatures have shown the importance of accurate weight perception as being an impetus for weight reduction and maintenance attempt and existence of racial differences in weight perception between white and black. It might be logical to say that there would not be any difference in the body weight perception between Black Americans and Black Africans because of the shared gene but differences in information to healthy living and access to qualitative healthcare are factors that need to consider

among Black Africans. Little is known about weight misperception among overweight/obese individuals in the sub-Saharan Africa, especially Nigeria, by using actual weight measurements. This is because few studies on weight perception among Nigerians are carried out among particular ethnic group (Okeke, Ibeh & Ene-Obong, 2006), undergraduates (Maruf, Akinpelu & Nwankwo, 2012) or of small sample size (Iliyasu, Abubakar, Abubakar, Lawan, Gajida and Jibo, 2013) which make generalisation of their results difficult.

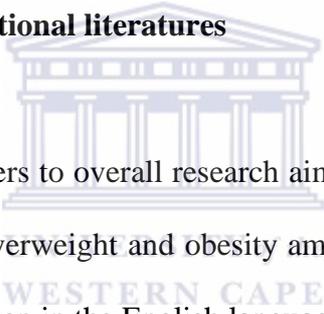
2.6 DESIGNING CULTURALLY APPROPRIATE INTERVENTION FOR OVERWEIGHT AND OBESITY

There is an alarming increase in the prevalence of overweight and obesity in high and low to medium income countries in of both adults and children. Globally, one billion people are overweight and 850 million individuals are underweight (WHO, 2005). Socio-economic and health consequences have been researched in literature which makes overweight/obesity urgent public health issues. Increase in body weight usually results from an imbalance of energy intake (nutrition) and calories burned (physical activity). It is believed that consumption of (too much/unhealthy) food and the amount of physical activity is the result of a complex interaction between individual behavioural characteristics and social, physical, cultural and economic aspects of the environment in which children and adolescent live, learn and play. The same is also applicable to adults.

An innovative approach for overweight/obesity management should be one that would be understandable by the target population and must be multi-dimensional so as to produce a structural solution. Health behaviours are bound strongly with culture and any intervention must in itself be culturally and linguistically appropriate and Cultural preferences may influence engagement with different recreational activities and food choices and also the nature of social support networks, essential for promoting health behaviour change, may also be different (Maynard, Baker, Rawlins,

Anderson & Harding, 2009). Family based approaches are strongly supported in the obesity treatment literature (Golan and Weizman, 2001), as social support from family members may encourage healthy dietary adherence (Wilson & Ampey-Thornhill, 2001). Compared to the Western focus on the individual, relational and family-orientated, non-Western traditions may influence the relevance and uptake of health promotion messages (Kreuter, Lukwago, Bucholtz, Clark & Sanders-Thompson, 2003). Ethnic-specific health intervention studies in the US have often involved both the family and the community organisations, promoting social support from the family and community as well as obtaining direct access to specific populations (Yancey et al., 2004).

2.6.1 Review of Local and International literatures



This was carried out to provide answers to overall research aim: designing ethnic based intervention for prevention and management of overweight and obesity among Nigerians. Randomised and non-randomised control trials articles written in the English language were considered from the following databases -Medline, Cochrane Library, Cumulative Index to Nursing and Allied Health Literature (CINAHL) research data base, Pub med and African Journal Online (AJOL). Articles published between 2005 and 2011 were reviewed and medical subject Headings (MESH) term included overweight, obesity and dietary. The titles and abstracts of all identified studies were assessed to determine whether they are pertinent to the research aim. Full manuscripts of relevant articles were obtained and reviewed by the researcher to determine the appropriate ones that were within the inclusion criteria and should be included. The outcome of the literature reviews was summarized in evidence tables which were used in designing ethnic based intervention for prevention and management of overweight and obesity.

Table 2.2 Summary of Intervention for Overweight and Obesity Management

| Author and Date | Title | Aims and Objectives | Population | Intervention | Outcome Measures |
|--|---|---|--|--|---|
| Mary Ann Faucher, CNM, PhD, and Julie Mobley(2010) | A Community Intervention on Portion Control Aimed at Weight Loss in Low-Income Mexican American Women | The primary aim of this pilot study was to evaluate a portion control intervention compared to standard care counselling on weight loss in low-income Mexican American women | N=19 Mean age=34.89 Female only Intervention=1 Standard care/Control=8 | Duration=20 weeks. Standard Care Group- received a physical examination and dietary education counseling on portion control and exercise(Spanish language food pyramid, portion control counseling, and tools for logging dietary intake and daily activity) Intervention Group - On portion control as a dietary intervention (attended four group meetings for weeks 1, 3, 7, and 13). NOTE - All foods prepared for classes were culturally specific to Mexican American families, low cost, and quick to prepare. | BMI, height,weight |
| RESULTS: The mean weight loss in the standard care group was 2.8 pounds (standard deviation [SD], 10.3) compared to the mean weight loss of 6.6 pounds (SD, 7.5) in the intervention group. The mean weight loss, regardless of group, was greater among participants who stated that they exercised two or more days a week at the beginning and at the end of the programme. | | | | | |
| Ken Resnicow, Ricia Taylor, Monica Baskin, and Frances McCarty(2005) | Results of Go Girls: A Weight Control Program for Overweight African-American Adolescent Females | The primary aim of the project, called Go Girls, was to develop and test a culturally tailored intervention programme for overweight 12- to 16-year-old AA adolescents and their parents. | N=123 girls | High-intensity (20 to 26 sessions) or moderate-intensity (six sessions) culturally tailored behavioural group intervention delivered over 6 months. | Primary outcome measure was BMI and secondary outcomes included percentage body fat, waist and hip circumferences, blood pressure (BP), serum measures of lipids, insulin, and glucose, and cardiovascular fitness (by Leger shuttle test). |

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| RESULTS: It was concluded that the intervention was not effective in reducing adiposity (BMI) though there were some positive findings among the high attenders | | | | | |
| Nangel M. Lindberg, Victor J. Stevens, Sonia Vega-López, Tia Kauffman, Mariana Rosales Calderón, and María Antonieta Cervantes (2012). | A weight-loss intervention programme designed for Mexican-American women: Cultural adaptations and results | This study assessed the feasibility of a culturally-appropriate weight-loss intervention targeting obese Spanish-speaking Mexican women. | Duration=12 months N=47 Mean age=38 years females | Behavioural interventions 1. Physical activity that the participants are familiar with and that can be done in the privacy of their homes. 2. Dietary intervention that conforms with Mexicans ways in terms of moving away from fast food and indulge in raw vegetables | BMI, dietary intake |
| RESULTS: This pilot study shows that it is feasible to develop and implement culturally appropriate behavioural lifestyle interventions for obesity treatment in Mexican-American women. | | | | | |
| Boyington JEA, Carter-Edwards L, Piehl M, Hutson J, Langdon D, McManus S. (2008). | Cultural Attitudes Toward Weight, Diet, and Physical Activity Among Overweight African American Girls | This pilot study sought to qualitatively examine perceptions, attitudes, and cultural experiences relative to weight and weight-related factors among a sample of overweight African American girls. | n=12 | Focus Group Discussion | 1) Definition of personal health; 2) dietary and physical activity habits; 3) perceptions of personal health and body; 4) important figures and role models; 5) social support; and 6) culture and environmental factors. |
| RESULTS: The findings imply that perceptions of weight and healthy lifestyle behaviours are largely determined by environmental and personal influences. These factors should be considered in the development of healthy-weight interventions for African American girls. | | | | | |
| VA Diaz, AG Mainous III and C Pope. (2007). | Cultural conflicts in the weight loss experience of overweight Latinos | Development of culturally appropriate weight loss strategies for overweight Latinos | N=19 | Focus Group Discussion | Weight loss experiences, reasons for wanting to lose weight, things that make them likely to lose weight, barriers to weight loss. |

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|--|--|---|--|--|--|
| RESULTS: To improve health promotion for Latinos, cultural factors distinctive to this underserved population, and barriers they articulate, should be considered when developing weight loss interventions. | | | | | |
| Shari L. Barkin, Sabina B. Gesell, Eli K. Po'e, Juan Escarfuller, and Tommaso Tempesti, (2012). | Culturally Tailored, Family-Centered, Behavioural Obesity Intervention for Latino-American Preschool-aged Children | To test the effect of a culturally tailored, family-centered, short-term behavioural intervention on BMI in Latino-American preschool-aged children. | Intervention=35 Control=45 Total=75 | Intervention Group- The culturally tailored Salud Con La Familia (Health with the Family) program consisted of weekly 90-minute skills building sessions for parents and preschool-aged children designed to improve nutritional family habits, increase weekly physical activity, and decrease media use (sedentary activity). Control Group- A brief school readiness program was conducted. The control group's program was designed to improve school readiness in preschool-aged children through increased parental verbal engagement (e.g., daily reading, playing word games, how to talk to children). | BMI |
| RESULTS: A skills-building, culturally tailored intervention involving parent-child dyads changed short-term early growth patterns in these Latino-American preschool-aged children. | | | | | |
| WS Carlos Poston, RS Reeves, CK Haddock, S Stormer, A Balasubramanyam, O Satterwhite, JE Taylor and JP Foreyt. (2003) | Weight loss in obese Mexican Americans treated for 1-year with orlistat and lifestyle modification | To evaluate the effectiveness of a culturally appropriate lifestyle intervention combined with orlistat in producing weight loss with obese Mexican-American women. | n=108(Female) Age: Intervention=42.4+9.2 Control=43.7+9.2 | Duration: 12 months 24 weekly intervention classes, six bimonthly and three monthly maintenance classes Interventions: Taking 120mg of orlistat three times a day at meals for the 12 months. Lowering of caloric intake by at least 500 calories per day. Limiting fat intake to 30% of total daily calories. To increase physical activity to a minimum of five times per week for 30 min per session for a total of 150 min or more per week(especially walking and stair climbing). | BMI, waist circumference, blood pressure, total cholesterol, triglycerides, low-density lipoprotein (LDL), and high-density lipoprotein. |

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|--|---|--|--|--|--|
| | | | | Control: | |
| RESULTS: This study demonstrates the effectiveness of an intervention combining orlistat and lifestyle modification with Mexican-American women, a population with substantial risk for obesity. | | | | | |
| Delia S. West, T. Elaine Prewitt, Zoran Bursac and Holly C. Felix. (2008). | Weight Loss of Black, White, and Hispanic Men and Women in the Diabetes Prevention Program | To provide the specific weight loss outcomes for African-American, Hispanic, and white men and women in the lifestyle and metformin treatment arms of the Diabetes Prevention Program (DPP) by race-gender group to facilitate researchers translating similar interventions to minority populations, as well as provide realistic weight loss expectations for clinicians | Age: Sample= 2,921 Black= 22% Hispanic= 17% White= 61% Women= 68% | Duration: 3 years Lifestyle modification (a 16-session of healthy diet= 25% of calorie reduction in dietary fat and 150 minutes moderate physical activity, PA). Metformin & Placebo (Annual individual session focusing on importance of weight loss and PA encouragement). | Weight, BMI, impaired glucose tolerance test |
| RESULT: Diminished weight losses were apparent among black women in comparison with other race-gender groups in a lifestyle intervention but not metformin, underscoring the critical nature of examining socio-cultural and environmental contributors to successful lifestyle intervention for black women | | | | | |
| Leonor Corsino, María Pilar Rocha-Goldberg, Bryan C. Batch, David I. Ortiz-Melo, Hayden B. Bosworth, and Laura P. Svetkey. (2012). | The Latino health project: pilot testing a culturally adapted behavioral weight loss intervention in obese and overweight Latino adults | Objective—To pilot test a culturally adapted behavioral weight loss intervention in obese and overweight Latino adults | N=56 Age: 38+9.2 Male:9 Female:47 | Duration=20 weeks/90-120 minutes /session. Dietary Approach to Stop Hypertension (DASH) dietary pattern, Increased moderate physical activity, reduced calorie intake. Cultural adaptation: traditional foods incorporation, Latino culture PA (dancing and soccer). | Weight, body mass index (BMI), blood pressure, dietary pattern, and physical activity were measured at baseline and at 20 weeks. |

A culturally adapted behavioural intervention for the treatment of overweight and obesity is potentially effective in a diverse group of Latino adults

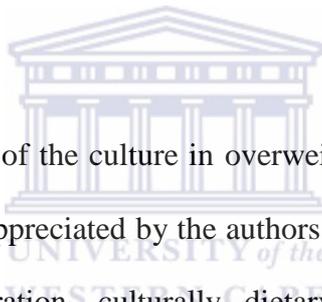
| | | | | | |
|--|--|---|---|--|--|
| <p>Sara Wilcox, Patricia A. Sharpe, Deborah Parra-Medina, Michelle Granner, Brent Hutto. (2011).</p> | <p>A randomised trial of a diet and exercise intervention for overweight and obese women from economically disadvantaged neighbourhoods: Sisters Taking Action for Real Success (STARS)☆</p> | <p>Primary aim of STARS is to test the effects of a 16-week behavioural/social support group-based intervention on body weight and waist circumference compared to a minimal intervention control group. Secondary aims: (a) Testing the effects of the 16-week group-based intervention on the secondary outcomes of physical activity, dietary composition, and dietary behaviours (b) Testing the effect of an 8-week telephone-delivered maintenance intervention on primary and secondary outcomes (c) Assessing longterm maintenance of primary and secondary outcomes after a 12-week no-contact maintenance phase that begins after the telephone maintenance phase ends (d) Examining whether changes in psychosocial</p> | <p>N=155 Age=38.9years Mean BMI=40.1kg/m² Intervention=80 Control= 75</p> | <p>Intervention: Received 16 theoretically-based and tailored weekly group sessions followed by 8 weeks of telephone maintenance counselling and a dietary and exercise counselling session. Control: Received 16 weekly health education mailings and a dietary and exercise counselling session.</p> | <p>Primary Outcome Measures: Weight Waist Circumference. Secondary Outcome Measures: Dietary intake, objective measurement of physical activity, estimated cardiorespiratory fitness, low-fat eating and emotional eating practices, fast food frequency.</p> |
|--|--|---|---|--|--|



| | | | | | |
|--|--|---|--|--|--|
| | | constructs consistent with our theoretical model mediate the relationship between the intervention and outcome measures at each of the measurement periods. | | | |
|--|--|---|--|--|--|



The intervention effectiveness was assessed using body mass index (BMI), weight, waist circumference, serum analysis, dietary intake and physical activity as mostly employed outcome measures. About 77.8% of the interventions employed BMI as outcome measure while about 44.4% used weight measurement as outcome measure. About 33.3% of the interventions used waist circumference, blood pressure, dietary intake and serum analysis. It can be seen from this review that BMI is widely used as outcome measure in assessing the effectiveness of an intervention for overweight and obesity management. This might be due to fact that BMI does not require sophisticated equipment and easy to use in epidemiological studies and resource constrained environment.

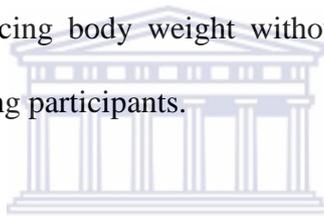


The overarching importance role of the culture in overweight and obese individuals in planning their treatment is well appreciated by the authors as shown in the above table. Culturally specific food preparation, culturally dietary education, high/moderate physical activity that is culturally tailored, and behavioural modifications that suits the culturally affiliations of the overweight and obese individuals were effective. These interventions were carried out between a minimum of twenty weeks to a maximum of three years. A thorough literature search yielded no results regarding culturally specific interventions for overweight and obesity management among Nigerians.

2.7 THEORETICAL FRAMEWORK

The effects of globalisation and acculturation in developing countries have been discouraging because of their impact on health and general wellbeing of the populace. In the U.S. and abroad, globalisation has been linked to fewer home-cooked meals,

more calories consumed in restaurants, increased snacking between meals, and increased availability of fast foods in schools (Bruss, Morris, Dannison, Orbe, Quitugua, & Palacios, 2005). Similarly, there have been changes in patterns of physical activity linked to risk of obesity in both adults and children worldwide, including increased use of motorised transport, fewer opportunities for recreational physical activity, and increased sedentary recreation (Lobstein, Baur & Uauy, 2004). Much of the research that has compared the dietary behaviours of normal versus overweight/obese individuals has focused on identifying individual risk factors, while often neglecting the interpersonal context in which these behaviours occur and are reinforced (Sorkin & Billimek, 2012) and also many treatment protocols have been instituted with the aims of reducing body weight without any recourse/reference to cultural orientation of the intending participants.



WESTERN CAPE

Culture is a system of common reasoning that influences and, in turn, is influenced by accumulation of knowledge of ways of life of people. It is learned and disseminated within a group so as to enable them to behave in mutually acceptable ways with one another. Understanding of obesity cause, course and cure, and the extent to which a society or ethnic group views it as an illness are among the shared understanding encapsulated by culture. Illness is shaped by cultural factors governing perception, labelling, explanation, and valuation of the discomfiting experiences (Kleinman, Eisenberg, & Good, 1978). Because illness experience is an intimate part of social systems of meaning and rules for behaviour, it is strongly influenced by culture. The ultimate goal is to reduce or stop the advancement of prevalence of overweight and obesity the success of which depends on thorough understanding of the factors (personal, cultural, environmental) that influence increase in body weight.

The literature is replete with studies documenting significant health effects of health promotion research and practice in overweight and obesity management. The myopic focus of health promotion and research used to be on modification of individual's health habits and lifestyles while neglecting the environmental underpinnings of health and illness. The significance of linking behavioural strategies of health promotion with efforts to improve environmental supports within the broader community that are conducive to personal and collective well-being (Green & Kreuter, 1991) and the development of cultural change strategies to foster socially supportive norms and healthful environmental conditions within work organisations (Allen & Allen, 1986) has been conceptualised in recent times. Encouraging people to increase their physical activity levels, consuming a healthy diet, and abhor and vices that are inimical to good health are too complex to be understood adequately from single level of analysis and therefore require more comprehensive approaches that integrate psychological, organisational, cultural, community planning, and regulatory perspectives (Anderson and O'Donnell, 1994; McLeroy, Steckler, Goodman & Burdine, 1992). Behavioural change, environmental enhancement, and social ecological model are few theoretical approaches employed in health promotion. A social-ecological model was employed as the theoretical framework for this study.

2.7.1 Behavioural Change Theories

Behavioural change theories are attempts by researchers to explain why and why not people behaviours change to adopt certain positive health behaviours. Major factors in behavioural determination are personal, environmental and behavioural factors. Theories of behavioural change are heterogeneous, in that they range from explaining (i) how people become motivated to change behaviour (e.g. form an intention), to (ii)

how they translate this motivation into actual behaviour change, to (iii) how they maintain newly adopted behaviours and reduce the risk of relapses (Web, Sniehotta & Michie, 2010). Glanz, Lewis and Rimmers (1990) suggested that good understanding of behavioural change theories and ability to use them in practice is a precursor to successful interventions designing to change behaviour. Below is the table that contains key elements of Behaviour Change and strategies to maximize them according to Witte (1997).

Table 2.3 Behavioural Change Models Variables

| Key Element | Definition | Strategies for Behaviour Change |
|-------------------|---|---|
| Threat | A danger or a harmful event of which people may or may not be aware. | Raise awareness that the threat exists, focusing on severity and susceptibility. |
| Fear | Emotional arousal caused by perceiving a significant and personally relevant threat. | Fear can powerfully influence behaviour and, if it is channeled in the appropriate way, can motivate people to seek information, but it can also cause people to deny they are at risk. |
| Response Efficacy | Perceptions that a recommended response will prevent the threat from happening. | Provide evidence of examples that the recommended response will avert the threat. |
| Self-Efficacy | An individual's perception of or confidence in their ability to perform a recommended response. | Raise individual's confidence that they can perform response and help ensure they can avert the threat. |
| Barriers | Something that would prevent an individual from carrying out a recommended response. | Be aware of physical and cultural barriers that might exist, attempt to remove barriers. |
| Benefits | Positive consequences of performing recommended response. | Communicate the benefits of performing the recommended response. |
| Subjective Norms | What an individual thinks other people think they should do. | Understand with whom individuals are likely to comply. |
| Attitudes | An individual's evaluation or beliefs about a recommended response. | Measure existing attitudes before attempting to change them. |
| Intentions | An individual's plans to carry out the recommended response | Determine if intentions are genuine or proxies for actual behaviour. |
| Cues to Action | External or internal factors that help individuals make decisions about a response. | Provide communication that might trigger individuals to make decisions. |
| Reactance | When an individual reacts against a recommended response. | Ensure individuals do not feel they have been manipulated or are unable to avert the threat. |

Witte, K. (1997). Research review theory-based interventions and evaluations of outreach efforts [electronic version]. *Planning and Evaluating Information Outreach among Minority Communities: Model Development Based on Native Americans in the Pacific Northwest*. Retrieved November 19, 2014 from <http://nrlm.gov/archive/pnr/eval/witte.html>.

Few of the most commonly used behavioural change models are Health Belief Model, Theory of Reasoned Action, Social Cognitive Theory and Transtheoretical Model or Stages of Change Model.

2.7.1.1 Health Belief Model (HBM)

This was developed by Irwin Rosenstock in 1966 and was inspired by the need to study the reasons people displayed for seeking or declining X-ray examinations for tuberculosis. Though it is of the earliest and most influential models in health promotion, its deficiencies include focusing on negative factors and ignoring positive motivations that prompt healthy behaviour and also focusing on individual factors rather than socioeconomic and environmental factors and therefore encouraging victim-blaming (Roden, 2004).

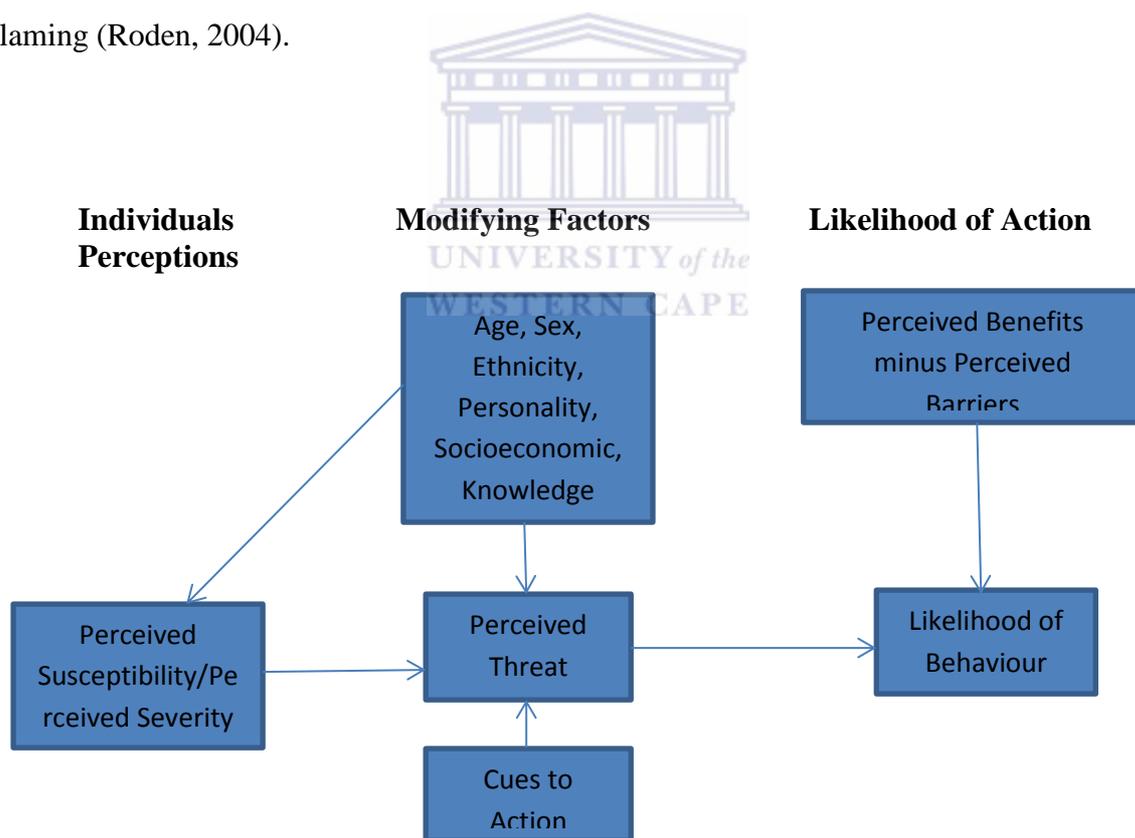


Figure 2.1 Health Belief Model (Stretcher & Rosenstock, 1997).

2.7.1.2 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action was developed in 1975 by Martin Fishbain and Icek Ajzen. This theory proposes that behavioural intentions are a function of attitudes and subjective norms (perceived approval of important others) (Webb, Sniehotta & Michie, 2010). It looks at the intentions rather than actual behaviour. The Theory of Reasoned Action does not provide ample information about how to change behavioural beliefs (Barker & Swift, 2009) and also the theory lacks environmental, economic and political factors.

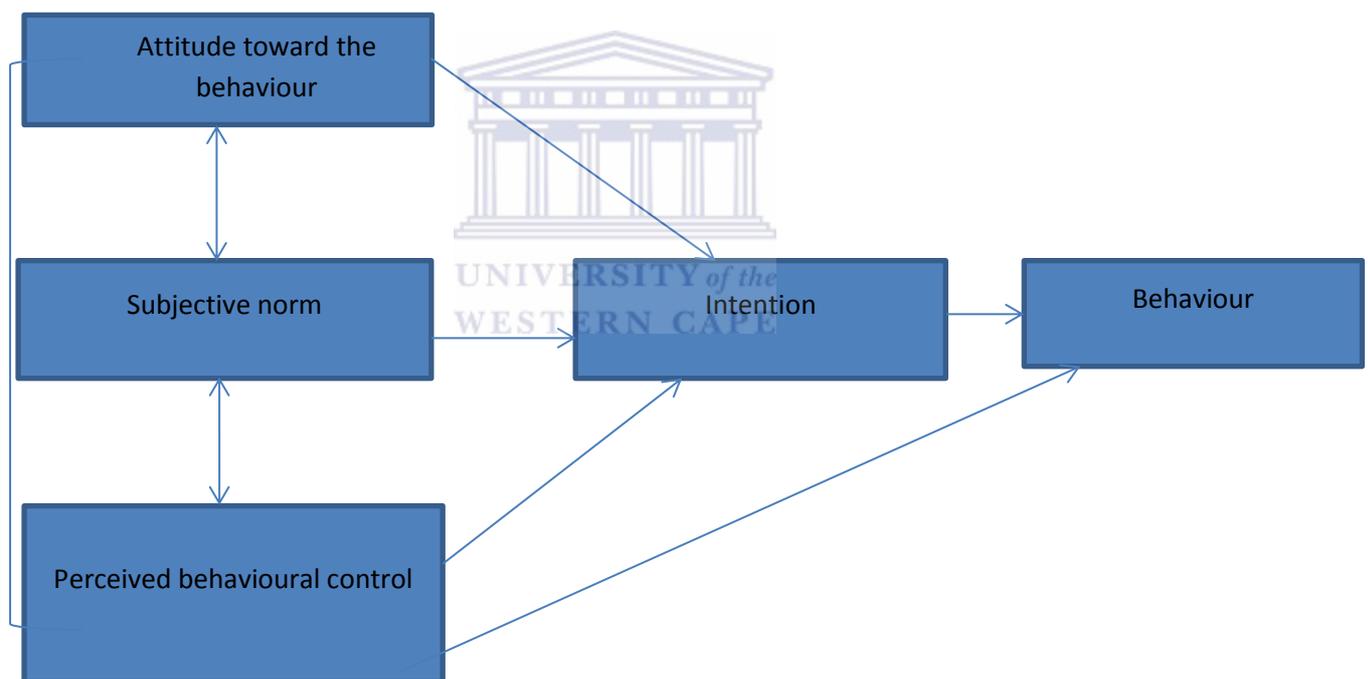


Figure 2.2 Theory of Planned Behaviour Model

2.7.1.3 Social Cognitive Theory (SCT)

This is otherwise called Social Learning Theory (SLT) developed by Bandura in 1989. It proposes that human beings are driven by external forces rather than inner forces.

Proponent of this theory believes that behaviour is learned through observation, imitation and positive reinforcement and that behavioural change is determined by environmental, social, personal, and behavioural elements. Social Cognitive Theory is the most widely recognizes feeder theory for health education and health promotion programmes (Macdonald, 2000).

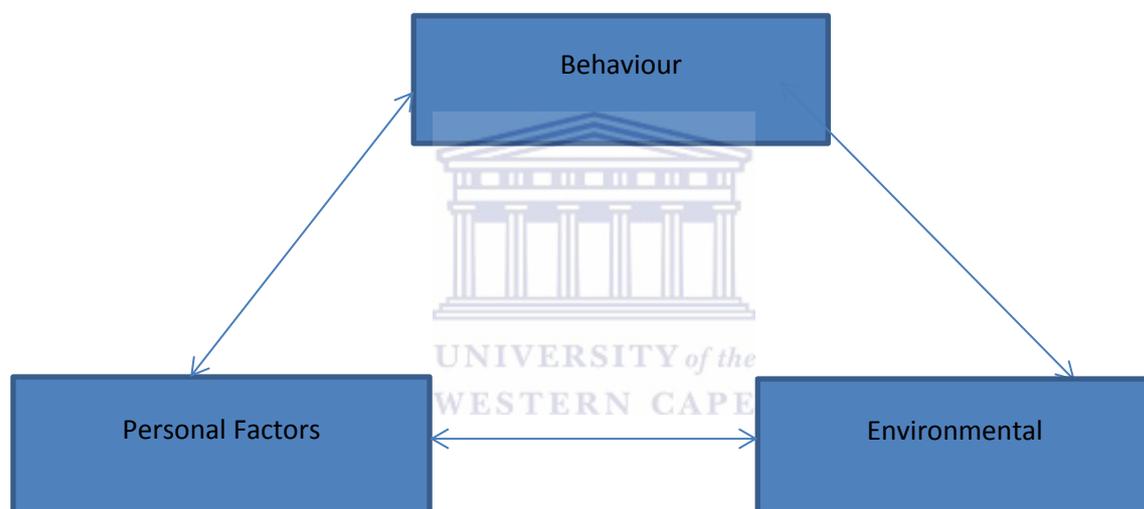


Figure 2.3 Social Cognitive Theory Model

2.7.1.4 Transtheoretical Model or Stages of Change Model

This was developed by James Prochaska and Carlo DiClemente in 1992 based on the position that willingness or intention to change behaviour varies among individuals and within individuals overtime. They described behavioural change as a five-step process: the stages of precontemplation, contemplation, preparation, action and maintenance. Precontemplation stage is the stage in which people are not ready or intending to make a change in the near future and contemplation stage is the stage when people are ready

and have intention to change. Individuals at this stage are aware of the advantages and disadvantages of changing their behaviour. Preparation represents the stage during which individual plans ways to change and intends to take action in the immediate future and action stage is when people make behavioural change. Maintenance is when the individual prevents relapse in the changed behaviour. This theory focuses more on health-related interventions than on individuals. Contrary to the assertion of Prochaska and his colleagues that interventions to change behaviour must pass through five stages, systematic review of literatures shows that staged interventions, like Transtheoretical Model, are no more effective than non-staged interventions (Reimsma et al., 2003). Transtheoretical model does not give attention to the environmental, economic, and political influences that can impact health behaviours.

