DETERMINANTS OF OVERWEIGHT AND OBESITY AMONG PRIMARY FOUR TO SEVEN PUPILS IN SELECTED SCHOOLS IN MUKONO DISTRICT AND KAMPALA CITY, UGANDA

BY

KEVIN TECKLA NAWANGI

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SUPERVISOR

PROFESSOR DAVID NDUNGUTSE

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D ON

I, Kevin Teckla Nawangi hereby declare that this is my original work and has never been presented to any other educational institution for any award. Any other Authors work utilized herein is highly acknowledged

Signature …… Date ……

KEVIN TECKLA NAWANGI

APPROVAL

This is to certify that Kevin Teckla Nawangi successfully carried out this research study under my guidance and supervision and is now ready for submission.

Signature..... Date.....

PROFESSOR DAVID NDUNGUTSE

SUPERVISOR

ACKNOWLEDGEMENTS

For having completed this work, Glory goes to God the Almighty. Special thanks and gratitude goes to my supervisor for the support I received in both the proposal and dissertation development.

DEDICATION

I dedicate this research work to my mother Barbara, my husband Joseph, my daughter Barbie, my brother Kenneth, my sister Rita, and friends who have supported me so much throughout my studies and while pursuing this course.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACODE	Advocates Coalition for Development and Environment
BMI	Body Mass Index
COU	Church Of Uganda
CDC	Centers for Disease Control & Prevention
FANTA	Food and Nutrition Technical Assistance III Project
HDL	High Density Lipoproteins
IHSU	International Health Sciences University
IOTF	International Obesity Task Force
KCCA	Kampala City Council Authority
LDL	Low Density Lipoproteins
MoES	Ministry of Education and Sports
MScPH	Master of Science in Public Health
NASPE	National Association of Sport and Physical Education
OR	Odds Ratio
$P_4 - P_7$	Primary four to Primary seven
PE	Physical Education
SES	Socio Economic Status
TV	Television
UNEB	Uganda National Examinations Board
USA	United States of America
WC	Waist Circumference
WHO	World Health Organization

OPERATIONAL DEFINITIONS

Childhood Obesity

For purpose of this study, childhood obesity was taken to mean a condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health in children (Z-score >+2SD).

Overweight

For purpose of this study, overweight was taken to mean a body having more fat than is optimally healthy (Z-score>+1SD).

Curriculum

For purpose of this study, a curriculum was taken to mean the set of courses, and their content offered at a school.

Psychosocial factors

For purpose of this study, psychosocial factors were taken as those factors that relate to child's psychological development in, and interaction with, a social environment.

Socio-economic status

In this study, socio-economic status was taken as a measure of parents' economic and social position.

Feeding habits

In this study, feeding habits were taken to mean the acquired pattern of supplying the body with nutrients essential for growth, maintenance and operation.

Behavioral factors

For purpose of this study, behavioral factors were taken to mean actions performed by individuals that exert influence on gaining or loosing body weight.

Physical activity

In this study, physical activity was taken to mean any activity that increases heart rate and requires expending high amounts of energy.

Sedentary behaviors

For purpose of this study, sedentary behaviors were taken to mean engagement in pursuits that lack moderate to vigorous physical activity.

ABSTRACT

Background to the study

Childhood obesity on the worldwide is still increasingly recognized as one of the most serious public health challenges of the 21st century. This is mainly attributed to the global nutritional transition from consuming healthy to less healthful diets. In Uganda, broad based interventions that have been instituted such as support policies and population-wide initiatives that include nutrition labeling, food taxes, and social marketing campaigns are yet to yield results.

Purpose and problem statement

The study was a way of assessing the determinants of childhood overweight and obesity among pupils attending schools. This was mainly because fewer interventions in overweight and obesity would predispose pupils to many diseases that would render the tomorrow generation unproductive.

Methodology

The study utilized a cross-sectional, descriptive study design in which questionnaires and interviews were administered to 409 pupils in Kampala city and Mukono district alongside their head teachers as key informants. Quantitative and qualitative data was collected and analyzed. WHO Anthroplus software was used to calculate the Z-scores for the pupils. The Pearson's chi-square was used to establish factors influencing overweight and obesity amongst the children. Qualitative data was analyzed using a narrative approach.

Findings and recommendations

The study found out that the prevalence of overweight and obesity stands at 4.1% and 3.8%, respectively. It also established that behavioral factors like feeding habits in terms of the number of meals normally consumed per day and phyco-social factors do not significantly contribute to

the nutrition status in overweight and obesity. However, gender and age of the pupil, family economic status, the means of transport, family history of obesity, physical activities alongside the type of school are contributing factors to overweight and obesity in pupils.

Based on the study findings, we recommend among others, that government and non-government organizations leverage items of knowledge through effortless sensitization to both the parents and pupils on the implications of overweight and obesity. This would help to develop concerted efforts towards averting the growing trends of overweight and obesity among primary pupils attending schools. Also, the ministry of education and sports through its examining body the Uganda National Examinations Board should find ways of extending some marks to children involved in school physical activities.

CHAPTER I

INTRODUCTION

Background to the study

The current study determined the prevalence and risk factors of overweight and obesity among primary four to primary seven pupils in selected schools of Mukono district and KCCA in Uganda. This chapter presents the background to the study, the statement of the problem, the general and specific objectives, the research questions, the significance of the study and its conceptual framework.

Globally, Childhood obesity prevalence is steadily rising and because of its many adverse effects, it is recognized as a serious public health concern of this century. It is a major public health problem that results in serious social, physical and psychological damage (da Mota et al., 2007). In 1990, the worldwide prevalence of childhood overweight and obesity was 4.2% and increased to 6.7% in 2010, respectively and is expected to reach 9.1% or 60 million in 2020. In 2010, 43 million children of whom 35 million are from developing countries were estimated to be overweight and obese and 92 million were at risk of overweight (de Onis, 2010). The prevalence of overweight and obesity continues to remain low in many low income countries including Uganda, but it seems to be changing in some middle income countries. The prevalence of childhood overweight and obesity is rising to alarming levels in both developing and developed countries (Kosti et al., 2006).

In Africa, the estimated prevalence of childhood overweight and obesity in 2010 was 8.5% and is expected to reach 12.7% in 2020. The prevalence of childhood overweight and obesity is lower in Asia (4.9% in 2010) than in Africa but the number of affected children (18 million) is higher in Asia (de Onis, 2010). Also in Africa, despite a high prevalence of under nutrition, the

prevalence of overweight is increasing at an alarming rate. The prevalence of overweight and obesity is also rapidly increasing among children. It is estimated that by 2015, 35 million children in European Union countries will be overweight including 9.4 million who will be obese (Kosti et al., 2008). In arabian oil-rich countries, overweight and obesity among children and adolescents have reached epidemic levels at 23.1-30.7% (El-Bayoumy et al, 2009).

Presently, there is limited data in Uganda on the magnitude of overweight and obesity and their associated risk factors among primary school children, and this represents a significant gap in knowledge. However, a study conducted by Baalwa (2010) in the areas of Kamuli and Kampala districts to determine the prevalence of overweight and obesity in young adults in Uganda found that the prevalence of obesity and overweight was 2.3% and 10.4%, respectively. The prevalence of obesity was 4.4% in Kampala and 0.0% in Kamuli while the prevalence of overweight was 10.2% and 10.6% in Kampala and Kamuli respectively. This is evidence for the existence of the problem in Uganda. Childhood obesity is caused by complex and multifaceted factors. According to Daniels et al (2009), obese children are likely to be obese adults and have an increased and long-term risk for breast, colon, and kidney cancers, stroke, cardiovascular disease, hypertension, diabetes, gall bladder disease and musculoskeletal disorders.

The increasing tendency of childhood overweight and obesity calls for accelerating programs that target primary prevention in developing countries, a practice that requires local data on the magnitude of the problem and the associated risk factors. To this effect, this study assessed the determinants of childhood overweight and obesity among primary four to seven pupils attending school in Mukono district and Kampala city in Uganda. It will contribute valuable information to the existing knowledge gap in this area with the knowledge that if unattended to, childhood obesity will affect the future generations rendering them unproductive. This will include

describing socio-economic and demographic characteristics of overweight and obese children. Finally, factors influencing development of overweight and obesity in children were determined in the study.

1.2 Statement of the Problem

According to WHO, childhood obesity is one of the most serious public health challenges of the 21st century, with the worldwide prevalence of childhood overweight and obesity increasing from 4.2% in 1990 to 6.7% in 2010 (de Onis, 2010). This is mainly attributed to the global nutritional transition from consuming healthy to less healthful diets. Obesity is known to increase the risk of many diseases and complications. Unfortunately, there has been no country wide research on childhood overweight and obesity in Uganda to establish its associated risk factors. The available data remains in-definitive and represents a knowledge gap in this area. Interventions have been put in place to address the problem. These include broad based interventions such as structures to support policies for example, leadership, and population-wide interventions such as nutrition labeling, food taxes, and social marketing campaigns. However, these interventions are yet to produce results due to poor policy implementation.

