THE PREVALENCE OF OVERWEIGHT AND OBESITY AMONG SENIOR SECONDARY STUDENTS IN OREDO LOCAL GOVERNMENT AREA

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DEDICATION

This work is dedicated to God Almighty for His strength, wisdom, and direction during the course of this work. To my mummy Mrs. Roseline Ogbonna and Daddy Mr. Livinus Ogbonna, I say a big thank you. To my loving siblings Joshua, Tony, Emmanuel and Gold for their supports in all ramifications.

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My entire gratitude goes to **God Almighty, Who** made it possible for me to write this book. May **His** name be praised.

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ABSTRACT

This study was designed to survey the prevalence of overweight and obesity in Oredo Local Government in Benin city, Edo state. A descriptive survey research design was used to obtain data. The instrument used to elicit information was the structured questionnaire. Two hundred questionnaires were administered and all were retrieved.

The purposes of the study were:

- *To determine if parental socio-economic status influences the prevalence of overweight and obesity.*
- *To determine if gender (sex) influences the prevalence of overweight and obesity.*
- *To determine if physical activities influences the prevalence of overweight and obesity.*
- *To determine if eating behavior of adolescents influences the prevalence of overweight and obesity.*

Analysis and interpretation of data revealed that parental socio-economic status influences the prevalence of overweight and obesity. It revealed that the male genders were more overweight or obese. It also revealed that physical inactivity and high consumption of energy dense food contributes significantly to the prevalence of overweight and obesity.

The researcher therefore recommends that Nutrition education should be included as a relevant topic in the secondary school curriculum. There is a difference in term of gender with the male having higher prevalence, a multi-disciplinary approach including low fat diet, behavior modification and exercise is recommended.

CHAPTER ONE

INTRODUTION

1.1 BACKGROUND OF THE STUDY

Weight gain, overweight, and obesity are increasingly significant problems and ones that are likely to endure and to have long term advanced influences on the health of individuals and populations unless action is taken to reverse the trend. They are emerging as a major public health problem of the present time and the health risk associated are often down played (Oluwayemisi, 2011). It is known to be associated with substantial loss of quality of life and social stigmatization.

A number of factors have been suggested as contributing to the development of weight gain, overweight and obesity. These include genetic factors, decreasing level of physical activity, increasing time spent in sedentary behavior, changes in diet and environmental factors (physical, economic, political and socio-cultural). In addition, life style factors including family influences, changes in society and media advertising have been associated with the increasing incidence of obesity, overweight, and weight gain.

Overweight and obesity as a single disease entity constitute one of the most serious health problems in the world (Plowman and Smith, 2003). Wilson (2003) and Centre for Review and Dissemination (2002) stated there has been a marked increase in the incidence of obesity in children and adolescents in the United Kingdom over 20 years. Wang (2001) opined that there is a strong association between childhood and adolescent obesity in developing economy. Surgeon General, Call to Action(2001) stated that "today, there are nearly twice as many overweight children and almost three times as many overweight adolescents as there were in 1980.

Childhood and adolescence obesity is a strong predictor of adult obesity (Surgeon General, Call to Action, 2001). It is a worldwide concern (Kaur et. al. 2003, Moran and Philip 2003) with the United Kingdom (Wilson 2003), New Zealand (Turnbull et.al. 2004), South America (Guigliano and Carneiro 2004), Japan (yoshinaga et.al. 2004) among the counties in which a need for intervention has been identified.

Although the prevalence of overweight and obesity is increasing worldwide, the increase has been faster in developing countries

(Onyiriuka, 2013). This increasing prevalence has health consequences likely to adversely affect the lives of a high proportion of the population both in childhood and adulthood. This will represent a significant drain on health care resources if action is not taken to reverse the trend and help children and young people who are overweight or obese improve their health.

If adolescence overweight and obesity are to be addressed, they must be defined and diagnostic criteria must be set to enable health care professionals identify those who are at risk or affected. Despite the increasing number of children described as overweight or obese, there is a lack of rigorous scientific definition of these terms and lack of clarity over how they should be assessed (Livieri et.al. 2003). The effects of obesity on children and adolescents have a huge impact and can range from low self esteem to increased risk of cardiovascular diseases. The most effective cure for childhood and adolescent overweight and obesity according to literature is prevention. Parents and health care professionals can work together to make prevention more effective, and one day, perhaps, abolish this epidemic.

The developmental transition (physical, psychological, and social) during adolescence provides a context for development and perpetuation of eating behavior that are substantially different from those in other phases of life. After the age of 12 years, adolescents seldom conform to a regular pattern of three meals a day with over 50% of them admitting that they eat at least five times a day (Swinburn, B.; Egger, G. 2004). Healthy eating behaviors during adolescence are a fundamental prerequisite for physical growth, psychosocial development and cognitive performance as well as for the prevention of diet-related chronic diseases in adulthood.

Both clinical experience and research data indicate that irregular meal patterns are associated with obesity and that overeating is linked with breakfast skipping (Neimer et.al. 2006). Adolescents are highly receptive to new food products and influence. As a consequence, their food habits tend to be dynamic and change with time.

Rates of overweight and obesity have greatly increased since 1990's, not only throughout high income counties but also in urban and even rural areas of many low-income counties; and not only in adults but

also in children and adolescents. Obesity in both childhood and adult life can now be seen more as a disease of poverty than of affluence (Jaqui et.al. 2004). In 2005, the World Health Organization (WHO) estimated the number of overweight adults (15+) to be approximately 1.6 billion with projection for 2015 increasing this figure to 2.3 billion.

Literature review that body fatness is or probably is a cause of a number of cancers as well as a large number of disorder, diseases, obesity and overweight .