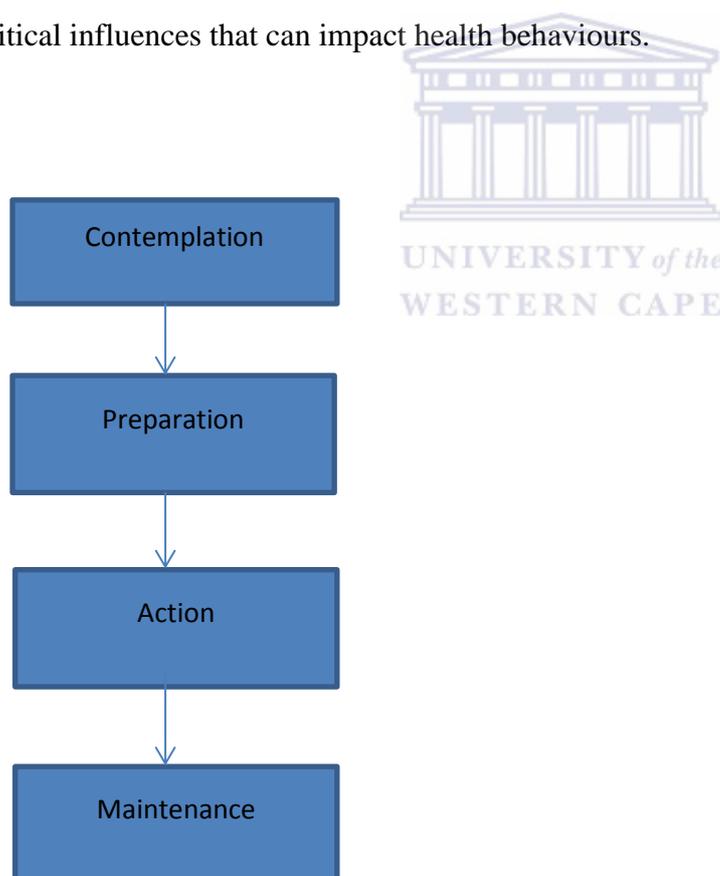


Figure 2.4 Transtheoretical Model or Stages of Change Model

2.7.2 Social-ecological Model

Stokols (1996) defined social ecology as an overarching framework, or set of theoretical principles, for understanding the interrelations among diverse personal and environmental factors in human health and illness. The social ecological perspective on health promotion is based, not only on a singular discipline or theory, but rather on a broad, overarching paradigm that bridges several different fields of research (Stokols, 1996). The social ecological model is engrafted in core principles concerning the interrelations among environmental conditions and human behaviour and well-being. The features of environmental settings according to the social ecological model include physical, social, and cultural dimensions that can affect arrays of health outcomes, including physical health status, developmental maturation, emotional well-being, and social cohesion (WHO, 1984). Human health is influenced by environmental circumstances as well as a variety of personal/individual varieties like genetic heritage, psychological disposition, and behavioural patterns. To address the challenges of translating social ecological theory for maximal usage in community health programmes, Stokols (1996) came up with core principles of social ecology. These are:

- Principle One: Multiple Dimensional Analysis
- Principle Two: Differential Dynamic Interplay
- Principle Three: Relevance of System Theory
- Principle Four: Interdependence of Environmental Conditions
- Principle Five: Inherent Interdisciplinarity

These aforementioned principles form the founding guidelines for designing and implementing efficient health promotion programmes for disease prevention and management on the platform of social ecological milieu. The table below outlines

guidelines for designing and evaluating health promotion programme on the basis of social ecological principles.

Table 2.4 Guidelines for Designing and Evaluating Health Promotion Programmes on the Basis of Ecological Principles (Stokols, 1996)

| Ecological Principle | Corresponding Procedural Guideline |
|---|--|
| Physical, mental, and social well-being are influenced by a variety of environmental factors | Examine links between multiple facets of well-being and diverse conditions of physical and social environment |
| Personal characteristics and environmental conditions often have interactive as well as direct effect on well-being | Examine the joint influence of behavioural, dispositional, developmental, demographic factors on people's exposure and responses to environmental hazards and demands |
| The degree of fit between people's biological, behavioural, and sociocultural needs and the environmental resources available to them is a key determinant of well-being | Identify sources of person-environment and group-environment misfit, and develop interventions that enhance the fit between people and their surroundings |
| Within the context of structured community settings, certain behaviours and roles exert pivotal influence on well-being | Identify behavioural and organizational "leverage points" for health promotion; consider both personal and other-directed health behaviour as targets for change within community interventions. |
| Examine links between physical and social conditions within particular settings and life domains on persons' health over extended periods | Account for the moderating and mediating influences of physical and social conditions on health; design community interventions that span multiple settings and have enduring positive effects on well-being |
| Interdisciplinary research, linking the perspectives of medicine, public health, and the behavioural and social sciences, is essential for developing comprehensive and effective health promotion programmes | Integrate biomedical, behavioural, regulatory, and environmental interventions for health promotion; use multiple methods to evaluate the health and cost-effectiveness of community programmes |



Figure 2.5: The Socio-Ecological Model

2.8 SUMMARY OF THE CHAPTER

This chapter gives an evaluative report of information on overweight and obesity regarding the global prevalence, weight misperception, predisposing associated risk factors, co-morbidities, and its management. The socio-ecological model that was employed by this study forms the last part of this chapter. The summary is therefore highlighted below:

- There is an increase in the prevalence of overweight and obesity in high and low income countries and this affects individuals with low SES residing in urban areas.
- Modernisation, aculturalisation and improvement in economic growth are few of the factors responsible for astronomical increase in overweight and obesity in developing countries.
- Weight misperception negatively affects attempt to lose weight and more blacks misperceive their weight than the whites.

- Most blacks believed to be overweight is a sign of being healthy and affluence.
- Age, gender, educational levels, marital status, employment status as well as area of residence are few socio-economic factors of overweight and obesity
- Health related risk factors of overweight and obesity include physical activity, alcohol consumption diabetes mellitus and high blood pressure.
- Hypertensions, diabetes mellitus, musculoskeletal problems, certain type of cancer, coronary artery disease are few of the co-morbidities of obesity.
- Non-surgical management of overweight and obesity includes diet therapy, increase in physical activity, behavioural therapy, pharmacotherapy.
- Surgical intervention is the last result and only affordable for the rich.
- A socio-ecological model was employed for this study because it gives better understanding of the interrelations among diverse personal and environmental factors in human health and illness.

It is apparent from this chapter that increase in the prevalence of overweight and obesity is no longer a deniable issue. Interventions currently employed do not take into consideration the cultures and environmental factors that facilitate increase in body weight. The primary focus of this study is to design a culturally appropriate intervention for overweight and obesity among Nigerians. Chapter Three gives details steps and methods to achieve this.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

This chapter provides all methodological steps taken towards achieving the objectives of this study. This chapter gives a detailed description of the methodology employed in conducting this study. A broad description of the research setting, population, study design, data collection procedures as well as data analysis are all explained. Ethical considerations pertaining to the study are also outlined.

3.2 RESEARCH SETTING



This study was conducted in Alimosho local government area of Lagos State, Nigeria. Although the smallest state in Nigeria in terms of land surface area, it is the second most populated state in Nigeria. It is a metropolitan state with a population of 9,013,534 (2006 National Population Census) people occupying 3577 square kilometres, of which 787 square kilometres are lagoons and creeks. It is a peaceful state besides the enormous economic opportunities present there. The most populous state in Nigeria, Kano State, was not suitable for selection as there is political unrest and violence is on-going. Alimosho local government, being the most populous of the twenty local governments in Lagos State, was chosen purposively. Alimosho local government has a population of 1,277,714 (2006 National Population Census). Alimosho local government has her boundary with Agege local government in the north, Ikeja Local government in the Northeast, Oshodi-Isolo local

government in the east, Ojo local government in the south and Ogun State in the West. It was created from Ikeja local government in 1979 because of the dense population of the area.



Figure 3.1 Lagos State Map



3.3 STUDY POPULATION

The target population for this phase were males and females Nigerians residing in fifteen enumeration areas in Alimosho local government area of Lagos State, within the age range of 18 years and 70 years. Traditional rulers, market leaders and health care providers were also part of the study population.

3.4 STUDY DESIGN

The design of this study was a mixed method design, i.e. characterised by the collection and analysis of both quantitative and qualitative data (Creswell, 2003). The convergent parallel

mixed design specifically was used in this study. This involves simultaneous timing of carrying out both quantitative and qualitative strands of mixed methods during the same phase of the research process, prioritises the methods equally, and keeps the strands autonomous during analysis and then mixes the results during overall execution. This enables the researcher to obtain different, but complementary data on the same topic (Morse, 1991) so as to have more in-depth inference of the research problem. With this type of design, the qualitative and quantitative strands are planned and implemented to answer related aspects of the same overarching research question (Teddlie & Tashakkori, 2009).

3.5 DATA COLLECTION METHODS AND PROCEDURES

The data collection for this study will be described for each phase.

3.5.1 PHASE 1: TO GATHER BASELINE INFORMATION REGARDING OVERWEIGHT AND OBESITY AMONG NIGERIANS.

This phase entailed gathering information regarding the prevalence of overweight and obesity and the risk factors associated with it. Furthermore, data on body weight perception of Nigerian overweight and obese individuals was also collected.

Study Population and Sampling

Cluster sampling technique was used to recruit subjects for this phase. Alimosho local government has a population of 1,277,714 (2006 census). There are eleven political wards in Alimosho local government. Using the World Health Organisation (WHO, 2004) guidelines for conducting community surveys, five out of eleven political wards into which Alimosho area is divided were randomly chosen. Three census enumeration areas (EAs) were randomly selected in each of the five chosen political wards. Census enumeration areas in each of the

chosen five political wards were randomly selected from EAs in Alimosho local government through National Population Commission 2006 census enumeration areas. Houses with odd numbers were selected for survey in each census enumeration area. In each of the fifteen (15) enumeration areas approximately 150 adults aged 18 years and above were approached and a sample size of 2250 was thus arrived at. However, 1571 individuals consented to participate in the study which gave a response rate of 69.82%. A total of 2250 individuals were approached in fifteen (15) enumeration areas of Alimosho Local Government area for participation and 1571 individuals consented to participate. Therefore, a response rate of 69.82% ($n=1571/2250$) was thus achieved.

Research Instruments

Self-administered questionnaires were used to collect data. The questionnaires were WHO- STEPS questionnaire and body weight perception/dissatisfaction questionnaire. Details of each of these are outlined below.

WHO - STEPS Questionnaire

The WHO STEPS instrument is a standardised method of collecting, analysing, and disseminating data in WHO member countries for non-communicable diseases (Appendix 5). It contains core and expanded items. For this study both the core and expanded items were used. The instrument measures demographic information such as gender, age, highest educational level, marital status and socio-economic status. Behavioural measurements assessed included tobacco use, alcohol consumption, diet and physical activity. In addition, information regarding the history of the raised blood pressure and diabetes was requested.

Physical measurements taken included height, weight, hip and waist circumference, blood pressure and heart rate (Appendix 5).

Reliability of the WHO-STEPS Questionnaire

To further ensure reliability of the instruments for the Nigeria context, a pilot study was carried out. The sample population was randomly recruited from an enumeration area that was not part of the ones randomly selected for the main study but within the same research setting. The WHO guidelines for conducting surveys were used (WHO, 2004). Houses with odd numbers were selected for the pilot study and the subject age was between 21 and 67 years. All ethical procedures were followed as outlined in the ethical consideration section.

The WHO-STEPS questionnaires were administered only to those who consented to participate in the study at two different times (two-week interval) to prevent the problems of carry-over, recall-effects and learning which are usually associated with test-retest reliability of an instrument (Allen & Yen, 1979). Test-retest intervals should be far enough apart to avoid fatigue, learning, or memory effects, but close enough to avoid genuine changes in the measured variable (Portney & Watkins, 1993). A pilot study is a small study/experiment/step that enables a researcher to assess or examine the feasibility of an instrument or approach that is intended to be used in a larger scale study. A pilot study is usually small in terms of the sample size, duration of the study and budget allocated for the study. It might be carried out to determine the sample size for the main study, determine the integrity of the study protocol, to test questionnaires/forms to be used in a study, acceptability of intervention, and selection of the most appropriate outcome measure (Lancaster, Dodd & Williamson, 2004). For this study, the demographic details and physical measurements sections of the questionnaire were excluded while analysing the reliability data. The result of the analysis showed the Cronbach

alpha to be 0.826 (21 items) which showed high level of internal consistency. The WHO- STEPS instrument has been used successfully in numerous countries, including in low and middle income countries (WHO, 2010) like Nigeria (Nigeria Heart Foundation, 2003), and Lebanon (Sibai & Hwalla, 2010).

Physical Measurements

Several physical measurements were taken and recorded with the instruments described below.

Stadiometer

This was used to measure subject height. Each subject was instructed to stand barefooted with feet together on a level cemented floor, buttocks and heels touching the wall, the head held erect, and the eyes looking forward so that the lower margin of the external auditory canal is in the Frankfurt horizontal plane. The point of greatest height to the nearest 0.1cm was marked off on the wall with a stretch-resistant tape measure.

Weighing Scale

For weight measurement, subject was encouraged to put on minimal clothing material prior to measurement. The subject weight was measured using TANITA BC-549 plus ironman body composition monitor. The weight was recorded to the nearest 0.5kg. To ensure reliability of these measurements, subject height and weight were measured thrice and average of the three measurements were used as subject height and weight.

Constant Tension Tape Measure

This was used to measure waist and hip circumference. Waist measurement was taken in a private area with the subject without clothing. The midpoint between the lower margin of the

last palpable rib and the top of iliac crest were located by the researcher and the subject was asked to stand with the feet together so as to allow even distribution of body weight. Both arms were held at the sides in a relaxed position. The measurement was taken at the end of a normal expiration using a constant tension tape. Hip measurement was taken immediately after waist measurement, but with minimal /very light clothing on. It was taken with the arms relaxed at both sides with the subject's feet together for the body weight to be evenly distributed over the feet. The constant tension tape was positioned horizontally around the maximum circumference of the subject buttocks. Hip circumference was measured once to the nearest 0.1cm. Each measurement was repeated twice; if the measurements were within 1 cm of one another, the average was calculated (WHO, 2008).

TANITA BC-549 plus Ironman Body Composition Monitor

This was used to measure body compositions of the subjects. This was measured using TANITA BC-549 plus Ironman body composition monitor. It allows body compositions to be measured on a clear surface without visible electrodes. TANITA BC-549 plus ironman body composition monitor uses Bioelectric Impedance Analysis (BIA) technology to monitor complete body compositions of the users. It measures body weight, body fat %, body water, muscle mass, physique rating, basal metabolic rate (BMR), metabolic age, bone mass and visceral fat rating. It is the highest standard in consumer full-body compositions.

Body composition measurement was carried out by asking subjects with minimal clothing and dry feet to step on the measuring platform after the subject gender, age and height were entered / keyed into the machine. A guest mode was used throughout the period of this study since it allows the researcher to programme the unit for a one-time use without resetting a

personal data number. Each subject was instructed not to step on the measuring platform until 0.0 was displayed. Also, the subject was asked to step onto the measurement platform within about 30 seconds after “0.0” appears. After the measurement was taken, readings were automatically displayed in this order; body weight, body fat %, body water, muscle mass, physique rating, basal metabolic rate (BMR), metabolic age, bone mass and visceral fat rating. An icon was displayed up for each result reading being shown (Appendix 7). Readings were recorded for each subject. Interpretation of body fat percentage was done according to Gallagher et al., (2000) (table 3.2).

VALUES FOR PHYSICAL MEASUREMENTS AND DATA ANALYSIS

Body Adiposity Indices

i. Body Mass Index

Participant BMI was computed as a ratio of total weight in kilograms to height square in meters $\{ \text{weight (kg)} / [\text{height (m)}]^2 \}$ (kg/m^2). Subjects were categorised into overweight or obese based on the calculation of BMI using WHO classifications.

Table 3.1 BMI Classifications

| Classification | Cut-off points(min) | Cut-off points(max) |
|-----------------------|----------------------------|----------------------------|
| Underweight | <18.50 | <18.50 |
| Normal weight | 18.50 | 24.99 |
| Overweight | 25 | 29.99 |
| Obese | >30 | |

ii. Body Adiposity Index

Body mass index is widely used to assess the level of adiposity in clinical and epidemiological arena. However, it has been shown that BMI is not accurate in subjects with increased lean body mass, and cannot be generalised among people of different ethnic

affiliations (Rahman & Berenson, 2010; Garrido-Chamorro, Sirvent-Belando, Gonzalez-Lorenzo, Martin-Carratala & Roche, 2009). To address this Bergman et al (2011) developed the body adiposity index (BAI). This can be measured without the use of weighing scale which makes it useful in settings where accurate measurement of body weight is difficult. The body adiposity index can be used to determine body fat % for adults from different ethnic affiliations, gender and age. It is calculated using this simple formula

$$BAI = \frac{\text{Hip Circumference(cm)}}{\text{height(m)}\sqrt{\text{height(m)}}} - 18$$

i.e. hip circumference in centimeters divided by height in meters to the 1.5 power minus 18 (Bergman et al, 2011).

Table 3.2 BAI Reference Values

| Nutritional Status | Male | Female |
|---------------------------|-------------|---------------|
| Undernutrition | <11% | <23% |
| Normal | 11-21.9% | 23-34.9% |
| Overweight | 22-27% | 35-40% |
| Obese | >27% | >40% |

Body Adiposity Index Calculator Tool – Better than BMI. <http://www.sweetadditions.net/health/bodyadiposity-index-calculator-tool-better-thanbmi>. Retrieved August, 25-2014.

iii. Waist to Hip Ratio (WHR)

Accumulative evidence shows that waist circumference and waist to hip ratio are widely used as indicators of abdominal obesity as well as atherogenic prognosticators in population studies. Although waist circumference might be a better reflection of abdominal fat, however, WHR produces a robust measure of risk in many population studies and has been proposed that an increased WHR may reflect both a relative abundance of abdominal fat and lack of gluteal muscles (Chowdhury, Lantz & Sjöström, 1996; Seidell, Han, Feskens & Lean, 1997). Waist-to-hip ratio is a better indicator of poor cardiac status than BMI. It has been shown that

waist-to-hip ratios predict more information regarding the cardiac status in obese patients than measures of height and weight and lend further support to including the measurement of this ratio as part of the general physical examination (Noble, 2001). Waist to hip ratio can be calculated using the circumferential measurement of waist in centimetres by circumferential measurement of hip in centimetres. Abdominal obesity is defined as a waist–hip ratio above 0.90 for males and above 0.85 for females, or a body mass index (BMI) above 30.0 (WHO, 2000) (table 3.3).

Table 3.3 World Health Organisation Cut-off Points for Waist to Ratio

| Indicator | Cut-off points |
|----------------------------|----------------------------|
| Waist circumference | ≥94 cm (M); ≥80 cm (F) |
| Waist circumference | ≥102 cm (M); ≥88 cm (F) |
| Waist–hip ratio | ≥0.90 cm (M); ≥0.85 cm (F) |

M, men; W, women (WHO Expert Consultation on Obesity, 2000)

iv. Body Fat Percentage

Participants body fat percentage (BF %) was arrived at from the readings of TANITA BC-549 plus Ironman body composition monitor. Participants were categorised into low (-ve), normal (0), high (+ve) and very high (++ve) body fat percentage based on their age and gender as shown in table 3.4 below (Appendix 7).

Table 3.4 Interpreting the Body Fat Percentage Result

| Gender | Age | -(Low) [BMI<18.5] | 0(Normal) [BMI18.5-4.9] | +(High) [BMI 25.0-29.9] | ++(very High) [BMI ≥30.0] |
|---------------|------------|---------------------------------|------------------------------------|------------------------------------|--------------------------------------|
| Female | 20-39 | <21.0 | 21.0-32.9 | 33.0-38.9 | ≥ 39.0 |
| | 40-59 | <23.0 | 23.0-33.9 | 34.0-39.9 | ≥40.0 |
| | 60-79 | <24.0 | 24.0-35.9 | 36.0-41.9 | ≥42.0 |
| Male | 20-39 | <8.0 | 8.0-19.9 | 20.0-24.9 | ≥25.0 |
| | 40-59 | <11.0 | 11.0-21.9 | 22.0-27.9 | ≥28.0 |
| | 60-79 | <13.0 | 13.0-24.9 | 25.0-29.9 | ≥30.0 |

Based on Gallagher et al., American Journal of Clinical Nutrition, Vol. 72, Sept. 2000

Quantitative Data Analysis

Demographic data of the subjects was reduced using descriptive statistics of mean, standard deviation and frequency. Subjects were categorised into overweight and obese based on the calculation of BMI. Participants were classified according to the WHO (2000) standards as follows: BMI <18.5 kg/m² as underweight; between 18.5 kg/m² – 24.9 kg/m² as normal; between 25 kg/m² – 29.9 kg/m² as overweight and >30 kg/m² as obese as shown in Table 3.1 above. Body fat percentage measured by TANITA was also used to classify the participants into low, normal, high and very high according to the participants' age and gender (Appendix 7). This is shown in Table 3.4. The metabolic equivalents (METs) of the subjects were calculated using the physical activity section of the WHO - STEPS questionnaire. For this study total physical activity MET-minutes/week were calculated using this formula:

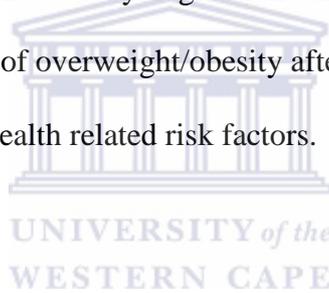
MET-minutes/week=the sum of the total MET minutes of activity computed for each setting.

Total Physical Activity=[(P2*P3*8)+(P5*P6*4)+(P8*P9*4)+(P11*P12*8)=(P14*P15*4)].

For this study, subjects were categorised as having high physical activity level if their MET-minutes/week was ≥3000, moderate if ≥600 and low if it did not reach the criteria for either

high or moderate levels of physical activity as shown in Tables 4.2 and 4.11. The proportion of individuals classified as overweight and obese were stratified by gender, household income, marital status and educational level. Inferential statistics were used to test for significant associations between demographic variables, risk factors and overweight/obesity. Chi-square tests were used to test for significance for categorical variables and student t-tests for continuous variables.

In order to determine the risk factors for overweight and obesity, descriptive statistic was carried to determine the percentages of the risk factors according to normal weight and overweight/obesity. This was followed by regression analysis using normal weight as a dependent variable for predictors of overweight/obesity after categorising the risk factors into socio-economic risk factors and health related risk factors.



The proportion of individuals who perceived themselves to be overweight and obese was stratified by gender, household income, marital status and educational level. A comparison between perceived overweight across BMI categories (normal weight, overweight and obese) was done. Multiple logistic regression analysis was performed with perceived overweight as the dependent variable and age, BMI, gender, income, marital status and educational level as independent variables. All independent variables were simultaneously included in the regression model regardless of their statistical significance. Level of significant was set at 0.05.

3.5.2 PHASE II: TO FIND THE BEST EVIDENCE WITH REGARDS TO INTERVENTION PROGRAMMES FOR PREVENTION AND MANAGEMENT OF OVERWEIGHT AND OBESITY IN NIGERIA

This phase consisted of a review of local and international literatures to find out the best evidence for an intervention programme (detailed in chapter 2). In addition, qualitative data was collected by means of focus group discussion (FGD) as discussed below this was done to explore the views of traditional healers as well as healthcare professionals about the availability and success of the existing programmes for the prevention and management of overweight and obesity.



Population and Sampling Technique

The participants for this phase were overweight and obese individuals (as determined in the first phase of the study), traditional healers as well as healthcare professionals in health institution within the research setting or catchment areas. Purposive sampling was used to select participants from the healthcare facilities, traditional healers and overweight/obese individuals. Focus group discussions (FGDs) were held separately for each group:

Focus Group Discussion for Overweight and Obese Individuals: individuals with a BMI above 25kg/m^2 were invited to participate in a focus group discussion for each enumeration area. Mobile numbers of those who agreed to participate were written down in a log book. Focus group discussions were carried on Saturdays so as to enable civil servants to participate. Each of the participants was reminded through SMS and phone calls on Fridays,

i.e. a day before FGD. Focus group discussions were done in suitable venues with minimal noise in each of the enumeration areas. A total number of 131 overweight/obese subjects were invited for FGD out of which 83 (63.36%) attended the discussion in thirteen enumeration areas. A minimum of six(6) subjects participated in each of the focus group discussions. The total number of female participants was 43 (51.81%) and male 40 (48.19%) with an age range between 18 and 71 years. Participants in two (2) of the fifteen (15) enumeration areas did not turn up. Consent form: community member (English) and consent form: community member (Yoruba) were administered on each member.

Focus Group Discussion for Traditional Healers: A total number of sixteen (16) traditional healers were present within the catchment area of the study, all belonging to Ewedogbon herbalist/traditional healers association and in turn an affiliate of Lagos State Traditional Medicine Board. The leader of Ewedogbon traditional healers association conveniently selected six (6) traditional healers to participate in the FGD. Earlier on, information sheet, confidentiality binding form (Yoruba), confidentiality binding form (English), consent form (Yoruba) and consent form (English) were administered on the participants.

In-depth Interview with Healthcare Providers: focus group discussion was intended to be conducted at Alimosho General Hospital, Igando, Lagos State, but could not be held because of the dearth of overweight and obese subjects. This was after approval had been granted by the Head of Administration of Alimosho General Hospital. The researcher was advised and referred to Lagos University Teaching Hospital (LUTH), Idi-Araba, Lagos State. LUTH is a tertiary health institution and referral centre, which services over 20 million Nigerians/people. It is a well-staffed teaching hospital with different areas of specialisations

and specialists. Heads of Dietetic and Nutrition, and Medicine Departments chose members of the indepth interview. Because of the busy schedule of the physicians and dieticians, in-depth interview was done separately for the physicians and dieticians. Questions about the causes of overweight and obesity, complications, referring factors and management of overweight and obese persons were asked.

Procedures of FGD and Interviews: Focus group/ in-depth interview information sheet and confidentiality binding forms were administered on each of the overweight and obese persons, and healthcare providers before commencement of the interview (Appendix 3a, Appendix 4a). Focus group discussions/in-depth interviews with overweight/obese individuals, traditional healers and healthcare givers were held in suitable places with minimal noise. The researcher was the moderator while the research assistant served as assistant moderator whose function was to take notes and operate tape recorder. For overweight/obese individuals, questions for FGD were divided into engagement questions, exploration questions and exit questions.

Engagements question: what are your views regarding overweight and obesity?

Exploration questions: what are the causes of overweight and obesity? What are the diseases associated with overweight and obesity? What are the challenges facing the overweight and obese individuals towards weight reduction? How is overweight and obesity managed?

Exit question: are there anything you would like to add to causes, challenges and management of overweight and obesity?

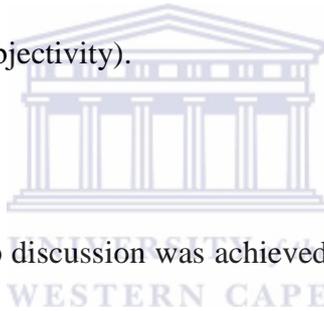
Qualitative Data Analysis

The analysis of the focus group discussions and interviews started with the transcription of information from the audio-tape recordings to produce a manuscript. A comparison was then made with the notes taken during the discussions, to verify accuracy. The discussions held with overweight/obese persons and traditional healers were transcribed and translated to English and then sent to an academic specialist in Yoruba language for back translation into Yoruba language. This was achieved using variance of Brislin method which involves rounds of forward and backward translation of the transcribed document from the Yoruba language to English language until an acceptable rendition was achieved (Brislin, 1970). The main advantage of the Brislin method is that the checks and balances inherent in the multiple rounds of forward and back translation ensure that semantic incongruences between the two versions of a document are identified and resolved; this reduces the potential for translation to introduce inaccuracies into a document (Mack, Ramirez, Friedland & Nnko, 2013). The final transcripts were read through several times by the researcher, with emphasis on the emergence from the ideas of themes. Notes were made throughout the reading of the transcripts. Thus, data were coded in themes, followed by the creation of broad categories of emerging themes which fit together. The analysis was done by reading through the transcripts, again and again, making as many headings as necessary to describe all aspects of the content. In addition, grouping of the themes into broader categories was done in order to reduce the number of themes or small categories. For instance, very similar headings were conflated to come up with one. However, thorough searching for categories that have internal convergence and external divergence was done to make sure that the categories are internally consistent but distinct from one another (Marshall & Rossman, 1995). After the derivation of themes, an independent researcher was asked to read through the transcripts and generated

themes, thus increasing the validity and reliability of the categorising. Lists from the researcher and independent researcher were then compared.

The trustworthiness of the qualitative data

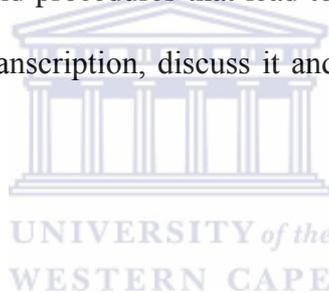
Trustworthiness of qualitative research generally is often questioned by positivist, perhaps because their concepts of validity and reliability cannot be addressed in the same way in the naturalistic work (Shenton, 2004). To address this, Guba (1981) proposes four criteria that should be considered in order to proffer trustworthiness by a qualitative researcher. These criteria are credibility (in preference to internal validity), transferability (in preference to external validity or generalisability), dependability (in preference to reliability) and confirmability (in preference to objectivity).



The credibility of the focus group discussion was achieved through membership checking. A participant was asked to read a transcript of the dialogue, on behalf of other participants, in which they participated. The emphasis was on whether the informants consider their words match what they actually intended, since articulations themselves will be accurately captured (Shenton, 2004). Also, triangulating through data source was also employed to enhance credibility of the qualitative data collection by making use of a wide variety of informants. To achieve this individual viewpoints and experiences were verified against others and, ultimately, a rich picture of the attitudes, needs or behaviour of those under scrutiny were constructed based on the contributions of a range of people (Shenton, 2004).

Transferability of the qualitative was enhanced through provision of sufficient contextual information about field work sites (Firestone, 1993) as well as detailed description of backgrounds of overweight and obesity. Methods employed in data collection, data analysis and interpretation were properly described. In order to address dependability of the qualitative data, the research design and its implementation, the operational detail of data gathering and reflective appraisal of the thesis were reported in details (Shenton, 2004).

The confirmability / objective of the qualitative data was achieved through the process audit trail. Audit trail allows any observer, non-researcher, to trace the course of the research step-by-step via the decisions made and procedures that lead to that decisions. Also, a note taker was asked to read through the transcription, discuss it and compare it with the researcher's transcription.

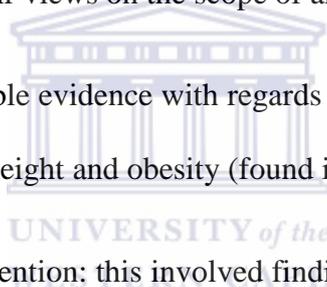


3.5.3 PHASE III: DESIGN A CULTURALLY APPROPRIATE PROGRAMME FOR THE PREVENTION AND MANAGEMENT OF OVERWEIGHT AND OBESITY AMONG NIGERIANS

The aim of the intervention would be to assist practitioners to deliver effective interventions for the prevention and management of overweight and obesity. The intervention is aimed at professionals or volunteers who have either a direct or indirect role and/or responsibility for the prevention and management of overweight and obesity. Furthermore, it must be developed through a process that considers all those who might be affected by the intervention (health care professionals, individuals who are overweight or obese, community

members and the leaders) and was based on the best possible research evidence. The following steps were followed in designing of the intervention:

- Established the scope of the intervention: This involved establishing the current situation regarding obesity in Nigeria (i.e. the results of the first objective of the study); the individuals that were considered in the intervention and the setting of the intervention (some information obtained from focus group discussions). A draft of the scope was then outlined by the researcher.
- Stakeholders' comments were then invited (through the focus group discussions with individuals who were overweight or obese, health care professionals and traditional healers) with regard to their views on the scope of an intervention.
- Examination of the available evidence with regards to interventions for the prevention and management of overweight and obesity (found in the literature reviews).
- Development of the intervention: this involved finding the evidence with regard to the effectiveness of interventions (reviews of literature on randomised control trials) and content of the intervention (informed by the results of the literature review and focus group discussions). The outcome of literature review and focus group discussions were then used to design an appropriate intervention for prevention and management of overweight and obesity for Nigerians who are overweight and obese.