Unlike Mukono, Kampala city presents a major risk for children because of its characteristic environment mainly urbanized in nature with many eating places such as restaurants and hotels that offer junk foods and there is hardly any space to carry out physical activity. According to Advocates Coalition for Development and Environment (ACODE), though mainly rural, Mukono district has had increased demand for education since 2010, with schools admitting more children. This affects the nutritional status of the children thus their BMI. Schools are claiming more land to be able to accommodate more children leaving no space for physical

activity and opt for unhealthy foods that are often cheap and readily available in order to feed all children leading to various forms of malnutrition including obesity.

Knowing that if unattended to, childhood overweight and obesity would increase the risk of many diseases and complications that would affect the productivity potential of the next generation and even that of the country; this study set out to provide information and recommendations regarding childhood overweight and obesity, and their risk factors in Uganda.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this study was to assess the determinants of childhood overweight and obesity among primary four to seven pupils attending schools in Mukono and Kampala.

1.3.2 Specific objectives

1. To determine the prevalence of overweight and obesity among primary four to seven pupils attending schools in Mukono district and Kampala city.
2. To describe the demographic characteristics of primary four to primary seven pupils who are overweight and obese in Mukono district and Kampala city.
3. To describe the socio-economic characteristics of parents / guardians of children who are overweight and obese in Mukono district and Kampala city.
4. To assess factors influencing development of overweight and obesity among these children in Mukono district and Kampala city.

1.4 Research questions

1. What is the prevalence of overweight and obesity among primary four to seven pupils attending schools in Mukono and Kampala city?

2. What are the demographic characteristics of primary four to primary seven pupils who are overweight and obese in Mukono district and Kampala city?

3. What are the socio-economic characteristics of parents / guardians of children who are overweight and obese in Mukono district and Kampala city?

4. What factors influence development of overweight and obesity among these children in Mukono district and Kampala city?

1.5 Significance of the Study

A rise in childhood overweight and obesity increases the risk of many diseases and complications that will affect the productivity potential of the next generation and even that of the country if unattended to. This calls for accelerating programs that target primary prevention in developing countries such as Uganda, a practice that requires local data on the magnitude of the problem and the associated risk factors. As a contribution to closing the existing knowledge gap in this area particularly among primary school pupils, this study provides information and recommendations regarding childhood overweight and obesity, and the determinants in Uganda.

School administrators; this study was meant to enable them gain better insight on the health situation of the pupils enrolled to their schools, which in turn help them refine and reinforce school guidelines on feeding and physical activities.

Obese children; being one of the reasons for this study, pupils would be assured of their safety, improved care and management of the condition as on site health talks were conducted to educate overweight and obese children on how to live healthy and achieve healthy weight.

Chronic disease researchers; this study was meant to act as an information source and guideline for other researches especially in the field of childhood overweight and obesity.

Government and Educators; this study was meant to provide information for interventions that can be used in teaching on the subject of obesity among primary school children.

Mukono district and Kampala city; information gathered from this study will be shared and used to improve health indicators so that no more funds will be wasted by the authorities to treat preventable diseases such as NCDs that are often as a result of increased body weight.

1.6 Conceptual framework

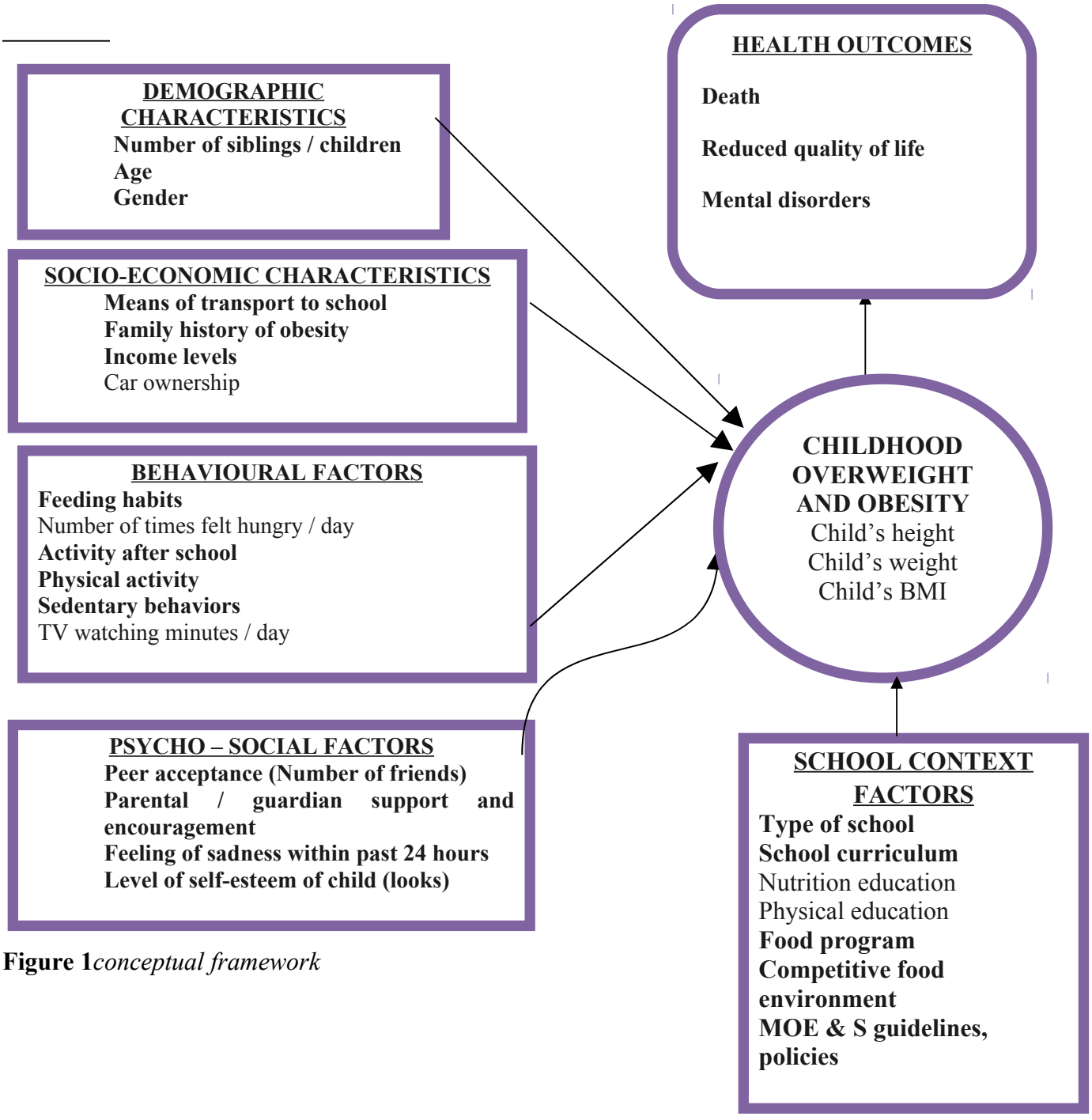


Figure 1*conceptual framework*

CHAPTER II

LITERATURE REVIEW

2.0 Introduction

The rates of obesity are rising rapidly across the world (Mendis et al, 2011). This chapter reviews the available literature concerning the prevalence of childhood overweight and obesity, the demographic and socio-economic characteristics of overweight and obese children, and factors (behavioral, psycho-social, and school context) influencing development of overweight and obesity among these children. The literature review highlights gaps or issues that have informed the decisions made in this research study.

2.1 Overview of childhood overweight and obesity

Human health has been significantly threatened by Malnutrition. The world's double burden of malnutrition includes both under nutrition and overweight (WHO, 2013). The growing rates of overweight and obesity worldwide are linked to a rise in chronic diseases that are difficult to treat in places with already overburdened health systems. There is a transition happening in Uganda, characterized by the increasing presence of overweight and obesity among adults. In particular, Southwestern Uganda is faced by the double burden of malnutrition, where over nutrition exists with under nutrition (FANTA-2, 2010). Obesity is a health condition in which excess body fat has accumulated to an extent that it affects the health negatively. Obesity is as a result of an overall positive energy balance maintained over time. This means that the metabolizable energy intake exceeds the energy expenditure for basal metabolic requirements, thermoregulation, physical activity, and growth (Kuteesa, 2010 and Daniels et al, 2009).

Obesity and overweight have negative psychological and health consequences in childhood; these effects are both short and long term in nature. The negative psychological outcomes include poor body image, low self-esteem, a risk of eating disorders, depressive symptoms, and behavior and learning problems. The negative health consequences of overweight or increased weight include; insulin resistance, type 2 diabetes, asthma, hypertension, high total and LDL cholesterol & triglyceride levels in the blood, low HDL cholesterol levels in the blood, sleep apnea, early puberty, orthopedic problems, and non-alcoholic steato-hepatitis (Nieman et al, 2012, the obesity society, 2010 and Daniels et al, 2009). The other effects may include; weight bias, bullying and experiences that make achieving good health difficult. Furthermore, obese children are likely to be obese adults and have an increased and long-term risk for breast, colon, and kidney cancers, stroke, cardiovascular disease, hypertension, diabetes, gall bladder disease and musculoskeletal disorders. A surgeon general in the US once suggested that obesity was second only to smoking as a preventable cause of death (Satcher, 2002 in Sharma et al, 2008).