1.2 STATEMENT OF THE PROBLEM

Overweight and obesity are leading risks of global deaths and studies have shown that obesity has killed more people than AIDS (Nafisa 2006). World Health Organization (2014) estimates that around 3.4million adults die each year as a result of being overweight or obese. In addition, 44% of the diabetes burden, 23% of Ischemic heart disease burden and between 7% and 41% of certain cancer burdens are attributable to overweight and obesity.

The health consequences of overweight and obesity of raised BMI is a major risk factor for non-communicable diseases such as cardiovascular diseases (mainly heart disease and stroke), diabetes, musculo-skeletal disorders especially osteoarthritis- a highly disabling degenerative disease of the joints, cancer etc. Childhood and adolescent obesity are associated with a higher chance of obesity, premature death and disability in adulthood. And in addition to increased future risks, obese children experience breathing difficulties, increased risk of fractures, hypertension, early markers of cardiovascular diseases, insulin resistance and psychological effects.

1.3 RESEARCH QUESTION

Based on statement of the problem, the researcher seeks to answer the following questions.

1. What is the prevalence of overweight and obesity among children of different parental socio-economic status?
2. What is the prevalence of overweight and obesity among children in private and public schools in Oredo Local Government?

3. What is the prevalence of overweight and obesity among students who engage in physical activities and those who do not?
4. What is the prevalence of overweight and obesity among male and female students?
5. What is the prevalence of overweight and obesity among students who enjoy high energy dense food and those who enjoy low energy dense food?

1.4 PURPOSE OF THE STUDY

The objectives of the study are:

1. To determine if parental socio-economic status influences the prevalence of overweight and obesity.
2. To determine if gender (sex) influences the prevalence of overweight and obesity in Oredo Local Government.
3. To determine if physical activity influences the prevalence of overweight and obesity.
4. To determine if eating behavior of adolescents influences the prevalence of overweight and obesity.

1.5 SIGNIFICANCE OF THE STUDY

The essence of this study is to make available useful information on the prevalence of overweight and obesity to parent, educators, school officials and students themselves. Parents can become aware of the prevalence of overweight and obesity among adolescents and provide healthier diets/food options at home after school hours. Educators can implement programs and adopt school-wide programs that will benefit the overall health of their students. Students themselves can adopt better practices such as fitness exercises, food habits/behaviors that will contribute to their wellness and development.

1.6 SCOPE OF THE STUDY

This study was designed to reach as many adolescents as possible in Oredo Local Government. However, due to financial constraints, limited time, and accessibility, it was restricted to selected schools in Oredo Local Government in Edo state.

1.7 LIMITATIONS

Major limiting factors to this study research project include:

1. Inability of the researcher to lay hands on printed literature resources as either books on this topic are unavailable in the library or they are outdated i.e. they are not recent publications.
2. Articles found in various electronic search engines were used if they were available on-line. All on-line resources are not durable as literature resources available from the library.
3. Limited time made the researcher settle for the use of a small sample size, it led the researcher to use only few selected secondary schools in Oredo Local Government.
4. Insufficient funds led to a production of a limited number of questionnaires.
5. The epileptic nature of electric power supply was also a challenge.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

The chapter attempts to review what other authors, writers, educationists and professionals in the field of health have said about overweight and obesity. This literature is treated under the following headings:

- Concept of overweight and obesity.
- Mechanism of overweight and obesity.
- Valid and reliable screening for overweight and obesity.
- Economic consequence of overweight and obesity.
- Health risks of overweight and obesity.
- Psycho-social effects of overweight and obesity.
- Weight loss interventions.
- Addressing overweight and obesity, enabling action.
- Summary.

2.1 CONCEPT OF OVERWEIGHT AND OBESITY

The American Heritage Dictionary formally defines obesity as condition of increased body weight that is caused by an excessive accumulation of fat. Moronkola and Okanlowo (2003) viewed obesity as a habit of eating food in excess of what the body needs to function effectively resulting in the accumulation of fat in the body. In the same vein, Adetokunbo and Herbert (2003) saw obesity as a condition in which excess body fat adversely affects health and increases the risk of other diseases. They further stated that obesity is caused by energy intake exceeding energy expenditure over a long period of time. Onyezere and Adeyomo (2007) viewed obesity as energy intake exceeding energy output to the resulting energy imbalance playing the essential role in the deposition of fat as the major cause of the disease.

Essentially, obesity is a result of consumption of a lot of fatty energy food stuffs, alcohol and beverages and there is no expenditure of equivalent energy in form of physical activities. Halpern (1987), stressed that etiology of obesity include genetic factors, pathologic mechanisms, lack of nutritional knowledge, modern lifestyle pregnancy, childhood

obesity and adolescents periods, socio-economic factor, psychiatric factors and estrogenic obesity. Dr. (Mrs.) S. O. Okoedion and Igbudu (2010) declared that the main factors responsible for obesity are excess intake of carbohydrate food than the person need, endocrinal disorder, genetic trait of obesity coupled with inactivity or sedentary lifestyle, intake of much fatty food and increase attack. Obesity usually occurs when diets are high in fat in such a way that there is increased energy density coupled with low physical activities. Obesity is caused by energy intake exceeding energy expenditure over a long period of time.