3.5.4 PHASE IV: TO REACH CONSENSUS ON THE CONTENT OF THE

INTERVENTION PROGRAMME

A Delphi study was used to reach consensus on the content of the designed intervention programme. The designed intervention was sent to experts in the field of prevention and management of overweight and obesity through e-mail in order to get the most reliable consensus of opinion from a group of experts in the field of intervention programme that was designed. Nominators were identified from professional organisations such as the International Association for the Study of Obesity, the European Association for the Study of Obesity, the World Health Organisation, universities and health institutions. These associations were asked to provide a list of names of people with expertise in the management of overweight and obesity who were willing to participate in the study. The experts at the universities and health institutions were identified and contacted to determine their willingness to participate in the study. An invitation to participate in the study, information sheet about the study as well as consent form was sent through e-mail to each of the selected experts (Appendix 8a and 8b). A total number of 44 experts met the predetermined inclusion criteria and were sent information sheets and consent forms for the Delphi study out of which 12 (27.78%) responded and consented to participate in the study. The consent of each of the chosen was sought before the designed intervention was sent to them through e-mail. Preliminary questions were sent to each of these experts to inquire about their demographic and professional information. Each member of the panel was asked to comment on each section of the designed programme using a Likert scale of 1-5 (strongly agree to strongly disagree). This process was repeated until consensus was reached regarding the relevance of the information included in the intervention programme, or when it became clear that no consensus was possible. The consensus in this study was defined as agreement

by 65% or more of the participants (Ludwig & Starr, 2005). Details of Delphi study procedure are explained in chapter six.

3.6 ETHICAL CONSIDERATIONS

Permission an ethical clearance was obtained from Senate Research Grants and Study Leave Committee at the University of the Western Cape (UWC) (Appendix 1). Further ethical clearance was also sought from the Health Research and Ethics Committee of Lagos State University Teaching Hospital, Ikeja, Lagos State (Appendix 2). The study was conducted according to ethical practices pertaining to the study of human subjects as specified by the Faculty of Community and Health Sciences Research Ethics Committee of the UWC as well as Health Research and Ethics Committee of Lagos State University Teaching Hospital. The following guidelines were followed:

The purpose of the study was clearly explained by the researcher to the participants and relevant authorities (Appendix 3a and 3b). Signed, written informed consents were sought from all participants (Appendices 4d, 4e, 4f, 4g and 4h). Participation in the study was voluntary. The participants were informed of their rights to withdraw from the study at any time without any consequences. Participants were treated with respect and dignity. The consent forms, information sheets and questionnaires were made available in the English and Yoruba. Identification codes using numbers were used on data forms to ensure anonymity. Information obtained from participants was used for the study only and was handled with confidentiality. Pseudonyms were used to protect participants' identities when results are

published. The researcher collected the questionnaires personally and was responsible for ensuring their storage in a locked and secure place. Information obtained from the focus group discussions was handled with confidentiality. All tapes were destroyed once they have been transcribed and documented according to themes. All information would be kept for a minimum of five years where after which it would be destroyed. Participants in the focus group were encouraged to sign a form where they undertook not to disclose any information from the focus group discussions (Appendix 4a, 4b and c). Although no perceived risks were experienced in the study, however, participants that needed medical advice or were affected by the study or experienced the questions to be traumatic were referred to appropriate personnel for assistance/management. The findings of the study would be made available to all the relevant stakeholders.

3.7 SUMMARY OF THE CHAPTER

The research setting for this study was Alimosho local government area out of which sixteen (16) enumeration areas were randomly selected. Quantitative and qualitative methods of data collection were employed for this study. The qualitative data was collected with the use of questionnaires and physical measurements while focus group discussion and interviews. Descriptive and inferential statistics were employed in analysing quantitative data while thematic analysis was used to analyse qualitative data. Ethical supports for the study were obtained from the Research Ethics Committee of University of the Western Cape, South Africa and Health Research and Ethic Committee of Lagos State University Teaching Hospital, Nigeria. The results of the quantitative and qualitative analyses are presented in the subsequent chapters.

CHAPTER FOUR

QUANTITATIVE RESULTS

4.1 INTRODUCTION

This chapter contains the results from the quantitative data analysis in an attempt to answer the first specific objective of this study i.e. to gather baseline information regarding overweight and obesity among Nigerians. This chapter will provide an overview of the socio-demographic profile, the physical measurements and health related variables of the study sample. Secondly, the prevalence of the overweight and obesity and the factors associated with it will be described. Lastly, the perception of body weight of the individuals who are overweight will be described.



4.2 DESCRIPTION OF THE STUDY SAMPLE

The population for this phase of the study sample were male and female Nigerians residing in fifteen (15) enumeration areas in Alimosho local government area of Lagos State, Nigeria, within the age range of 18 years and 70 years.

4.2.1 SOCIODEMOGRAPHIC CHARACTERISTICS OF THE STUDY SAMPLE

A total of 2250 individuals were approached in fifteen (15) enumeration areas of Alimosho local government area for participation and 1571 individuals consented to participate. Therefore, a response rate of 69.82% ($n=1571/2250$) was thus achieved. The study sample consisted of both males 51.2% ($n=805$) and females 48.8% ($n=766$) with the mean age of 35.36 ($SD=11.36$) and a third of the sample were within the 28-37 years age range ($n=519$).

Among those who completed secondary school, 53.4% (n=429) were males and 46.6% (n=375) were females as summarised in Table 4.1.

Table 4.1 Socio-demographic Characteristics of the Study Sample (n=1571)

| Characteristics | Male n (%) | Female n (%) | Total n (%) |
|---|-----------------------|-------------------------|------------------------|
| Age (35.36±11.66) | | | |
| 18-27 | 261 (57.2) | 195 (42.8) | 456 (29) |
| 28-37 | 270 (52) | 249 (48) | 519 (33) |
| 38-47 | 174 (49) | 178 (51) | 352 (22.4) |
| 48-57 | 66 (39.8) | 100 (60.2) | 166 (10.6) |
| 58-67 | 24 (41.4) | 34 (58.6) | 58 (3.7) |
| 68-77 | 8 (47.1) | 9 (52.9) | 17 (1.1) |
| 78+ | 2 (66.7) | 1 (33.3) | 3 (0.2) |
| Highest educational level | | | |
| No formal schooling | 22 (26.8) | 60 (73.2) | 82 (5.2) |
| Primary school ^a | 220 (53.8) | 189 (46.2) | 409 (26) |
| Secondary school completed | 429 (53.4) | 375 (46.6) | 804 (51.2) |
| Tertiary education completed ^b | 134 (48.6) | 142 (51.4) | 276 (17.6) |
| Marital Status | | | |
| Single ^c | 335 (64.2) | 187 (35.8) | 522 (33.2) |
| Married | 470 (44.8%) | 579 (55.2%) | 1049 (66.8) |
| Employment status | | | |
| Employed | 710 (51.7) | 664 (48.3) | 1374 (87.5) |
| Unemployed ^d | 89 (48.6) | 94 (51.4) | 166 (11.6) |
| Pensioner | 6 (42.9) | 8 (57.1) | 14 (0.9) |
| No of People in the Household | | | |
| Living alone | 132 (64.4) | 73 (35.6) | 205 (13) |
| 2- 4 persons | 476 (40.8) | 491 (59.2) | 1167 (74.3) |
| 4persons and above | 97 (48.7) | 102 (51.3) | 199 (12.7) |

^a incomplete and completed primary school

^b completed 1st degree and postgraduate

^c never married, divorced, widowed

^d students, volunteers and unemployed

In addition to socio-demographic variables, participants reported on tobacco smoking, alcohol consumption, diabetes mellitus and hypertension. More than half (51.6%) of the

study sample reported alcohol use as summarized in Table 4.2. In addition, the majority (97.8%) of the study sample reported not ever being diagnosed with diabetes mellitus (self-reported) and 91.5% of the study sample also reported not ever being diagnosed with hypertension. However, analysis of measured blood pressure showed that 71.6% of the sample size are categorised as hypertensive according to WHO (2003) definition of hypertension (systolic/diastolic $\geq 140/90$ mmHg). The mean and standard deviation for pulse rate, systolic and diastolic blood pressures are shown in Table 4.2 below. There was no significant difference between male and female systolic blood pressure but there were significant differences in diastolic blood pressure and pulse rate between male and females ($P < 0.05$). The majority of the study sample (91.9%) indicated that they perceive to lead active lifestyle while 8.1% perceived to live a sedentary lifestyle.

Table 4.2 Health Related Characteristics of the Study Sample (n=1571)

| Characteristics | Male n (%) | Female n (%) | Total n (%) |
|-----------------------------------|----------------------------|----------------------------|------------------------|
| Alcohol Use | | | |
| yes | 506 (62.4) | 305 (37.6) | 811 (51.6) |
| no | 299 (39.3) | 461 (60.1) | 760 S(48.4) |
| Tobacco Use | | | |
| yes | 66 (91.7) | 6 (8.3) | 72 (4.6) |
| no | 739 (49.3) | 760 (50.7) | 1499 (95.4) |
| Self-reported DM | | | |
| yes | 20 (57.1) | 15 (42.9) | 35 (2.2) |
| no | 785 (51.1) | 751 (48.9) | 1536 (97.8) |
| Self-reported Hypertension | | | |
| yes | 55 (41) | 79 (59) | 134 (8.5) |
| no | 750 (52.2) | 687 (47.8) | 1437 (91.5) |
| Measured Hypertension | | | |
| Normal | 194 (43.5) | 252 (56.5) | 446 (28.4) |
| Hypertensive | 611 (54.3) | 514 (45.6) | 1125 (71.6) |
| | m\pmSD | m\pmSD | P |
| Systolic | 130.7 \pm 21.6 | 129.7 \pm 22.1 | 0.370 |
| Diastolic | 77.6 \pm 15.9 | 79.3 \pm 14.7 | 0.027* |
| Measured Physical Activity | | | |
| Sedentary | 47 (36.7) | 81 (63.3) | 128 (8.1) |
| Active | 758 (52.5) | 685 (47.5) | 1443 (91.9) |

*p<0.05

4.2.2 PHYSICAL MEASUREMENTS OF THE STUDY SAMPLE

The physical measurements of the study sample are outlined in Table 4.3. The mean height of the study sample was 1.65m (SD=8.71) and the mean weight for the study sample was 68.59kg (SD=8.71). It is observed that there are significant differences in the mean scores in each of these physical measurements between male and female.

Table 4.3 Physical Measurements of the Study Sample (n=1571) (mean ± SD)

| | Male (n=805) | Female (n=766) | Total (n=1571) | P |
|------------------------------|-------------------------|---------------------------|---------------------------|----------|
| Height(m) | 1.70±7.52 | 160±6.67 | 165±8.71 | .001 |
| Weight(kg) | 67.82±12.39 | 69.40±15.61 | 68.59±14.07 | .001 |
| Waist(cm) | 82.77±12.43 | 90.19±13.11 | 86.39±13.30 | .001 |
| Hip(cm) | 90.51±10.01 | 101.34±34.93 | 95.79±25.98 | .001 |
| WHR | .93±.33 | .91±.23 | .92±.29 | .001 |
| BF% | 17.47±7.81 | 32.95±15.66 | 25.01±14.51 | .001 |
| BMI(kg/m²) | 23.38±4.16 | 27.03±5.95 | 25.16±5.43 | .001 |
| BAI | 22.81±5.07 | 32.03±16.25 | 27.31±12.77 | .001 |

WHR=waist hip ratio BF%= body fat percentage BMI= body mass index BAI= Body adiposity index

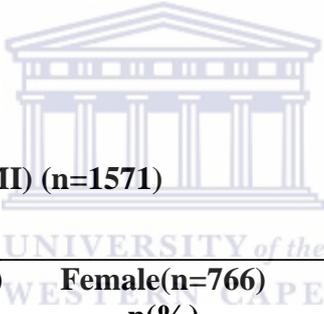
4.3 PREVALENCE OF OVERWEIGHT AND OBESITY

Overweight and obesity of the study sample was determined with the use of body mass index (BMI), body adiposity index (BAI), waist hip ratio (WHR), waist circumference (WC) and body fat percentage (BF %).

Body Mass Index (BMI)

This was computed as a ratio of total weight in kilograms to height squared (kg/m^2). Participants were then classified into underweight, normal weight, overweight and obese according to the WHO classifications (WHO, 2005). The prevalence of overweight was 25.1% for the study sample of which 45.2% were males (n=178) and 54.8% were females (n=398). Mean and standard deviation for underweight/normal weight and overweight/obese are 21.54 ± 2.19 and 30.09 ± 4.55 . There are significant differences between the BMI of underweight/normal weight and overweight/obese and between male and female. These are summarised in table 4.4. Furthermore the prevalence of obesity was 17.3% of which 20.3% (n=55) were females and 79.7% (n=216) were females.

Table 4.4 Body Mass Index (BMI) (n=1571)



| BMI Categories | Male(n=805) | | Female(n=766) | | Total (n=1751) | | p-value |
|-----------------------|--------------------|------------|----------------------|------------|-----------------------|------------|----------------|
| | n | (%) | n | (%) | n | (%) | |
| Underweight | 52 | 76.5 | 16 | 23.5 | 68 | 4.3 | 0.001 |
| Normal Weight | 520 | 62.2 | 318 | 37.8 | 836 | 53.3 | |
| Overweight | 178 | 45.2 | 216 | 54.8 | 394 | 25.1 | |
| Obese | 55 | 20.3 | 216 | 79.7 | 271 | 17.3 | |

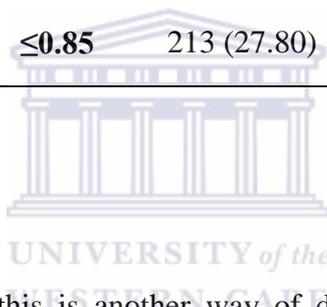
P<0.001

Waist-hip Ratio (WHR) - this was determined using the ratio of circumferential measurements of waist and hip. According to the WHO guidelines (WHO, 2000), abdominal obesity is defined as a waist-hip ratio above 0.90 for males and 0.85 for females. The mean and standard deviation for the whole sample were 0.91 (0.25) with confidence interval of

0.90 - 0.93. According to this guideline, more than half 51.90% of males and 72.20% of the females had a WHR that are greater than normal values as outlined in Table 4.5. This shows that majority of the sample had the preponderance of having abdominal obesity. Pearson chi-square shows there is significant difference in the WHR of the sample size χ^2 (1054, N1571) =562, $p<0.000$) between males and females.

Table 4.5 Waist-hip Ratio (WHR)(n=1571)

| WHR | Males(n=805) n(%) | WHR | Females(n=766) n(%) | p-value |
|-------------|----------------------|-------------|------------------------|---------|
| ≥ 0.90 | 418 (51.9) | ≥ 0.85 | 553 (72.20) | 0.001 |
| ≤ 0.90 | 387 (48.1) | ≤ 0.85 | 213 (27.80) | |



Waist Circumference (WC) - this is another way of determining abdominal obesity. It provides information on the topography of fat deposition in the trunk. Normal WC reference value for male is <94cm and <80cm for females according to the WHO guidelines (WHO, 2000). About 15.78% of the males had their WC above normal reference value and 72.97% of females had excess abdominal obesity and 84.22% of the male population waist circumference is within normal values as outlined in Table 4.6. Pearson chi-square shows there is significant difference in the WC of the sample size χ^2 (254.7, N=1571) =70, $p<0.000$) between male and female.

Table 4.6 Waist Circumference (WC) (n=1571)

| WC | Males(n=805) n(%) | WC | Females(n=766) n(%) | p-value |
|-------|----------------------|-------|------------------------|---------|
| >94cm | 127 (15.78) | >80cm | 559 (72.97) | 0.001 |
| <94cm | 678 (84.22) | <80cm | 207 (27.03) | |

The Body Adiposity Index (BAI) - this was developed by Bergman et al (2011) as an alternative parameter to assess body fat for adults men and women from different population without numerical correction. It is calculated using the following formula:

$$BAI = \frac{\text{Hip Circumference(cm)}}{\text{height(m)}\sqrt{\text{height(m)}}} - 18$$

Although there is a variation in the guidelines for classification of BAI, most recommend that females with the 23% - 35% body fat fall within normal/healthy range and those with 35% - 40% body fat are overweight, and those females above 40% are obese. For males, those with body fat percentage between 11% - 22% falls within the healthy range, those with 22% - 27% body fat are overweight, and those with body fat above 27% are obese. The results of the analysis showed that 40.2% of the sample was overweight (27.5%) or obese (12.7%) with a mean/BAI 27.1 (SD7.5) and confidence interval of 26.72 - 27.46. However, more than half of the study sample (54.7%) was of normal weight according BIA as shown in Table 4.7 below. Pearson chi-square shows there is significant difference in the BAI of the sample population χ^2 (1371, N=1571) =688, p<0.000) between male and female.

Table 4.7 Body Adiposity Index (BAI) (n=1571)

| BAI Categories | Male(n=805) | | Female(n=766) | | Total (n=1751) | | p-value |
|-----------------------|--------------------|------|----------------------|------|-----------------------|------|----------------|
| | n(%) | | n(%) | | n(%) | | |
| Underweight | 4 | 0.5 | 76 | 9.9 | 80 | 5.1 | 0.001 |
| Normal Weight | 398 | 49.4 | 461 | 60.2 | 859 | 54.7 | |
| Overweight | 271 | 33.7 | 161 | 21.0 | 432 | 27.5 | |
| Obese | 132 | 16.4 | 68 | 8.9 | 200 | 12.7 | |

P<0.001

Body Fat Percentage (BF %) - this was measured by the use of bioelectric impedance analysis machine (TANITA BC-549 PLUS). Descriptive analysis shows that 39.2% of the sample size had high/very high percentage body fat with 50.3% females and 28.6% males. This is shown in Table 4.9 below. The mean and standard deviation for percent body fat were 14.8(11.4) with confidence interval of 24.18-25.31. Pearson chi-square shows there is significant difference in the BF% of the sample size χ^2 (984.8, N=1571) =386, p<0.000) between males and females.

Table 4.8 Body Fat Percentage (BF %) (n=1568)

| BF% Categories | Male(n=804) | Female(n=764) | Total(n=1568) | p-value |
|-----------------------|--------------------|----------------------|----------------------|----------------|
| | n(%) | n(%) | n(%) | |
| Low | 574(71.4) | 380(49.7) | 954(60.8) | 0.001 |
| High | 230(28.6) | 384(50.3) | 614(39.2) | |

4.4 RELATIONSHIP BETWEEN THE MEASURES OF BODY FATNESS

Accurate assessment of body compositions provides a precise indication of body adiposity/fatness which is associated with an increase in cardiometabolic disorders. Body fatness was assessed with BF%, BMI, WC, HC, BAI and WHC in this study. Relationship between these measures of body fatness was determined using Spearman's Rho correlation. The result shows strong and positive significant correlations between other measures of body fatness (.694 to .872) except WHR with low but positive relationships between BF% (.184), BMI (.280), WC (.495), and negative relationships with HC (-.077) and BAI (-.076).

Table 4.9 Relationship between Measures of Body Fatness (n=1571)

| | BF% | BMI | WC | HC | BAI | WHR |
|------------|------------|------------|-----------|-----------|------------|------------|
| BF% | - | | | | | |
| BMI | .812** | - | | | | |
| WC | .757** | .834** | - | | | |
| HC | .763** | .783** | .794** | - | | |
| BAI | .799** | .745** | .694** | .872** | - | |
| WHR | .184** | .280** | .495** | -.077** | -.076** | - |

**p<0.001

The use of BMI has been recommended by the World Health Organisation (WHO) as a way for assessment/measurement of body fatness because it requires very little instrumentation. For this study, body fatness from BMI was used as a criterion method for which other measures of body fat assessments were compared with in predicting body fatness among Nigerians. Receiver operating characteristic curve was plotted to determine the level of agreement between BMI and other body fat measures. Below are the curve and the respective areas under the curve (AUC) for WC (0.927, 95%CI: 0.914-0.941), HC (0.903, 95%CI: 0.887-0.919), BF% (0.908, 95%CI: 0.895-0.922), BAI (0.882, 95%CI: 0.866-0.899) and WHR (0.646, 95%CI: 0.618-0.673). The results show that WC, HC, BF% are excellent while

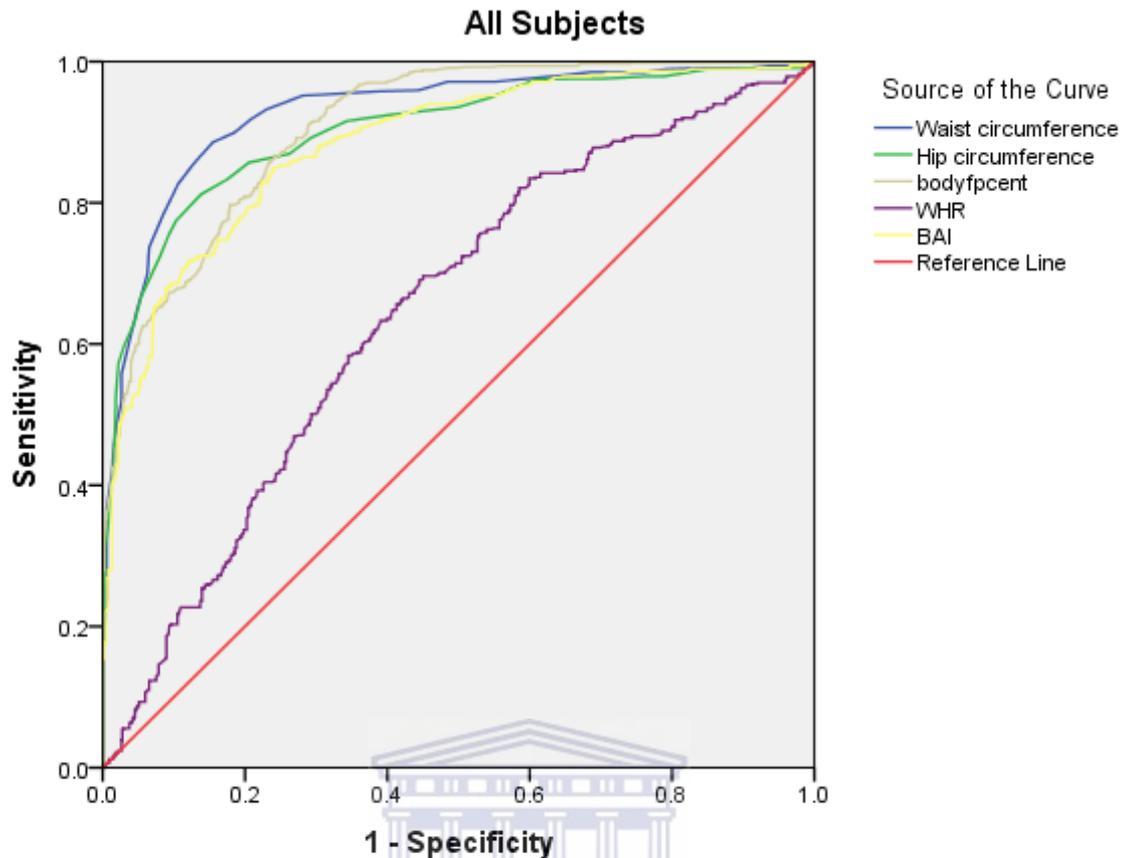
BAI and WHR are good and fair in assessing overweight and obesity among the sample size under consideration. Waist circumference (WC) has the greatest discriminant capacity of diagnosing body adiposity of all measures of body adiposity. These are shown in table 4.10 and figure 4.2 respectively.

Table 4.10 Area Under the Curve for levels of Agreement for Overweight Measures

| Variable | Area Under The Curve | Asymp. Sig | 95% CI | |
|------------|----------------------|------------|--------|-------|
| | | | Lower | Upper |
| WC | 0.927 | 0.000 | 0.914 | 0.941 |
| HC | 0.903 | 0.000 | 0.887 | 0.919 |
| BF% | 0.908 | 0.000 | 0.895 | 0.922 |
| WHR | 0.646 | 0.000 | 0.618 | 0.673 |
| BAI | 0.882 | 0.000 | 0.866 | 0.899 |

p<0.005





Receiver Operating Characteristic (ROC) curve for WC, HC, BF%, WHR and BAI for overweight and obesity

Figure 4.2: Receiver Operating Characteristic (ROC) Curve for WC, HC, BF%, WHR and BAI for Overweight and Obese

4.5 FACTORS ASSOCIATED WITH OVERWEIGHT AND OBESITY

The relationship between overweight/obesity and health related and socio-economic factors were examined. Health related risk factors measured in this study were physical activity levels (METs), alcohol consumption, self-report measurement of Type II diabetes mellitus and blood pressure, measurement of blood pressure by the researcher while socio-economic risk factors were employment status, marital status, highest educational level and number of people in household.

4.5.1 Health Related Factors

Descriptive analysis shows that more than half of the sample size 51.6% indulges in alcohol consumption out of which 45.4% were overweight/obese. However, almost half (48.4%) of the participants did not indulge in alcohol. They were also asked if they had been told that they have increased blood sugar and 2.2% responded yes that they had been told. About 62.9% of those who had been told of elevated blood sugar were overweight/obese. Blood pressure of each of the participants was measured and they were categorised into normotensive and hypertensive according WHO (2003) blood pressure classifications for adults. About 71.6% of the study sample was hypertensive among which there were 48% overweight/obese. There was a statistically significant difference between systolic blood pressure of overweight and obese but no significant difference in the diastolic. Physical activity levels of the participants were categorised into sedentary and active. This was after their METs were calculated based on WHOSTEPS formula. Results of the analysis show that majority of the participants were active with 91.9% while only 8.1% were under sedentary category. Participants were also asked if they indulge in tobacco smoking and only 4.6% responded yes, while a large number 95.4% responded no. There are significant differences in alcohol consumption, self-reported DM, self-reported hypertension, blood pressure and physical activity between underweight/normal weight and overweight/obese groups. These are summarised in Table 4.11 below.

Table 4.11 Health Related Factors (n=1571)

| Risk Factors | Underweight/Normal n(%) | Overweight/Obesity n(%) | Normal n(%) | p-value |
|---------------------------------|------------------------------------|------------------------------------|------------------------|----------------|
| Alcohol Consumption | | | | |
| Yes | 443 (54.6) | 368 (45.4) | 811 (51.6) | 0.012 |
| No | 463 (60.9) | 297 (39.1) | 760 (48.4) | |
| Self-report DM | | | | |
| Yes | 13 (37.1) | 22 (62.9) | 35 (2.2) | 0.013 |
| No | 893 (58.1) | 643 (41.9) | 1536 (97.8) | |
| Self-report Hypertension | | | | |
| Yes | 50(37) | 84 (63) | 135 (8.6) | 0.001 |
| No | 854 (59.6) | 581 (40.4) | 1432 (91.4) | |
| Blood Pressure | | | | |
| Normotensive | 321 (72) | 125 (28) | 446 (28.4) | 0.001 |
| Hypertensive | 585 (52) | 540 (48) | 1125 (71.6) | |
| Physical Activity(MET) | | | | |
| Sedentary | 61 (47.7) | 67(52.3) | 128(8.1) | 0.017 |
| Active | 845 (58.6) | 598(41.4) | 1443(91.9) | |
| Tobacco Smoking | | | | |
| Yes | 38 (52.8) | 34 (47.2) | 72 (4.6) | 0.390 |
| No | 868 (57.9) | 631 (42.1) | 1499 (95.4) | |

P<0.001

4.4.2 Socio-economic Factors – the result of the descriptive statistics shows that more half of the study sample (51.2%) completed secondary/high school, of which 35.8% were overweight/obese. A small number 5.2% of the sample had no formal schooling of which 59.8% were overweight/obese, while those who completed tertiary education were almost three times the number of the participants who did not have formal schooling 17.6%. The marital status of the respondents was also assessed and it was observed that 66.8% were married of which 51.1% were overweight/obese. About one-third of the participants were single (never married, divorced, widowed or separated) with 33.2%, of which 24.7% were

overweight/obese. The vast majority of the study sample was employed (87.5%), with 45.2% overweight/obese. More than three-quarters 72.2% of the participants reside with between 2-4 persons in the household, were overweight with 42.4% prevalence. Analysis shows significant differences in educational level, marital status, employment status and number of people in the household as summarised in Table 4.12.

Table 4.12 Socioeconomic Risk Factors (n=1571)

| Risk Factors | Underweight/ Normal | Overweight/Obese | Total | p-value |
|---|--------------------------------|-------------------------|--------------|----------------|
| <u>Highest educational level</u> | | | | |
| No formal schooling | 33(40.2) | 49(59.8) | 82(5.2) | 0.001 |
| Primary school ^a | 238(58.2) | 171(41.8) | 409(26) | |
| Secondary school completed | 524(65.2) | 280(35.8) | 804(51.2) | |
| Tertiary education completed ^b | 111(40.2) | 165(59.8) | 276(17.6) | |
| <u>Marital Status</u> | | | | |
| Single ^c | 393(75.3) | 129(24.7) | 522(33.2) | 0.001 |
| Married | 513(48.9) | 536(51.1) | 1049(66.8) | |
| <u>Employment status</u> | | | | |
| Employed | 753(54.8) | 621(45.2) | 1374(87.5) | 0.001 |
| Unemployed ^d | 147(80.3) | 36(19.7) | 183(11.6) | |
| Pensioner | 6(42.9) | 8(57.1) | 14(0.9) | |
| <u>No of People in the Household</u> | | | | |
| Living alone | 141(68.8) | 64(31.2) | 205(13.1) | 0.001 |
| 2-4 persons | 672(57.6) | 495(42.4) | 1167(72.2) | |
| 5 persons and above | 93(46.7) | 106(53.3) | 199(12.7) | |

^a incomplete and completed primary school

^b completed 1st degree and postgraduate

^c never married, divorced, widowed

^d students, volunteers and unemployed

4.6 PREDICTORS OF OVERWEIGHT AND OBESITY RISK FACTORS

A general logistic regression model was carried out to assess how socio-economic and health related risk factors predicts overweight and obesity. To do this, the dependent variable was categorised into normal weight ($BMI < 24.99 \text{ kg/m}^2$) and overweight ($BMI \geq 25 \text{ kg/m}^2$). The independent variables embedded in the model were gender, age, educational level, marital

status, number of people in the household, tobacco smoking, alcohol consumption, self-reported history of blood pressure increase and self-reported diabetes mellitus.

The logistic regression model was statistically significant χ^2 (24, n=1571)=433.55, $p < 0.0005$. The regression model as a whole explained between 24.2% (Cox and Snell R square) and 32.5 % (Nagelkerke R Square) of the variance of the dependent variable and correctly classified 73% of all the cases. As shown in Table 4.13a below, gender (female) and age were the socio-economic variables predicting overweight and obesity while alcohol consumption and self-reported blood pressure were the health related risk factors for overweight and obesity. The strongest predictor of overweight was age (48-57) with odds ratio of 8.59. This shows that Nigerians within the age range of 48-57 years were 8.59 times more likely to be overweight than others who were not within that age range. The odds ratio of 0.53 for alcohol consumption was less than 1 which means that those who consumed alcohol were 0.53 times less likely to be overweight.

Table 4.13a Overweight and Obesity Specific Risk Factors (n=1571)

| Variable | Unadjusted Odds Ratio | p-value | 95%CI for Odds ratio | |
|----------------------------|-----------------------|---------|----------------------|-------|
| | | | Lower | Upper |
| Gender(male) | 1 | | | |
| Female | 3.84 | 0.000 | 2.97 | 4.98 |
| Age(yrs) | | | | |
| 18-27 | 1 | | | |
| 28-37 | 2.12 | 0.000 | 1.48 | 3.04 |
| 38-47 | 4.33 | 0.000 | 2.89 | 6.49 |
| 48-57 | 8.59 | 0.000 | 5.07 | 14.56 |
| 58-67 | 3.45 | 0.000 | 1.75 | 6.75 |
| Alcohol(yes) | 1 | | | |
| No | 0.53 | 0.000 | 0.41 | 0.68 |
| Blood Pressure(yes) | 1 | | | |
| No | 0.57 | 0.000 | 0.37 | 0.87 |

$p < 0.0001$

However, adjustment to the model using gender shows that currently married males and participants within the age ranges of 18-27, 28-37, 38-47, 48-57 and 68-77 are risk of being overweight and obese. However, females with more than 5 persons in the household, participants who do not consume alcohol as well as those without history of blood pressure are less likely to be overweight or obese. These are shown in Table 4.13b below.