Improving nutrition and physical activity levels are not the only solution to this problem (Vaidya, 2006 in Nieman et al., 2012). Health workers must identify and help families address the psychological factors that contribute to overweight and obesity. Stressed children are more prone to overeating. This stress may result into poor sleeping habits, fatigue and avoiding engagement in physical activity at school and at home. Parents play pivotal role in the management of childhood obesity. Parents have the role to be good role models, set limits (American academy of pediatrics, 2006), purchase healthy foods for family consumption, keep to healthy family routines, have effective time and money management skills, and ensure that family problems such as divorce do not cause trauma to their children. Preventing childhood has become a top priority in efforts to improve the nation's public health (Puhl et al., 2007). It is

important to approach this problem with an understanding of the social stigma that obese children face.

The WHO global strategy on dietary, physical activity and health recommends public health efforts that are broad, comprehensive and coordinated at national, regional, and local levels. Such efforts include; reducing unhealthy eating, reducing physical inactivity, raising awareness on the influence of diet and physical activity on health. Furthermore, these initiatives must be evidence based, multi-sectoral, multi-disciplinary and focus on life-course perspective (WHO, 2004). To prevent obesity, it was acknowledged that the environment is important by stating that major social and environmental changes have to be made to make healthier choices more accessible and preferable. Such environments should avoid nurturing over-eating and inactive lifestyles.

2.2 Causes of childhood overweight and obesity

According to the obesity society (2010), the risk factors for child hood overweight and obesity include; food choices, physical activity vs. sedentary activity, parental obesity, the eating patterns, parenting styles, diabetes during pregnancy, low birth weight, excessive weight gain during pregnancy, formula feeding, parental physical activity habits, and demographic factors such as age. Food is not the only cause of childhood obesity (Ireland, 2011). Childhood obesity is caused by complex and multifaceted factors because it has so many influences such as genetic, biological, environmental and psychosocial (Frank and Ling, 2010 in Vasquez et al, 2012). Some medications have been found to cause overweight and obesity. According to Mayo clinic (2012), there are so many factors that work in combination to increase a child's risk of becoming

overweight: diet, lack of exercise, family history and factors, psychological factors and socio-economic factors.

Having inadequate sleep is a known risk factor for Obesity (Ievers-Landis, 2008). Parent reported child sleep duration as significantly associated with the odds of obesity with an increase of 41% for each 1 hour reduction in sleep duration. Family socio-economic and demographic factors are linked to pediatric obesity (Zeller et al, 2009). According to Sharma et al (2008), the determinants of overweight and obesity are considered numerous and complex. These start early on in life with high birth weight, rapid growth in infancy, maternal behaviors such as maternal BMI, maternal smoking and lack of breast feeding. The modifiable determinants are family food environment and dietary behaviors that include; the consumption of unhealthy foods, dietary fat, initial nutritional preferences, portion sizes, snacking and number of family meals. The other factors are physical activity levels, screen time, psychological, social correlates, race, gender, socio-economic status and parental influence. The non-modifiable determinants of overweight and obesity are age, sex, ethnicity and genetics. Focus should be put on the determinants that are considered modifiable.

2.3 Assessment and classification of childhood overweight and obesity

According to Centers for Disease Control and Prevention (2013), BMI can be used to determine if a child is overweight or obese by comparing the calculated BMI with the CDC growth charts. Children with a BMI of or above 95% percentile for age and sex are considered obese (http://www.cdc.gov/growthcharts/). A person's body mass index (BMI) determined in terms of weight and height can be used to measure obesity. The assessment of obesity for both adults and children differs. This is because the children are growing and the growth patterns of children

differ by age (Barbara, 2009). Since the growth pattern for boys is different from the growth pattern for girls, pattern of growth is dependent upon the sex of the child. BMI in children is determined using carefully measured height and weight. Growth charts or graphs are used to find each child's BMI percentile-for-age by plotting the BMI value versus age for that child's sex. The birth date of the child can be used to calculate the age of the child in months which can be used on a BMI chart (CDC, 2000). Children BMI for age percentile, age 2-19 years was classified as; underweight $\leq 5^{th}$ percentile, healthy weight 5^{th} to the 85^{th} percentile, overweight 85^{th} to the 95^{th} percentile and obese $\geq 95^{th}$ percentile (Benjamin, 2010).

According to Shamir et al (2013), the WHO anthroplus software for assessing growth and development of children allows one to analyse4 growth data using the WHO child growth standards for 0 to 60 months children and the WHO 2007 growth references for 5 to 19 years especially for public health uses.

In a research setting, several tools have been developed to assess dietary intake. They include; standardized diet history, weighted food records, semi-quantitative food records. These are reliable but not feasible in the primary care setting. More feasible but less reliable methods include informal diet history and standardized or informal food-frequency questionnaires (Daniels et al, 2009). In studies measuring physical activity, the methods of assessment include; heart rate monitoring, accelerometers, doubly labeled water and calorimetry, pedometers, informal physical activity questionnaires, and physical and sedentary diaries.

According to the Council on sports medicine and fitness and council on school health (2006), BMI is most convenient and can be calculated according to formulas; weight (kg) / height (m^2) or weight (kg) / height (cm) / height (cm) x 10,000 or weight (ib) / height (in) x 703 (Lobstein et al, 2004).

2.4 Prevalence of childhood overweight and obesity

According to the World Health Organization (WHO) in 2010, 43 million children of which 35 million were in developing countries were estimated to be overweight and obese. Also, 92 million children were found to be at risk of overweight and the prevalence of childhood overweight and obesity had increased from 4.2% in 1990 to 6.7% in 2010, world widely. This trend is expected to reach 9.1% (60 million) in 2020. In 2010, the prevalence of childhood overweight and obesity in Africa was estimated to be 8.5% and is expected to reach 12.7% in 2020. Furthermore, it was determined that the prevalence of overweight and obesity was lower in Asia than in Africa at 4.9% in 2010.

The number of affected children estimated at 18 million was higher in Asia than in Africa (http://www.who.int/nutgrowthdb/publications/overweight_obesity/en/index.html). There is an increase in the prevalence of obesity, particularly in developed countries. This is partially explained by the societal changes that promote both consumption of energy-dense foods and unhealthy eating patterns (CDC, 2011). According to CDC in Ireland, 2011, an estimate of almost 20% of all children aged 6 to 11 are obese. Overall, 10% of the school-aged children in the world were overweight (IOTF, 2004).

According to the Global School-Based Student Health Survey 2003: Uganda Country Report, 5.3% of Ugandan school children aged 13-15 years (2% were male and 12% were female) were identified as at risk of overweight (BMI> 25 or more than 85 percent of weight for age and sex). The obesity levels were estimated to be around 0.7% (WHO, 2003). However a study conducted by Baalwa (2010) in the areas of Kamuli and Kampala to determine the prevalence of overweight and obesity in young adults in Uganda found that the overall prevalence of obesity and overweight was 2.3% and 10.4%, respectively. The prevalence of obesity was 4.4% in

Kampala and 0% in Kamuli while the prevalence of overweight was 10.2% and 10.6% in Kampala and Kamuli, respectively.

In a study conducted to determine the prevalence of overweight and obesity among school children aged 6-12 years in Dodoma and Kinondoni municipalities in Tanzania, the prevalence of obesity among children aged 6–9 years in Dodoma and Kinondoni were 5.6% and 6.3% respectively. Also, overweight in children aged 6–9 years in Dodoma was 4.2% and 8.6% in Kinondoni municipalities. For children aged between 10–12 years, 3.9% in Dodoma were obese compared to 5.8% of their counterparts in Kinondoni municipality (Mosha et al, 2010).

In a study carried out by Juliusson et al (2010) to estimate the prevalence of childhood overweight and overweight and to identify socio-demographic risk factors in 6386 Norwegian children aged 2-19 years, found that the overall prevalence of overweight and obesity was 13.8% (13.2% in boys and 14.5% in girls). There was a higher prevalence in primary school children aged 6-11 years (17%). In the US, the occurrence of overweight in children has tripled in the past 30 years with overweight estimated at 1 in 5 children. Prevalence increase is being seen in younger children including preschoolers and is especially higher among certain populations such as Hispanic, African American, Mexican Americans, and Native Americans. More children are becoming overweight and those that are already overweight are becoming heavier. This is the reason as to why childhood overweight is regarded as the most common prevalent nutritional disorder of the children and adolescents in the US (The obesity society, 2010).

To investigate the socio-demographic, ethnic and dietary factors associated with the development of childhood obesity in 276 school children aged 8-12 years in Thessaloniki, Northern Greece, it was found that 26.1 % of the boys and 22.4% of the girls were overweight. 11.6% of the boys and 10.9% of girls were obese (Hassapidou et al, 2009). The overweight and obesity rate was

lower in immigrants at 10% and 3.3% compared to 25.8% and 12.7% in Greeks. Dupuy et al (2011), in a study to investigate the socio-demographic and lifestyle factors associated with overweight of 11-15 year olds in France found that the prevalence of overweight was 10.4%; with 11.8% in boys and 9.0% in girls. There was an association between gender, socio-demographic and lifestyle factors. There was no association with age, smoking and computer use. South Africa has not been spared by the worldwide increase in the prevalence of childhood overweight and obesity identified as a major threat to children's health.