However, American College of Sport Medicine (2001) observed that many people may misclassify active people who have large muscle mass as obese while Moronkola and Okanlowon (2003) opined that overweight is not the same thing as obesity as overweight is excess lean body tissues than excess body fat as in obesity but the two condition can occur when one overeats and also become inactive. Overweight is a less severe excess of body fat than obesity

2.2 MECHANISM OF OVERWEIGHT AND OBESITY

The cause of obesity is diverse and we cannot for sure say that insulin resistance is the cause of obesity as there are other causes of both obesity and insulin resistance. Although sedentary lifestyle, with reduced physical activity and an unlimited offer of food have been suggested to support these metabolic disease (Bettina meissburger, 2010) several monogenetic causes for obesity have been described. Some of them as cited by Bettina (2010) include mutations in leptin and the leptin receptor or mutations in the melanocortin receptor 4 and pro-opiomelanocortin leading to pronounced hyperphagia or gluttony, likewise, monogenetic disorders of glucose metabolism which are essential genes in β-cell development, insulin secretion and insulin signaling. However monogenetic cases of obesity are rare, as most people who are obese according to studies carry polygenetic risk factors.

Adipocytes (fat cells) found in the adipose tissue are the main storage site for excess energy in the form of triglycerides. During growth, these fat cells increase in number and when energy intake exceeds expenditure, the fat cells increase in size. When fat cells have reached

their maximum size and energy intake continues to exceed energy expenditure, fat cells increase in number again. With fat loss, the size of the cell shrinks, but not the number. When fat loss occurs, none of the cells decrease in number, they only decrease in size (Whitney & Rolfes, 2002).

Triglycerides are composed of three fatty acids attached to a glycerol molecule. To make triglyceride, a series of condensation reactions take place with fatty acids, combining with hydrogen atom to form the glycerol, and a hydroxyl group to form a fatty acid releasing a molecule of water. Fatty acids reach the adipocyte via circulation in three major forms: non – esterified fatty acids (FFA) which are associated with albumin in the serum, lipoprotein lipase (LPL) which is associated with the outer membrane of the adipocyte through heparance sulphate proteoglycans and can hydrolyse non-esterified fatty acids from triglyceride-rich chylomicrons and very low density lipoprotein particles (VLDL) can be taken up completely by the adipocyte via the VLDL receptor (VLDLT) or low density lipoprotein receptor-related protein. After entry into the cell, fatty acids are esterified by acyl-coA-synthetase

and used for triacylglyceride synthesis on the endoplasmatic reticulum. For storage, triglycerides are incorporated into lipid droplets, which form at the ER and are covered with PAT family proteins such as perilipin.

The central regulation of caloric intake and energy expenditure that contributes to energy balance involves interaction between the peripheral hormonal and neuromodulary factors and neural pathways. Peripheral signals of hunger and satiety are interpreted in the hypothalamus and distributed to the periphery by the sympathetic nervous system. A positive energy balance or satiety is mediated by increased intestinal distention and other mechanical-chemical changes that induce neural impulses carried by the afferent vague nerve and by augmentation in the circulation of glucose, cholecystokinin, leptin, glucagons-like peptide-1 and peptide.

Leptin is a signal secreted mainly from fat cells that control food intake and energy homeostasis. The concentration of leptin in the blood is highly correlated with total body fat mass. When the leptin feedback system is disturbed, there is a chronic bias to overeat and gain weight.

These individuals are hyperphagic and extremely obese and the administration of leptin may reverse this syndrome.

However, leptin alone cannot regulate this energy homeostasis alone, both insulin and leptin are responsible for adiposity signals. The hypothalamus depends upon information from adipose stores in the form of insulin and leptin as well the availability of energy from the liver and hindbrain to help control food intake and energy expenditure. Individuals who are insulin-deficient may become hyperphagic. However administration of insulin eliminates their hyperphagia which suggest the importance of insulin as an adiposity signal.

Ghrelin stimulates hunger. Circulating ghrelin concentrations increase food intake through the stimulation of ghrelin receptors on hypothalamic orexigenic neuropeptide Y (NPY), express neurons and agouti-related protein (AGRP) expressing neurons. Leptin (an anorexigenic, or appetite-suppressing factor) and ghrelin (an orexigenic or appetite stimulating peptide) act in a mutual antagonistic manner through their respective receptors in the hypothalamus and brainstem to regulate caloric intake and energy expenditure.

There are six single gene defects that give rise to human obesity, and all of them involve proteins in the leptin-melanocortin pathway. Four of these are autosomal recessive, and affect leptin receptors. In all of these cases, there is profound hyperphagia and childhood-on set massive obesity. While these forms are rare, those caused by mutation in the gene are quite common. (Adopted from Overweight And Obesity In Women; A Literature Review and Journal of Young Investigators).

2.3 VALID AND RELIABLE SCREENING FOR OVERWEIGHT AND OBESITY

There are various methods of screening for overweight and obesity; body weight alone is not a very sensitive indicator for defining obesity (Atkinson, 1993). Factors such as age, sex, height, lean muscle mass and body fat percentage are all unaccounted for when using weight alone to measure healthy body weight on an individual level (Odom, 2006). Thus, weight alone should be avoided as a standard for assessing a person's relative risk for overweight and obesity.

National Institute of Health (NIH) in 1998 utilized Body Mass Index (BMI) for defining overweight and obesity (NIH, NHLBI; 1998). BMI is a practical measure that requires only two things: accurate measure of an individual's weight and height. Odom (2006) stated that the most accurate assessment of obesity is body fat content. Methods used to measure body fat mass include measuring body circumference, skin fold measurements, bio-impedance, underwater weighing, computed tomography, nuclear magnetic resonance imaging, or dual x-ray absorptiometry. These assays are largely unavailable to most practitioners and are prohibitively expensive.

The Gothenberg, Sweden, longitudinal study showed that increased waist size was positively correlated with an increased incidence of myocardial infarction, angina, and stroke independent of age and BMI (Klauer and Aronne, 2002) thus waist circumference (the smallest circumference below the rib cage and above the umbilicus) and waist to hip ratio (the circumference of the waist divided by the circumference of the hip) can be used as a simple measure of body fatness, though it can be subject to measurement error.