Table 4.13b Overweight and Obesity Specific Risk Factors (n=1571)

| Variable | Adjusted Odds Ratio | | p-value | | 95%CI | | | |
|------------------------------|---------------------|--------|----------------|----------------|------------|--------------|------------|--------------|
| | male | female | male | female | Lower male | Lower female | Upper male | Upper female |
| Marital Status | | | | | | | | |
| Never Married | 1 | 1 | | | | | | |
| Currently Married | 1.68 | 1.30 | 0.037* | 0.382 | 1.03 | 0.72 | 2.73 | 2.33 |
| Once Married | 0.58 | 1.12 | 0.561 | 0.829 | 0.92 | 0.42 | 3.65 | 3.00 |
| Age(yrs) | | | | | | | | |
| 18-27 | 1 | 1 | | | | | | |
| 28-37 | 1.72 | 2.57 | 0.049* | 0.000** | 1.00 | 1.57 | 2.93 | 4.21 |
| 38-47 | 3.56 | 4.98 | 0.000** | 0.000** | 1.95 | 2.86 | 6.48 | 8.68 |
| 48-57 | 4.95 | 16.07 | 0.000** | 0.000** | 2.39 | 6.86 | 10.25 | 37.66 |
| 68-77 | 13.65 | 7.17 | 0.042* | 0.000** | 1.10 | 2.72 | 170.10 | 18.95 |
| Household Number | | | | | | | | |
| 1 person | 1 | 1 | | | | | | |
| 2 persons | 0.73 | 1.15 | 0.263 | 0.066 | 0.42 | 0.96 | 1.27 | 3.18 |
| 3 persons | 0.85 | 1.94 | 0.618 | 0.056 | 0.44 | 0.98 | 1.63 | 3.83 |
| 4 persons | 0.76 | 1.13 | 0.470 | 0.756 | 0.37 | 0.53 | 1.59 | 2.43 |
| 5 persons and above | 1.24 | 2.99 | 0.557 | 0.004* | 0.61 | 1.42 | 2.50 | 6.31 |
| Alcoholic Consumption | | | | | | | | |
| Yes | 1 | 1 | | | | | | |
| No | 0.54 | 0.48 | 0.002* | 0.000** | 0.37 | 0.34 | 0.80 | 0.68 |
| Blood Pressure | | | | | | | | |
| Yes | 1 | 1 | | | | | | |
| No | 0.45 | 0.58 | 0.015* | 0.075 | 0.24 | 0.32 | 0.86 | 1.06 |

**=p<0.0001 *p<0.05

4.7 SUMMARY OF THE CHAPTER

A total of 1571 individuals consented to participate in the study. Using body mass index (BMI), 42.3% of the study sample were classified as either overweight or obese. Furthermore, the results of the study show that WC, HC, and BF% are excellent in assessing overweight and obesity while BAI and WHR are good and fair. Age was found to be a strong predictor of overweight and obesity while alcohol consumption was not a good predictor of overweight and obesity.

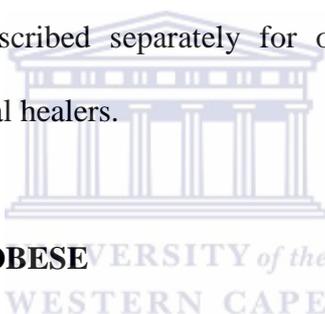


CHAPTER 5

QUALITATIVE RESULTS

5.1 INTRODUCTION

This chapter contains the results of the thematic/content analysis of the focus group discussions which was one of the steps taken towards designing an intervention for overweight and obese Nigerians. The focus group discussions focused on various factors that lead to overweight and obesity, diseases that usually arise from overweight and obesity, ways of managing overweight and obesity as well as those challenges encountered by the participants that prevented them from reducing their weight. The themes emanating from the focus group discussions are described separately for overweight/obese individuals and healthcare professionals/traditional healers.



5.2 OVERWEIGHT AND OBESE

A total number of 131 overweight/obese subjects were invited for FGD, of which 83 (63.36%) attended the discussion in thirteen enumeration areas. The total number of female participants was 43 (51.81%) and male 40 (48.19%) with a minimum age of 25 years and maximum age of 71 years old.

5.3 EMERGING THEMES

Four main themes were identified during the thematic analysis. These themes with sub-themes are outlined in Table 5.1. Verbatim quotes were used to illustrate the abovementioned themes.

Table 5.1: Themes and Sub-themes Emanating from the Focus Group Discussion

| THEME | SUB-THEMES |
|---|--|
| KNOWLEDGE OF THE CAUSES OF OVERWEIGHT AND OBESITY | Type of diet Timing of meal Sedentary lifestyle Inherited factor |
| KNOWLEDGE OF THE CO-MORBIDITIES OF OVERWEIGHT AND OBESITY | Joint Pains High Blood Pressure Diabetes Mellitus Hypercholesteraemia |
| MANAGEMENT OF OVERWEIGHT AND OBESITY | Diet Increased physical activity Herbs Possible Solutions |
| CHALLENGES EXPERIENCED WITH WEIGHT REDUCTION ATTEMPTS | Lack of time for exercise No recreational facility Ignorance about the need to reduce weight Lack of support from immediate family Lack of money |

5.3.1 KNOWLEDGE REGARDING THE CAUSES OF OVERWEIGHT AND OBESITY

The discussion about the participants' knowledge of the causes of overweight and obesity generated many diverse responses that could be categorised into three sub-themes. These

diverse responses emanated from the participants' personal experiences, informal discussion, health care professional advice given and what they see in their environment during their day-to-day activities.

Type of diet

The majority of the participants in all the enumeration areas where FGDs were conducted responded that the type of diet one consumes is one of the causes of overweight and obesity. They were of the opinion that consuming high energy food like amala, iyan, eba, fufu can make one overweight. These sentiments are illustrated in the excerpt below:

The kind of food we eat leads to overweight and obesity.like eating heavy food (high energy food) too often can causebody to be too heavy um um andbig (demonstrating with her hands) - P1 (Meiran)

Thank you Re for coming to our area. This is a kind of gathering I like to attend. Yea. Concerning the causes of overweight I know eating lots of heavy foods (high energy foods) and inactivity can lead to overweight. I mean something like iyan, eba, amala, fufu etc - P1 (Igando)

Few were even of the opinion that frequent consumption of junk foods, sweet foods and drinks do lead to increase in weight by saying that consumption of junk and processed foods from an eatery can also lead to overweight and obesity:

Eemm.....all those junk foods are not okay for our body. I was 'consuming' heavy foods (high energy foods) anytime they came my way....like eba, fufu, iyan etc. I used to take dinner around 11p.m. because I usually come home late because of the nature of my job though there is a facility for lunch at my place of work. I preferred junk foods for lunch with lots of coca cola.....imagine taking 75cl per meal...oh God that was too much you know - P7(Abule-Egba)

We (pointing to everybody) like sitting down in one place for hours and taking transport to even nearer places. Look at the food we eat..... Unhealthy food! - P5 (Ajegunle-Ilo)

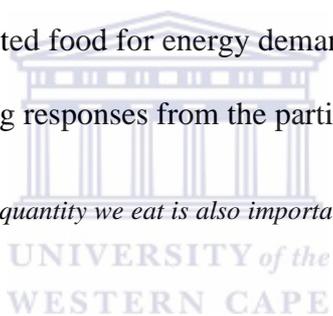
P5 is right. But we think we are enjoying while eating the junk foods, but they are adding to our problems. No vegetables to compliment what we eat there. A doctor friend advised me to stop eating it - P6 (Ajegunle-Ilo)

I agree with P1 and P2 because all snacks and junk foods from eatery that do not contain vegetables are not useful for the body. We patronise them because most of us nowadays are lazy to prepare good foods that are beneficial to our body. So, I think we need to change our ways. But there is a friend of mine who is big despite being very active and eating good food. Re, how do we explain that? - P6 (Meiran)

Timing of the Meal

There is a general assertion that the timing of meal does lead to an increase in body weight. Participants were of the view that consumption of high energy food (amala, fufu, iyan, eba e.t.c.) as dinner leads to overweight and obesity and that high energy foods should be eaten as breakfast in order to use the digested food for energy demanding activities. The issue of meal timing brought about the following responses from the participants:

I agree with P4 (pointing to P4) but the quantity we eat is also important. Yeah. Um um and the time we eat the food - P3 (Ijegun)



The researcher further probed P3 regarding food timing and weight increase.

Yes now! Time we eat. You know, eating heavy food (high energy food) as dinner is not good - P3 (Ijegun)

Thanks all. My contribution is still on food as a cause for overweight. Somebody here mentioned heavy foods (high energy foods) we eat as a cause of overweight which, to me, is true but I personally want to say that the time we eat heavy the foods (high energy foods) matters too. You see the heavy foods are supposed to be taken to do heavy duty work...I mean not to be taken for dinner....and... anyway that is my point - P6 (Igando)

Thanks. I want to also say that the timing of meal matters too. Foods I mentioned earlier were high energy that are needed for those works that are strenuous em em...I meant energy demanding jobs but most of us take them even as supper- P2 (Baruwa)

The majority of the participants believe that one should take high energy food after the day job so as to compensate for the energy used during the day, as outlined below:

I think timing of food consumption is also important in weight reduction. High energy and junk foods should not be taken as dinner. We believe that eating amala, eba, fufu, iyan as supper after the day's work is good for the body whereas it is not. That is my...em...personal view- P5 (Egbeda)

Eating dinner late has become a norm because of the nature of work that most of the respondents do. They commented that they close late from their different places of work, hence eating dinner late and eating something heavy to renew the lost energy:

One problem I have is the time for exercise because my work involves getting out early in the morning and coming back late in the night. I am even going out now to get what I would sell in my shop next week- P6 (Baruwa)

Thanks all. My contribution is still on food as a cause for overweight. Somebody here mentioned heavy foods we eat as a cause of overweight which, to me, is true but I personally want to say that the time we eat heavy the foods matters too. You see the heavy foods are supposed to be taken to do heavy duty work...I mean not to be taken for dinner....and... anyway that is my point - P6 (Igando)

Inactivity/ Sedentary lifestyles

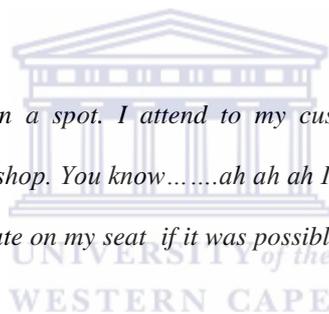
Participants were of the view that reduced level or lack of physical activity leads to an increase in body weight. They were of the opinion that those in the urban areas prefer to use

automobiles to go to the nearest places instead of regular walking which those in rural areas do a lot. They believed that regular walking and increased level of activity do help in preventing the weight increase:

Um um I do agree with P1 but not walking about does increase one's weight and eating repeatedly leads to being big (overweight) too - P2(Ajegunle-Ilo)

Umm umm what I know that can make somebody to be overweight or obese is when somebody lives a sedentary lifestyle and eats good food like chicken, turkey,etc - P1(Idimu)-

My work involves prolonged sitting on a spot. I attend to my customers in sitting and make use of my apprentices for errands even within my shop. You know.....ah ah ah I am lazy....ah ah ah. I take breakfast and lunch in a sitting position. I would urinate on my seat if it was possible for me ah ah ah..... because I am very lazy - P4(Alagbado)



Participants also highlighted that sedentary lifestyle is due to laziness on their part:

I also think that sedentary lifestyle leads to overweight. I know I am overweight (pulling out her left side of her tummy) but I can carry my weight because I don't usually sit in one place (I am active) - P2 (Meiran)

The researcher further enquired from P2 (Meiran) and other participants regarding the issue of sedentary lifestyle and they responded with the following contributions:

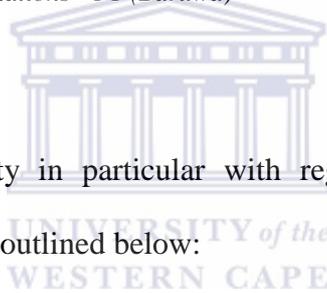
Yes oo. One would be able to shed weight if one is active, I mean if one moves from one point to another. You would be able to sweat out very well and feel lighter - P2 (Meiran)

They were of the view that inactivity results from the type of life they live in the city and that those in the rural areas are more active and walk more than those in the urban areas:

Thank you Re. In the past we used to trek a lot of various destinations but that is not happening this time around. Especially those of us in the city like Lagos. As for me (touching his chest) I know those in the villages live a healthy life unlike those of us in the city - P5 (Ijegun)

City life has reduced our levels of physical activity. We used to trek long distances before but we now rely on the use automobiles to our various destinations - P1 (Baruwa)

The benefits of physical activity in particular with regard to weight management are appreciated by the participants as outlined below:



Another thing is to be more active. To reduce sedentary lifestyle. Most of us prefer the sedentary lifestyle which is not good for us. Re (pointing to Re) do you know I can walk fast now with exhaustion? I do lots of trekking now unlike before....and is assisting in reducing my weight - P3(Idimu)

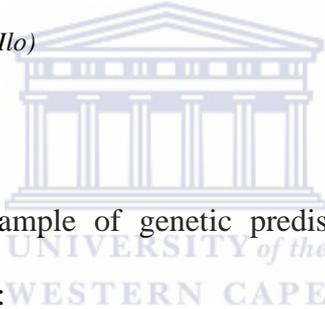
Genetic Predisposition

There is awareness that there is a possibility of genetic predisposition regarding overweight and obesity but they found it difficult to assign the right term for it. They were of the opinion

that people can be overweight and obese not only from the type of food consumed and inactivity but through genetic predisposition:

The reason is that some people are born being big (using her hands to demonstrate). Once somebody is born like that he or she would be big if at all he or she fasts every day. And..... you know there is nothing anyone can do to reduce the weight.....I mean not by eaten excess food that one becomes big or overweight - P4 (Ajegunle-Ilo)

Yes. I wanted to say what P4 said. My brother is overweight despite the fact that he doesn't eat regularly. He fasts a lot because he is a pastor but he is still big. Look, he is the biggest among our siblings. P5 (pointing to P5) knows him very well - P2 (Ajegunle-Ilo)



Another participant gave an example of genetic predisposition as a factor that causes overweight in a family in her area:

I think it is possible. There is a family in my compound despite the fact that they are poor, they look well fed (smile). Big (demonstrating with her upper limbs)..... Especially the husband. That is the only example I know - P7 (Alagbado)

I quite agree with the previous speakers, but there are few people who are overweight not only because of the type food they eat but because they inherited it from their parents. Such people would be overweight even if they fast every day of their life (smiling). Or what do you guys think (asking others)? - P4 (Igando)

5.3.2 KNOWLEDGE REGARDING THE CO-MORBIDITIES OF OVERWEIGHT AND OBESITY

Participants were asked to discuss the co-morbidities of overweight and obesity. This generated some sub-themes which the researcher thought would prompt the participants to seek help so as to reduce their weight. Among co-morbidities mentioned were joint pains, high blood pressure and diabetes mellitus:

Joint Pains

Degenerative changes that usually present as joint pains are one of the co-morbidities of overweight and obesity. Joint pain is one of the recurring sub-themes from the participants during focus group discussions among overweight and obese subjects. Though the majority of the participants did not know the medical name, they still appreciated osteoarthritis as one of the diseases that can arise from overweight and obesity. Excerpts of which are below:

I meant somebody who is overweight can have pain in the joints especially knee (touching the hip and knee joints) - P4 (Ajegunle-Ilo)

Diseases? yea... I know those who are overweight usually have joint pains and they usually find it difficult to walk long distances. Honestly, my fear is not to experience that kind of thing (touching his knee joints) in my joints especially in my old age - P6 (Meiran)

Yes. Discomfort in the joints... especially lower limb joints is one of the problems with overweight. Somebody who is overweight would find it difficult to ascend and descend staircase because of joint discomfort. But what I don't know is whether it affects lower limb joints mostly - P5 (Igando)

Does it mean being overweight is not a sign of good living? So there are associated problems with being big ah ah ah (laughing). Just joking. My joints ache because of my weight especially my knee joints. Both really hurt. The pain started few years ago from right knee joint but now it has spread to left knee. It is difficult for me to negotiate a staircase because of pain. My doctor said there are wear and tear inside my knee joints - P6 (Akinogun)

Hypertension (High Blood Pressure)

The participants gave examples of various kinds of health challenges they have that result from being overweight/obese. Hypertension or high blood pressure was also one of the comorbidities that the participants were aware of:

Yea...yea, I remember somebody having high blood pressure because of his weight. Even P2 brother has high blood pressure but I don't know ooo if his weight caused the blood pressure to rise - P4 (Ajegunle-Ilo)

Ok. Thank you. I am overweight you know (smiling and touching her tummy). My doctor said my blood pressure rises because of my weight about ten years ago. I have diabetes mellitus now because of the weight. Honestly, I don't know what else to do. I am fed up - P5 (Ajegunle-Ilo)

I agree with P5 but another disease is high blood pressure. You know I am (pointing to herself) hypertensive because of my weight. My physician told and advised me to reduce my weight so as to reduce my blood pressure - P3 (Igando)

I am hypertensive because of my weight. I was informed by my doctor that my weight was the cause of my hypertension and that it would reduce if I can reduce my weight. Though he places me on some drugs for BP reduction I still want the weight to reduce very well - P3 (Igando)

The link between hypertension and subsequent stroke was appreciated by the participants as indicated below:

Yea. A colleague in my office suffered stroke because of his weight. We were told his blood pressure was high and.....huh..... had stroke. I am afraid too..... because I don't want to have stroke like him. I am on hypertensive medicine - P6 (Alagbado)



Diabetes Mellitus

Diabetes is one of the diseases attributed to or as a result of overweight and obesity. Participants submitted that diabetes involves profuse urinating and water consumption. The excerpt are:

I know of diabetes mellitus because I have it. My doctor told me I have it because of my weight. I'm taking high blood pressure tablets too. Only God can preserve my life (looked disturbed) - P6 (Ijegun)

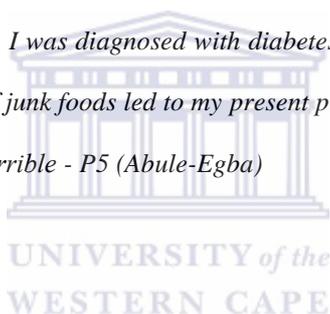
Diabetes mellitus. Yeah because I have due to my weight. My doctor told me to watch my weight in order to reduce the amount of sugar in my blood - P1 (Ikotun)

Yea. Urinating frequently.... Thirsty for water....especially in the night - P4 (Alagbado)

Yea (smiling) regarding diseases associated with overweight individuals, I know of high blood sugar..... that one would be drinking and urinating profusely (demonstrating with both hands). I even wake up in the night to drink water because of thirst though I have consulted a physician for it. Re is it true that exercise can help in blood sugar reduction? - P3 (Meiran)

Thanks you Re. Diabetes mellitus can also arise from being overweight. You know.....when you wake up in the night to urinate profusely and drink lots of water because of thirst. Oh my God....this funny you know. Looks as if we have one type of ailment or the other from overweight - P4 (Igando)

I also want to give a personal example. I was diagnosed with diabetes mellitus three years ago because of my weight. My uncontrolled consumption of junk foods led to my present predicament. I was drinking and urinating profusely during the night....oh it was terrible - P5 (Abule-Egba)



5.3.3 MANAGEMENT OF OVERWEIGHT AND OBESITY AMONG NIGERIANS

During the focus group discussions participants drew from the knowledge and advice gained during the consultations with healthcare professionals, personal experience as well as interpersonal discussions. This was seen in how they eagerly responded to some of the ways through which overweight and obesity are managed. The quotes below show diverse responses of the participants on their views regarding management of overweight and obesity. their suggestions are outlined below.

Diet

Participants were of the opinion that by paying attention to the type and quantity of food, and the timing of their meals, they can reduce their weight. The following excerpts were participants' views regarding the type of food for overweight management:

In my own opinion whoever wants to reduce weight would have to reduce eating heavy foods (high energy foods). He should also be eating fruits a lot which will make him more active and will be able to do much..... move with ease and the body would be lighter. Em em secondly he must be eating neat and clean food. He should also refrain from eating heavy foods (high energy foods) like eba in the morning and amala as dinner.....with this he would reduce - P4 (Ijgun)

Participants were further asked to expand more on how reducing their quantity of food would reduce one's weight and one of the responses was:

I was advised to reduce my food to $\frac{3}{4}$ and eat plenty of vegetables along with fruits. But fruits are expensive. That is what I have been doing emm emm but exercising.... has been a major problem for me - P3 (Ikotun)

Respondent P3 (Ikotun) drew an example of a food and weight reduction strategy she was advised on for others to see. All the FGD participants believed that reducing food quantity would surely help in weight reduction but a only few knew the exact quantity to reduce:

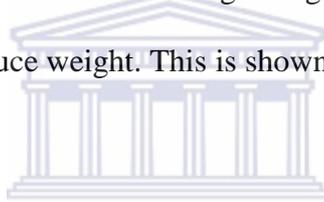
This (she marked $\frac{1}{3}$ of the circle) should be reduced for all the food we eat - P3(Ikotun)

I was advised to reduce the quantity of food I eat by 1/3 every month and eat lots of vegetables and fruits. But.....you know.....vegetables and fruits are expensive in the city here. I only reduce food quantity - P4 (Idimu)

As for me oo (touching his chest) I do not know the exact quantity to reduce but weekly reduction of food quantity would help. Or what do you think? - P1(Idimu)

Yea.....reducing food quantity would help.

Further, with respect to the role of diet in weight reduction, participants were of the opinion that timing of food consumption matters too. Eating of high energy food for dinner should be avoided if one really wants to reduce weight. This is shown from their responses:



I think one of the ways of managing overweight is to reduce or stop eating heavy foods as dinner. I...mean something like eba, fufu, amala etc late in the night. The food we eat is supposed to digest before going to bed - P2 (Igando)

And:

Yea. Any food you eat early in the night would digest and use for some activities before one goes to bed - P2 (Igando) -

Supported by:

I also want to say that not only avoiding late meal but we reduce that quantity of food we eat and lots of fruits and vegetables. You know....like replacing the quantity of food you reduce with plenty vegetables and water - P4 (Igando)

Yea.... and should be eaten early for dinner or to be eaten as breakfast - P3 (Abue-Egba)

P4 is right about reducing food quantity. I also want to say that time we eat the food is important too. I was advised not to eat heavy food early in the night. Food like amala, eba, fufu, iyan are all heavy food (high energy food) which should not be taken late for dinner. Sir (pointing to Re) increase in activity level can also make one to reduce weight - P1 (Akinogun)



Increased Physical Activity

Under the emerging theme of weight reduction came the issue of the use of increased physical activity as another means of weight control. Participants unanimously agreed that the use of exercise and increased physical activity is of great importance in weight control and reduction.

I know if one exercises very well, weight would reduce - P6 (Alagbado)

Yea....one should also reduce inactivity. I mean one should be involved in an exercise program - P1 (Akinogun)

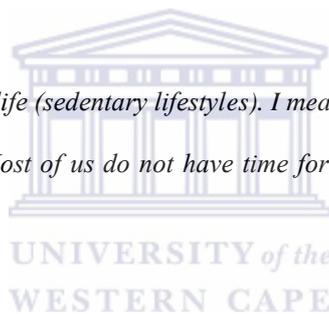
Yea.....reducing food quantity would help. Another thing is to be more active. To reduce sedentary lifestyle. Most of us prefer the sedentary lifestyle which is not good for us. Re (pointing to Re) do you know I can walk

fast now without exhaustion? I do lots of trekking now unlike before....and is assisting in reducing my weight - P3 (Meiran)

Participants were fully aware of the benefits of physically active lifestyle, some highlighted time constraints as a barrier to becoming physically active as illustrated below:

I think regular exercise would help in weight reduction. But emm.....how do we exercise when we spend most of time on our source of livelihood? One goes out early in the morning and come back late in the night. But exercise will surely help in weight reduction - P4 (Abule-Egba)

I think one should not live a lazy man's life (sedentary lifestyles). I mean one should increase his level of activity which.....you know is a big problem. Most of us do not have time for exercise....which is not so good for our health - P2 (Igando)



In addition to time constraint, participants seem to be unsure of how much physical activity or exercise is sufficient as shown below:

I think we are not serious about weight reduction (frowning) because.....I know there are few exercises we can do even in our places of work. We just need to reduce sedentary habits especially those of us who are self-employed - P4 (Abule-Egba)

Yea exercise. We all need to be active if truly we want to reduce our weight. We can do 5 minutes of exercise in our living room/balcony. We need not to go to the national stadium ah ah ah ah (laughing).

We should be doing more of walking than using automobiles. I do walk to the bus stop instead of using okada (motor bike) - P6 (Akinogun)

Herbs for Weight Reduction

Herbs, concoctions and other natural medicines have been in use among Nigerians before the advent of orthodox medicine. The use of herbs in weight reduction was thoroughly discussed:

Yea. There are herbs/concoctions for weight reduction. There are herbs we use for children who are overweight that can reduce their weight - P5 (Meiran)

Even if your new born baby is too small, there are herbs that can be used to make the baby weight increase. But the concoction should not be allowed to be in contact the baby head while bathing with it - P2 (Meiran) -

There are some herbs that a friend used along with Epson salt - P4 (Ajegunle-Ilo)

The only thing I remember is Epson salt she added to the concoction before taking the bath - P4 (Ajegunle-Ilo)

....and.....

She bathed every day after 4pm - P4 (Ajegunle-Ilo)

Some of the participants were sceptical and cautious because of the side effects of the herbs:

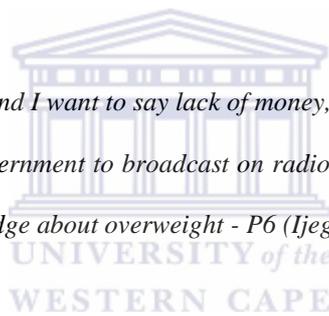
I am aware too that herbs can be used to reduce weight because I have seen few people who benefited from herbs. They say herbs work but I have not tried it - P6 (Abule-Egba)

yeah there are herbs that can be used to reduce once weight but most of them cause stooling after taking them. Beside the herbalists won't tell you the compositions of the concoctions. I tried it sometimes ago but had to stop taking it because I was stooling - P6 (Igando)

honestly I don't know but I have been advised to consult herbalist for weight reduction..... but my fear is after effects of the herbs on my system (pointing to her tummy) - P5 (Alagbado)

A participant suggested a solution to constraints faced with weight reduction which is highlighted below:

I agree with P1 regarding lack of time and I want to say lack of money, good area for exercise and support from government. You see I expected the government to broadcast on radio and TV all what we have been speaking about so as to enable us to have knowledge about overweight - P6 (Ijegun)



I think a health talk like this would surely help but not everybody is here to listen to you. May be jingles on the radio would help or what do you think?- P8 (Ikotun)

5.3.4 CHALLENGES EXPERIENCED WITH WEIGHT REDUCTION

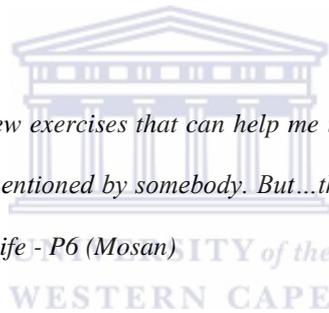
Weight reduction is difficult to achieve and maintaining the weight loss might even more difficult. The majority of the participants highlighted various challenges preventing them from weight reduction. Among the challenges are:

Lack of Time for Exercise

Participants submitted that lack of time for exercise is one of the challenges they face wanting to be physically active to assist in weight reduction. It seems that the nature of their work does not allow them to have adequate time for exercise. This is shown below:

One problem I have is the time for exercise because my work involves getting out early in the morning and coming back late in the night. I am even going out now to get what I would sell in my shop next week - P6 (Baruwa)

Personally I do not have time to do a few exercises that can help me in reducing my weight. The nature of my job does not allow me to trek a lot as mentioned by somebody. But...this is my health em..i have to create time for few exercises so as to live a healthy life - P6 (Mosan)



They also voiced their opinion that a possible solution is to be engaged in walking as a means of transportation, to reduce their weight:

The challenge I have is the time to exercise. I...em....mean lack of time for exercises. I work throughout the week and even Saturday sometime. I would not mind to anything to reduce my weight because of diseases we mentioned ah ah ah (laughing). What I think would benefit me is regular trekking everyday on my way to and from the office. I would try and walk fast so as to sweat very well but uh uh uh my body would be smelling because of the sweat (smiling) - P1(Ayobo)

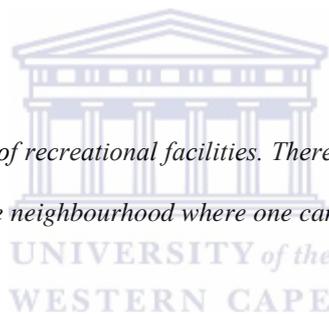
Previous speakers are right about the problems we have but personally lack of time for exercise and money the challenges I have. The only time I am free is Sunday which is the day I go for service and prepare for the events

of the week. One needs money to consult specialists, especially on private basis, on weight reduction which I cannot afford - P3 (Ajegunle-Ilo)

Lack of Recreational Facilities

Aside from lack of time for exercise as a hindrance to weight reduction, they also pointed out that absence of recreational facilities in their areas is one of the factors that prevent them becoming physically active to assist in reducing their weight. This is seen from their contributions as follows:

I think one of the challenges is the lack of recreational facilities. There are no places for exercise. You see...em em there is supposed to be a place in the neighbourhood where one can go for exercise anytime one wishes - P6 (Ajegunle-Ilo)



I know there is a need for me to reduce weight but the problem I have is time for exercise. Also, no recreational facilities in our area to do various forms of exercises. Government should provide recreational facilities for us - P4 (Ikotun)

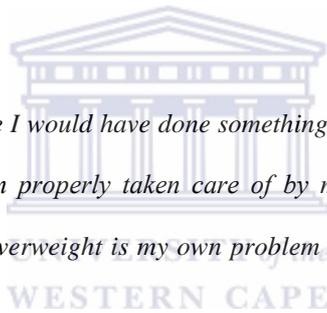
Challenges...they are many sir. I know in the developed countries there are places you can go to exercise but those recreational centres are not here. You pay heavily to exercise in hotels which I cannot afford - P6 (Abule-Egba)

Ignorance about the Need to Reduce Weight

Ignorance with regards to the need to reduce weight seems to exist among the participants. They believe that being overweight is a sign of good living. This is displayed in the following excerpts:

Yea I agree with her. I think the lack of knowledge about the need to reduce weight is another challenge because we believed that being big (overweight) is a sign of good living ah ah ah. But thank you guys for the health talks - P2 (Ajegunle-Ilo)

I didn't know I am overweight otherwise I would have done something about it. I thought being big like me is a sign of good living. It shows that I am properly taken care of by my husband. So,...emm....I think lack of knowledge about the consequences of overweight is my own problem that I have regarding weight reduction - P3 (Meiran)



And those most Nigerian men prefer their wives to be a bit robust:

Thank you Re. My own challenge is the lack of knowledge about the need for me to reduce my weight. I thought it a good sign to be big. But I have been learning about it of recent which is helping me. Most Nigerian men prefer their wives to be a bit more robust/big in order to show that wives are being taken care of you know ah ah ah - P8 (Ikotun)

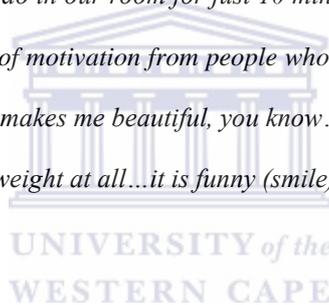
Thank you. I thought being big (overweight) is a sign of good living. People think you are sick or not being properly taken care of if you are lean/skinny. But my belief has changed of recent (smiling). We usually think

that our wives don't take care of us if one is not big and well fed. That is one of the problems we have in our environment - P4 (Akinogun)

Lack of support from the immediate family and fear of being laughed during exercise

Participants were of the opinion that they are not being supported and motivated to reduce weight from their immediate family as highlighted below:

I think there are many exercises we can do in our room for just 10 minutes. So P6 doesn't have any reasons for not exercising. My own problem is lack of motivation from people who surround me. They do not encourage me to lose weight.....keep saying my weight makes me beautiful, you know....em em..at the expense of my health. My husband is not even bothered about my weight at all...it is funny (smile) - P2 (Baruwa)



Ah there lots of challenges Re. Personally, I do not have support from my wife. She prefers to feed me with unhealthy foods that are not good for my health. Though she eats it too but she does not bother because she is not overweight like me - P1 (Alagbado)

The only problem I can think of is the will to follow the necessary steps for weight reduction. I would have done better if we were to be in a group. That would have been encouraging us to do few things - P6 (Idimu)

In addition, participants feared being laughed at if they should attempt to exercise as shown below:

Sincerely.....em em ...I love exercise but people would laugh at you when you are exercising. They would not mind their own business - P2 (Ikotun)

Another problem I have that I do not want people to be laughing at me while exercising. You know our people the way they think. Those are the two problems I have now - P1 (Alagbado)

Lack of money

Among the factors that can influence access to treatment is the lack of financial capability on the part of the patient. The focus group discussion participants agreed that lack of money to access the health professionals, as well as procuring the necessary diet regimen impacts on their ability to reduce their weight.