In order to determine the prevalence and socio-demographic risk factors associated with childhood overweight and obesity in the Stellenbosch area, Western Cape Province, 638 children aged 6- 13 years attending selected primary schools were weighed and measured to calculate body mass index (BMI) using International Obesity Task Force (IOTF) guidelines. The results of this study indicated that the prevalence of overweight and obesity in the sample of primary school children was 13% of which 9% were overweight and 4% obese (Petronella, 2011). Maternal employment hours, family characteristics like number of children, eating behavior and time spent doing sport were significantly associated with overweight and obesity.

According to Kosti et al (2006), obesity affects both developing and developed countries and its prevalence has reached alarming levels in all socio-economic groups irrespective of the sex, age and ethnicity. The prevalence of overweight in Africa and Asia averages well below 10% and in America and Europe above 20%. Also, 25% of the children in USA are overweight and 11% are obese (Dehghan et al, 2005). Wang et al (2002) determined the trends of overweight and underweight in young persons aged 6-18 years from four countries including USA, Brazil, China, and Russia. Using nationally representative data, for Brazil the prevalence of 4.1% and 13.9% was realized in 1975 and 1997 respectively. For China it was 6.4% and 7.7% in 1991 and

1997. It was 15.4% and 25.6% in the US in 1971-1974 and 1988-1994 respectively. For Russia in 1992 and 1998, it was 15.6 % to 9.0%. Overall, the annual rates of change in the overweight prevalence were 0.5% for Brazil, 0.2% for China, -1.1% for Russia, and 0.6% for USA. The prevalence of overweight and obesity in the Eastern Mediterranean Region has been recorded at 3%–9% among preschool children and 12%-25% among school children (Musaiger, 2004). A study to determine the prevalence of overweight and obesity among 1355 adolescents aged 13-16 years in Irbid governorate, Jordan, found that it was 24.4% (15.7% overweight and 8.7 % obese). It was higher among female students, those who lived in urban areas and those with working parents (Abu Baker et al, 2010).

According to El-Bayoumy et al (2009), the prevalence of obesity and overweight among 5402 intermediate school Kuwaiti children aged 10 to 14 years was 30.7% and 14.6%, respectively. Children were considered as obese if they had a BMI value higher than 95 percentile and overweight if percentile was between 85 and 94 percent. The overall prevalence of overweight and obesity among males was 29.3% and 14.9%, respectively and among females was 32.1% and 14.2%, respectively. In a study to determine the prevalence of overweight and obesity among 460 primary school children aged 8–11 years in Aydin, Turkey (Alişir et al, 2011), the prevalence of overweight and obesity was found to be 12.8% and 13.7%, respectively. Data from 2 national health and nutrition examination surveys (1976 to 1980 and 2003 to 2004) in the US show that the prevalence of overweight among children 2-5 years of age increased from 5% to 13.9%, those aged 6-11years 6.5% to 18.8%, and for those 12 to 19 years of age, it increased from 5.0% to 17.4% (Daniels et al, 2009).

2.5.0 Demographic characteristics of overweight and obese children

Sex, age, genetics and ethnicity are the non-modifiable determinants of childhood and adolescent obesity (Sharma et al, 2008). This section reviews the demographic characteristics of overweight and obese children including age, sex and number of siblings.

2.5.1 Number of siblings

In a study to determine the prevalence and socio-demographic risk factors associated with childhood overweight and obesity in the Stellenbosch area, Western Cape Province, 638 children aged 6- 13 years attending primary schools were studied. The results indicated that factors including maternal employment hours, family characteristics e.g. number of children in the household, were significantly associated with overweight or obesity. These results propose that the number of children in the household is an important predictor variable for childhood overweight and obesity (Petronella, 2011). There is a higher incidence of obesity among children without siblings for reasons still unknown (Chen et al, 2010). Children from single mother families especially with no siblings are at higher risk or obesity than children living with 2 parents and having siblings. Children with siblings have a lower BMI and are less likely to be obese than children without siblings. A study aimed at investigating obesity in children and young adults in regard to differences in family size and birth order; found that only-children had significantly higher odds of obesity both in childhood and in young adulthood compared with their colleagues with siblings. No association was found between first born status and obesity (Haugaard et al, 2013). The odds ratio of last born children being obese was significantly increased in childhood. Being an only child or last born child was associated with obesity.

A study comprising of 460 primary school children aged 8-11 years was carried out to determine the prevalence of overweight and obesity and their correlation with socio-demographic characteristics in Aydin, Turkey (Alışır et al, 2011). The study determined that having a family with four or fewer members increased the risk of overweight and obesity. The other finding was that a mother's education level of secondary school or less decreased the risk of overweight and obesity of children. It was also determined that the greater the mother's and father's BMI, the more marked was the children's risk of becoming overweight.

According to Juliusson et al (2010), the significant socio-demographic risk factors in the development of overweight and obesity in Norwegian children were fewer siblings and a low level of parental education. This study confirmed the effect of number of siblings and parental education on the prevalence of overweight and obesity in children. The factors that did not affect the risk of being overweight were parental employment status and living in a single / two-parent family.

2.5.2 Age and Gender

In another study to determine the prevalence and socio-demographic risk factors in Norwegian children, there was an increased risk in the children aged 6-11 years and the risk was significantly different in boys and girls. This study confirmed the effect of age and sex on the prevalence of overweight and obesity in children (Juliusson, 2010). There was a positive relationship found between the age groups and sex, with an additional risk for being overweight or obese in girls compared with boys in the youngest age group. According to the Global School-Based Student Health Survey 2003: Uganda Country Report, the percentage of schoolchildren

who engaged in a physical activity in the week before the survey was low in both boys and girls at 14% and 16% respectively (WHO, 2003).

2.6.0 Socio-economic characteristics of overweight and obese children

In 2006 more than 41 of the obesity cases were linked to the growth of obesity when a favorable environment was present (Poirier et al, 2006). This section describes the socio-eco9nomic characteristics of overweight and obese children including family history of obesity and income levels indicated by parental / guardian ownership of a vehicle.

2.6.1 Income levels; Vehicle ownership

Due to economic development and rapid urbanization, energy expenditure has fallen greatly. These have also contributed to a shift from active to sedentary occupations, sedentary leisure options, and greater use of motorized transport and less activity in daily increased chores (Mendis et al, 2011). In industrialized countries, data has suggested that there is excess weight gain in children belonging to the lower income families (American Academy of Pediatrics, 2003). These families face numerous barriers that include; food insecurity, unsafe places for physical activity, and the lack of consistent access to healthful food choices especially fruits and vegetables. Children that come from economically disadvantaged homes tend to fall into unhealthy habits and are more likely to become overweight. These habits are characterized by physical inactivity and poor nutrition (Singh et al, 2008 in Nieman et al, 2012).

Alaimo et al (2001) determined the association between family income, food insufficiency, and being overweight in US children aged 2 to 7 and 8 to 16 years. The results from the study indicated that children in families with low income were more likely to become overweight than

in families with high income. Goodman et al (2003) characterized the association between socioeconomic status (SES) and obesity of 1491 black and white adolescents attending public school in Ohio. He found that there were no sex differences in SES and that black students were more likely to come from families with less well-educated parents and lower incomes. Black girls had the highest BMI. On further analysis, it was revealed that parent education, household income was associated with overweight.

2.6.2 Family history of obesity

In a study to investigate the socio-demographic, ethnic and dietary factors associated with the development of childhood obesity among 276 children, aged 8-12 years in Thessaloniki, Northern Greece, it was found that there was a positive relationship between parental obesity and childhood obesity. Also, obese children received less pocket money compared to their non-obese counterparts (Hassapidou, 2009). It is reported that obesity predominates in poorer adolescent females and is associated with higher socio-economic status in early childhood.

The relationship between parental and childhood obesity was determined (Kumar et al, 2010). The results revealed that parental history of obesity was present for 32.7% of obese children. 25.2 times more chances of developing obesity were realized for children with parental history of obesity. Boys had 6.2 times more chances of developing obesity if the father was obese compared to girls with 40.1 times. Additionally, mother's obesity status influenced 23.7 % of the boys and only 16 % of the girls. Parental obesity holds strong predictive power for the development and persistence of obesity in childhood (Zeller et al, 2009).

2.7.0 Behavioral factors associated with overweight and obesity in children

This section reviews the behavioral factors associated with overweight and obesity in children including the feeding habits like the number of times the pupils feel hungry in a day, activities after school, physical activity and sedentary behaviors such as TV watching.

2.7.1 Feeding habits

According to Kuteesa (2010), dieting behaviors, breakfast consumption, and fast food consumption from convenient stores are very predictive of obesity in children as whole. A study was carried out to determine the socio-demographic, ethnic and dietary factors associated with the development of childhood obesity (Hassapidou et al, 2009). 276 children aged 8-12 years were involved form seven schools in Thessaloniki, Northern Greece. Procedures included anthropometric measurements, assessment of dietary intake and physical activity. Lower rates of overweight and obesity were found in immigrant children compared to Greeks. This was followed with the finding that daily energy and carbohydrate intakes were higher in immigrants compared to Greeks. This was also true or physical exercise (6.38 h/w vs. 4.14 h/w). In addition, immigrants consumed more bread and cereals compared to Greeks. The BMI values were lower in immigrants. There was no difference between the two groups in TV viewing. It was concluded that in planning interventions, food intake and physical activity patterns be considered.