In children and adolescents, overweight has been defined as a sex and age-specific BMI at or above the 95th percentile; based on revised centers for disease control and prevention (CDC). But because a child's BMI changes dramatically with age during childhood and adolescents, therefore defining overweight in children and adolescents is done by determining "BMI for age" in children aged 2 -20 years old (Dalton and Watts, 2002). Children at or above the 85th to 95th BMI percentile are defined as "overweight". Centre for Disease Control and Prevention (CDC) of the United States of America suggests the BMI is the most appropriate and easily available method to screen for children and adolescent obesity.

2.4 ECONOMIC CONSEQUENCES OF OVERWEIGHT & OBESITY

Overweight and obesity and their associated health problems have substantial economic consequences. For example, Public Health Agency of Canada (PHAC) estimated that in 2008, obesity engendered direct costs of nearly two billion dollars while Anis et al calculated direct costs

of six billion dollar for 2006. This increasing prevalence of overweight and obesity is associated with both direct and indirect costs (Surgeon General, Call to Action). Direct health cost refers to health service delivery to treat obesity related health problems, such as hospitalization, medical consultation in outpatient clinics and the consumption of medications. Indirect cost refers to cost productivity when individuals must temporary (absenteeism) or permanently (disability or premature mortality) leave work for health reasons. Such costs are based on the contributions that the individuals would have made to the economy were they not affected by health problems.

Anis et al have estimated that obesity and overweight-related absenteeism and disability led to productivity loss on the order of five billion dollars in 2006, and the PHAC study, by adding losses stemming from premature mortality, concludes that such losses stand at $2.63 billion for 2008 as regard obesity.

According to other studies, the economic burden reveals that the rise in overweight and obesity is not a source of concern solely for interveners working in the field of health, indeed, health problems linked

to obesity affect several sectors of the economy and the resulting economic burden (Chantal Blouin, 2014). Due to these high costs, the Government has embarked on programs that are aimed at preventing obesity. Since there are so many diseases related to obesity, the campaign is aimed at reducing their cost too. Researchers however have dismissed the effectiveness of these programs saying that they may improve public health but they do not reduce the health expenditure. The reason given for this is that prevention programs will help people live longer and spend more on medication and other medical costs during their longer life span.

2.5 HEALTH RISKS OF OVERWEIGHT AND OBESITY

Adolescent overweight and obesity constitute a public health problem. The first thing a child is taught is how to eat. Eating though a necessity often becomes a recreation to most children while physical activity more often is regarded as punishment (Oluwayemisi,2011). Oluwayemisi stressed that based on his anecdotal experience, most parents in Nigeria today; indulge their children in eating sprees without

knowing the health consequences of such actions. This is because they are not aware that a fat child is not a necessity. This attitude (a non-disciplined feeding habit) may predispose the children to overweight and obesity.

Epidemiological studies show an increase in mortality associated with overweight and obesity. The Centre For Disease Control and Prevention suggests that people who are overweight stand the risk of developing the following conditions:

- ✓ Coronary heart disease
- ✓ Type 2 diabetes
- ✓ Cancer(endometrial, breast, colon)
- ✓ Hypertension(high blood pressure)
- ✓ Dyslipidemia (for example high level of triglycerides)
- ✓ Stroke
- ✓ Liver and gallbladder disease
- ✓ Sleep apnea and breathing problems
- ✓ Osteoarthritis(a breakdown within a joint)
- ✓ Gynecological problems(abnormal periods, infertility)

- ✓ High blood cholesterol
- ✓ Stress incontinence(urine leakage caused by weak pelvic floor muscles)
- ✓ Psychological difficulties due to social stigmatization
- ✓ Increased surgical risk and above all
- ✓ Premature death.

Although obesity associated morbidities occur most frequently in adults, important consequences of excess weight as well as antecedents of adult disease occur in overweight children and adolescents. Overweight children and adolescents are more likely to become overweight or obese adults. This concern is greatest among adolescents (Surgeon General, Call to Action). He further stated that Type 2 diabetes, high blood lipids, and hypertension as well as early maturation and orthopedic problems also occur with increased frequency in overweight youth.

The tracking of obesity from childhood to adulthood is only fair, but it is higher from adolescent to adulthood (Wang,2011).

2.6 PSYCHO-SOCIAL EFFECTS OF OVERWEIGHT AND OBESITY

Being obese has serious psychological and social effects. NYU Langone Weight Management Program (2014) revealed that many people who are overweight are subject to disapproval, even lectures from family and friends and to sneers and remarks from strangers. The program went further to state that such behavior is propagated by the general societal belief that obesity is caused by a lack of self-discipline or moral weakness. This attitude is carried over into the work world, where a job or a promotion is often denied simply because of how much one weighs.

Weight stigma occurs in multiple settings by a range of individuals. For example, in employment settings, overweight people may face bias from several sources. Experimental studies have found that when a resume is accompanied by a picture or video of an overweight person (compared to an “average” weight person), the overweight applicant is rated more negatively and is less likely to be hired. Literatures show that overweight employees are ascribed multiple

negative stereotypes which include being lazy, sleepy, less-competent, lacking in self-disciple, disagreeable, less conscientiousness and being poor role models. Overweight employees are also paid less for the same jobs than thin people with the same qualifications.

In school settings, students who are overweight or obese can face harassment and ridicule from peers as well as negative attitudes from teachers and other educators. In medical facilities, biased attitudes towards obese patients have been documented among physicians, nurses, psychologist, dieticians and medical students and include perceptions that obese patients are unintelligent, unsuccessful, weak-willed, unpleasant, over indulgent and lazy. Consequent upon these, negative experiences may lead to depression, anxiety, social isolation, poor psychological adjustment, low self- esteem, self blame truancy etc.