Also fruits are expensive in the city here which makes it difficult for one to buy. I can afford the cost of buying the fruits and vegetables that I need to supplement the quantity of food I am reducing - P2 (Baruwa)

My own challenges are lack of money and knowledge about the reason why I should lose weight. I thought being an overweight person is a sign of affluence but that has changed now. I eat what I can afford. I do not have money to see dieticians or buy those items I need for weight reduction - P3 (Mosan)

Challenges...they are many sir. I know in the developed countries there are places you can go to exercise but those recreational centres are not here. You pay heavily to exercise in hotels which I cannot afford. Also, cost of consulting a dietician is much as well as the cost of getting the necessary diet regimen. You know our government is not serious about the issue of overweight and obesity but they are serious about malaria and HIV/AIDS - P6 (Abule Egba)

Yea... there are challenges. Mine are time and money. Time to do the exercise and money to get the vegetables and fruits I need to supplement the quantity of food I reduced. You know fruits are expensive for no good reasons - P4 (Idimu)

5.4 DISCUSSIONS WITH TRADITIONAL HEALERS AND INTERVIEW WITH HEALTH PROFESSIONALS

Management of overweight and obesity involves inter-professional involvement in the health care system. In view of this, focus group discussion was held with traditional healers, and in-depth interviews with dietician and physician.

Traditional Healers: A total number of sixteen (16) traditional healers were present within the catchment area of the study, all belonging to Ewedogbon Herbalist/Traditional Healers Association and in turn an affiliate of Lagos State Traditional Medicine Board. The leader of Ewedogbon Traditional Healers Association conveniently selected six (6) traditional healers to participate in the FGD.

In-Depth Interview with Medical Personnel: Heads of Dietetic and Nutrition, and Medicine Departments chose members of the focus group interview. Because of the busy schedule of the physicians and dieticians, in-depth interview was done separately for the physicians and dieticians. Questions about the causes of overweight and obesity, complications, referring factors and management of overweight and obese persons were discussed.

5.5 EMERGING THEMES

Table 5.2: Themes and Sub-Themes Emanating from in-Depth Interview with Dietician and Physician

| THEME | SUN-THEMES |
|--|---|
| CAUSES OF OVERWEIGHT AND OBESITY | Food Genetics Sedentary lifestyle |
| CO-MORBIDITY OF OVERWEIGHT AND OBESITY | Joint pain Type II diabetes mellitus Hypertension Osteoarthritis |
| MANAGEMENT OF OVERWEIGHT AND OBESITY | Herbs Diet Drugs Physical activity Surgery |

5.5.1 CAUSES OF OVERWEIGHT AND OBESITY

There is an agreement regarding the causes of overweight and obesity between the community leaders and physicians. The type of food consumed, genetic as well as sedentary lifestyle are the reasons submitted as the causes of overweight and obesity.

Type of Food

Responses of the traditional healers and health professionals regarding type of food consumed as one of the causes of overweight and obesity are highlighted below:

Overweight and obesity are caused by ingestion of high calorie foods without taking note of the content of what they are eating. People are now eating the so called fast foods which are lipid loaded with the aim of showing affluence – Physician

The second cause is the food one eats lots of fatty foods...like too much of carbohydrates...like eating eba as breakfast, lafun as lunch and semovita as supper..em em will surely lead to increase in weight even if the stew/soup used along the aforementioned foods contain protein lead to overweight. We have been told that most these carbohydrates usually digest and store in the body if not properly utilised - Traditional healer - P1

So taking this westernized diet usually lead to increase in weight. Junk foods like meat pie, sausage rolls, burger do add increase weight astronomically and consumption of sweet drinks which I do want to mention for reasons best known to me and this attitude of sitting in one spot....sedentary lifestyle also leads to increase in weight - Physician

Genetics

The views of health professional and traditional healers regarding genetic factor as a cause for overweight and obesity were:

There are many causes of overweight and obesity. The first one is hereditary. If one comes from a family that has the tendency to be overweight no matter what one does, even if one starves himself or fasts every day, that person will surely be overweight - Traditional healer P1

Also, there are few who are overweight not because of food but...genetic factors..they don't eat much and they are overweight. Their family does not eat much... but they are overweight. So,..those are the factors that can cause obesity - Physician

I quite agree with P1 regarding hereditary as one of the causes of overweight and obesity. Using my case as an example, I am from a family in which all of us are big (overweight), that is hereditary is a cause of overweight and also excessive consumption of salt can also lead to overweight - Traditional healer P2



Sedentary Lifestyle

Both the physicians and traditional healer agreed that being physically inactive do leads to an increase in body weight as shown below:

....sedentary lifestyle also leads to increase in weight - Physician

Lack of adequate exercise can also lead to overweight and obesity - Traditional healer P1

5.5.2 DISEASES THAT USUALLY ARISE FROM OVERWEIGHT AND OBESITY

Regarding the diseases that usually arise from overweight, the physician was emphatic on the commonest and rarely seen ones while the traditional healers mentioned joint pains (OA of the joints) as the disease that arise from being overweight.

The diseases that are really common in this area are type II diabetes, hypertension, osteoarthritis, em em on a rare case we have a fungal skin infection and respiratory difficulties. The commonest are hypertension, osteoarthritis and type II diabetes mellitus - Physician

*Still in line with previous speakers, I want to say that being overweight can result from hereditary factor. As we all know that I was bigger than before but was advised to lose weight because of many health problems I had then, one of which was joint pains. I was advised to stop eating high energy foods like eba, amala, fufu, rice, reduce salt intake because of my blood pressure that was high.....and I lost some weight because I followed the diet regimen given me. I was also advised to eat lots of beans, moinmoin which I have been doing religiously -
Traditional healer P3*

The traditional healer further mentioned other ailments from overweight when asked about how to diagnose overweight and obesity by saying:

We know someone is overweight because of excess fat when he/she pants after walking few metres, or someone who sweats profusely and complains of joint pains - Traditional healer P1

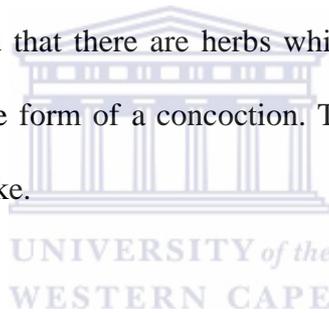
This shows a dearth of knowledge about the sequelae of overweight and obesity on the part of traditional healers.

5.5.3 MANAGEMENT OF OVERWEIGHT AND OBESITY

Management of overweight and obesity by traditional healers and health professionals generated the use of herbs, diet, exercise, drugs and surgery as emerging themes.

Herbs

The traditional healers submitted that there are herbs which can be used to reduce weight. These are usually prepared in the form of a concoction. The constituents of the concoction were not disclosed for patency sake.



There are some ways we use in managing overweight as Nigerians. I want to say this because I have tried it and it worked for me,

I trust its efficacy. There are some herbs we use, which I do not want to disclose the compositions because it is the secret of our profession, but I would mention only one component of it which is lemon juice. You mix lemon juice with some herbs and drink it daily for at least two weeks for weight reduction. The only exception to that is if the overweight results from hereditary and women with fibroid should not use it - Traditional healer P6

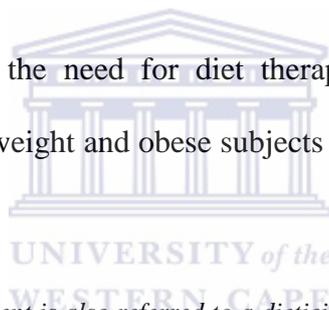
The researcher further probed the traditional healer to disclose the contents of the concoction but observed it was a general consensus that no matter what, it would not be disclosed.

Diet Therapy

The use of diet as treatment for overweight and obesity had a unanimous consensus among the traditional healers, dietician and the physician.

What I said was a form of advice too. We usually advise them on the right foods to be eaten and must be followed strictly. That they should reduce the quantity of high energy foods they eat as well as be more active. They should not live a sedentary lifestyle - Traditional healer P6

The physician also emphasised the need for diet therapy for weight reduction. This is appreciated by referring the overweight and obese subjects to a dietician. This is shown in his submission:



Regarding diet therapy, overweight patient is also referred to a dietician who places him/her about the types of foods and drinks to be taken - Physician

Detailed management of overweight and obesity using diet was obtained from the dietician. This includes mode of referral, mode of evaluation, treatment planning and treatment implementation.

Mode of referral is not by first contact basis, but by referral by a doctor/physician:

You have to come by referral from a doctor/physician or physiotherapist - Dietician

The importance of BMI and daily recommended calories was also highlighted by the dietician:

The patient BMI is calculated to determine level of overweight...to categorise them into overweight or obese, then we calculate their ideal body weight and daily calorie need, then place them on a diet. After placing them on diet,...the diet is divided into daily daily calorie need measure....that they measure on their own. We also encourage in-between meals base on the food they eat.....we also give them a diet sheet which we have translated for them to understand - Dietician

Body mass index is calculated by using this formula

$$BMI = Wt(kg)/ht(m)^2$$

While the ideal body weight is derived by

$$Ideal\ body\ weight(Rw) = H^2(m) \times BMI\ constant(25)$$

$$Recommended\ daily\ calorie = R(w) \times activity\ level$$

Activity level classifications

Low Active=20, Sedentary=25, Active=30, Very active=35

The physician divided the overweight and obesity management into non-pharmacological and pharmacological:

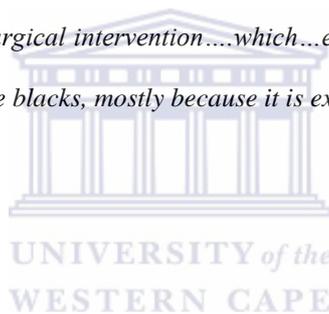
Specifically, the treatment is stepwise in nature. It starts with non-pharmacological which is based on the morbid status of the patient. The non-pharmacological treatment is a form of lifestyle modifications which include exercises and diet therapy. The patient is referred to physiotherapists who put him/her through a series of exercise regimen based on the needs of the patient. Regarding diet therapy, overweight patient is also referred to a dietician who places him/her about the types of foods and drinks to be taken – Physician

Em em I want to say that the pharmacological treatment involves the use of anticoagulants to reduce low density lipoprotein and pharmacokinetics correction which is the use of drugs to reduce fat absorption into the system. I....mean this is one of the last options after exercise and diet therapy fail. That is why I said the treatment is stepwise in nature depending on the needs of the patients...and the treatments are based on evidence based medicine...it have been certified that uh uh uh (clearing his throat) the treatments work by scientists – Physician

And surgery as a form of the non-pharmacological treatment which most Nigerians cannot afford:

Yeah...another very last option is the surgical intervention....which...em...em we don't usually do here. This is more common among the whites than the blacks, mostly because it is expensive for black to afford - Physician

5.6 SUMMARY



There was a unanimous assertion that the type of diet, meal timing, reduced physical activity and genetic factors are the causes of overweight and obesity. It is pertinent to point out that overweight/obese Nigerians who participated in the FGD had fair knowledge of co-morbidities that usually arise from overweight and obesity. The most mentioned consequence of overweight and obesity were joint pains, high blood pressure, Type II diabetes mellitus and the presence of fat in the blood (hypercholesterolaemia). This prompted the participants to seek intervention for weight reduction intervention. Focus group discussion participants were highly motivated to mention various weight reduction interventions they have sought or would seek. These were diet therapy, an increase in physical activity and the use of herbs. Regarding diet therapy, it was a unanimous assertion that reduction/stoppage of consumption

of high energy early consumption of supper will go a long way to reduce one's weight when combined with an increase in physical activity. The use of herbs was thoroughly discussed, but there was inconsistency on the potency of herbs and the compositions. Nigerians who were overweight and obese were keen on reducing their weight so as to live a healthy life, but were faced with some challenges among which were lack of time for exercise because of the nature of their jobs, lack of recreational facilities, lack of motivation and support from family members to reduce weight, lack of money and poor or lack of knowledge to reduce weight.



CHAPTER SIX

DELPHI STUDY

6.1 INTRODUCTION

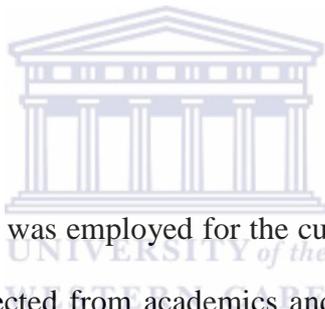
The procedure used to reach consensus on a culturally appropriate intervention for overweight and obese individuals are described in this chapter.

6.2 BACKGROUND

The main objective of this study was to design an intervention for the management of overweight and obesity among Nigerians. The intervention to be designed is aimed at meeting the cultural values the Nigerians bearing in mind that for effective intervention in the prevention of the epidemic of obesity, the context in which unhealthy behaviours occur should also be taken into consideration. These include socio-economic, cultural and environmental factors. The behaviours must be understood within the context of the cultural values in which they occur, reinforcing values which promote positive behaviours while discouraging negative ones (Puoane, Matwa, Bradley & Hughes, 2006).

The ability to make decisions in situations where there is conflicting or a deficit of information has led to an increased use of consensus methods, namely brainstorming, nominal group technique and the Delphi survey technique (Hasson, Keeney & McKenna, 2000). The Delphi survey method was originated by the RAND Corporation in an attempt to develop a technique to obtain the most reliable information that would be consensual from a

group of experts in the early 1950s. The Delphi method is characterised by employing multiple iterations that are designed to develop a consensus of opinions concerning a specific topic (Ludwig, 1994), the ability to provide anonymity to the respondents or experts, a controlled feedback process which enables the experts to reassess their responses and the suitability of a variety of statistical analysis techniques to analyse and interpret the data (Dalkey, 1972; Ludlow, 1975; Douglas, 1983). The employment of the Delphi survey has been in use in many disciplines including nursing (Gibson, 1998; Lawton & Wimpenny, 2003). The Delphi methodology has been applied in many fields such as public administration, economics, business, resource and environmental management, education, health care, energy policy, and urban and regional analysis because of its various advantages (Miller, 1993).

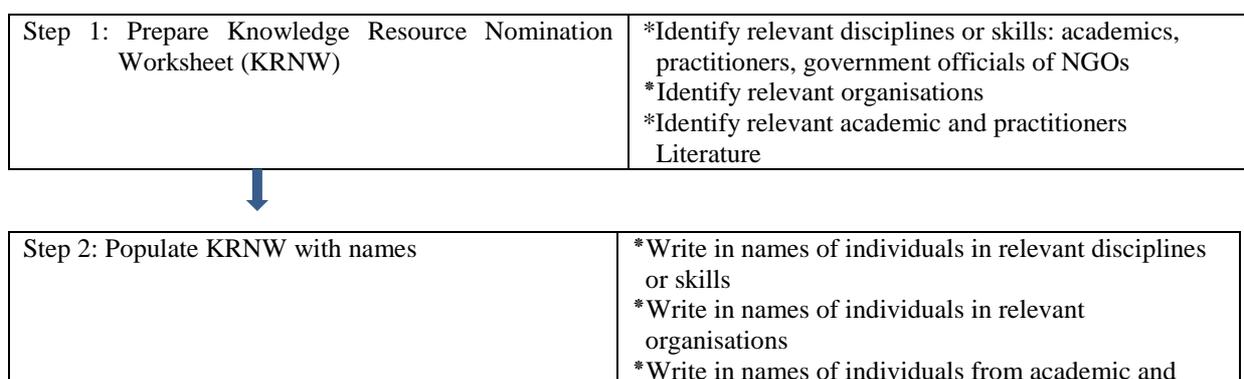


6.3 METHODOLOGY

A three round e-Delphi technique was employed for the current study. Experts in the field of overweight and obesity were selected from academics and healthcare practitioners who are involved in the training and management of overweight and obesity.

6.3.1 Procedure

The selection procedure as outlined by Okoli and Pawlowski (2004) was adapted as illustrated in Figure 6.1 below.



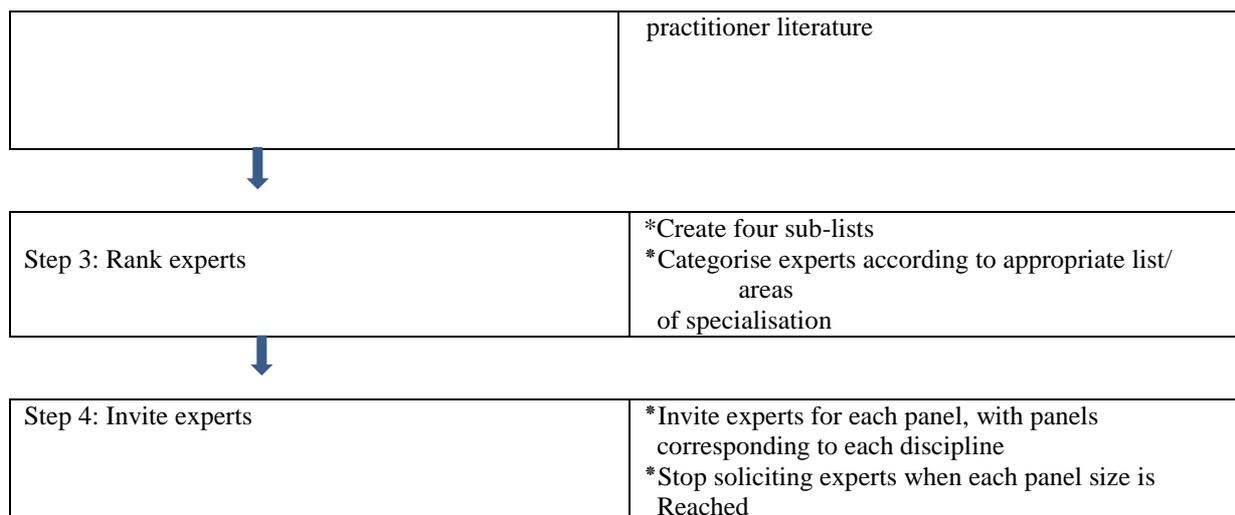


Fig. 6.1: Procedure for selecting experts (Okoli and Pawlowski, 2004)

Therefore, a purposely selected panel of experts were invited to participate in the Delphi study. The participants included dietitians, physicians, physiotherapists, and surgeons. An invitation to participate was sent via e-mail. An information sheet (Appendix 8a) and consent form (appendix 8b) were included in the invitation. Informed consent was requested from 44 experts. Twelve (12) of these consented to participate. No reason was given by the experts who declined. A questionnaire was developed requesting for the demographic details of the experts like age, gender, highest qualification(s) obtained, current professional practice, number of years' experience in health promotion, non-communicable disease, overweight/obesity prevention/management or role in the management of non-communicable disease/overweight/obesity. These were followed by four open-ended questions as written below. Experts returned the questionnaire after three (3) weeks. Descriptions of the participants are outlined below in Table 6.1. The mean age of the experts for the Delphi study was 49.92 years (SD=7.72), while the mean years of practice was 18 (SD=9.67).

Table 6.1: Demographic Characteristics of Panel of Experts (n=12)

| ID | Age | Gender | Highest Qualification | Current Occupation | Years of Experience | Roles in NCD prevention and Management |
|----|-----|--------|-----------------------|--|---------------------|--|
| 1 | 38 | Male | PhD | Postdoctoral Fellow | 2 | Researcher in overweight and obesity. In addition, I also manage health risks relevant to my discipline including osteoarthritis and stroke. |
| 2 | 44 | Female | PhD | Senior lecturer at academic institution | 9 | Teaching with regards to NCDs, exercise prescription and health promotion in general on both undergraduate and post-graduate level.. |
| 3 | 51 | Male | HND | Dietetic and nutritionist | 26 | Counselling of patients with obesity, measuring body mass index (BMI) giving dietary advice. |
| 4 | 49 | Male | MSc | Healthcare Provider | 25 | Healthcare provider |
| 5 | 43 | Female | PhD | Physiotherapist and exercise instructor | 8 | Physiotherapist and Exercise promoter |
| 6 | 55 | Female | MSc | Consultancy | 21 | Consultancy(overweight and obesity) |
| 7 | 59 | Female | PhD | Lecturer at academic institution, researcher | 25 | Lecturer, researcher |
| 8 | 62 | Male | MD/PhD | Lecturer at academic institution, researcher | 25 | Withheld |
| 9 | 52 | Male | MD/PhD | Anaesthetist at hospital | 15 | Anaesthesia for obese patients presenting for surgery |
| 10 | 59 | Female | PhD | Researcher and practitioner | 35 | Researcher and practitioner |
| 11 | 45 | Male | MD | Consultant physician | 15 | As a Consultant Physician and Cardiologist, one of my research/clinical area of interest is in the primary, secondary and tertiary prevention/management of NCDs and overweight/obesity. These are being carried out both within the hospital and in the community |
| 12 | 42 | Female | MSc | Lecturer at academic institution, researcher | 10 | Coordinator of a nutrition clinic at a tertiary hospital and nutrition lecture |

6.4 RESULTS OF FIRST ROUND OF THE DELPHI STUDY

The first round of the Delphi study involved sending open-ended questions to the twelve (12) experts who consented (Appendix 8c). All the twelve (12) experts responded making the response rate 100%. The results of the thematic analysis are presented in a tabular format. The recurring emerging themes regarding the benefits or the role of health promotion for individuals who are overweight or obese included risk factors reduction, morbidity and mortality reduction, enhancement of self-efficacy in weight management among others as outlined in Table 6.2.

Experts were of the opinion that health promotion leads to knowledge engagement and empowerment towards overweight and obesity and its management, leads to attainment of healthy life as depicted in table 6.2 below.

Table 6.2: The Benefits or Role of Health Promotion for Overweight or Obese

| Individuals | | | |
|--------------------|---|----------|------------|
| | Emerging Themes | n | (%) |
| | Reduces Risk Factors | 3 | (25) |
| | Reduces Morbidity and Mortality | 3 | (25) |
| | Provides Knowledge Engagement and Empowerment | 5 | (41.66) |
| | Warns about health Hazards of Obesity | 2 | (16.67) |
| | Helps in Achieving Healthy Life | 5 | (41.66) |
| | Leads to Self-efficacy in weight management | 1 | (9.09) |

The type of activities or items that should be included in an intervention that is culturally appropriate for prevention or management of overweight and obesity according to the experts' opinion included physical activity, dietary habits, lifestyle changes and education. This is summarised in Table 6.3 below.

Table 6.3: The Type of Activities or Items that should be included in an intervention that is Culturally Appropriate for Prevention/Management of Overweight and Obesity

| Activities /Items | n | (%) |
|-------------------------------|----|---------|
| Physical Activity | 11 | (91.67) |
| *type of exercise | 2 | (16.67) |
| *duration of exercise | 2 | (16.67) |
| *frequency of exercise | 1 | (8.33) |
| *cultural acceptability | 1 | (8.33) |
| *screen time | 1 | (8.33) |
| Dietary Intervention | 9 | (75) |
| *type of food | 3 | (25) |
| *timing of food | 1 | (8.33) |
| *quantity of food | 2 | (16.67) |
| *food availability | 1 | (8.33) |
| Lifestyle Modification | 3 | (25) |
| *group therapy | 1 | (8.33) |
| *individualised therapy | 1 | (8.33) |
| Education | 2 | (16.67) |
| *shopping for healthy food | 1 | (8.33) |

*calorie needs and food nutrient content 2 (16.67)

Regarding the best ways of implementing such an intervention in communities to reduce overweight and obesity, experts agreed that individualised therapy, group therapy, community participation and policy maker intervention are the means of implementing interventions that would be culturally appropriate for obesity management. These are shown in Table 6.4 below.

Table 6.4: The Best Way of Implementing Such an Intervention in Communities

| Suggested Interventions | n | (%) |
|--|----------|------------|
| Individualised Therapy | 1 | (8.33) |
| *provision of nutrition education | 1 | (8.33) |
| Group Therapy | 7 | (58.33) |
| *clients decision intervention | 1 | (8.33) |
| *weekly session at PHC | 1 | (8.33) |
| *health talks | 3 | (25) |
| *organising recreational activities | 1 | (8.33) |
| Community Participation | 6 | (50) |
| *talks to friend and family members | 1 | (8.33) |
| *social and religious groups participation | 4 | (30) |
| *monitoring of school menu | 1 | (8.33) |
| Policy Maker Intervention | 1 | (8.33) |
| *restriction of access to sugar/sweetened foods & beverage | 1 | (8.33) |

*enforcing clear labelling of food stuffs 1 (8.33)

The experts submitted that cultural practice of the people, economic status of the country, literacy levels as well as presence of recreational facilities are the differences that would be seen in the interventions between high economic countries and low economic countries of sub-Saharan Africa. These are shown in Table 6.5 below.

Table 6.5: Differences in Interventions in High Income Countries such as the USA, UK and those in sub-Sahara Africa

| Intervention Differences | n | (%) |
|---|----------|------------|
| Cultural Practice | 5 | (41.67) |
| *weight perception | 1 | (8.33) |
| *absence of diseases | 1 | (8.33) |
| *PA not supported by culture and environment | 2 | (16.67) |
| *Use of locally available food stuff | 1 | (8.33) |
| Economic Status/Opportunity of the Country | 5 | (41.67) |
| *inability to afford healthy food | 2 | (26.67) |
| *financial incapability towards joining recreational facility | 1 | (8.33) |
| Literacy Level | 2 | (16.67) |
| *inadequate media penetration & coverage | 2 | (16.67) |
| Presence of Recreational Facilities | 4 | (30) |
| *lack of affordable recreational facilities | 1 | (8.33) |
| *lack of safe environment for exercises | 1 | (8.33) |
| Technological Development | 1 | (9.09) |
| Health Development | 1 | (9.09) |

6.5 RESULTS OF SECOND ROUND OF THE DELPHI STUDY

The intervention programme for the management of overweight and obesity for Round 2 Delphi study was designed based on the emerging themes from the experts' responses from Round 1 (Appendix 8d). The response rate was 100% as all the twelve (12) experts who consented to participate in the study responded to Round 2 Delphi study. For an item to be included in the designing cultural appropriate programme for overweight and obesity management, consensus from the experts was set at 70% or more (Sumison, 1998; McKenna & Hasson, 2002).

Second round Delphi study was aimed at reaching consensus on the content, mode of instruction, length of implementation of the programme and venue for culturally appropriate intervention for overweight and obesity management. All the experts (n=12, 100%) consented that the content of culturally appropriate intervention should include physical activity/exercise, diet therapy and education while the majority of the experts (n=11, 91.67%) agreed that self-monitoring should be included. They also advised that diets should be evaluated on an individual basis. Before any evidence-based advice on diet, environmental intervention, parental (family) intervention, behavioural/ lifestyle intervention should be part of the content and exploration of the roles of government in preventing and managing overweight and obesity (e.g. access to micro-finance schemes, compulsory food labelling etc.) worth considering.

Regarding the components of each of the contents of the appropriate programme for overweight and obesity prevention and management, the majority of the experts agreed that

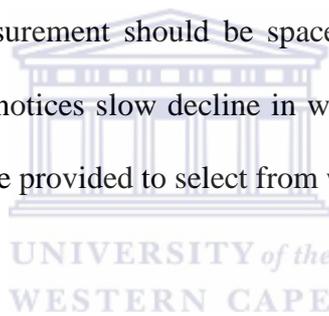
components of physical activity/exercise should be culturally acceptable (n=11, 91.67%), light and enjoyable (n=11, 91.67%), affordable (n=11, 91.67%), individualised (n=10, 83.33%) and carried out in a friendly environment (n=10, 83.33%). The experts also agreed that physical activity/exercise should include cardiorespiratory exercise/activity (n=11, 91.67%), strengthening exercises (n=11, 91.67%) and to a lesser extent general stretching (n=9, 75%). Experts further advised that extra daily physical activity routines should be encouraged, public facilities design to increase physical activity (e.g. use of stairs as opposed lifts; car parks further away from shopping malls etc.) and sport clubs e.g. tennis, netball or soccer for weekend players.

Diet therapy is one of the components of the contents of the intervention programmes recommended by the experts. The experts agreed that diet therapy should include change in dietary habits (n=11, 91.67%). Dietary education on fruits and vegetable consumption (n=12, 100%), low carbohydrate diet (n=9, 75%), reduction in fat intake (n=10, 83.33%), reduction in sugar/sweet intake (n=12, 100%), meal timing (n=12, 100%), reduction in food quantity (n=11, 91.67%) and healthy food shopping education (n=10, 83.33%). On a general note, they further advised that the component of the diet therapy should include food that is affordable for the client, avoidance of eating in-between meals by the clients, consumption of genetically modified foods should be well controlled and modified, individualised diet therapy as well as land agrarian reforms to address food insecurity.

Experts reached consensus on healthy food shopping education (n=10, 83.33%), fruits and vegetable education (n=12, 100%), education on complications of overweight and obesity (n=12, 100%), education on how to calculate BMI (n=10, 83.33%), and nutrition education on food calorie (n=11, 91.67%). They also advised that educating the clients on the

nutritional content/composition would be more useful rather than the energy/calorie contents. The need to re-orientate the clients on those cultural values and beliefs that promote overweight and obesity was also reiterated. Education on the benefits of exercise with regard to general health as well as overweight and obesity should be carried out.

Regarding self-monitoring by overweight and obese clients, experts agreed that reduction in screen timing (n=9, 75%), proper monitoring of the food consumed (n=11, 91.67%), keeping exercise logs (n=10, 83.33%) and regular weight measurement (n=10, 83.33%) and all vital self-monitoring points for overweight and obesity prevention and management. The intervention should also train the community health workers for periodical evaluations of weight assessment. Weight measurement should be spaced out to prevent discouragement that might arise if an individual notices a slow decline in weight values. Food logs should be kept and list alternatives should be provided to select from when craving for food.



To deliver physical activity/exercise, experts agreed that sports scientists/exercise physiologists, physiotherapists, occupational therapists should be included. However, since the prevalence of overweight and obesity is higher among the people of lower SES, members of the health team who are closer to these people should be trained (e.g. community health workers) to carry out physical activity/exercise. Diet therapy is better delivered by dietician and physician into clinical nutrition while education for prevention and management of overweight and obesity is better delivered by educators and all other healthcare professionals that manage this group of patients, psychologists, social scientists, health promotion specialists and public health practitioners. It was agreed that overweight and obese patients are better positioned to monitor their treatment. They also advised the use of public health educators in monitoring the patients to carry out the treatment interventions.

All experts agreed that group sessions (small group) (n=12, 100%) and interactive group work (n=12, 100%) are the best ways of implementing culturally appropriate interventions for overweight and obesity prevention and management. There was unanimous consent on the use of DVD or videos in the waiting rooms of health facilities (n=11, 91.67%), posters in the waiting rooms of health facilities (n=11, 91.67%), widespread media campaigns about consequences of overweight and obesity (n=11, 91.67%), and involvement of policy makers to enforce actual food labelling (n=11, 91.65%), are better ways of implementing a culturally appropriate intervention programme for overweight and obesity management and prevention. The use of hand-outs (n=10, 83.33%) and one-on-one sessions (n=9, 75%) between patients and their caregivers are good ways of implementing programmes that are culturally appropriate. Among the suggestions proffered by the experts on ways of implementing culturally appropriate programmes included carrying out training in goal setting and lifestyle skills, provision of self-help materials or specific dietary plans and that the programmes can be carried out during religious activities.