Ludwig et al (2001) examined the prevalence of obesity in relation to the consumption of sugar-sweetened drinks among 548 school children aged 11 years in Massachusetts. BMI and frequency of obesity increased for each additional serving of sugar-sweetened drink consumed after adjusting for anthropometric, demographic, dietary, and lifestyle factors. According to Shields, M., (2005), children and adolescents who eat fruits and vegetables five or more times a

day are less likely to be overweight or obese than those that consume fruit and vegetables less frequently. Overweight and obesity tends to rise in children 6-11 years and adolescents 12 to 17 years as time spent watching TV, playing video games or using computer increases.

2.7.2 Physical activity

In a study to determine the independent and joint association between several socio-economic, behavioral characteristics, physical activity (Singh et al, 2008) and inactivity prevalence among 68, 288 US children aged 6-17 years, the children who watched TV ≥3 h/day had a 60% chance of physical inactivity and 20% odds of physical activity than those that experienced ≥ 5 nights of adequate sleep during the week.

The development of overweight and obesity is due to energy balance related behaviors particularly a combination of increased fat intake, decreased physical activity and increased screen time. Physically active children may gain both immediate and long term positive effects (Ekelund et al, 2004 and Hartmann et al, 2010 in Vasquez et al, 2012). Restaurant food, sweetened beverages, large portion sizes, and frequency of meals are named as the frequent contributors to excess energy intake. Physical activity is considered to be a protective factor against the development of obesity (Sharma et al, 2008).

There are so many ways children can increase their physical activity during school and non-school hours. These include recreational activities, personal fitness activities, unorganized outdoor play, organized sports and active transportation. It is recommended by CDC that children should at least accumulate 60 minutes of daily moderate to vigorous physical activity. In the US, the national association of state boards of education recommends 150 minutes / week and 225 minutes / week of physical education for elementary students and middle or high school students respectively (Lobstein et al, 2004). Implementation of these guidelines is futile. For

example, it was found that among 814 students in the US, the mean duration of PE was 33 minutes twice a week and only 25 minutes per week at a moderate to vigorous intensity level. Elementary school–aged children between 6–9 years should be encouraged by their parents to walk, dance, or jump rope. Organized sports such as soccer, baseball may be initiated, and should have flexible rules and focus on enjoyment rather than competition. For middle school–aged children between 10–12 years well supervised weight training may be initiated. Also, the 1991-2003 youth risk behavior surveillance data demonstrated the fact that the percentage of high school students enrolled in PE class was constant at 48.9%–55.7%, and there was a decrease in the percentage of students who attended PE daily from 41.6% in 1991 to 25.4% in 1995. The percentage remained stable thereafter at 25.4% to 28.4%.

According to Tremblay et al (2003), studies have found physical activity to be a protective factor against obesity, but some studies have found no such association. In some studies, there was no association of physical activity and overweight and obesity at ages 6 to 11 but in ages 12 to 17 years. These associations were significant but only for boys. The percentage prevalence of obesity was more likely to be high in sedentary boys than in active boys (16% vs. 9%). On the contrary, a big proportion of active and moderately active boys were found to be overweight but not obese compared with sedentary boys.

Physical activity pattern and its hypothesized psychosocial and environmental determinants in 54 obese and 133 non obese US children were compared (Trost et al, 2001). The obese children engaged in low levels of moderate and vigorous physical activity compared to their non-obese counterparts. Also, the obese children were less likely to report their male guardian as physically active. The prevalence of physical activity varies considerably with socio-economic and behavioral characteristics, with older, female, non-English speaking children and those with

lower socio-economic status having higher inactivity and lower activity levels (Singh et al, 2008).

In Hong Kong, 18 obese children aged 6-17 years and 18 non-obese children aged 6-17 years were investigated to determine their total daily energy expenditure and physical activity pattern (Yu et al, 2002). The obese children had significantly lower total daily energy expenditure by 22% than that of non-obese children. The obese children had 51% more time in sedentary activity, spent 12% less time asleep and 30% less time physically active. Page et al (2005) examined the levels and patterns of physical activity in obese and non-obese children in United Kingdom. Eleven (11) of the 65 girls and fourteen (14) of the 68 boys were classified as obese. The obese children had less physical activity and spent less time in physical activity of moderate / vigorous intensity than their non-obese counterparts. The time patterns of activity indicated that obese children had less activity than non-obese children at times when there was a free choice for activity particularly outside of school time.

2.7.3 Sedentary behaviors

Lioret et al (2007) examined the prevalence of overweight and obesity and how physical activity and sedentary behavior were associated with socio-economic status while taking into account total energy intake in French children aged 3-14 years. It was found that 15.2% of the children were overweight and obese. Overweight was negatively correlated with socio-economic status in children over 6 years of age and leisure-time physical activity among 3-5year old children. Sedentary behavior was positively related to overweight in childhood.

According to Fernandes et al (2011), children that met the National Association of Sport and Physical Education (NASPE) recommended time for PE had a 0.74 unit decrease in BMI

percentile. This was determined among first to fifth grade 8246 USA children with the aim of assessing the role of physical activity programs and recess. 7% of the first graders met the recommended time for PE and boys had a significant decrease in body mass than the girls.

In a WHO-Collaborative Health Behavior in School-aged Children (HBSC) study, Dupuy et al (2011) collected data from 7154 school-aged children (3558 boys, 3596 girls) aged 11-15 years in France. The relationship of overweight with several socio-demographic and lifestyle factors was determined using logistic regression models. There was an association between these factors and overweight. The adjusted odds ratios for the association were: 1.80 for low family affluence; 0.73 for eating breakfast daily; 0.69 for moderate to vigorous physical activity; and 0.71 for vigorous physical activity. There was a significant relationship between age and gender as well as TV watching. For the boys, there was no relationship between age / TV watching and overweight. However, for girls, there was a negative correlation between age and overweight but a positive correlation between TV watching and overweight. Factors not associated with overweight included fruit and vegetable intake, smoking, alcohol consumption, and computer / video games use.

In relation to TV watching, Vandewater et al (2004) showed that overweight children spent more time in sedentary activities, such as TV watching and playing video games than those with underweight. Dennison et al (2002) determined the relationship between TV watching and adiposity in low income children. The results showed that black children viewed the TV more times than the white children and this trend increased with the child's age. About 40% of the studied children had a TV set in their bedroom. These kids were more likely to be overweight and spent more time watching TV than their counterparts with no TV in their bedrooms.

They maintain a sedentary lifestyle often choosing to watch TV and play video games (Ireland, 2011). The child is afraid to spend time with his / her peers causing limited physical activity opportunities. He / she will not join a sports team. In addition to this, being overweight encourages bullying from other children. As a result, the child shies away from sports and other physical activities. A parent has an influence on a child's weight gain as he / she will do what their parent does. Also, parents tend to use food as a reward. Teasing is a problem for overweight and obese children regardless of racial or ethnic group (Washington, 2011).

2.8.0 Psycho-social factors associated with overweight and obesity in children

According to the obesity society (2010), the negative psychological and health consequences in childhood obesity include; depressive symptoms, poor body image, low self-esteem, risk for eating disorders, and behavioral and learning problems. This section reviews the psycho-social factors associated with overweight and obesity in children including peer acceptance parental support, feeling of sadness and level of self-esteem.

The relationship between obesity and psychological problems seems to be two-fold, in that clinical psychological problems might lead to weight gain but also, obesity may lead to psychological problems. The common implicated external psychological factors are impulsivity and attention-deficit hyperactivity disorder and the internal factors are depression and anxiety. The other implicated psychological factors are behavioral problems and uncontrolled eating behavior (Puder et al, 2010).

More teasing and relational victimization are some of the concerns experienced by overweight children than their normal weight colleagues (Neumark-Szt-ainer, 2002 in Daniels, 2009). Lower self-esteem as well as depression and anxiety have also been associated with body dissatisfaction

and shape concerns in overweight children. According to the American academy of child adolescent psychiatry, low self-esteem is one of the risk factors for weight gain. When a child feels bad about their looks, they may avoid taking the necessary steps required for them to be healthy.

The psycho-social influences on child hood obesity may include personality, coping styles, perceived barriers, interpersonal skills, parental psychological functioning and body image (Stouffer et al, 1999). The main challenges include; lack of parental involvement, having limited access to after school activities and limited financial resources. Poor nutritional habits and inadequate physical activity may be direct results of psycho-social contributors to overweight and obesity. The important psycho-social contributors to obesity include stressors that cause emotional eating such as; being bullied, neglect suffering, lack of consistency and supervision, and maltreatment (Puhl et al, 2007 in Nieman et al, 2012).

2.9.0 School context factors associated with childhood overweight and obesity

In a study carried out to define physical education and school contextual factors relating to obesity among students in Texas, it was found that some of the school and policy factors that impacted on the students' fitness were: teachers' training, recess time, and availability of physical activity space (Zhu et al, 2010). To promote healthy eating behavior, a school food policy can help reduce the intake of sugar and fat in food. The other food policies would include the presence of food vending machines in schools, the consumption of packed food at school (Belderson, et al., 2003 and Whincup et al., 2005 in Vasquez et al, 2012). Other correlates to obesity include; limited access to recreational opportunities, parks and neighborhood playgrounds, the usual by-products of urbanization (Razani, 2010 in Nieman et al, 2012).