2.7 WEIGHT LOSS INTERVENTION

So many approaches exist to assist people to lose weight, some of the approach from the literature include: physical activity, diet, behavioral modification, pharmaco-therapies, surgery etc.

Physical Activity and Exercise

Physical activity is basic to health (Odom, 2006). It is a component of lifestyle interventions for weight loss. Physical activity can be defined as any movement that involves the use of one or more large muscle groups and raises the heart rate (National Health and Medical Research Council, NHMRC, 2013). Exercise, a type of physical activity is variously defined and has a cross over with physical activity in its definition. It can be considered a planned, structured and usually repetitive activity that enhances or maintains physical fitness and/or overall health and wellness. The benefits derived from regular exercise are well documented and include positive effects on mind, bone, lipid, profile, endothelial function, risk of cancer, glucose tolerance and insulin sensitivity and quality of life (Odom, 2006). The Nurses' Health study documented a lower incidence of cardiovascular disease, including both coronary health disease and stroke (Klauer and Aronne, 2002; p 1084). NHMRC (2013) opined that the frequency, intensity and duration of the activity are part of an exercise prescription. Even a moderate- intensity exercise such as walking is associated with a lower risk of disease. The recommendation

for aerobic activity is thirty minutes on most, if not all days of the week. This is the minimum recommendation; those wishing to lose weight should aim to exceed this (Klauer and Aronne, 2002). The patient should be advised to gradually increase her energy expenditure through changes to her daily routine (e.g. climbing stairs rather than riding the elevator, parking farther from destination if safe) and the incorporation or regular exercise likely to be continued over the long term (Odom, 2006).

The New Zealand Clinical Guideline for Weight Management in New Zealand Adults however stated that exercise does not significantly increase weight loss after 12months. Exercise combined with diet results in an average increased weight loss of 1.4kg at 12 months, while the combination of exercise, diet, and behavioral strategies results in greater weight loss (2.1kg) in comparison to exercise and diet at 12month or more. Exercise is an important component of weight loss programs and should be considered in combination with diet and some form of behavioral support.

Diet

Fundamental to treatment of obesity is reduction in the number of calories consumed. An overall decrease in the number of calories is necessary for weight loss to occur, with emphasis on consumption of raw fruits and vegetable, protein, fiber, and should be sufficient in nutrients and vitamins. Decreasing intake of processed foods, sugars, salts, fats, oil and nutritional-dense foods should be encouraged (Odom, 2006).

The New Zealand Clinical Guideline for Weight Management in New Zealand Adults categorized dietary interventions as follows:

- Nutrition
- Low energy-1000 to 1600 kcal or 4200 to 6720 per day;
- Very low energy diets-< 1000 k cal or <4200 KJ per day.
- Low glycaemic index diets- defined as 55 or under (low), 56 to 69(medium and 70 or higher (high).
- Moderate macronutrient diets-diets that differ substantially from the acceptable distribution range of 50% to 55% total energy from

carbohydrate, 20 to 35% from the total fat and 15 to 25% from protein. These can be further categorized as;

- Low carbohydrate (less than/equal to 40% total energy from carbohydrates.
- Low fat (greater than or equal to 35% total energy from protein); and
- High carbohydrate (greater than or equal to 65% total energy from carbohydrates.

Calculating the calories requirements can assists the health care provider in counseling patients about caloric needs to maintain weight. One way to determine how many calories an individual should consume each day is calculating the patients basal metabolic rate (BMR), or the energy required for involuntary physiologic functions to maintain life, including respiration, circulation, and maintenance of muscle tone and body temperature. The BMR accounts for 65-70% of the body energy requirement. It is calculated by 10 x ideal weight (IBS) = kcal needed for BMR daily (Odom, 2006).

Calories need can also be calculated by calculating the resting energy expenditure. Resting energy expenditure is the estimated kilocalories needed for thermo genesis, voluntary activities and any increased need for catabolic and anabolic process. Thus weight loss should occur by either increasing the energy expenditure or decreasing the calories need values or both.

Behavioral Modification

Behavioral therapy is a useful adjunct to diet and physical activity. The goal of behavioral therapy is to assist the individual to make long term changes in their lifestyle by monitoring and modifying the food intake and physical activities levels. Behavioral strategies should be used to access patient's motivation and readiness to implement the weight management plan and take the steps to motivate the patient for treatment. Behavioral strategies increase weight loss by 2-8kg at up to one year (CGMW, 2009). Behavioral strategies to promote diet and exercise should be used routinely as they are helpful in achieving weight loss and maintenance (Odom, 2006).

All weight reduction programs should incorporate some form of behavioral modification. The best programs should help the patient identify the cause of the weight gain and thereby gain better control over the situations that cause overeating. Goals of treatment include identification of situations that trigger eating, improve exercise habits, food shopping with awareness and recognition of hunger versus craving. Behavioral modification alone provides weight losses of ten percent (Klauer & Aronne, 2002; p. 1087).

PHARMACO-THERAPIES

Pharmacotherapy can increase compliance and increase the amount of weight loss above that achieved with diet and exercise. Different types of weight loss drugs exist and they include orlistat, sibutramine, phentermine, bupropion etc.

Orlistat: is a gastro intestinal lipase inhibitor that works in the gut by preventing the absorption of 30% of dietary fat. It binds with lipase in the stomach or small intestine and thereby prevents dietary fat from being broken down and digested.

Side effects of orlistat includes flatus, oily spotting, abdominal pain, fecal incontinence, and a slight reduction in the level of fat soluble vitamins. These side effects are related to the amount of fat that is ingested (Odom, 2006).