As stated earlier, for an item to be included in designing cultural appropriate programmes for overweight and obesity management, consensus from the experts was set at 70% or more (Sumison, 1998; McKenna & Hasson, 2002) in this study. Experts' advice on how often the intervention should be carried was that the patients should be encouraged to continue with the interventions at home after being taught what to do, to reduce cost and time. The advice on how long the intervention should be carried included at least 30 minutes as recommended by the literatures, depending on employment status of the patients and as long as the subject can tolerate. Experts also suggested on how long in total the intervention should last that it can be

as much as six months, depending on the components of the programme as well as the time spent per component, and as long as the problem persists.

Regarding the use of media campaigns for the prevention and management of overweight and obesity, experts agreed to the use of television (n=11, 91.67%), radio (n=12, 100%), weekly newspapers (n=11, 91.67%), magazines (n=10, 83.33%) and town criers (n=7, 58.33%). Experts' suggestion on the use of television for preventive campaigns included focussing on documentary programmes on health by inviting a resource person to talk on overweight and obesity, its complications and preventive measures. They also suggested the use of jingles and government sponsored programmes during news broadcasts detailing the merits of weight reduction and complications that are usually arise from overweight and obesity. The same suggestion was offered for the use of radio in overweight and obesity prevention and management. However, it was unanimously suggested that the use of radio is the most appropriate, as almost everybody has a radio at home and that the jingles should be run continuously. Writing articles in newspapers on the complications and preventive measures of overweight and obesity and proper food display were among the suggestions offered by the experts. The same suggestions were offered regarding the use of magazines as well as advice on cardiovascular health promotion and chronic non-communicable diseases preventive steps that include lifestyle modifications. Experts further advised that the use of trained community health workers, regular provision of relevant information and guidelines, and awareness creation in local languages on overweight and obesity complications and using town criers as a means of campaigning preventative measures and management of overweight and obesity.

Few of the experts agreed that television (n=8, 66.67%), radio (n=7, 58.33%), newspapers (n=10, 83.33%), magazines (n=7, 58.33%) and town criers (n=8, 66.67%) should be used for 1-2 times per week respectively. Experts also agreed that the media campaigns should run for as long as 12 weeks (n=7, 58.33%). They also suggested that television and radio campaigns should be run during every 19h00 daily news broadcast. Using newspaper or magazine for campaign, experts advised that the campaign be run at least once in a week, and that for town criers, it should be run every major market day. It was also pointed out that the media campaign should be ongoing and be part of our daily life since the campaign does not target only those with overweight and obesity.

Experts consented that interventions for overweight and obesity prevention and management could be held at community halls (n=11, 91.67%), religious centres (n=11, 91.67%), and recreation centers (n=10, 83.33%) if not held at community/public health facilities. They also suggested that the campaign could be held at car parks, market places and education institutions (primary, secondary and tertiary). Regarding how often the intervention should be held, experts agreed on 1-2 times per week (n=7, 58.33%) and for a period of 12 weeks (n=8, 66.67%). It is however advised that any intervention to prevent and manage overweight and obesity should be continuous and be part of our daily routine.

A summary of the suggestions made by the experts on the content, mode of instruction and duration and place of intervention is outlined in Table 6.6.

Table 6.6 The Content of Culturally Appropriate Intervention for Person with Overweight/Obesity

| Item | n (%) | Opinion/advice |
|------------------------------|--------------|--|
| • Physical Activity/Exercise | 12(100) | Inclusion of environmental, parental (family),and behavioural/ lifestyle |
| • Diet Therapy | 12(100) | |
| • Education | 12(100) | |

- Self-monitoring 11(91.67) intervention

The Components of Culturally Appropriate Intervention for Person with Overweight/Obesity

| Item | n (%) | Opinion/advice |
|---|-----------|---|
| Physical Activity/Exercise | | |
| • Culturally acceptable(e.g. gardening, walking, dancing, house chores, swimming, no of steps counting) | 11(91.67) | Encourage extra routine daily PA, design public facilities to increase PA |
| • Light and enjoyable | 11(91.67) | |
| • Group exercise/physical activity | 9(75) | |
| • Affordable exercise/physical activity | 11(91.67) | |
| • Planned individualised exercise/physical activity | 10(83.33) | |
| • Exercise/physical activity friendly environment | 10(83.33) | |
| • Exercise/physical activity should include | | |
| ○ Cardiorespiratory exercise/activity | 11(91.67) | |
| ○ Strengthening exercise/activity | 11(91.67) | |
| ○ General stretching /activity | 9(75) | |
| Diet Therapy | | |
| • Dietary habits | 11(91.67) | Affordable prescribed diet, client to avoid in-between meals |
| • Dietary education on fruits and vegetables consumption | 12(100) | |
| • Low carbohydrate diet | 9(75) | |
| • Reduction in fat intake | 10(83.33) | |
| • Reduction in sugar/sweet intake | 12(100) | |
| • Meal timing | 12(100) | |
| • Food quantity | 11(91.67) | |
| • Healthy food shopping education | 10(83.33) | |
| Education | | Educate the clients about |
| • Healthy foods shopping education | 10(83.33) | food nutritional |
| • Fruits and vegetables dietary education | 12(100) | contents/components |
| • Possible complications of overweight and obesity | 12(100) | |
| • Calculation of BMI | 10(83.33) | |
| • Nutrition education on food calorie | 11(91.67) | |
| Self-monitoring | | Training of community |
| • Reduction in screen time | 9(75) | health workers, keeping of |
| • Proper monitoring of food consumed | 11(91.67) | food logs and provision of |
| • Keeping exercise logs | 10(83.33) | alternative list when craving |
| • Regular weight measurement | 10(83.33) | for food |

Ways of implementing Cultural Appropriate Interventions

| Items | n (%) | Opinion/advice |
|--|-----------|---|
| • One on one session | 9(75) | Carrying out training in goal setting and lifestyle skills, provision of self-help materials or specific dietary plans and that the programmes can be carried out during religious activities |
| • Group sessions (small group) | 12(100) | |
| • Group sessions (classroom based) | 7(58.33) | |
| • Interactive group work | 12(100) | |
| • Use of hand outs | 10(83.33) | |
| • DVDs or videos in waiting rooms of health facility | 11(91.67) | |
| • Posters in waiting rooms of health facility | 11(91.67) | |
| • Wide spread media campaigns regarding consequences of overweight/obesity | 11(91.67) | |
| • Involvement of policy makers to enforce actual food labelling etc | 11(91.67) | |

The Frequency of Intervention if at Health Facility(including community/primary health facility)

| Frequency | n (%) | Opinion/advice |
|---|----------|--|
| How often | | The patients should be encouraged to continue with the interventions at home after being taught what to do, to reduce cost and time Employment status as well as tolerability of the client should be observed The intervention should continue as long as the problem persists |
| • 1-2 times per week | 6(50) | |
| For how long | | |
| • more than 30 minutes | 6(50) | |
| How long in total should the intervention last | | |
| • 12 weeks | 8(66.67) | |

The frequency of Intervention if Held at Community (excluding community/primary health facility)

| Frequency | n (%) | Opinion/advice |
|------------------------------|-----------|---|
| Type of Venues | | The campaign can be held at car parks, market places and education institutions (primary, secondary and tertiary) |
| • Community Halls | 11(91.67) | |
| • Religious centers | 11(91.67) | |
| • Recreation centers | 10(83.33) | |
| • “Joints” (similar to pubs) | | |
| How often | | Intervention should be continuous and be part of daily routine |
| • 1-2times per week | 7(58.33) | |
| How long in total | | |
| • 12 weeks | 8(66.67) | |

Through Media Campaign

| Type of Media | n (%) | Opinion/advice |
|---------------|-----------|----------------|
| • Television | 11(91.67) | |
| • Radio | 12(100) | |
| • Newspaper | | |
| ○ Daily | | |
| ○ Weekly | 11(91.67) | |
| • Magazine | 10(83.33) | |
| • Town Crier* | 7(58.33) | |

Suggestions for how to use Media for prevention Campaigns

| Type of Media | Opinion/advice |
|---------------|--|
| • Television | Health talks by the experts on TV, uses of government sponsored programme during news broadcasts |
| • Radio | Health talks by the experts on TV, uses of government sponsored programme during news broadcasts. The use of radio is the most appropriate. |
| • Newspaper | |
| ○ Daily | Writing articles in the newspapers on the complications and preventive measures of overweight and obesity and proper food displays |
| • Magazine | Writing articles in the newspapers on the complications and preventive measures of overweight and obesity and proper food displays |
| • Town crier* | The use of trained community health workers, regular provision of relevant information and guidelines, and awareness creation in local languages |

How OFTEN should each of these Media Campaigns be used

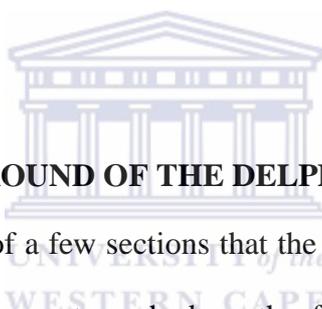
| Type of Media | n (%) | Opinion/advice |
|----------------------|----------|--|
| • Television | 8(66.67) | Media campaigns should be run during every 7p.m daily news broadcast |
| ○ 1-2 times per week | | |
| • Radio | | |

- 1-2 times per week 7(58.33) Media campaigns should be run during every 7p.m daily news broadcast
- **Newspaper**
- 1-2 times per week 10(83.33)
- **Magazine**
- 1-2 times per week 7(58.33)
- **Town Crier***
- 1-2 times per week 8(66.67)

For how LONG in total should media campaign run

- 12 weeks

7(58.33)



6.6 RESULTS OF THIRD ROUND OF THE DELPHI STUDY

Round 3 Delphi study consisted of a few sections that the experts could not reach consensus on (Appendix 8e). Consensus was not reached on the frequency of interventions for the management of overweight and obesity if the intervention were to be held at health facility (excluding community/primary health facility), and through media campaign. Questions regarding how often, for how long and how long the intervention should be in total were sent to twelve (12) experts and three (3) weeks were allowed for response. Ten (10) out of 12 experts responded at the end of third week which gave a response rate of 83.3%.

No consensus were reached on how often and how long the intervention should be held in a health facility (including community/public health facility) with the level of agreements 60% (n=6) and 50% (n=5) respectively. However, consensus was reached on how long in total the intervention should be held. There was a unanimous decision that the intervention should be

held for 12 weeks (80%), if it were to be held in health facility (including community/primary health facility). Also, 70% (n=7) of the experts agreed that the intervention should be held for 1-2 times in a week and for 12 weeks in total (n=8, 80%). There was no agreements on the use of television (n=6, 60%) and newspaper (n=6, 60%) but the experts agreed that radio (n=7, 70%) and magazines (n=8, 80%) can be used as forms of media campaign and for twelve (12) weeks in total (n=8, 80%). These are shown in Table 6.7 below.

Table 6.7 Frequency of Intervention for Overweight and Obesity Management (n=10)

| a. If at Health Facility (including community/primary health facility) | | |
|---|-----------|------------|
| Frequency | no | (%) |
| How often | | |
| • 1-2 times per week | 6 | 60 |
| For how long | | |
| • more than 30 minutes | 5 | 50 |
| How long in total should the intervention last | | |
| • 12 weeks | 8 | 80 |
| b. If at the community (excluding community/public health facility) | | |
| Frequency | no | % |
| How often | | |
| • 1-2times per week | 7 | 70 |
| How long in total | | |
| • 12 weeks | 8 | 80 |
| c. Through media campaign | | |
| Frequency | no | % |

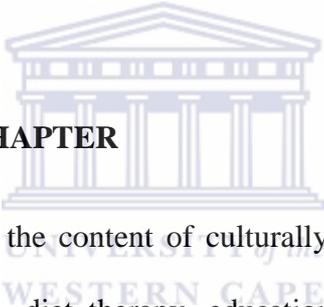
How OFTEN should each of these media campaigns be used

| | | |
|----------------------|---|----|
| • Television | 6 | 60 |
| ○ 1-2 times per week | | |
| • Radio | 7 | 70 |
| ○ 3-4times per week | | |
| • Magazine | 8 | 80 |
| ○ 1-2 times per week | | |

For how LONG in total should media campaign run

| | | |
|------------|---|----|
| • 12 weeks | 8 | 80 |
|------------|---|----|

6.7 SUMMARY OF THE CHAPTER



Experts unanimously agreed that the content of culturally appropriate interventions should include physical activity/exercise, diet therapy, education and self-monitoring. They also advised that diets should be evaluated on an individual basis. Evidence-based advice on diet, environmental intervention, parental (family) intervention, behavioural/ lifestyle intervention should be part of the content, and exploration of the roles of government in preventing and managing overweight and obesity (e.g. access to micro-finance schemes, compulsory food labelling etc.) are worth considering. Physical activity/exercise should be individualised, culturally acceptable, affordable, environmental friendly and should include cardiorespiratory exercise/activity, strengthening and general stretching exercises. Diet therapy is to include change in dietary habits, dietary education on fruit and vegetable consumption, advice on low carbohydrate diet, reduction in fat intake and food quantity as well as healthy food shopping. Clients are to be educated on the complications of overweight and obesity, calculation of

BMI, food calories nutrition/composition education and reorientation of the values and beliefs that encourage increase in body weight. Reduction in screen timing, monitoring of the food consumed, regular weight measurement and keeping exercise logs are a way of weight reduction agreed upon by the experts.

Physical activity/exercise is to be delivered by sports scientists/exercise physiologists, physiotherapists, or occupational therapists. Diet therapy is better delivered by dieticians and physicians for clinical nutrition, while education for prevention and management of overweight and obesity is better delivered by educators and all other healthcare professionals that manage this group of patients- psychologists, social scientists, health promotion specialists and public health practitioners.

Experts agreed that implementation of culturally appropriate interventions should be done in small group session that is interactive. They also advocated the use of DVDs or videos in the waiting rooms of health facilities, posters in the waiting rooms of health facilities, widespread media campaigns about the consequences of overweight and obesity, and the involvement of policy makers to enforce actual food labelling. The use of hand-outs and one-on-one sessions between patients and their caregivers are good ways of implementing programmes that are culturally appropriate.

Experts consented that interventions for overweight and obesity prevention and management could be held at community halls, religious centres, and recreation centres if not held at community/public health facilities. They also suggested that the campaign could be held at car parks, market places and education institutions (primary, secondary and tertiary). There was a unanimous decision that the intervention should be held for 12 weeks if it were to be held in health facilities and should be held between 1-2 times per week, if conducting within

the community (excluding community/ public health facility) for 12 weeks in total. Regarding the use of media campaigns for prevention and management of overweight and obesity, experts agreed to the use of television, radio, weekly newspapers and magazines. The use of radio should be 3-4 times per week, magazines 1-2 times per week and each for 12 weeks in total.

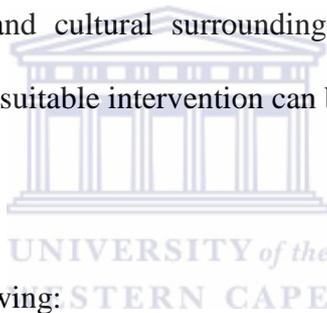


CHAPTER SEVEN

DISCUSSION

7.1 INTRODUCTION

The primary aim of this study was to design a culturally appropriate intervention for the prevention and management of overweight and obesity among Nigerians. The socio-ecological model recognises that an interwoven relationship exists between an individual and his/her environment. It also further recognises that any intervention to curb an issue such as overweight and obesity should take into consideration the interactions between an individual's physical, social, and cultural environments. The present study therefore, examined the physical, social and cultural surroundings. Several questions have to be answered first, however, before a suitable intervention can be designed.



These questions include the following:

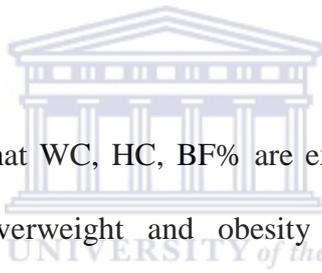
- What are the prevalence and severity of overweight and obesity among Nigerians?
- How do socio-economic factors influence overweight and obesity among Nigerians?
- What are the cultural factors associated with overweight and obesity among Nigerians?

7.2 WHAT ARE THE PREVALENCE AND SEVERITY OF OVERWEIGHT AND OBESITY AMONG NIGERIANS?

A large body of evidence exist that overweight and obesity are major risk factors for the development of chronic diseases and mortality (Schneider, Glaesmer, Klotsche, Bohler, Lehnert, Zeiher, et al, 2006). BMI is a quick and easy measure that is well understood and used by the general public (Meeuwssen, Horgan & Elia, 2010). Several researchers have, however, cautioned that when using BMI, accuracy in measuring body composition is sacrificed for simplicity (Meeuwssen, Horgan & Elia, 2010) and that other indicators such as WC and WHR are better (Schneider et al, 2006). In addition, the accuracy of BMI in determining the excess adiposity comes into question in athletes with elevated lean body mass and its values cannot be generalised among individuals of different ethnic affiliations (Garrido-Chamorro, Sirvent-Belando, Gonzalez-Lorenzo, Martin-Carratal & Roche, 2009). It is likely that individuals are often misdiagnosed as having inappropriate body fat due to variation in muscle mass, and that certain subjects with significant adiposity are overlooked (Bergman, Stefanovski, Buchanan, Summer, Reynolds, Sebring, et al. (2011).

Taking all of the above into consideration, the present study utilised WHR, BAI and BF% in addition to BMI to investigate the prevalence of overweight and obesity among Nigerians. When using BMI as measurement, 42.3% of the study sample in this study was found to be overweight or obese. These findings are similar to that reported in other African countries such as South Africa South Africa Department of Health, 1999), Egypt (Galal, 2002), and Ghana (Amoah, 2003b). The overall high prevalence of overweight and obesity witnessed in

this study might be due to nutritional transition in Nigeria. Nutritional transition refers to the tendency of reduced consumption of healthy and nutritional diets in favour of high energy and processed foods (Popkin, Adair & Ng, 2012). The ideal healthy traditional diets and agrarian lifestyles are abandoned coupled with an increase in sedentary lifestyles in developing countries. The nutritional transition is characterised by economic, demographic, environmental, and cultural changes taking place in a society that negatively affect both energy intake and energy expenditure (Monteiro, Conde & Popkin, 2004). Furthermore, the study sample was sourced from urban areas in Lagos State. Residents from urban areas have been shown to be less physically active and to prefer to make use of automobiles instead of trekking and consumed foods that are rich in high fat.

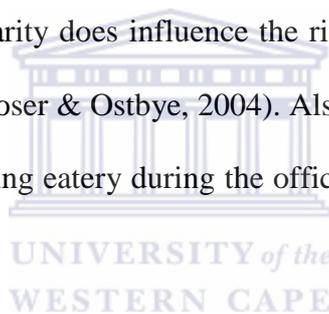


The results of this study show that WC, HC, BF% are excellent while BAI and WHR are good and fair in assessing overweight and obesity among the sample size under consideration. These measures have shown a prevalence of overweight and obesity of 38.2% (WHR), 43.7% (WC), 40.2% (BAI), and 39.2% (BF %). The use of BMI has been recommended by the World Health Organisation (WHO) as a way for assessment/measurement of body fatness because it requires very little instrumentation. For this study, body fatness from BMI was used as a criterion method for which other measures of body fat assessments were compared with in predicting body fatness among Nigerians. Receiver operating characteristic curve was plotted to determine the level of agreement between BMI and other body fat measures. It is therefore clear that there is a need for a measure that will be sensitive to gender, age, ethnicity, physical training and special clinical situations when it comes to the measurement of overweight and obesity. As Meeuwssen, Horgan and Elia (2010) concluded, a more direct measurement of body composition should become routine procedure in research studies examining the link between obesity and health.

7.3 HOW DO SOCIOECONOMIC FACTORS INFLUENCE OVERWEIGHT AND OBESITY AMONG NIGERIANS

Evidence exists that various socio-economic factors are associated with the development of overweight and obesity in both high and low income countries. Among these factors are age, educational levels, marital status, employment status and number of people in the house hold. All these factors were associated with overweight and obesity in this study. Being female was found to be a significant predictor for overweight and obesity. This is similar to the findings of Wahab et al. (2011) and Mbada et al. (2009) who reported gender a predictive factor for obesity in the Northern and Western parts of Nigeria respectively. Kanter and Caballero (2012) highlighted in their review that a higher prevalence of overweight and obesity are observed among women in developing countries of the Middle East and North Africa. The higher prevalence of obesity among females in some parts of the world might be due to some cultural attitudes and practices that enhance development of overweight and obesity. In some parts of Nigeria and the Pacific (Brinks, 1989), cultural practices of female fattening are common in preparation for marriage. Furthermore, obesity is seen as a sign of good health and wealth in developing countries and plumpness is viewed as an ideal of feminine beauty and symbol of prestige (Brown & Konner, 1987). It must also be highlighted that in sub-Saharan Africa and some developing countries, men perform most of the high energy demanding jobs requiring physical activity (Rashidy-Pour, Malek, Eskandarian, & Ghorbani 2009; Sodjinou, Agueh, Fayomi & Delisle, 2008) possibly because of the belief that women are weaker sex. Therefore, it is believed that changes in occupation type and sociocultural factors affecting physical activity, particularly among women in developing countries are related to why there are more overweight and obese women in these countries compared with men (Kanter & Caballero, 2012).

Age was also significantly associated with overweight and obesity among Nigerians in this study. The finding of this study is comparable to the study of Mbochi, Kuria, Kimiywe, Ochala and Steyn (2012) where age was reported as one of the significant risk factors for overweight and obesity. Agbeko et al., (2013) also reported that women within the 35-44 age group had the highest odds of being overweight or obese. Unadjusted odds ratio in this present study shows that Nigerians in the 48-57 age groups had the highest odds of being overweight or obese while adjusted odds ratio shows women within the same age group had the highest odds of being overweight or obese. The reason for this might be due to the fact that Nigerians within this age group tend to reduce the level of their physical activity, rely more on automobile, and number of parity does influence the risk of women being overweight or obese (Weng, Bastian, Taylor, Moser & Ostbye, 2004). Also, Nigerians within this age group are usually working and patronising eatery during the office hours which is seen as a sign of affluence.



Gender and age were found to be the major predictors of overweight and obesity among Nigerians. These factors must be taken into consideration when designing an intervention for the prevention and management of overweight and obesity. special efforts must be made to reach women of a specific age group (economically active) for inclusion in the intervention programme.

7.4 WHAT ARE THE CULTURAL FACTORS ASSOCIATED WITH OVERWEIGHT AND OBESITY AMONG NIGERIANS?

Culture can be viewed as the beliefs, norms, attitudes, values and knowledge that can be used to identify a group of people. Nigeria is a country of multiple ethnicities with different

cultures and beliefs. Overweight and obesity are also influenced by cultural attitudes. However, the increased prevalence of overweight and obesity is seen across different cultural entities that made up Nigeria as a nation. The increase in overweight and obesity prevalence prevails through all regions and cultures because of certain beliefs and norms shared by Nigerians. The prevalence recorded in this study is a representation of what obtains in the other parts of Nigeria because Lagos is the economic nerve centre of Nigeria which attracts people of different ethnic backgrounds.

In Nigeria, obesity is socially and culturally acceptable and thus not seen as a medical problem (Arojo & Osungbade, 2013). Ekpenyong and Akpan (2013) reported that among Efiks, Annangs tribes of Nigeria women are kept indoors to lighten their skin and fed with fattening foods (along with reduced physical activity) in preparation for their bridegroom and at the end of which the most “big” maiden is seen to be the most beautiful. In the same line, Onayemi (2004) reported participants in a study on beauty in the African/Yoruba Art as saying *“for the Yoruba and indeed Africans generally, full fleshed woman is preferable to the thin, almost male-like figures of young classical women”*. Obesity is seen as a sign of beauty and wealth in African cultural context. Ojofeitimi, et al., (2007) also reported that in spite of the higher educational levels of their participants in a university community in South Western Nigeria, many of them believed that being obese gives respect and that it is a sign of good living.

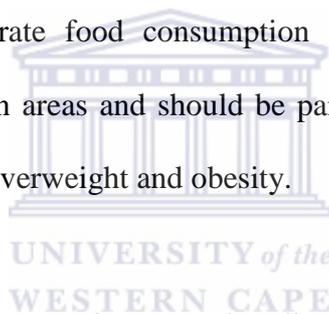
Another aspect of overweight and obesity associated factors that were highlighted in this study was the type of food consumed and the timing of consumption. Most of the affordable traditional foods available in Nigeria are high carbohydrate foods. Consumption of high energy food and late consumption of high energy were reported to cause overweight and obesity by FGD participants:

Thanks all. My contribution is still on food as a cause for overweight. Somebody here mentioned heavy foods (high energy foods) we eat as a cause of overweight which, to me, is true but I personally want to say that the time we eat heavy the foods (high energy foods) matters too. You see the heavy foods are supposed to be taken to do heavy duty work...I mean not to be taken for dinner....and... anyway that is my point- P6 (Igando).

And another participant contributed by saying:

yea. No. I want to explain what I feel about eating lots of food. Foods like amala, eba, iyan, fufu and....semo that are heavy foods (high carbohydrate foods) can add to somebody's weight-P4 (Ijegin)

These issues of high carbohydrate food consumption and late dinner are common to Nigerians in both rural and urban areas and should be paid attention to in any intervention aimed at preventing or reducing overweight and obesity.



After attempting to answer all the questions posed earlier in this chapter (introduction), the next step would be a consideration of the implications of all these factors in the design of intervention.

7.5 OVERALL IMPLICATIONS IN OVERWEIGHT AND OBESITY MANAGEMENT

This study has established that:

- There is high prevalence of overweight and obesity among Nigerians
- Gender and age are the major predicting factors for overweight and obesity development among Nigerians.

- Certain socio-cultural beliefs and practices enhance overweight and obesity development.

It is in view of the above mentioned that there is a need to develop overweight and obesity interventions that suits Nigerian context. Interventions that take into consideration the cultural values and norms of Nigerians that enhance overweight and obesity development.

7.6 THE DESIGNED INTERVENTION

Acknowledging the prevalence of overweight/obesity and the seriousness of associated co-morbidities, designing effective weight management interventions should be the utmost priority for everybody. An effective intervention should be multi-components that emphasises and encompasses physical activity, diet, behavioural management and education. There is good evidence that interventions which provide support and advice on physical activity and diet, education as well as self-monitoring together are more likely to be effective for weight outcomes than single-component approaches (Cavill & Eells, 2010). According to Campbell et al., (2007), interventions to achieve maximum health benefits should be based on best evidence and theory to optimise their effectiveness and understand how and why interventions do or do not work. As earlier explained, overweight and obesity likely involve genetics, physiology, culture, socio-economic status (SES), the environment and the interactions among these. In order for intervention to be effective, a clear understanding of the influence of the above mentioned variables on diet, physical activity is needed. Literature has shown that evidence based interventions must be relevant to the cultural needs and preferences of a sub-cultural group, i.e. their beliefs, values, customs, traditions and lifestyle (Castro, Barrera & Steiker, 2010; Frankish, Lovatto & Poureslami, 2007).

To assist in the development of a culturally appropriate intervention, a thorough investigation was done to understand how SES, culture, the environment and traditions impact on diet and physical activity among overweight and obese individuals.

Physical Activity: An increase in physical activity has been shown to be an important component of reduction intervention since it results in increased energy expenditure, reduction of food intake by overweight and obese individuals as well as maintaining targeted weight. As part of the intervention for preventing and managing overweight and obesity among Nigerians, physical activity should be carried out for a period of 12 weeks. Earlier on, the US Surgeon General advised that all people over the age of 2 years should accumulate at least 30 minutes of endurance type of PA, of at least moderate intensity, on most preferably all days of the week (Office of Surgeon General, 2001). Also, 2006 Canadian Clinical Guidelines on the management and prevention of obesity in adults recommend that long-term, regular physical activity, which is associated with maintenance of body weight or a modest reduction in body weight, for all overweight and obese individuals and that physical activity of 30 minutes a day of moderate intensity, to be increased when appropriate, to 60 minutes a day as part of an overall weight-loss programme (CMAJ, 2007). During the interaction with traditional healers, dieticians and other health workers, it also became apparent that they recognised that the lack of physical activity is one of the reasons for increased weight.

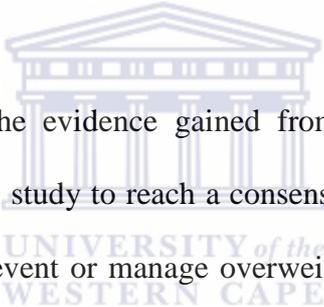
....sedentary lifestyle also leads to increase in weight - Physician

Lack of adequate exercise can also lead to overweight and obesity – Traditional Healer PI

Overweight and obese individuals too were aware of the importance of the inclusion of physical activity in the interventions to decrease weight.

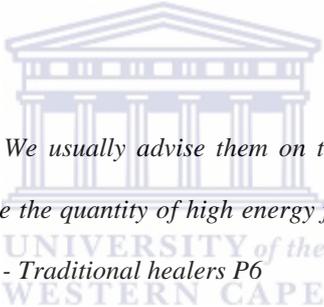
Yea exercise. We all need to be active if truly we want to reduce our weight. We can do 5 minutes of exercise in our living room/balcony. We need not to go to the national stadium ah ah ah ah (laughing). We should be doing more of walking than using automobiles. I do walk to the bus stop instead of using okada (motor bike) - P6 (Akinogun)

I think one should not live a lazy man's life (sedentary lifestyles). I mean one should increase his level of activity which.....you know is a big problem. Most of us do not have time for exercise.....which is not so good for our health - P2 (Igando)



All these views together with the evidence gained from in-depth literature review was presented to experts in the Delphi study to reach a consensus on what should be included in an intervention programme to prevent or manage overweight and obesity. For the designed physical activity component to achieve its aims, it must be culturally acceptable, light and enjoyable, can be carried out individually or in group, must be done in a friendly environment and should include cardiorespiratory, strengthening and general stretching exercises. Although consensus could not be reached by the experts on the frequency of the physical activity regarding how often/number of times to conduct PA in a week and how long/number of minutes for the PA to be carried out per session, the guidelines discussed above regarding the inclusion of physical activity in daily routine on most of the days of the week can be followed.

Diet: Noël and Pugh (2002) reported that regardless of the final nutritional composition of their diet, patients need to decrease their caloric intake to lose weight and that reductions of 500 to 1000 kcal a day are needed to produce weight loss at the recommended levels of 1 or 2 lb (0.45 or 0.90 kg) a week. Canadian clinical guidelines suggest a high-protein or a low-fat diet (within acceptable macronutrient distribution ranges indicated in the Dietary Reference Intakes) as a reasonable short-term (6–12 months) treatment option for obese adults as part of a weight-loss program. Current dietary recommendations continue to focus on the low-calorie, low-fat diet, with intake of 800 to 1500 kcal of energy per day (Orzano & Scott, 2004). The use of diet as a means of intervention was also advocated for by the healthcare professional and traditional healers.



What I said was a form of advice too. We usually advise them on the right foods to be eaten and must be followed strictly. That they should reduce the quantity of high energy foods they eat as well as be more active. They should not live a sedentary lifestyle - Traditional healers P6

Regarding diet therapy, overweight patient is also referred to a dietician who places him/her about the types of foods and drinks to be taken - Physician

Overweight and obesity individuals also recognised the importance of correct diet in their management:

In my own opinion whoever wants to reduce weight would have to reduce eating heavy foods (high energy foods). He should also be eating fruits a lot which will make him more active and will be able to do much... move with ease and the body would be lighter.

In addition, it became clear that education regarding different food types included in the traditional diet should be part of any intervention:

Em em secondly he must be eating neat and clean food. He should also refrain from eating heavy foods (high energy foods) like eba in the morning and amala as dinner.....with this he would reduce- P4 (Ijgun)

The WHO (2004) advocated educational campaigns in the field of nutrition in an attempt to combat overweight and obesity. Hence, weight management combined with nutritional counselling during the intervention should be an important goal for overweight and obese individuals. Practical knowledge in the field of preparation and composition of the diet, based on the preferred food may be a response to the needs of the patient with the ability to continue healthy cooking at home after finishing weight loss therapy (Stelmach-Mardas, Mardas, Warcho, Jamka & Walkowiak, 2014). Experts then also reached consensus on the contents of diet therapy are change in dietary habits, dietary education on fruits and vegetables consumption, low carbohydrate diet, low fat diet, reduction in sugar/sweet intake, meal timing, reduction in food quantity, and healthy food education.