The significant determinants of childhood overweight in children and adolescents are type of school, the size of the municipality, province and gender (Moreno et al, 2004 in Sharma et al, 2008). In 2000, a school health policies and program study in the US looked at a nationally representative sample of private and public schools. It was found that only 8% of the elementary schools, 64% of middle schools, and 5.8% of high schools had existing Physical education requirements and provided daily PE classes for all grades for the entire year (Burgeson et al, 2000 in Lobstein et al, 2004). On school grounds, policies to regulate consumption of fast foods in children are directed towards control of access times, distribution points, and nutrition quality of competitive foods and beverages (Kuteesa, 2010).

There are three major Contextual factors existing at various levels. The factors at the individual or psychosocial level are one's beliefs, attitudes, values and expectations. The factors at the socio-environmental level are; interpersonal dynamics, role modeling, norms and support. These occur with families, among peers and within other community environments, especially schools. The physical environment factors include the access to and support for healthy eating, recreational physical activity, and active transportation. This can operate at home, school, and neighborhood environments (Lytle, 2009).

In a study to determine whether school vending machines were loaded with calories and fat in private and public schools of Minnesota, 18% of beverage items met the criteria for calories. The food products met the calorie criteria with 41%, 45% for fat criteria, and 22% for both the fat and calorie criteria. However, more food items met both criteria in public than private schools. In general, the study found that foods and beverages offered in vending machines are high in fat and calories. The public schools are providing healthier foods compared to private schools (Pasch et al, 2011).

2.10.0 Conclusion and Summary of gaps and issues that inform the proposed concept

The main conclusions, gaps and recommendations of this review that inform this study are summarized below:

a. The worldwide distribution and increased trends in the prevalence of childhood overweight and obesity suggest a real public health threat to this and future generations that creates tremendous health and social adversity. There is need for more research regarding this issue for better prevention and treatment strategies. Therefore, the current study is relevant to this cause.

b. The review has demonstrated the fact that children grow and develop in different contexts and thus childhood obesity is a dynamic process as it is as a result of interaction of various factors that include psychosocial and environmental. In addition, it is clearly shown that weight gain is a result of an imbalance between energy consumed and expended. A variety of factors have been cited as energy balance related behaviors including; fat intake, reduced physical activity, increased TV viewing, mediated by socio-economic factors. This study seeks to demonstrate how the various factors interact with overweight and obesity.

c. Research is needed to better understand the developmental trajectories of childhood overweight and obesity to improve prevention and treatment efforts. This research will demonstrate the role of moderators such as age, sex, socio-economic status, behavioral, school context, and psycho-social factors in the development of overweight and obesity.

d. It has been demonstrated in the literature review that the association between weight gain and psycho-social factors is in-definitive. There is need to explore the interrelatedness between psychological problems and childhood overweight and obesity. The relationship tends to go

both ways with psycho-social factors causing weight gain and also weight gain leading to psycho-social problems. This relationship will be explored further in this study.

e. To obtain reliable results, methods used to assess the prevalence overweight and obesity and associated factors must be feasible in terms of time, cost, quality and usefulness of the data collected. This is why in this study we shall use interviewer administered questionnaires to assess the various factors related to weight gain, take anthropometric measures to determine BMI, and carry out key informant interviews to obtain more information.

f. Finally, there is no much data regarding overweight and obesity in school going children in Uganda. Knowing that overweight and obesity increase the risk for several complications, this research will provide information, results and recommendations in an attempt to close this knowledge gap.

CHAPTER III

METHODOLOGY

3.0 Introduction

This chapter describes the study design, sources of data, study population, sample size calculation, study variables, data collection techniques and tools, plan for data analysis, quality control issues, data dissemination, ethical issues and limitations to the study.

3.1 Study design

A cross-sectional study design was used to assess the determinants of childhood overweight and obesity. This study design was chosen because it samples a population and makes measurement at a particular point in time. It is also relatively simple, practical and inexpensive to use. Both quantitative and qualitative approaches to data collection were used. This is because they supplement each other in that qualitative methods provide in depth explanations while the quantitative methods provide hard data needed to meet required objectives.

3.2 Sources of data

The primary sources of data included the primary pupils and heads of schools by use of interviews, questionnaires and taking anthropometric measurements. The secondary sources of data included school registers and Ministry of education and sports database.

3.3 Study population

The target population included P_4 to P_7 school pupils of Uganda. The study population included eligible primary four to seven pupils in the selected schools from the districts of Mukono and

Kampala. The sample included 422 primary four to seven pupils in selected schools whose guardians / parents consented for their children to participate in the study. Both private and public schools were included.

3.4 Inclusion and Exclusion criteria

Both male and female pupils attending selected schools and in classes primary four to seven, attending either day or boarding school were included in the study. Pupils with physical and mental impairment, those with chronic illnesses such as type-1 diabetes and those who were overweight or obese and already in weight management programs were excluded from the study.

3.5 Sample size calculation

The sample size was determined according to Fischer *et al*. (1965) formula in Mugenda and Mugenda (1999):

$$n = \frac{Z^2 . p . q}{d^2}$$

Where, n = the desired sample size,

Z = the standard normal deviation at 1.96 for a confidence limit of 95%,

p = for a conservative estimate of the sample size, p and q were taken as 0.5 based on Amin (2005). d = the permissible error at 0.05, and

q = the proportion with probability of not being overweight and obese at q = 1- p = 0.5.

$$n = \frac{(1.96^2) \times 0.5 \times (1-0.5)}{(0.05^2)}$$

$$n = 384$$

A sample size of 384 pupils was required to be 95% confident of the results obtained in the study. A 10% adjustment of the sample size was made to cater for the non-response rate [(10÷100) x 384 = 38.4] and as a result, 38 pupils were added to 384 to make a total sample size of 422 pupils.

3.6 Sampling procedures

In this study, an equal proportion of schools that's 3 in number were respectively chosen from Kampala and Mukono districts. This is mainly because according to the Uganda Education Statistical Abstract (2011), both districts had an approximately equal number of schools that's 466 and 338 respectively giving an estimated ratio of 1.38:1. The schools were chosen randomly using the lottery method where each school was allocated a number. The first 3 schools picked successively without replacement corresponding to the 3 numbers were chosen.

In each school, 17 pupils from each class out of the 45 recommended by the Ministry of Education and Sports were chosen using the same lottery technique. 17 were chosen on the assumption that if each class had 45 pupils then the sample size (422) will be distributed equally among the total number of classes (24). The simple random sampling method was used because it does not only give each school or participant an equal chance of being selected but also produces a more unbiased sample for generalization.

3.7 Study variables

The study variables included the dependent variable which in this case was the child nutrition status in terms of overweight and obesity indicated by the BMI and independent variables that's the risk factors associated with childhood overweight and obesity. For the case of dependent

variable while a z score less than -1.64 meant underweight, -1.64 to less 1.04 meant normal weight and 1.04 to less than 1.64 meant overweight, a Z score of 1.64 above meant a condition of obesity (Wang, 2012). The independent variables included demographic characteristics, socio-economic characteristics of parents, the psycho-social factors, behavioral factors, and school context factors.

3.8 Data collection techniques

Data collection techniques included survey technique that's administering questionnaires, key informant interviews and taking anthropometric measures.

3.8.1 Key Informant interviews

The purpose of key informant interviews was to obtain additional information on the factors associated with overweight and obesity among the pupils. The key informants were presumed to have firsthand knowledge on school community temporal trends in obesity and dietary habits / practices. The key informants were teachers from the study schools who accepted to participate in the study and had signed the informed consent form (appendix C(. Using a key informant interview guide encompassing questions related to the study, face to face interviews were held to obtain deeper insights. The questions were asked and notes were taken. The respondents were asked to sit down in a comfortable place at the site (school / office). Only the respondent and the researcher were present. The information written down was confidential and no one else except the people on the research team were given access to the information. No names were recorded, only the title and place. The questions were mainly related to the school community, and childhood overweight and obesity.

3.8.2 Administering questionnaires

Interviewer administered questionnaires were administered to the child participants. Permission to include children in the study was sought from the school administration. Children to participate were randomly selected from the classes. Since the children are minors, class teachers were asked to sign informed consent forms accepting the children in boarding school to participate and parents signed for the day scholars (refer to appendix A and B). Face to face interviews with the children were conducted by the researcher to fill the questionnaires. During the survey the interviewer explained any of the questions that seemed to be unclear. Questions were both open and closed ended types including the 'yes/no' questions, which offered a dichotomous choice; and the multiple choice questions, which offered several fixed alternatives. The questionnaire consisted of four (4) sections including; demographic characteristics, socio-economic factors, psycho-social factors, behavioral factors, and school context factors (refer to appendix D).

3.8.3 Taking anthropometric measures

The measures that were taken in this study included; height and weight. These were used to calculate BMI thus define childhood overweight and obesity in the study.

3.8.3.1 Height

A measuring tape with a fixable end was used to measure the height. This was fixed on the wall during measurement. During the measurement, children were asked to remove shoes and stand straight with arms by the sides, palms facing the thighs, heels together touching the vertical wall with the feet positioned at a 60^0 angle to each other, and the weight distributed equally between

both feet and the back of the head touching the meter. Height was measured and recorded to the nearest 0.1m.