Subutramine: is another weight loss medication that acts centrally in the brain. It is a serotonin and noradrenaline reuptake inhibitor. By inhibiting reuptake, more serotonin and noradrenaline are available to act on receptors, thereby increasing satiety and increase energy expenditure (CGWM in New Zealand Adults, 2009).

Side effects associated with sibutramine are mild and usually resolve in a few weeks. They include dry mouth, insomnia, headache, constipation and restlessness. Some patients experience a rise in blood pressure and heart rate (Odom, 2006).

Phenetermine: is a sympathomimetic amine, phenetermine is a stimulant that acts on the central nervous system and suppresses appetite (CGWM in New Zealand Adults, 2009).

Other medications associated with weight loss include Melformin in patients with non-insulin-dependent diabetes. Melformin promotes weight loss by enhancing satiety. In combination with orlistat, melformin has been shown to offer significant weight reduction and improvement in lipid profile with type 2 diabetes (Odom, 2006).

Bupropin is anti-depressant that does not cause weight gain as other antidepressants do, such as monoamide oxidase inhibitor and selective serotonin reuptake inhibitors (Odom, 2006).

BARIATRIC SURGERY

Odom in her study noted that surgical interventions can be considered for patients with BMI greater than 40 who fail other methods of treatment, particularly if serious obesity-related complications are present. A range of surgical procedures can be performed with the purpose of including weight change in patients with overweight or obesity. NHMRC 2013 classified bariatnic surgery as follows;

- ✓ Restrictive procedures: including vertical banded gastroplasty(VBG) laparoscopic adjustable gastric banding (LAGB) and sleeve gastrectomy (SG);
- ✓ Malabsorptive procedures including bilio-pancreatic diversion (BDP) and by passing the majority of the small bowel absorptive area and
- ✓ Combination procedures: such as the Roux-en-y gastric bypass (RYGB), which also alters neuro-hormonal pathway that regulates energy balance. Malabsorption after RYGB is primarily limited to micronutrients; lifelong vitamin and mineral supplementation is required to prevent nutritional deficiencies.

2.7 ADDRESSING OVERWEIGHT AND OBESITY-ENABLING ACTION

There are consistent sets of enabling actions identified in addressing overweight and obesity in current frameworks promoting physical activity and healthy weight in Australians (NSW Centre for Overweight

and Obesity). University of Sydney identified that over the last ten years, public health policies and plans have increasingly recognized the importance of more macro-level enabling actions as an essential adjunct to programs and settings-based initiatives in public health programs. These enabling actions include Healthy Weight 2008 which factors are described as national actions and include: community- wide education, whole of community demonstration areas, evidence and performance monitoring and coordination and capacity building. Similarly, in Be Active Australia, the overarching strategies comprises: communication and community education, increasing workforce capacity, evidence research, monitoring and evaluation, and strategic management and coordination.

These strategies were designed to provide essential resources and tools to underpin and support the implementation of specific intervention in addressing overweight and obesity. The question now is, "is there any intervention program in Nigeria to address this fast spreading disease called overweight and obesity?" "Are children and adolescents cautioned on the implication of their eating habit/behavior, sedentary lifestyle and

physical inactivity which has been suggested as the major factors that lead to overweight and consequently obesity?"

Many people believe that dealing with overweight and obesity is a personal responsibility. To some degree they would be right, but it is also a community responsibility. When there are no safe, accessible places for children to play or adults to walk, jog, or ride a bike, that is a community responsibility. When school lunch rooms or office cafeterias do not provide healthy and appealing food choices that is a community responsibility. When we do not require daily physical education in our schools, which is a community responsibility. There is much that we can and should do together. (Surgeon General, Call to Action 2001).

2.8 SUMMARY

Taking action to address overweight and obesity will have a profound effect on increasing the quality and years of healthy life and on eliminating health disparities. The process begins with our attitudes about overweight and obesity. Overweight and obesity must be approached as preventable and treatable problems with realistic and

exciting opportunities to improve health and save life. Individuals lie at the foundation of the solution to the problems of overweight and obesity. Individuals can share their own knowledge and habits regarding a healthy diet and physical activity with their children (for the parents), other family members and friends through frank dialogue regarding the methods, challenges and benefits of adopting a healthy lifestyle. Individuals can make the effort to combat the obesity epidemic. Organizations can develop programs that educate members on food choices and appropriate levels of physical activity and engage members in these healthy habits.

In the community, a forum should be provided in which all community members can discuss the scope of the problem of overweight and obesity within the community, and adapt policies and programs to reduce the burden of overweight and obesity within the community.

CHAPTER THREE

METHODOLOGY

The chapter describes the method and procedures utilized in the conduct of the study. It is presented under the following headings:

1. Research design
2. Population of the study
3. Sample and sampling procedure
4 Validity of the instrument
5. Reliability of the instrument
6. The instrument of the study
7. Method of data collection
8. Data analysis.

3.1 Research Design

The descriptive survey research design was adopted for the study. It involves the gathering of data through the administration of the questionnaire. It is not expensive and we can generalize with its findings.

3.2 Population of the study

The population of the study consist of all adolescents between senior secondary school one (S.S.1) to senior secondary school three (S.S.3) in Oredo Local Government.

3.3 Sampling and sampling procedure

The sampling size consists of two hundred (200) respondents taken from four (4) secondary schools in Oredo Local Government. 50% of the respondents were taken from two public schools while the other 50% of the respondents was taken from two private schools which were derived from 10% and 13% of the total population of private schools and 20% from public schools.