Successful weight reduction and maintenance hinge of effective use of combination of increased physical activity, change in dietary habits, nutrition education and behavioural approaches (self-monitoring). These are in line with previous studies. It has been shown that employment of physical activity for overweight and obesity prevention and management leads to modest weight loss (Orzano and Scott, 2004) but lifestyle intervention that combines diet therapy, increase in physical activity and behavioural intervention, like self-monitoring,

lead to most successful weight loss and weight maintenance and increase in cardiovascular fitness.

However, there are some limiting factors that overweight and obese Nigerians highlighted as hindrances to successful weight management which need to be brought up. These challenges are lack of time for exercise, lack of recreational facilities, ignorance about the need to reduce weight, lack of motivation to reduce weight from family members, and lack of money.

Personally I do not have time to do a few exercises that can help me in reducing my weight. The nature of my job does not allow me to trek a lot as mentioned by somebody. But...this is my health em..i have to create time for few exercises so as to live a healthy life - P6 (Mosan).

Overweight and obesity managers as well as policy makers need to be aware of these challenges and should be included into treatment plans for effective weight management.

Implementation modes

Regarding mode of implementation, experts consented that for the intervention to be successful and culturally appropriate, it should be carried out using one-on-one sessions, group sessions (small and classroom based) and interactive group work if held at community/primary health facility. In addition, posters regarding overweight and obesity information should be displayed in the waiting rooms of community/primary health facilities. DVDs or videos can also be played in these waiting rooms. The use of wide media campaigns regarding the health consequences of overweight and obesity as well as involvement of the policy makers in enforcing actual food labelling were also advocated for.

The successful use of one on one session approach in the management of overweight and obesity has been documented in literature. Ball, Mackenzie- Rife, Newton, Alloway, Slack, Plotnikoff et al., (2011) reported lifestyle intervention delivered in a real-world clinical setting led to short-term improvement in the obesity status of Canadian adolescents. The lifestyle intervention included motivational interviewing and cognitive behavioural therapy that was carried out one on one session with obese adolescents. This approach is applicable to overweight and obese adults. A multicentre clinical trial designed to prevent type 2 diabetes in adults, demonstrated that a lifestyle behavioural intervention delivered primarily through one-on-one counselling delays the onset of type 2 diabetes through weight management and behavioural changes (DPP, 2002). The employment of patient-centered, motivation-based approaches to weight management care has been recommended by the experts (Lau, Douketis, Morrison, Hramiak, Sharma, % Ur. 2006). Also, the efficacy and cost effectiveness of group-based intervention for obesity management has been documented in literatures. In a meta-analytic review of randomised controlled trials on lifestyle intervention for overweight treatment among children, Wilfley, Tibbs, Van Buren, Reach, Walker and Epstein (2007) reported the efficacy of group-cased therapy. Minniti, Bissoli, Francesco, Fantin, Mandragona, Olivieri (2007), reported reduce attrition with group based intervention when compared with one on one intervention. Weight reduction multicomponent interventions that are delivered through multidisciplinary care may be more effective than interventions delivered by individual health professionals during active weight management (Tsai & Wadden, 2009).

Mass media render useful leverage for promoting health from time immemorial. They have been widely used to expose high proportions of large populations to messages through

routine uses of television, radio, newspapers and magazines (Catalan-Matamoros, 2011). Although wider coverage is achieved through mass media in public health, people's exposure to such message is usually passive (Wakefield, 2010). Experts opinion regarding the use of media is based on the fact that majority of the Nigerians populace would have access to radio, and to a lesser extent, television. Focus group discussion participants also alerted to how the media could be used to curb the increase in the prevalence of overweight and obesity.

You see I expected the government to broadcast on radio and TV all what we have been speaking about so as to enable us to have knowledge about overweight - P6 (Ijegun)

I think a health talk like this would surely help but not everybody is here to listen to you. May be jingles on the radio would help or what do you think?- P8 (Ikotun)

Public health use of mass media is usually aimed to change knowledge, awareness and attitudes, contributing to the goal of changing behaviour (Catalan-Matamoros, 2011). However, public health campaign which relies on mass media alone has shown that behaviour change might be limited to those who actively respond and join the campaign (Mile, Rapoport, Wardle, Afuape & Duman, 2001).

Table 7.1 The Designed Intervention

Physical Activity/Exercise

- Culturally acceptable(e.g. gardening, walking, dancing, house chores, swimming, no of steps counting)
- Light and enjoyable
- Group exercise/physical activity
- Affordable exercise/physical activity
- Planned individualised exercise/physical activity

- Exercise/physical activity friendly environment
- Exercise/physical activity should include
 - Cardiorespiratory exercise/activity
 - Strengthening exercise/activity
 - General stretching /activity

Diet Therapy

- Dietary habits
- Dietary education on fruits and vegetables consumption
- Low carbohydrate diet
- Reduction in fat intake
- Reduction in sugar/sweet intake
- Meal timing
- Food quantity
- Healthy food shopping education

Education

- Healthy foods shopping education
- Fruits and vegetables dietary education
- Possible complications of overweight and obesity
- Calculation of BMI
- Nutrition education on food calorie

Self-monitoring

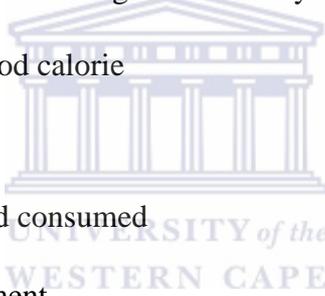
- Reduction in screen time
- Proper monitoring of food consumed
- Keeping exercise logs
- Regular weight measurement

Implementation Modes

- One on one session
- Group sessions (small group)
- Group sessions (classroom based)
- Interactive group work
- Use of Hand outs
- DVDs or videos in waiting rooms of health facility
- Posters in waiting rooms of health facility
- Wide spread media campaigns regarding consequences of overweight/obesity
- Involvement of policy makers to enforce actual food labelling etc

Duration (Health Facility)

- **How often**
 - nil consensus
- **For how long**
 - nil consensus
- **How long in total**
 - 12 weeks



NB- the patients should be encouraged to continue with the intervention at home after being taught what to do so as to reduce cost, time and to maximize the intervention. The intervention should continue as long as the problems persist.

Duration (Outside Health Facility)

Type of Venues

- Community Halls
- Religious centers
- Recreation centers

How often

- 1-2times per week

For how long

- nil consensus

How long in total

- 12 weeks

Intervention through Media Campaign

- Television
- Radio
- Newspaper
- Daily
- Weekly
- Magazine



Intervention Duration using Media Campaign

- **Television**
- 1-2 times per week
- **Radio**
- 3-4times per week
- **Magazine**
- 1-2 times per week

How Long in Total

- 12 weeks

NB- media campaign should be run during 7p.m. daily news. Health talks by the experts on radio and television, uses of government sponsored programme during news broadcasts. Writing articles in the newspapers on the complications and preventive measures of overweight and obesity and proper food display/labelling. Trained community health workers should be used to provide regular and relevant information and guidelines, and awareness creation in local languages.

7.7 CONCLUSION

The prevalence of overweight and obesity is increasing at an alarming rate in many developing countries especially in sub-Saharan Africa with attending increase in associated health problems like osteoarthritis, sleep apnea and psychological problems and those associated with metabolic effects of increased adiposity such as coronary heart disease, hypertension, type II diabetes mellitus and certain types of cancer. This study was carried out to design culturally appropriate intervention for overweight and obesity management.

All measures of body fat employed in this study showed that the prevalence of overweight and obesity is on the increase among Nigerians with a larger percentage among females. Socio-economic factors such as gender, age, marital status, educational level and employment were found to be associated with the increased prevalence of overweight and obesity. Other health risk factors associated with overweight and obesity were smoking, physical inactivity, Type II diabetes mellitus and hypertension. The need for an intervention to prevent or manage the health problems of overweight and obesity was clearly highlighted by these findings.

For interventions to be effective, however, an understanding of the relationships between an individual and his/her environment (socio-ecological model), is an important factor to be explored. During these explorations, issues such as lack of knowledge regarding the inclusion or exclusion of traditional food types, timing of meals, the change of lifestyle due to urbanisation and the perception of overweight and obesity as indicators of wealth and sound

health, was highlighted. These are all important issues, therefore, to be addressed in effective interventions.

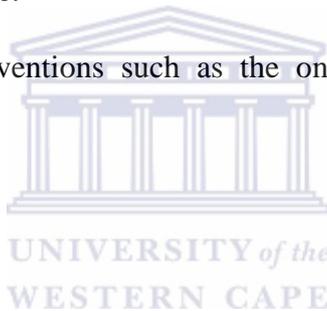
Although several studies have been done to highlight the public health problems of overweight and obesity in Nigeria, no studies have been done to test the effectiveness of a culturally appropriate intervention for overweight and obesity prevention and management. The intervention designed in this study should thus be used as a tool to manage and or prevent overweight and obesity among Nigerians. It allows for the implementation to be carried out in clinical and community settings. The use of various media platforms such as television, radio and newspapers can assist to reach most of the populace. To achieve success in curbing the rising prevalence of overweight and obesity in Nigeria requires joint efforts of healthcare professionals and policy makers: healthcare professionals to make use of treatment protocols that meet the cultural values and norms of Nigerians and policy makers to appreciate the extent of the obesity epidemic and to come up with necessary measures reduce the prevalence.

7.8 RECOMMENDATIONS

The following recommendations are made based on the outcome of this study for the prevention and management of overweight and obesity among Nigerian adults:

Nigerian Government

- There is an urgent need for health promotion programme for overweight and obese individuals' communities of urban and rural areas in Nigeria.
- In addition, health promotion programmes should also aim to prevent overweight and obesity among Nigerians.
- Overweight and obese individuals are at risk of developing co-morbidities such as Type II diabetes mellitus and hypertension amongst others. Government should make every effort to address this.
- Safety, security and accessibility of facilities should be addressed to assist in citizens becoming physically active.
- Culturally sensitive interventions such as the one in this study should be given increasing attention.



Primary Healthcare Facilities

- Primary- and community-based health promotion programmes should be implemented in the communities.
- Clients should be empowered to take control of their health and prevent the development of co-morbidities associated with overweight and obesity.
- Specific allocated venues to accommodate health promotion activities (sessions for small group) should be available at primary healthcare facilities.

Researchers

- Implementation of the designed intervention to test the effectiveness thereof in both urban and rural settings.

- Close collaboration between researchers and healthcare facilities during the planning phase of the implementation to ensure effectiveness.
- The designed intervention should be implemented to determine its efficacy among Nigerians in rural and urban areas.
- The outcome of this intervention should be assessed at six (6), twelve (12) and eighteen (18) months post intervention to determine its short and long term efficacy.

7.9 LIMITATIONS OF THE STUDY

Cautions should be exercised in interpreting the results of this study in the light of the following limitations:



- Causal inferences should not be deduced from the results of this study because the data for the first phase of this study was collected and analysed cross-sectionally.
- Also, few sections of the instrument administered on the study sample were self-reported which are subject to bias and misreporting.
- Comparison of the outcome of this study with studies from rural areas or other part of world should not be encouraged because of marginal differences in sociocultural parameters.

7.10 FUTURE STUDIES

- The primary aim of this study was to design an intervention for overweight and obesity management among Nigerians in Lagos State, Nigeria. Though this was

achieved, the study outcome also highlighted the prevalence of overweight and obesity, predisposing risk factors for overweight and obesity, challenges encountered by overweight and obese individuals towards weight reduction as well as relationships between different outcome measures of overweight and obesity. However, one of the acknowledged limitations of this study was that the data for this study was collected and analysed cross-sectionally which would not allow causal inferences to be drawn from the study. Future studies should be carried using a more rigorous longitudinal analysis research design.

- The perception of Nigerians regarding the causes of overweight and obesity, associated morbidities, and weight status should be assessed in future studies. Weight perception has been shown to have positive influence on weight maintenance attitude. Future studies should focus on weight perception among adult Nigerians in rural and urban areas using actual body weight.
- It is also important to point out that this study was carried out in urban setting of Lagos State, the economic nerve center of Nigeria, where there are different ethnic groups in varying entities. This study outcomes might not be appropriately extrapolated on Nigerians in rural areas because of the effects of rural-urban migration.

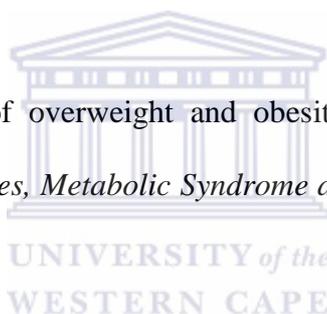
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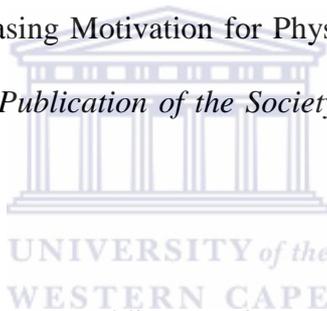
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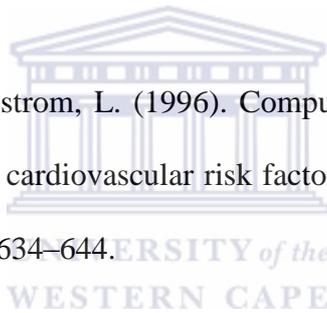
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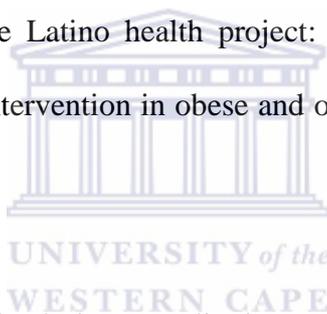
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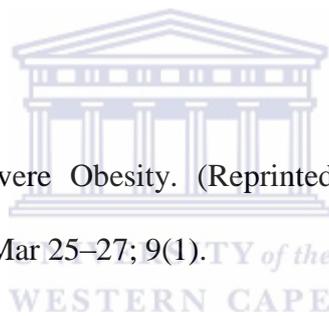
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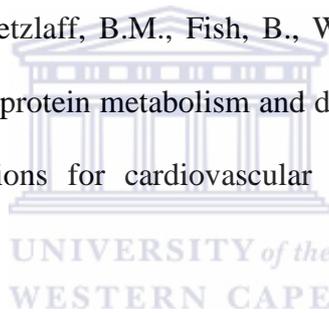
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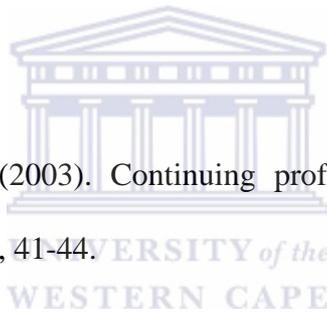
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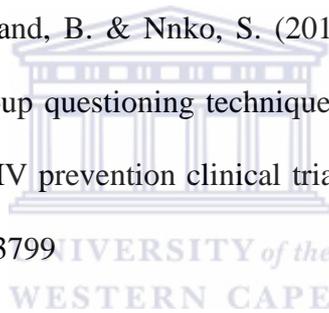
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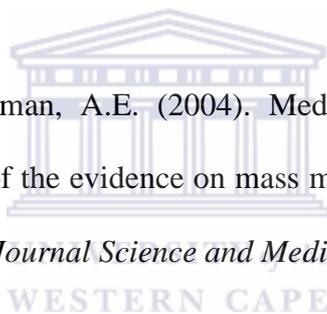
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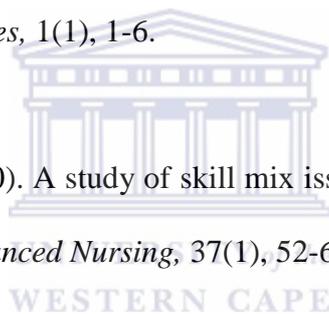
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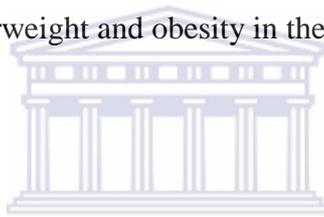
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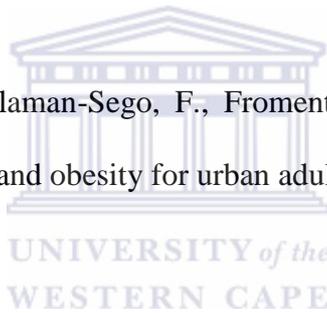
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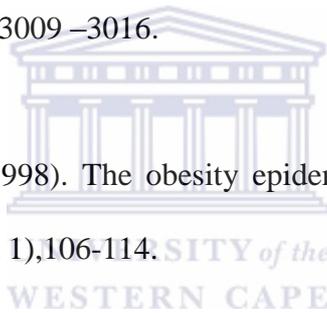
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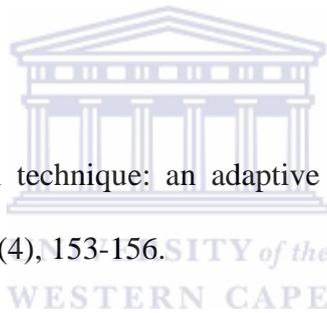
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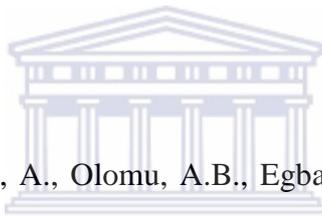
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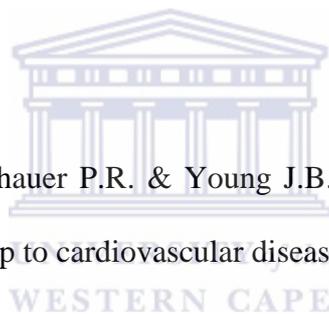
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UNIVERSITY of the
WESTERN CAPE

OFFICE OF THE DEAN
DEPARTMENT OF RESEARCH DEVELOPMENT

05 December 2012

To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape has approved the methodology and ethics of the following research project by:
Mr M Akindele (Physiotherapy)

Research Project: An intervention programme for management of overweight and obese Nigerians in Lagos State, Nigeria.

Registration no: 12/9/15

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

A handwritten signature in cursive script, appearing to read 'Josias'.

*Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape*

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DIRECTORATE OF CLINICAL SERVICES AND TRAINING

HEALTH RESEARCH AND ETHICS COMMITTEE

REG.NO. NHREC04/04/2008

(www.nhrec.net)

PROJECT TITLE: AN INTERVENTION PROGRAMME FOR MANAGEMENT OF OVER WEIGHT AND OBESE NIGERIANS IN LAGOS STATE NIGERIA

REF. NO.: LREC/10/06/261

PRINCIPAL INVESTIGATOR: MUKADAS OYENIRAN AKINDELE

ADDRESS: DEPT. OF PHYSIOTHERAPY, UNIVERSITY OF THE WESTERN CAPE SOUTH AFRICA

DATE OF RECIEPT OF VALID APPLICATION: 09/01/13

DATE OF APPROVAL: 19/02/2013

This is to inform you that the research described here in the submitted protocol, the consent forms, advertisements and other participant information materials have been reviewed and given full approval by the Health Research and Ethics Committee of LASUTH. (LREC)

This approval dates from 19/02/2013 to 19/05/2013. If there is any delay in starting the Research, Please inform the LREC so that the dates of approval can be adjusted accordingly. Note that no participant accrual or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the LREC assigned number and duration of LREC approval study in multiyear research, endeavor to submit your annual report to the HREC early in order to obtain renewal of your approval and avoid disruption of your research.

THE NATIONAL CODE FOR HEALTH RESEARCH AND ETHICS(www.nhrec.net) REQUIRES YOU TO COMPLY WITH ALL INSTITUTIONAL GUIDELINES, RULES AND REGULATIONS AND WITH THE TENETS OF THE CODE INCLUDING ENSURING THAT ALL ADVERSE EVENTS ARE REPORTED PROMPTLY TO THE HREC.NO CHANGES ARE PERMITTED IN THE RESEARCH WITHOUT PRIOR APPROVAL BY HREC LASUTH EXCEPT IN CIRCUMSTANCES OUTLINED IN THE CODE.THE LREC RESERVES THE RIGHT TO CONDUCT COMPLIANCE VISIT TO YOUR RESEARCH SITE WITHOUT PREVIOUS NOTIFICATION.

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Appendix 3a



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INFORMATION SHEET: HEALTH CARE PROVIDERS

Project Title: An Intervention Programme for Management of Overweight and Obese Nigerians in Lagos State, Nigeria

What is this study about?

This is a research project being conducted by **Mukadas Oyeniran Akindele** at the University of the Western Cape. We are inviting you to participate in this research project because you are a health care provider in Nigeria. The purpose of this research project is to come up with possible intervention programmes for Nigerians who are overweight or obese. Overweight and obesity are associated with many co morbidities and mortalities and it has been shown that there is increase in number of people who are overweight and obese; hence there is a need to design an intervention that can be used by overweight and obese Nigerians.

What will I be asked to do if I agree to participate?

You will be asked to provide basic information about various intervention programmes available for managing overweight and obesity for Nigerians which involves having a group discussion. Details of all these will be explained before the commencement of the study. The study will be conducted in 15 census enumeration areas of Alimosho Local Government, Lagos State, Nigeria.

Would my participation in this study be kept confidential?

We will do our best to keep your personal information confidential. To help protect your confidentiality your name and other vital information provided will be coded. Details of any information provided will be kept strictly confidential. Data collected will be kept in a pass worded computer and other saving devices.

If we write a report or article about this research project, your identity will be protected to the maximum extent possible.

What are the risks of this research?

There are no known risks associated with participating in this research project.

What are the benefits of this research?

This research is not designed to help you personally, but the results may help the investigator learn more about overweight and obesity among Yoruba ethnic group and enables researcher to design an

intervention for management of overweight and obesity that will be appropriate for Yoruba ethnic group. We hope that, in the future, other people might benefit from this study through improved understanding of overweight and obesity health consequences and appropriate intervention for their management.

Describe the anticipated benefits to science or society expected from the research, if any.

It is anticipated that the outcome of this study will assist in the design of an appropriate intervention programme for the management of overweight and obesity among Nigerians; provide baseline information regarding overweight and obesity among Nigerians and its associated risk factors.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

Is any assistance available if I am negatively affected by participating in this study?

You will be referral to appropriate health facility should there be a need for referral during course of the study.

What if I have questions?

This research is being conducted by Mukadas Oyeniran Akindele, Department of Physiotherapy, University of the Western Cape. If you have any questions about the research study itself, please contact Mukadas Oyeniran Akindele at:

**Department of Physiotherapy,
University of the Western Cape,**

Private Bag X17,

Bellville 7535,

South Africa.

Mobile No: +27788172675

Email: 3110615@myuwc.ac.za

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Head of Department: Prof A. Rhoda,

Dean of the Faculty of Community and Health Sciences: Prof H. Kloopper,

University of the Western Cape,

Private Bag X17,

Bellville 7535,

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee.

Appendix 3b



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-2540, Fax: 27 21-217

E-mail: 3110615@myuwc.ac.za

IWE ITOKA

Akole iwadi imo Ijinle: Igbese lati wa idena ati itoju fun omo orile ede Nigeria ti iwon arawon tobi pupo ti won ngbe Ipinle Lagos

Kini iwadi imo ijinle yi wafun?

Oruko mi ni Mukadas Oyeniran Akindele. Moje omo ile eko giga Western Cape ni orile ede South Africa. Mo nro yin lati bami kopa ninu iwadi imo ijinle tori wipe eje omo orile ede Nigeria. Mo nse iwadi yi lati wa itoju and igbese fun omo orile ede Nigeria ti iwon ara won pojulo.

Awon ibeere wo ni ema a bere lowo mi to moba fe kopa?

Ema dahun ibere lori ojo ori yin, bi ese ga si, iwon yin, ati ipade lati wa ona abayo fun iwon ti opujulo.

Se e ma bomi ni asiri to moba kopa ninu iwadi yi?

Gbogbo ona ni Mukadas Oyeniran Akindele yio gba lati ma tu asiri tabi ohun kohun ti eba so tabi fi sile ninu ero agbohun sile. Gbogbo nkan ti a ba lo fun iwadi yi ni ama a kopamo si ibiti oni aabo to peye.

Ewu wo lowa ninu iwadi yi?

Kosi ewu Kankan rara ninu iwadi yi.

Kini anfani towa ninu iwadi yi?

Iwadi yi yio ran Mukadas Oyeniran Akindele lowo lati mo nipa iwon tio tobi pupo ati lati wa itoju fun iwon ara eniyan ti otobi pupo. Mo lero wipe iwadi yi yio wulo fun elo miran ni ojo iwaju.

Se alaye anfani ti iwadi yi yio muba awon onimo ijinle ni agabye.

Mo ni ero wipe abajade iwadi yi yio

1. Jeki a ni itoju tio daju fun omo orile ede Nigeria ti oni iwon ara tio owuwo pupo
2. Jeki a mon nipa iwon ora, egungun ati omi ti owa ni ara omo orile ede Nigeria.
3. Lati je amon iha ti omo orile ede Nigeria ko si iwon wuwo ara won.

4. Lati je amo awon nkan orisirisi ti onfa iwon ara eniyan wuwo ni orile ede Nigeria.

Se mole kuro lati ma a kopa nigbakugba ti oba wumi?

Ikopa ninu iwadi yi ki i se dandan. E le e pinnu lati ma kopa ninu iwadi yii nigbakugba ti o ba wuyin.

Se iranlowo wa ti oniwadi le e se fun mi ti nkankan ba sele si mi ninu iwadi?

Oniwadi yio gbiyanju lati je ki eri dokita onitoju ara eniyan.

Tani yio dahun ibeere mi?

E dari ibeere yin si Mukadas Oyeniran Akindele, eka imo ijinle Physiotherapy, ti ile-eko giga Western Cape pelu apejuwe tio wani isale yi

Private Bag X17, Bellville 7535, South Africa.

Mobile No: +27788172675

Email: 3110615@myuwc.ac.za

Tabi si olori eka eko imo Physiotherapy

Head of Department: Prof A. Rhoda

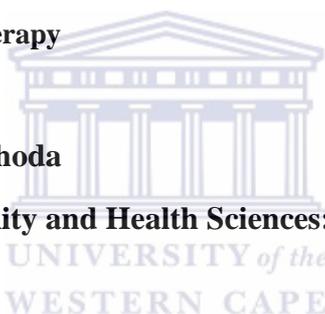
Dean of the Faculty of Community and Health Sciences: Prof H. Klopper

University of the Western Cape

Private Bag X17

Bellville 7535

Ile igbimo asofin ile eko giga University of Western Cape fi owo si iwadi yii.



Appendix 4a



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa
Tel: +27 21-959 2760, Fax: 27 21-959 3683

e-mail: 3110615@myuwc.ac.za

FOCUS GROUP CONFIDENTIALITY BINDING FORM: HEALTH CARE PROVIDERS

Title of Research Project: An Intervention Programme for Management of Overweight and Obese Nigerians in Lagos State, Nigeria

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way. I agree to be audio-taped during my participation in the study. I also agree not to disclose any information that was discussed during the group discussion.

Participant's name.....

Participant's signature.....

Witness's name.....

Witness's signature.....

Date.....

Appendix 4b



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2760, Fax: 27 21-959 3683

e-mail: 3110615@myuwc.ac.za

FOCUS GROUP CONFIDENTIALITY BINDING FORM: TRADITIONAL HEALERS

Title of Research Project: An Intervention Programme for Management of Overweight and Obese Nigerians in Lagos State, Nigeria

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way. I agree to be audio-taped during my participation in the study. I also agree not to disclose any information that was discussed during the group discussion.

Participant's name.....

Participant's signature.....

Witness's name.....

Witness's signature.....

Date.....

Appendix 4c



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2760, Fax: 27 21-959 3683

e-mail: 3110615@myuwc.ac.za

IWE IDANILOJU AND IFINI LOKANBALE FUN OLUKOPA NINU IWADI IMO IJINLE

Akole iwadi imo Ijinle: Igbese lati wa idena ati itoju fun omo orile ede Nigeria ti iwon arawon tobi pupo ti won ngbe Ipinle Lagos

Won ti se alaye iwadi yi fun mi ni ede abinibi to si yemi yeke mosi gba lati bawon kopa ninu e. Won ti dahun Ibere mi nipa iwadi na. O si dami loju wi pe won ni je ki enikankan mo ni ipa mi ati wipe mo le yopa yose kuro ninu iwadi na lai fi eromi han funwan atiwi pe kikuro mi ninu iwadi na koni semi ni ose kankan. Mosi gba pe ki won ka ohun misi ne ninu ero gbohun gbohun. Mosi tun gba wipe mi oni sofun enikakan nipa ohun ti a agba ni ero ninu iwadi na.

Oruko Olukopa

Ifowosiwe Olukopa

Oruko Eleri

Ifowosiwe Eleri

Ojo Oni

Appendix 4d



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2760, Fax: 27 21-959 3683

e-mail: 3110615@myuwc.ac.za

CONSENT FORM: HEALTH CARE PROVIDERS

Title of Research Project: Title of Research Project: An Intervention Programme for Management of Overweight and Obese Nigerians in Lagos State, Nigeria

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

Participant's name.....

Participant's signature.....

Witness.....

Date.....

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

Study Coordinator's Name: AKINDELE OYENIRAN MUKADAS

University of the Western Cape

Private Bag X17, Belville 7535

Telephone: (021)959-2542

Cell: +27788172675

Fax: (021)959-1217

Email: 3110615@uwc.ac.za

Appendix 4e



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

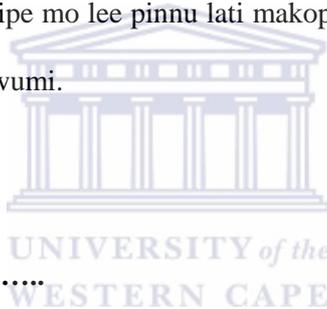
Tel: +27 21-959 2760, Fax: 27 21-959 3683

e-mail: 3110615@myuwc.ac.za

CONSENT FORM: TRADITIONAL HEALERS (Yoruba)

Akole iwadi imo Ijinle: Igbese lati wa idena ati itoju fun omo orile ede Nigeria ti iwon arawon tobi pupo ti won ngbe Ipinle Lagos

Mukadas Oyeniran Akindele ti se apejuwe imo iwadi yii fun ni ede tio yemi yekeyeke mosi ti finu fedo lati kopa ninu iwadi naa. Gbogbo ibeere mi ni Mukadas Oyeniran Akindele ti dahun. Odami loju wipe oniwadi yio bomi ni asiri ati wipe mo lee pinnu lati makopa ninu iwadi naa lain ii jasi inira tabi wahala fun mi ni igba ku gba ti oba wumi.



Oruko Olukopa.....

Ifi owo siwe Olukopa.....

Eleri.....

Ojo

E lee kan si oniwadi ti eba ni ibeere tabi ti inira bawa sele nigba ti eba nkopa ninu iwadi yii **Oruko**

Oluwadi: AKINDELE OYENIRAN MUKADAS

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Appendix 4f

UNIVERSITY OF THE WESTERN CAPE



Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2542, Fax: 27 21-9591217

E-mail: 3110615@myuwc.ac.za

CONSENT FORM: TRADITIONAL HEALERS

Title of Research Project: Title of Research Project: An Intervention Programme for Management of Overweight and Obese Nigerians in Lagos State, Nigeria

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

Participant's name.....

Participant's signature.....

Witness.....

Date.....

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

Study Coordinator's Name: AKINDELE OYENIRAN MUKADAS

University of the Western Cape

Private Bag X17, Belville 7535

Telephone: (021)959-2542

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Fax: (021)959-1217

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Appendix 4g



UNIVERSITY OF THE WESTERN CAPE

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E-mail: 3110615@myuwc.ac.za

Akole iwadi imo Ijinle: Igbese lati wa idena ati itoju fun omo orile ede Nigeria ti iwon arawon tobi pupo ti won ngbe Ipinle Lagos

Mukadas Oyeniran Akindele ti se apejuwe imo iwadi yii fun ni ede tio yemi yekeyeke mosi ti finu fedo lati kopa ninu iwadi naa. Gbogbo ibeere mi ni Mukadas Oyeniran Akindele ti dahun. Odami loju wipe oniwadi yio bomi ni asiri ati wipe mo lee pinnu lati makopa ninu iwadi naa lain ii jasi inira tabi wahala fun mi ni igba ku gba ti oba wumi.