3.8.3.2 Weight

This measure contributed to the assessment of the presence of excess body fat and normal growth. Weights were determined by using a digital weighing scale. Participants were asked to remove shoes and step on a zeroed digital weighing scale. The weight was measured and recorded to the nearest 0.1 kg.

3.8.3.3 Body Mass Index (BMI)

This is an anthropometry-based index of weight-for-height that is safe, non-invasive, simple, and inexpensive to obtain. The equation for BMI is weight / height squared, where weight is expressed in kilograms and height in meters.

3. 9 Data collection tools

The data collection tools included; interviewer administered questionnaires, key informant interview guides, & a checklist, weighing scale and stadiometer for anthropometric measures (refer to appendix D, E, F and G).

3.9.1 Key informant interview guides

A key informant interview guide was used for the head teachers and administrators as attached in appendix E.

3.9.2 Questionnaire

Interviewer administered questionnaires were used to collect information from the child participants as attached in appendix D.

3.9.3 Checklist, weighing scale and stadiometer for anthropometric measures

The tools used to take anthropometric measures included; a stadiometer for height in meters and a digital weighing balance for weight in kilograms as shown in appendix G.

3. 10 Plan for Data Analysis

Data processing and analysis started in the field, with checking for completeness of the data and performing quality control checks, while sorting the data by technique used and by group of informants. Child BMI changes with age therefore age and gender specific BMI z-scores were used in place of BMI. Child BMI was adjusted for age and sex using WHO Anthroplus system application. These were the growth charts as recommended by CDC. WHO Anthroplus was used to provide a BMI z-score based on child sex, height, weight and age using reference data from Centre for Disease Control and Prevention. Data analysis was completed using Statistical Package of Social Sciences (SPSS) system (version 19.0). Data collected was compiled, coded, and analyzed using SPSS were frequency distributions were computed. The Pearson Chi-square statistic was used to establish the associations between child nutrition / diet, physical activity and psychosocial variables and BMI z-scores. All variables with $P < 0.05$ level were considered significant. The SPSS software was used given its robust standard errors that account for the sampling design.

3.11 Quality Control issues

Quality control involves techniques used to ensure validity and reliability of the study findings.

Reliability: The techniques that were used to ensure that the results of the study are reproducible under similar procedures included; pre-testing that helped in identifying ambiguities in the instruments in the proposed study, standardization of procedures, The questions in the research instruments were as well reshuffled as to ensure that the respondents were not just guessing the responses. Also, a rough review of related literature was done.

Validity: The techniques used to maintain credibility, accuracy, and authenticity of the current study results included; triangulation were more than one data collection method and research assistants were used to overcome bias. Peer debriefing was done to probe possible bias. Rechecking of analysis of data and interpretation was done to ensure that the facts had not been distorted. For qualitative data, a thick description of information was obtained. Heterogeneity was obtained by creating a sampling frame that maximizes the sample inherent variation.

3.12 Data dissemination

The study results were compiled into this report together with the recommendations. Three copies of the report were submitted to the Institute of Health Policy and Management at International Health Sciences University (IHSU) for academic reasons and approval. Copies of the approved report were disseminated to the 6 schools that participated in the study. Also, conferences, publications and seminars will be used as other arenas for disseminating the results to stakeholders so that other interested people can learn from this study.

3.13 Ethical considerations

An approval to carry out the study was obtained from the International Health Sciences University (IHSU) research and ethical committee. However, further permission to conduct the study was obtained from the authorities of the randomly selected participating primary schools. For the participants below 18 years of age, the teachers were issued with written informed consent on their behalf. Teachers were given a full explanation about the relevance and purpose of the study. It is emphasized that obtaining written informed consent was voluntary and without pressure. No form of incentive was provided to respondents to share information or participate in the study especially before data collection. Harm to the participants was avoided by evading questions thought to create discomfort. To maintain confidentiality, respondents were not identified by name. Valid instruments were used.

3.14 Limitations to the study

The time allocated to the study was limited. This directly limited the time, that was taken in the field and writing the report. However, it should be noted that this never prevented the study from achieving its main objective which was to assess the determinants of childhood overweight and obesity among primary four to seven pupils attending schools in Mukono district and Kampala city. The current study only tells us on the existence of an influence based on only cross tables but doesn't come up clear on issues regarding to what extent and direction in terms of magnitude the factors such as the socio demographic, socioeconomic and psycho-physical among others result in overweight and obesity.

CHAPTER FOUR

THE STUDY RESULTS

4.0 Introduction

This section presents the findings following the critical analyses on the data collected. It in specific presents the findings related to the prevalence of overweight and obesity among primary four to seven pupils attending schools, describes the demographic characteristics of children who are overweight and obese, describes the socio-economic characteristics of children who are overweight and obese and assesses factors influencing development of overweight and obesity among primary four to seven pupils attending schools in Mukono district and Kampala city.

4.1 Biographic characteristics

The study captured information regarding the biography of the respondent pupils attending schools in Mukono district and Kampala city. The key background characteristics as explained below include the class distribution of the pupils, their gender and age.

The findings with regard to the background characteristics of the pupils is as presented below,

Table 1: The background characteristics of the respondent pupils

Background characteristics		**Frequency (n=409)**	**Percentage**
Gender	Male	160	39.1
	Female	234	57.2
	None response	15	3.7
Age	8-10	70	17.1
	11-13	220	53.8
	> 13	104	25.4
	None response	15	3.7
Religious Affiliation	Catholic	162	39.6
	C.O.U	91	22.2
	Muslim	61	14.9
	Seventh day Adventist	16	3.9
	Other (Pentecost, hindi, orthodox)	64	15.6
	None response	15	3.7
Number of siblings	None	14	3.4
	1-3	170	41.6
	4-6	163	39.9
	> 6	47	11.5
	None response	15	3.7
Total		409	100.0

Source: Primary

From the table, the study established that the majority 57.2% of the pupils attending schools in Mukono district and Kampala city were of the female sex. This could be due to the ever increasing call for gender balance that has forced parents to ensure that their female children study. Findings show that out of the 409 respondent pupils, 219 of them who constituted the majority 53.5% were between the ages of 11 to 13 years. The reason for the non –response was due to the fact that the pupils were busy with exams by the time of data collection.

4.2 The prevalence of overweight and obesity among primary four to seven pupils attending schools in Mukono district and Kampala city

In relation to the prevalence, taking into account the variations in the background characteristics of the pupils attending schools, the study established the prevalence of overweight and obesity amongst the pupils. The findings were as presented in the table below

Table 2: The nutrition status of pupils attending schools in Mukono district and Kampala city

Z-score category	Area				Nutrition status
	Kampala		Mukono		
	N	%	N	%	
< -1.64	89	22.7	99	25.3	Underweight
-1.64 -< 1.04	93	23.7	80	20.4	Normal weight
1.04 -< 1.64	14	3.6	2	0.5	Over weight
1.64 +	14	3.6	1	0.2	Obese
Total	**210**	**53.6**	**182**	**46.4**	

Source: Primary

The findings show that majority 22.7% and 25.3% of the pupils attending schools in Mukono district and Kampala city respectively are underweight. The findings also show that a good proportion of up to 23.7% in Kampala city and 20.4% in Mukono district possessed normal weight. Much as 3.6% of the children are respectively overweight or obese in Kampala, Mukono district had a lower proportion of children with overweight and obese. These constituted of 0.5% and 0.2% respectively.

Generally, while the prevalence of obesity amongst the pupils stands up to 3.6% and 0.2% in Kampala and Mukono respectively, the overall prevalence of obesity is 3.8% in both areas.

Table 3: The Analysis of the Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	p-value
Between Groups	8.668	1	8.668	16.580	0.000

Within Groups	203.893	390	.523		
Total	212.561	391			

Findings based on the analysis of the variance indicated that with significance value of 0.00, the prevalence of overweight and obesity amongst pupils differed from area to area. It also varied between schools within the different areas.

The study also compared the distribution of the pupils attending schools in Mukono district and Kampala city in terms of nutrition status with the WHO child growth standards. The findings in this regard are as presented in figure 1 below;