3.4 Validity of the instrument

The instrument of the study was validated by showing them to the supervisor and other experts in the field. This is to ensure the content validity of the instrument. The observations and corrections made were adjusted before the final draft of the instrument was produced.

3.5 Reliability of the instrument

The split half method of establishing reliability was used. The researcher administered the test to the respondents' ones and then divided the test into two halves (all odd numbered items in one half and all even numbered items in the other half). If the coefficient of reliability is high, the test has good split-half reliability.

The researcher calculated the correction using the spearman brown split- half reliability formulae

$$r\text{total test} = \frac{2r\ \text{split-half}}{1+r\text{split-half}}$$

The coefficient was 0.87 which indicates that the instrument was reliable and consistent.

3.6 The instrument of the study

The research instrument for data collection for the study was the questionnaire. The questionnaires consist of twenty seven (27) items

divided into two (2) sections: section A and B. section A contains the demographic data such age, sex, religion, height, weight, BMI while section B contain the variables.

3.7 Method of data collection

The questionnaire was personally administered to the respondents selected for the study to ensure adequate returns. The respondents were ensured that the purpose of the exercise was for research and they were also guaranteed absolute confidence in the information they will give. The questionnaire were distributed by the researcher to the respondents after adequate explanation were given to the respondents on areas likely to be misunderstood and the weight and height of the respondents taken by the researcher.

3.8 Data analysis

The researcher tabulated and grouped the data collected with consideration to the research questions. The researcher used frequency count and simple percentage to analyze the data collected

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND RESULTS

4.1 Data analysis

This chapter presents an analysis of the prevalence of overweight and obesity among secondary school students in Oredo Local Government Area. The data was analyzed based on the findings of the research. The method of analysis as earlier stated was simple percentage to interpret the data collected to provide the authenticity or the other wise of the stated research questions. Tables were prepared for easy comparism.

Research question one:

What is the prevalence of overweight and obesity among children of different parental socioeconomic status?

Questions 8, 9 and parental occupation of the questionnaire presents data for the treatment of the research question above.

Table one

s/no	Research Question	yes	%	No	%
8	Do you walk to school on daily bases?	33	33%	67	67%
9	Do your parents drop you off at school?	51	51%	49	49%
	Parental status	65	65%	35	35%

With the above data gathered based on the percentage score results, 33% reported that they walk to school on daily bases while 67% were driven down. Also 51% agreed that their parents drop them off at school daily while 49% came to school by other means.

The study revealed that 65% of the respondents were from middle and high socioeconomic background while 35% of the respondents were from low socioeconomic background. It also revealed that 77% of the respondents from middle and high socioeconomic background were either overweight or obese while 23% had normal weight.

Research question two

What is the prevalence of overweight and obesity among children in private and public schools?

The BMI of the respondents in both private and public secondary schools were used in treating the research question above.

Table two

S/no		Yes	%	No	%
1	Number of overweight or obese students in public schools.	75	75%	25	25%
2	Number of overweight or obese students in private schools.	77	77%	23	23%

With the above data gathered based on the percentage, it shows that 75% of the respondents in public schools were either overweight or obese while 25% were either of normal weight or underweight. It also revealed that 77% of the respondents in private schools were either overweight or obese while 23% were of normal weight.

Research Question Three

What is the prevalence of overweight and obesity among male and female students?

Table Three

s/no		Yes	%	No	%
1	Number of overweight or obese male	77	77%	23	23%
2	Number of overweight or obese female	76	76%	24	24%

From the above data gathered based on percentage score showed that 77% of the male respondents were either overweight or obese w-hile 76% of the female respondents were either overweight or obese.

The study revealed that more male was either overweight or obese compared to the female respondents.

Research Question Four

What is the prevalence of overweight and obesity among students who engage in physical activities and those who do not?

Questions 9, 10, 11, 13, and 19 of the questionnaire, present data for the treatment of the research question above.

Table Four

s/no	Research questions	Yes	%	No	%
9	Do your parents drop you off at school?	51	51%	49	49%
10	Are you actively involved in sports or sporting activities?	62	62%	38	38%
11	Does your school conduct inter house sports competition?	80	80%	20	20%
13	Do you enjoy watching TV programmes?	90	90%	10	10%
19	Do you like walking home after school?	47	47%	53	53%

The above data gathered based on percentage scores, 51% of the respondents were dropped off at school on daily bases while 49% of the respondents came to school by other means, 62% of the respondents were actively involved in sporting activities while 38% were passively

involved. 80% of the respondents agreed that their school conducts inter house sports competition while 20% disagreed. 90% of the respondents enjoyed watching TV programs while only 10% do not enjoy TV programs. 47% of the respondents accepted that they like walking home after school while 53% dislike walking home after school. Research Question Five:

What is the prevalence of overweight and obesity among students who enjoy high energy dense food and those who enjoy low energy dense food?

Question 2, 3,4,5,6,7,12,15,16,17 and 18 provides data for treatment of research question above.

Table Five:

s/no	Research questions	Yes	%	No	%
2	Do you eat breakfast regularly?	54	54%	46	46%
3	Do you skip meals?	62	62%	38	38%
4	Do you skip breakfast	52	52%	48	48%
5	Do you eat fruit regularly in a week	52	52%	48	48%
6	Do you take snack very often	69	69%	31	31%
7	Do you take soft drink very often	57	57%	43	43%
12	Do you eat carbohydrate food regularly	80	80%	20	20%
15	Do you eat more than fast food than homemade food	24	24%	76	76%
16	Do you enjoy taking snacks with your friends?	73	73%	27	27%
17	Do you come to school with launch pack?	39	39%	61	61%
18	Does your mother or father buy snacks when returning from work?	51	51%	49	49%

From the above data gathered based on percentage score showed that 54%of he respondents eat breakfast regularly while 46% do not. 62% skip meals while 38% do not skip meals. 52% of the respondents skip breakfast while 48% eat breakfast regularly. 52% admit that they take fruit regularly in a week while 48% do not take fruit regularly. 69%

took snacks very often while 31% do not, also 57% took soft drink very often and 43% do not take soft drinks often.