Oruko Olukopa.....

Ifi owo siwe Olukopa.....

Eleri.....

Ojo

E lee kan si oniwadi ti eba ni ibeere tabi ti inira bawa sele nigba ti eba nkopa ninu iwadi yii

Oruko Oluwadi: AKINDELE OYENIRAN MUKADAS

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Private Bag X17, Belville 7535

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Fax: (021)959-1217

Email: 3110615@uwc.ac.za

Appendix 4h



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

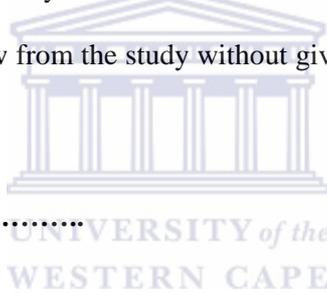
Tel: +27 21-959 2542, Fax: 27 21-9591217

E-mail: 3110615@myuwc.ac.za

CONSENT FORM: COMMUNITY MEMBERS

Title of Research Project: Title of Research Project: An Intervention Programme for Management of Overweight and Obese Nigerians in Lagos State, Nigeria

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.



Participant's name.....

Participant's signature.....

Witness.....

Date.....

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

Study Coordinator's Name: AKINDELE OYENIRAN MUKADAS

University of the Western Cape

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Telephone: (021)959-2542

Cell: +27788172675

Fax: (021)959-1217

Email: 3110615@uwc.ac.za

Participant Identification Number

Appendix 5



WHO STEPS Instrument for Chronic Disease Risk Factor Surveillance

<NIGERIA/LAGOS/ALIMOSHO>

Survey Information

| Location and Date | | Response | Code |
|-------------------|--------------------------------------|---|------|
| 1 | Cluster/Centre/Village ID | <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | I1 |
| 2 | Cluster/Centre/Village name | | I2 |
| 3 | Interviewer ID | <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | I3 |
| 4 | Date of completion of the instrument | <input type="text"/> <input type="text"/> dd mm year | I4 |

UNIVERSITY of the
WESTERN CAPEParticipant Id Number

| Consent, Interview Language and Name | | Respo | Code |
|--|---|---|------|
| 5 | Consent has been read and obtained | Yes 1 No 2 IF NO, END | I5 |
| 6 | Interview Language <i>[Insert Language]</i> | Englis h 1 <i>[Add others]</i> 2 <i>[Add others]</i> <i>[Add others]</i> 4 | I6 |
| 7 | Time of interview (24 hour clock) | <input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/> hrs mins | I7 |
| 8 | Family Surname | | I8 |
| 9 | First Name | | I9 |
| Additional Information that may be helpful | | | |
| 10 | Contact phone number where possible | | I10 |

Record and file identification information (I5 to I10) separately from the completed questionnaire.

Participant Identification Number

Step 1 Demographic Information

| CORE: Demographic Information | | | |
|-------------------------------|---|---|------|
| Question | | Response | Code |
| 11 | Sex (<i>Record Male / Female as observed</i>) | Male 1 Female 2 | C1 |
| 12 | What is your date of birth? <i>Don't Know 77 77 7777</i> | <div style="display: flex; justify-content: space-around; align-items: center;"> ____ ____ ____ If known, Go to C4 </div> <div style="display: flex; justify-content: space-around; align-items: center; font-size: small;"> dd mm year </div> | C2 |
| 13 | How old are you? | Years ____ | C3 |
| 14 | In total, how many years have you spent at school or in full-time study (excluding pre-school)? | Years ____ | C4 |

| EXPANDED: Demographic Information | | | |
|-----------------------------------|--|--------------------------------|----|
| 15 | What is the highest level of education you have completed? <i>[INSERT COUNTRY-SPECIFIC CATEGORIES]</i> | No formal schooling 1 | C5 |
| | | Less than primary school 2 | |
| | | Primary school completed 3 | |
| | | Secondary school completed 4 | |
| | | High school completed 5 | |
| | | College/University completed 6 | |
| | | Post graduate degree 7 | |
| 16 | What is your <i>[insert relevant ethnic group / racial group / cultural subgroup / others]</i> background ? | Refused 88 | C6 |
| | | <i>[Locally defined]</i> 1 | |
| | | <i>[Locally defined]</i> 2 | |
| | | <i>[Locally defined]</i> 3 | |
| 17 | What is your marital status ? | Refused 88 | C7 |
| | | Never married 1 | |
| | | Currently married 2 | |
| | | Separated 3 | |
| | | Divorced 4 | |
| | | Widowed 5 | |
| | | Cohabiting 6 | |

| | | | |
|----|---|---|-----|
| 33 | In the past , did you ever use smokeless tobacco such as [snuff, chewing tobacco, or betel] daily ? | Yes 1 No 2 | T12 |
| 34 | During the past 7 days, on how many days did someone in your home smoke when you were present? | Number of days Don't know 77 <input type="text"/> | T13 |
| 35 | During the past 7 days, on how many days did someone smoke in closed areas in your workplace (in the building, in a work area or a specific office) when you were present? | Number of days Don't know or don't work in a closed area 77 <input type="text"/> | T14 |

Participant Identification Number

| CORE: Alcohol Consumption | | | |
|--|---|---|------|
| The next questions ask about the consumption of alcohol. | | | |
| Question | | Response | Code |
| 36 | Have you ever consumed an alcoholic drink such as beer, wine, spirits, fermented cider or [add other local examples]? (USE SHOWCARD OR SHOW EXAMPLES) | Yes 1 No 2 <i>If No, go to D1</i> | A1a |
| 37 | Have you consumed an alcoholic drink within the past 12 months ? | Yes 1 No 2 <i>If No, go to D1</i> | A1b |
| 38 | During the past 12 months, how frequently have you had at least one alcoholic drink? (READ RESPONSES, USE SHOWCARD) | Daily 1 5-6 days per week 2 1-4 days per week 3 1-3 days per month 4 Less than once a month 5 | A2 |
| 39 | Have you consumed an alcoholic drink within the past 30 days ? | Yes 1 No 2 <i>If No, go to D1</i> | A3 |
| 40 | During the past 30 days, on how many occasions did you have at least one alcoholic drink? | Number Don't know 77 <input type="text"/> | A4 |
| 41 | During the past 30 days, when you drank alcohol, on average , how many standard alcoholic drinks did you have during one drinking occasion? (USE SHOWCARD) | Number Don't know 77 <input type="text"/> | A5 |
| 42 | During the past 30 days, what was the largest number of standard alcoholic drinks you had on a single occasion, counting all types of alcoholic drinks together? | Largest number Don't Know 77 <input type="text"/> | A6 |
| 43 | During the past 30 days, how many times did you have for men: five or more for women: four or more standard alcoholic drinks in a single drinking occasion? | Number of times Don't Know 77 <input type="text"/> | A7 |
| EXPANDED: Alcohol Consumption | | | |
| 44 | During the past 30 days, when you consumed an alcoholic drink, how often was it with meals? Please do not count snacks. | Usually with meals 1 Sometimes with meals 2 Rarely with meals 3 Never with meals 4 | A8 |

| | | | | |
|----|--|-----------|-----|-----|
| 45 | During each of the past 7 days , how many standard alcoholic drinks did you have each day? (USE SHOWCARD) Don't Know 77 | Monday | ___ | A9a |
| | | Tuesday | ___ | A9b |
| | | Wednesday | ___ | A9c |
| | | Thursday | ___ | A9d |
| | | Friday | ___ | A9e |
| | | Saturday | ___ | A9f |
| | | Sunday | ___ | A9g |

Participant Identification Number

| CORE: Diet | | | |
|--|--|---|------|
| The next questions ask about the fruits and vegetables that you usually eat. I have a nutrition card here that shows you some examples of local fruits and vegetables. Each picture represents the size of a serving. As you answer these questions please think of a typical week in the last year. | | | |
| Question | Response | | Code |
| 46 | In a typical week, on how many days do you eat fruit ? (USE SHOWCARD) | Number of days Don't Know 77 ___ <i>If Zero days, go to D3</i> | D1 |
| 47 | How many servings of fruit do you eat on one of those days? (USE SHOWCARD) | Number of servings Don't Know 77 ___ | D2 |
| 48 | In a typical week, on how many days do you eat vegetables ? (USE SHOWCARD) | Number of days Don't Know 77 ___ <i>If Zero days, go to D5</i> | D3 |
| 49 | How many servings of vegetables do you eat on one of those days? (USE SHOWCARD) | Number of servings Don't know 77 ___ | D4 |

| EXPANDED: Diet | | | | |
|---|--|-----------------------------|-----|---------|
| 50 | What type of oil or fat is most often used for meal preparation in your household? (USE SHOWCARD) (SELECT ONLY ONE) | Vegetable oil 1 | D5 | |
| | | Lard or suet 2 | | |
| Butter or ghee 3 | | | | |
| Margarine 4 | | | | |
| Other 5 <i>If Other, go to D5 other</i> | | | | |
| None in particular 6 | | | | |
| None used 7 | | | | |
| Don't know 77 | | | | |
| | | Other | ___ | D5other |
| 51 | On average, how many meals per week do you eat that were not prepared at a home? By meal, I mean breakfast, lunch and dinner. | Number Don't know 77 ___ | D6 | |

Participant Identification Number

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|

| CORE: Physical Activity | | | |
|---|--|---|-------------|
| <p>Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person.</p> <p>Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment. <i>[Insert other examples if needed]</i>. In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.</p> | | | |
| Question | | Response | Code |
| Work | | | |
| 52 | Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like <i>[carrying or lifting heavy loads, digging or construction work]</i> for at least 10 minutes continuously? <i>[INSERT EXAMPLES] (USE SHOWCARD)</i> | Yes 1 No 2 <i>If No, go to P 4</i> | P1 |
| 53 | In a typical week, on how many days do you do vigorous-intensity activities as part of your work? | Number of days <input type="text"/> | P2 |
| 54 | How much time do you spend doing vigorous-intensity activities at work on a typical day? | Hours : minutes <input type="text"/> : <input type="text"/> hrs mins | P3 (a-b) |
| 55 | Does your work involve moderate-intensity activity, that causes small increases in breathing or heart rate such as brisk walking <i>[or carrying light loads]</i> for at least 10 minutes continuously? <i>[INSERT EXAMPLES] (USE SHOWCARD)</i> | Yes 1 No 2 <i>If No, go to P 7</i> | P4 |
| 56 | In a typical week, on how many days do you do moderate-intensity activities as part of your work? | Number of days <input type="text"/> | P5 |
| 57 | How much time do you spend doing moderate-intensity activities at work on a typical day? | Hours : minutes <input type="text"/> : <input type="text"/> hrs mins | P6 (a-b) |
| Travel to and from places | | | |
| <p>The next questions exclude the physical activities at work that you have already mentioned.</p> <p>Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to place of worship. <i>[Insert other examples if needed]</i></p> | | | |
| 58 | Do you walk or use a bicycle (<i>pedal cycle</i>) for at least 10 minutes continuously to get to and from places? | Yes 1 No 2 <i>If No, go to P 10</i> | P7 |
| 59 | In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places? | Number of days <input type="text"/> | P8 |
| 60 | How much time do you spend walking or bicycling for travel on a typical day? | Hours : minutes <input type="text"/> : <input type="text"/> hrs mins | P9 (a-b) |

| CORE: History of Raised Blood Pressure | | | |
|--|---|-----------------------------|------|
| Question | | Response | Code |
| 68 | Have you ever had your blood pressure measured by a doctor or other health worker? | Yes 1 | H1 |
| | | No 2 <i>If No, go to H6</i> | |
| 69 | Have you ever been told by a doctor or other health worker that you have raised blood pressure or hypertension? | Yes 1 | H2a |
| | | No 2 <i>If No, go to H6</i> | |
| 70 | Have you been told in the past 12 months? | Yes 1 | H2b |
| | | No 2 | |

| EXPANDED: History of Raised Blood Pressure | | | |
|---|---|-------|-----|
| Are you currently receiving any of the following treatments/advice for high blood pressure prescribed by a doctor or other health worker? | | | |
| 71 | Drugs (medication) that you have taken in the past two weeks | Yes 1 | H3a |
| | | No 2 | |
| 71 | Advice to reduce salt intake | Yes 1 | H3b |
| | | No 2 | |
| 71 | Advice or treatment to lose weight | Yes 1 | H3c |
| | | No 2 | |
| 71 | Advice or treatment to stop smoking | Yes 1 | H3d |
| | | No 2 | |
| 71 | Advice to start or do more exercise | Yes 1 | H3e |
| | | No 2 | |
| 72 | Have you ever seen a traditional healer for raised blood pressure or hypertension? | Yes 1 | H4 |
| | | No 2 | |
| 73 | Are you currently taking any herbal or traditional remedy for your raised blood pressure? | Yes 1 | H5 |
| | | No 2 | |

| CORE: History of Diabetes | | | |
|---------------------------|--|-----------------------------|------|
| Question | | Response | Code |
| 74 | Have you ever had your blood sugar measured by a doctor or other health worker? | Yes 1 | H6 |
| | | No 2 <i>If No, go to M1</i> | |
| 75 | Have you ever been told by a doctor or other health worker that you have raised blood sugar or diabetes? | Yes 1 | H7a |
| | | No 2 <i>If No, go to M1</i> | |
| 76 | Have you been told in the past 12 months? | Yes 1 | H7b |
| | | No 2 | |

| EXPANDED: History of Diabetes | | | |
|--|--|-------|-----|
| Are you currently receiving any of the following treatments/advice for diabetes prescribed by a doctor or other health worker? | | | |
| | Insulin | Yes 1 | H8a |
| | | No 2 | |
| | Drugs (medication) that you have taken in the past two weeks | Yes 1 | H8b |
| | | No 2 | |
| 77 | Special prescribed diet | Yes 1 | H8c |
| | | No 2 | |
| | Advice or treatment to lose weight | Yes 1 | H8d |
| | | No 2 | |
| | Advice or treatment to stop smoking | Yes 1 | H8e |
| | | No 2 | |
| | Advice to start or do more exercise | Yes 1 | H8f |
| | | No 2 | |
| 78 | Have you ever seen a traditional healer for diabetes or raised blood sugar? | Yes 1 | H9 |
| | | No 2 | |
| 79 | Are you currently taking any herbal or traditional remedy for your diabetes? | Yes 1 | H10 |
| | | No 2 | |

Step 2 Physical Measurements

| CORE: Height and Weight | | | |
|--|--|---|------|
| Question | | Response | Code |
| 80 | Interviewer ID | _ _ _ _ | M1 |
| 81 | Device IDs for height and weight | Height _ _ | M2a |
| | | Weight _ _ _ | M2b |
| 82 | Height | in Centimetres (cm) _ _ _ _ _ | M3 |
| 83 | Weight <i>If too large for scale 666.6</i> | in Kilograms (kg) _ _ _ _ . _ | M4 |
| 84 | For women: Are you pregnant? | Yes 1 <i>If Yes, go to M 8</i> | M5 |
| | | No 2 | |
| CORE: Waist | | | |
| 85 | Device ID for waist | _ _ | M6 |
| 86 | Waist circumference | in Centimetres (cm) _ _ _ _ _ _ _ _ | M7 |
| CORE: Blood Pressure | | | |
| 87 | Interviewer ID | _ _ _ _ | M8 |
| 88 | Device ID for blood pressure | _ _ | M9 |
| 89 | Cuff size used | Small 1 Medium 2 Large 3 | M10 |
| 90 | Reading 1 | Systolic (mmHg) _ _ _ _ | M11a |
| | | Diastolic (mmHg) _ _ _ _ | M11b |
| 91 | Reading 2 | Systolic (mmHg) _ _ _ _ | M12a |
| | | Diastolic (mmHg) _ _ _ _ | M12b |
| 92 | Reading 3 | Systolic (mmHg) _ _ _ _ | M13a |
| | | Diastolic (mmHg) _ _ _ _ | M13b |
| 93 | During the past two weeks, have you been treated for raised blood pressure with drugs (medication) | Yes 1 | M14 |
| EXPANDED: Hip Circumference and Heart Rate | | | |
| 94 | Hip circumference | in Centimeters (cm) _ _ _ _ _ | M15 |
| 95 | Heart Rate | | M16a |
| | Reading 1 | Beats per minute _ _ _ _ | |
| | Reading 2 | Beats per minute _ _ _ _ | |
| | Reading 3 | Beats per minute _ _ _ _ | |



Appendix 7a

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DELPHI STUDY INFORMATION SHEET

Title of Research Project: An Intervention Programme for Management of Overweight and Obese Nigerians in Lagos State, Nigeria

Invitation

You are being invited to take part in a research study being conducted by AKINDELE MUKADAS (PhD candidate) of the Department of Physiotherapy, University of the Western Cape, Republic of South Africa. More information regarding the study is outlined below. Please feel free to contact me if more information/clarification is needed.

What is the purpose of the study?

The drastic increase in the prevalence of overweight and obesity in both low and high income countries has become a public health focus because of associated health and economic consequences. Overweight and obesity are risk factors for cerebrovascular disease, hypertension, type 2 diabetes mellitus, some cancers, osteoarthritis and heart diseases and the economic sequelae include loss of productive hours and overstretching of existing health facilities which might be inadequate, especially, in low income countries. While the high income countries have the capacities to tackle the menace of obesity and other communicable diseases, low income countries face the problems and consequences of communicable and noncommunicable diseases because of lack of the required financial, research and expertise needed. For effective intervention in the prevention of the epidemic of obesity, the context in which unhealthy behaviours occur should also be taken into consideration. These include socioeconomic, cultural and environmental factors. The overall aim of this study is to design a culturally appropriate intervention for the prevention and management of overweight and obesity among Nigerians with different ethnic and religious affiliations.

Why have I been chosen?

You have been chosen to participate in this research project because you have been identified as an expert in the field of overweight and obesity management. The primary aim of this research is to design an intervention that will meet the cultural aspirations of Nigerians towards the management of overweight and obesity. The development of this culturally appropriate intervention will be based on the results of quantitative data from overweight and obese Nigerians; focus group discussions held with individuals who are overweight and obese; and community leaders; interview with health professionals who are experts in overweight and obesity management; and a literature review.

Do I have to participate?

Participation is voluntary. If you decide to participate you will be asked to complete a consent form. You are free to withdraw at any time without giving a reason. A decision not to participate or to withdraw at any time, will not affect you in any way.

What will happen if I participate?

If you agree to participate in the study you will firstly be asked to complete a consent form and return it via email. This research will be carried out using the Delphi study technique consisting of two to three rounds (questionnaire) aimed to achieve consensus. With your permission the questionnaire will be emailed to you. Simple and specific instructions will be provided for the questionnaire. The amount of time necessary to complete each questionnaire will vary with each panellist, but should range between 10-15 minutes per round. There are no right or wrong answers to the questions. This study is seeking your opinion.

The following points are important for you to remember:

- Your participation is entirely voluntary.
- You may decline or withdraw from the study at any time.
- You will remain anonymous to the other participants (or experts) throughout this Delphi study and only the researcher will be able to identify your specific answers.
- All records are confidential. Your name will only be recorded on the consent form; it will not be recorded on any questionnaire. All information will only be available to members of the research team. All information will be destroyed 5 years after the research is completed.
- Any information that you be provided will be confidential and when the results of the study are reported you will not be identifiable in the finding.
- Following the study, information gathered will be sent for publication in professional journals and will be presented at conferences. All details of people who participated in the study will be kept anonymous.
- You will only have to complete the consent form once; return of the completed Delphi rounds implies your consent to participate.

What if something goes wrong?

I am not aware of any complications or risks that could arise from participating in this study. However, if you decide to participate in the study, you will be given written information dealing with the names and telephone numbers to contact should you have any complaints or difficulties with any aspect of the study.

Will my participation in the study be kept confidential?

If you consent to participate in the study, your name will not be disclosed and would not be revealed in any reports or publications resulting from this study. Apart from your consent form, your name will not be recorded on Delphi rounds. Each participant will be allocated a unique code. You will remain anonymous

to the other participants (experts) throughout this Delphi study and only the researcher will be able to identify your specific answers. All information will be destroyed after 5 years after the research is completed.

What happens when the research study stops?

The results of this study will be used to design a culturally appropriate intervention for the management of overweight and obesity among Nigerians. The findings will also be published in professional journals and/or presented at conferences.

This study has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee (12/9/15) and Lagos State Ministry of Health (LREC/10/06/261), Nigeria.

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact:

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University of the Western Cape,

Private Bag X17, Belville 7535,

Republic of South Africa. Telephone:

(021)959-2542

Cel: +27788172675

E-mail: 3110615@myuwc.ac.za

Study Supervisor

Prof Julie Phillips, Physiotherapy

Department, University of the Western

Cape, Republic of South Africa.

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Appendix 7b

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DELPHI STUDY CONSENT FORM

Title of Research Project: An Intervention Programme for Management of Overweight and Obese Nigerians in Lagos State, Nigeria

| | | |
|---|--|--|
| 1 | I confirm that I read and understood the information sheet dated for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily | |
| 2 | I am willing to participate in all the rounds of the Delphi study and the follow-up stage | |
| 3 | I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. However, I understand that the success of this study depends on all participants completing all the Delphi rounds | |
| 4 | I understand that I will remain anonymous to the other participants(or experts) throughout this Delphi study and only the researcher will be able to identify my specific answers | |
| 5 | I understand that the researcher will hold all information and data collected in a secure and confidential manner | |

..... Participant's name

Date

Signature

1 I am NOT willing to participate in this study



Appendix 7c

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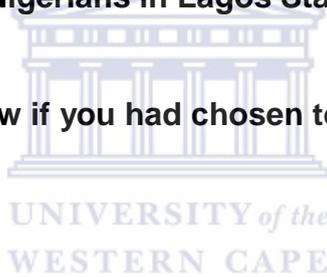
DELPHI STUDY- Round 1

Participant Identification number.....

Title of Research Project: An Intervention Programme for Management of Overweight and Obese Nigerians in Lagos State, Nigeria.

Please complete information below if you had chosen to participate in the study

(complete the consent form)



SOCIO-DEMOGRAPHIC INFORMATION

Age:.....(years)

Gender: Male

Female

Highest level of Qualification.....

Current Profession.....

Number of years' experience in health promotion/non-communicable diseases/overweight/obesity prevention/management.....(years)

Role in management of non-communicable diseases/overweight/obesity prevention/management.....

.....

QUESTIONS (use as much space as needed)

1. In your opinion, what are the benefits or the role of health promotion for individuals who are overweight or obese?

.....

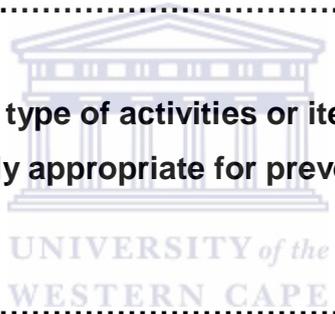
.....

.....

.....

.....

2. In your opinion, what is the type of activities or items that should be included in an intervention that is culturally appropriate for prevention/management of overweight and obesity?



.....

.....

.....

.....

.....

3. In your opinion, what is the best way of implementing such an intervention in communities?

.....

.....

.....

.....

**4. In your opinion, how will the interventions differ in countries such as the USA, UK
and those in sub-Saharan Africa?**

.....

.....

.....

.....



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Thank you for taking time to complete this survey

Appendix 7d



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Participant identification (email address).....

Title of Research Project: An Intervention Programme for Management of Overweight and Obese Nigerians in Lagos State, Nigeria.

Thank you for valuable information you provided in Round 1 of the Delphi study. Please complete the information below.

Tick (v) all the appropriate answer(s) (ctrl c and ctrl v v). You are also requested to share this document with 3110615@myuwc.ac.za after completion by clicking share at the uppermost right hand side of this document.

1. The content of culturally appropriate intervention for person with overweight/obesity should include the following components

| | Yes | No |
|--|-----|----|
| (A) Physical Activity/Exercise | | |
| (B) Diet Therapy | | |
| (C) Education | | |
| (D) Self-monitoring | | |
| (E) Other (Elaborate if any other issues should be included) | | |

2. The components of culturally appropriate intervention for person with overweight/obesity should include the following

| (A) Physical Activity/Exercise | Yes | No |
|---|-----|----|
| <ul style="list-style-type: none"> • Culturally acceptable(e.g. gardening, walking, dancing, house chores, swimming, no of steps counted) | | |
| <ul style="list-style-type: none"> • Light and enjoyable | | |
| <ul style="list-style-type: none"> • Group exercise/physical activity | | |
| <ul style="list-style-type: none"> • Affordable exercise/physical activity | | |
| <ul style="list-style-type: none"> • Planned individualised exercise/physical activity | | |
| <ul style="list-style-type: none"> • Tie exercise/physical activity to religious based | | |
| <ul style="list-style-type: none"> • Exercise/physical activity friendly environment | | |
| <ul style="list-style-type: none"> • Exercise/physical activity should include <ul style="list-style-type: none"> ○ Cardiorespiratory exercise/activity ○ Strengthening exercise/activity | | |
| <ul style="list-style-type: none"> • Other..... | | |
| (B) Diet Therapy | | |
| <ul style="list-style-type: none"> • Dietary habits | | |
| <ul style="list-style-type: none"> • Dietary education on fruits and vegetables consumption | | |
| <ul style="list-style-type: none"> • Low carbohydrate diet | | |
| <ul style="list-style-type: none"> • Reduction in fat intake | | |
| <ul style="list-style-type: none"> • Reduction in sugar/sweet intake | | |
| <ul style="list-style-type: none"> • Meal timing | | |
| <ul style="list-style-type: none"> • Food quantity | | |
| <ul style="list-style-type: none"> • Healthy food shopping education | | |
| <ul style="list-style-type: none"> • Cooking lessons | | |
| <ul style="list-style-type: none"> • Food availability | | |
| <ul style="list-style-type: none"> • Nutrition education on food calorie | | |
| <ul style="list-style-type: none"> • Reduction in screen time | | |
| <ul style="list-style-type: none"> • Other..... | | |
| (C) Education | | |
| <ul style="list-style-type: none"> • Healthy foods shopping education | | |
| <ul style="list-style-type: none"> • Fruits and vegetables dietary education | | |
| <ul style="list-style-type: none"> • Possible complications of overweight and obesity | | |
| <ul style="list-style-type: none"> • Calculation of BMI | | |

| | | |
|--|--|--|
| <ul style="list-style-type: none"> Other..... | | |
| (D) Self-monitoring | | |
| <ul style="list-style-type: none"> Reduction in screen time | | |
| <ul style="list-style-type: none"> Proper monitoring of food consumed | | |
| <ul style="list-style-type: none"> Keeping exercise logs | | |
| <ul style="list-style-type: none"> Regular weight measurement | | |
| <ul style="list-style-type: none"> Other..... | | |

3. In your own opinion which member of the health team is the most appropriate to deliver each of these components

| Component | Health Team Member(s) |
|--------------------------------|-----------------------|
| (A) Physical Activity/Exercise | |
| (B) Diet Therapy | |
| (C) Education | |
| (D) Self-monitoring | |
| (E) Other..... | |

4. Ways of implementing Cultural Appropriate Interventions

| Means/ways | Yes | No |
|--|-----|----|
| <ul style="list-style-type: none"> One on one session | | |
| <ul style="list-style-type: none"> Group sessions (small group) | | |
| <ul style="list-style-type: none"> Group sessions (classroom based) | | |
| <ul style="list-style-type: none"> Interactive group work | | |
| <ul style="list-style-type: none"> Use of Hand outs | | |
| <ul style="list-style-type: none"> DVDs or videos in waiting rooms of health facility | | |
| <ul style="list-style-type: none"> Posters in waiting rooms of health facility | | |
| <ul style="list-style-type: none"> Wide spread media campaigns regarding consequences of overweight/obesity | | |
| <ul style="list-style-type: none"> Involvement of policy makers to enforce actual food labelling etc | | |
| <ul style="list-style-type: none"> Other..... | | |

5. The frequency of intervention for management of overweight and obesity should be implemented for at least

a. If at Health Facility (including community/primary health facility)

| | Yes | No |
|--|-----|----|
| <p>How often</p> <ul style="list-style-type: none"> • 1-2 times per week • 3-4 times per week • 5 times per week | | |
| <p>For how long</p> <ul style="list-style-type: none"> • less than 20 minutes • between 20-30 minutes • more than 30 minutes | | |
| <p>How long in total should the intervention last</p> <ul style="list-style-type: none"> • 4 weeks • 6 weeks • 8 weeks • 12 weeks | | |



b. Through media campaign

| | Yes | No |
|---|-----|----|
| (A) Type of media | | |
| • Television | | |
| • Radio | | |
| • Newspaper | | |
| ○ Weekly | | |
| • Magazine | | |
| • Town Crier* | | |
| (B) Suggestion for how to use media for prevention | | |
| Campaigns | | |
| • Television | | |
| • Radio | | |
| • Newspaper | | |
| ○ Daily | | |
| ○ Weekly | | |
| • Magazine | | |
| (C) How OFTEN should each of these media campaigns be used | | |
| • Television | | |
| ○ 1-2 times per week | | |
| ○ 3-4times per week | | |
| ○ 5 times per week | | |
| ○ Other..... | | |
| | | |
| | | |
| • Radio | | |
| ○ 1-2 times per week | | |
| ○ 3-4times per week | | |
| ○ 5 times per week | | |



| | | |
|---|--|--|
| <ul style="list-style-type: none"> <input type="radio"/> 3-4times per week <input type="radio"/> 5 times per week <input type="radio"/> Other..... <ul style="list-style-type: none"> • Magazine <ul style="list-style-type: none"> <input type="radio"/> 1-2 times per week <input type="radio"/> 3-4times per week <input type="radio"/> 5 times per week <input type="radio"/> Other..... | | |
| <p>(D) For how LONG in total should media campaign run</p> <ul style="list-style-type: none"> • 4 weeks • 6 weeks • 8 weeks • 12 weeks | | |



*Town crier: individual making announcements in public places such as markets.

c. If at the community (excluding community/public health facility)

| | Yes | No |
|--|-----|----|
| <p>(A) Type of Venues</p> <ul style="list-style-type: none"> • Community Halls • Religious centers • Recreation centers • “Joints” (similar to pubs) • Other <p>(B) How often</p> <ul style="list-style-type: none"> • 1-2times per week | | |
| <p>How long in total</p> <ul style="list-style-type: none"> • 4 weeks • 6 weeks • 8 weeks • 12 weeks | | |



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DELPHI STUDY ROUND 3

Participant identification (email address).....

Title of Research Project: **An Intervention Programme for Management of Overweight and Obese Nigerians in Lagos State, Nigeria.**

Thank you for the valuable information you provided in Rounds 1 and 2 of this Delphi study. However, consensus were not reached in few areas listed in the table below hence there is a need to address those areas.

Tick (✓) all the appropriate answer(s).

1. The frequency of intervention for management of overweight and obesity should be implemented for at least
 - a. If at Health Facility (including community/primary health facility)

| | Yes | No |
|---|-----|----|
| How often <ul style="list-style-type: none"> • 1-2 times per week • 3-4 times per week | | |
| For how long <ul style="list-style-type: none"> • between 20-30 minutes • more than 30 minutes | | |
| How long in total should the intervention last <ul style="list-style-type: none"> • 8 weeks • 12 weeks | | |

b. If at the community (excluding community/public health facility)

| | Yes | No |
|--|-----|----|
| How often <ul style="list-style-type: none"> • 1-2times per week • 5 times week | | |
| How long in total <ul style="list-style-type: none"> • 8 weeks • 12 weeks | | |

c. Through media campaign

| | | |
|---|--|--|
| <p>How OFTEN should each of these media campaigns be used</p> <ul style="list-style-type: none"> • Television <ul style="list-style-type: none"> ○ 1-2 times per week ○ 3-4times per week • Radio <ul style="list-style-type: none"> ○ 1-2 times per week ○ 3-4times per week • Newspaper <ul style="list-style-type: none"> ○ 1-2 times per week ○ 3-4times per week | | |
| <p>For how LONG in total should media campaign run</p> <ul style="list-style-type: none"> • 6 weeks • 8 weeks | | |

THANK YOU.