The study review that 80%of the respondents eat carbohydrate food regularly while 20% do not, 24% of the respondents ate more of fast food than homemade food, while 76% ate more of homemade food than fast food. 73% admitted that they enjoy snacks with their friends while 27% do not. 39% of the respondents agreed that they come to school with lunch pack while 61% do not.

Finally, 51% 0f the respondents admit that either their mother or father bought snacks when returning from work while 49% of the respondents did not.

4.2 Discussion of the findings

The study examined the prevalence of overweight and obesity among secondary school students in Oredo local government area. 77% of the recruited samples from middle and high socioeconomic background were found to be either overweight or obese. The high percentage of overweight and obese students in middle and high socio-

economic background directly indicate how parental socio-economic states influence the prevalence of overweight and obesity as pointed out in previous studies in developed countries. Wang (2001) reported strong association between child and adolescent obesity to parental socio-economic status. In one of his studies, he also discovered adolescents in china from high income parents were more likely to be obese.

The finding revealed that the prevalence of overweight and obesity was slightly higher in private than public school, indicating the importace of socio-economic status in the prevalence of overweight and obesity in secondary school adolescents. This is because it is only the affluent can enroll their children in private school.

The prevalence of overweight and obesity was slightly higher in male than in female students which contradicts the findings of Oluwayemi (2011) in which gender difference in overweight and obesity showed that female gender is an important factor in the prevalence of overweight and obesity.

The study confirms the findings of Onyinuka et al (2013) whose findings revealed that meal skipping especially breakfast to weight gain ultimately resulting in overweight. Also a relatively high rate of consumption of fast food, soft drinks and less physical activity contribute significantly to the prevalence of overweight and obesity.

CHAPTER FIVE

Summary, conclusions and recommendations

5.1 Summary

The purpose of the study was to survey the prevalence of overweight and obesity among secondary school students in Oredo local government Area, in Benin City, Edo state.

The literature was treated under the following headings

- ❖ Concept of overweight and obesity.
- ❖ Mechanism of overweight and obesity.
- ❖ Valid and reliable screening for overweight and obesity.
- ❖ Economic consequence of overweight and obesity.
- ❖ Health risks of overweight and obesity.
- ❖ Psycho-social effects overweight and obesity.
- ❖ Weight loss interventions.
- ❖ Addressing overweight and obesity, enabling action.
- ❖ Summary.

The research design was a descriptive survey which involved the gathering of data through the administration of questionnaire.

The instrument used in collecting data was the questionnaire. The questionnaire was given to two hundred students selected randomly from four senior secondary schools in Oredo local government. Two were private school while the other two were public schools.

The major findings of the study were:

- Parental socio-economic status influences the prevalence of overweight and obesity
- The prevalence of overweight and obesity was slightly higher in public schools than in private schools
- The prevalence of overweight and obesity was slightly higher in male than in female students.
- The consumption of energy dense food contributes significantly to the prevalence of obesity and overweight.
- Physical activity also contributes to the prevalence of overweight and obesity.

5.2 Conclusions

From the findings of this study, it was concluded that the prevalent rate of overweight and obesity was higher among children from private schools, among children of middle and higher socio-economic status and among male students.

5.3 Recommendations

1. Private school should be encouraged to have facilities for sports and recreational activities
2. Focus on improving parental engagement and tangible support that involve direct participation from parents in physical activities with their adolescents.
3. There is a difference in terms of gender with male having higher prevalence, a multidisciplinary approach including low fat diet, behavior modification and exercise is recommended.
4. Nutrition education should be included as relevant topic in the secondary school curriculum

5. It is recommended that the level of physical activity be increased in urban secondary school and physical education be made compulsory in all levels of secondary education.

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DEPARTMENT OF HEALTH ENVIROMENTAL EDUCATION

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QUESTIONNAIRE ON PREVALENCE OF OVERWEIGHT AND OBESITY AMONG SECONDARY SCHOOL STUDENTS IN OREDO LOCAL GOVERNMENT AREA.

This questionnaire is designed primary to collect data for a research project on the prevalence of obesity and overweight among adolescents in oredo local government, Benin city. The result of this study will be used in making suggestions for improvement of the nutritional habits as well as the general lifestyle of adolescents which eventually will enhance their wellbeing. You are sincerely assured that any information supplied by you will be treated as confidential and used only for this study.

SECTION A

Age_____

Sex: female male

Religion: christain islam others

Height:_____

Weight:_____

Father's occupation:_____

Mother's occupation:_____

SECTION B

S/no		yes	no
1	Do you eat three square meals a day?		
2	Do you eat breakfast regularly?		
3	Do you skip meals?		
4	Do you skip breakfast?		
5	Do you eat fruits regularly in a week?		
6	Do you take snacks very often?		
7	Do you take soft drinks very often?		
8	Do you walk to school on daily bases?		
9	Do your parents drop you off at school?		
10	Are you actively involved in sports or sporting activities?		
11	Does your school conduct inter-house sports competition?		

12	Do you eat carbohydrate foods regularly?		
13	Do you enjoy watching T.V programmes?		
14	Is your mother or father fat?		
15	Do you eat more of fast food to homemade food?		
16	Do you enjoy taking snacks with your friend?		
17	Do you come to school with lunch pack?		
18	Does your mother or father buy snacks when returning from work?		
19	Do you like walking home after school?		