Figure 2: Nutrition status of the pupils in comparison to WHO growth standards

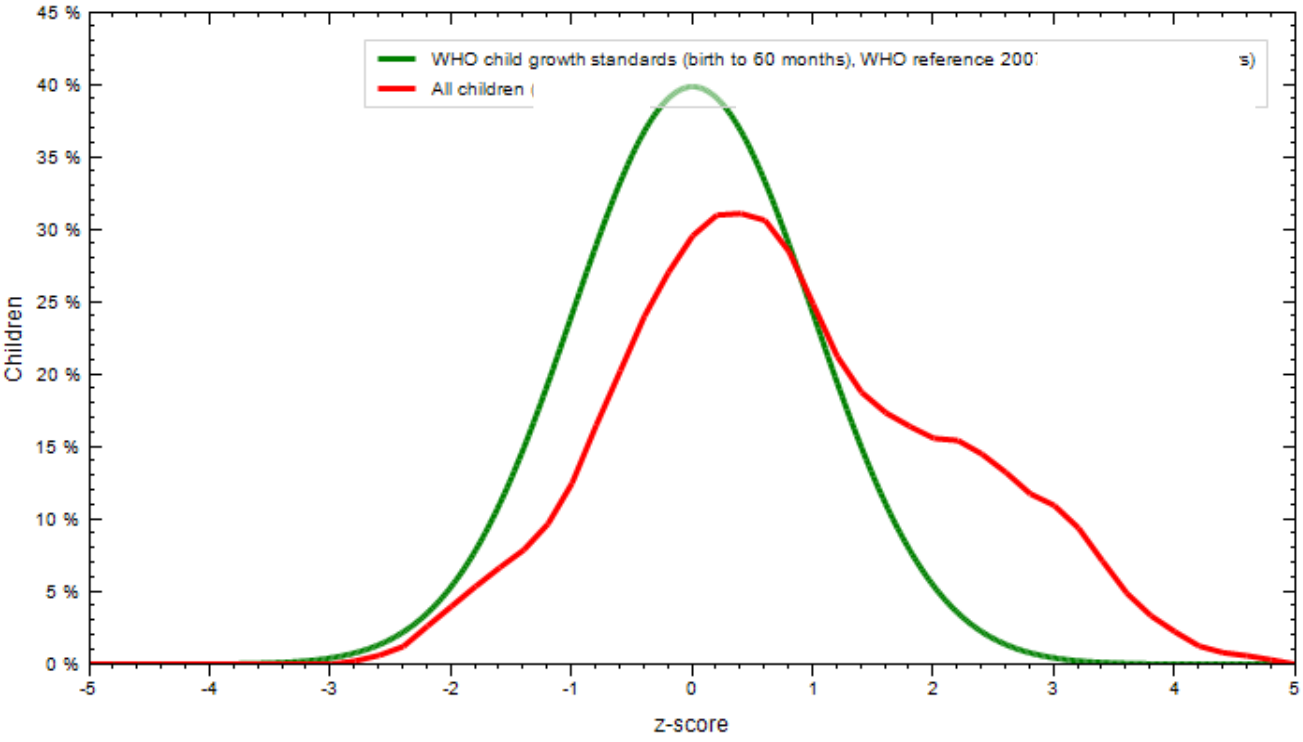
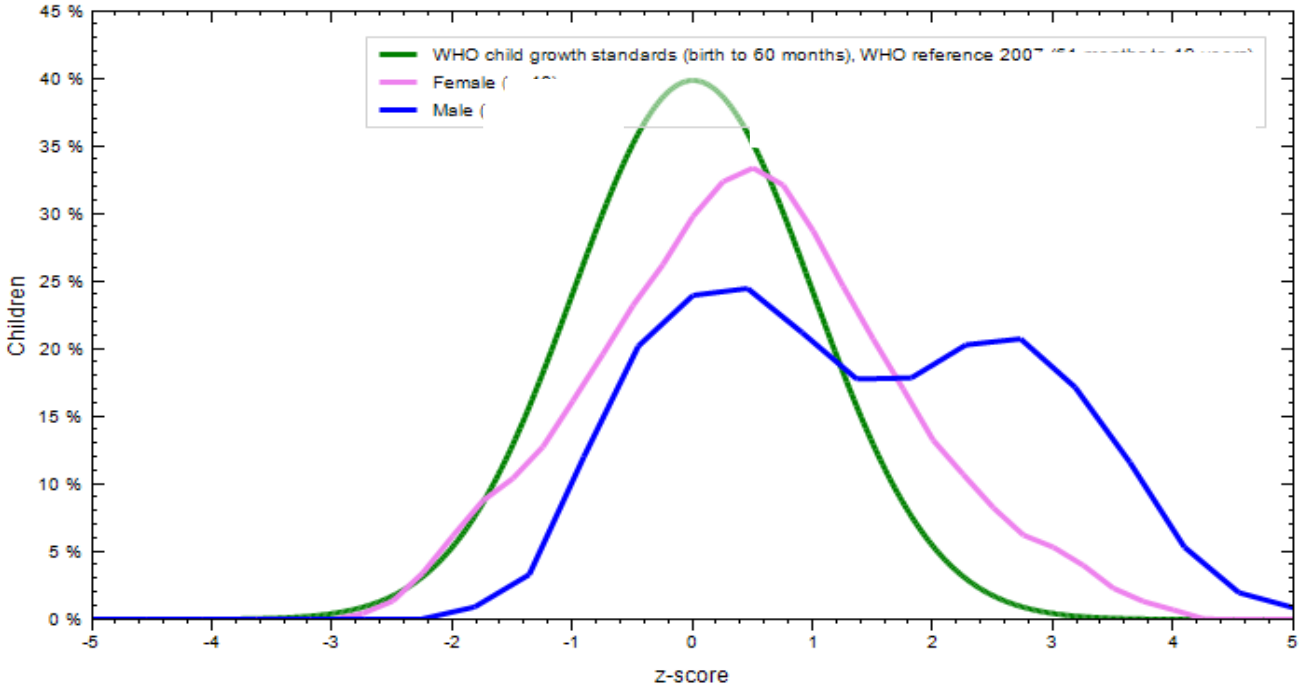


Figure 3: Nutrition status of the pupils by sex in comparison to WHO growth standards



happened to be having normal weight, more boys were overweight and obese than the girls. However, more girls were underweight than the boys.

4.3 The demographic characteristics of children who were overweight and obese

The study established whether the pupils' socio-demographic factors had a bearing in as far as their nutrition status was concerned. The findings are as presented in the table below

Table 4: The gender of the child and the nutrition status of pupils attending schools

		Nutrition Status								Total		
		Underweight		Normal weight		Over weight		Obese				
		n	%	n	%	n	%	n	%	n	%	
Sex	**Male**	90	23.0	54	13.8	8	2.0	8	2.0	160	40.8	χ^2 = 12.010 df = 3 P-Value = 0.007*
	Female	98	25.0	119	30.4	8	2.0	7	1.8	232	59.2	
Total		**188**	**48.0**	**173**	**44.1**	**16**	**4.1**	**15**	**3.8**	**392**	**100.0**	
Age	**< 13**	151	38.5	107	27.3	15	3.8	15	3.8	288	73.5	χ^2 = 25.302 df = 3 P-Value = 0.000*
	13 +	37	9.4	66	16.8	1	0.3			104	26.5	
Total		**188**	**48.0**	**173**	**44.1**	**16**	**4.1**	**15**	**3.8**	**392**	**100.0**	

Source: Primary, *significant at 5%

Findings based on what has been presented above using the Pearson's' Chi-square analysis found out that with a P-Value of 0.007 which is less than 5% significance level, over weight and obesity was dependant on the gender of the pupil. This is evidenced by the fact that while majority female pupils were either underweight that's 25% and normal that's 30.4%, the majority males were obese that's 2% by proportion compared to the 1.8% females. This can be explained by the fact that female pupils are more involved in the home cores than the boys.

Findings with regard to age using the Pearson's' Chi-square analysis shows with a P-Value of 0.000 which is less than 5% significance level, overweight and obesity in the pupils is significantly influenced by their age. As presented, more pupils by proportion that's 3.8% aged

less than 13 years were found either overweight or obese, compared to only a small proportion of 0.3% age 13 years and above who were found with overweight.

4.4 The socio-economic characteristics of children who are overweight and obese

During the study, efforts as well helped to establish whether the social economic characteristics bone of the pupils' families affected their nutrition status in terms of overweight and obesity. Study findings with regard to how family vehicle ownership influences the pupils' nutrition status are as presented in table 4.3.2 below;

Table 5: Family vehicle ownership as an income proxy and nutrition status of pupils attending primary school

Family Vehicle ownership	Nutrition status								Total		
	Underweight		Normal weight		Over weight		Obese				
	n	%	N	%	n	%	n	%	n	%	χ^2 = 18.200 df = 3
Owned	100	25.7	94	24.2	13	3.3	15	3.9	222	57.1	
Not owned	89	22.9	76	19.5	2	0.5	0	0.0	167	42.9	P-value = 0.000*
Total	189	48.6	170	43.7	15	3.9	15	3.9	389	100.0	

Significant at 5%

Findings following a Pearson's' Chi-square analysis established that with a P-Value of 0.00 which is less than 5% significance level, nutrition status in overweight and obesity terms was significantly influenced by the ownership of a vehicle within the family of the pupils. This relationship is in such a way that a big proportion of up to 3.9% of the pupils whose families owned a vehicle were obese compared to families without a family vehicle where none of the pupils were obese. Also, the proportion of pupils with overweight was higher where the pupils' family owned a vehicle that's 3.3% than where they did not own a family vehicle that's 0.5%.

4.5.0 The factors influencing development of overweight and obesity among pupils in Kampala city and Mukono district

4.5.1 Feeding habits

The study findings with regard to how the number of meals normally consumed per day and pupils' nutrition status especially in terms of overweight and obesity are as presented below;

Table 6: The number of meals normally consumed per day and pupils' nutrition status

	Nutrition Status								Total		
	Underweight		Normal weight		Over weight		Obese				
Meals per day	n	%	N	%	N	%	n	%			χ^2 = 2.149
Less than 4	99	30.6	110	34.0	10	3.1	9	2.8	228	70.4	
4 and above	35	10.8	49	15.1	6	1.9	6	1.9	96	29.6	df = 3
Total	134	41.4	159	49.1	16	4.9	15	4.6	324	100.0	P-value = 0.542*

Source: Primary, *insignificant at 5%

The findings using the Pearson's' chi-square, show a P-Value of 0.542 which value is greater than 5%. This simply implies that the number of meals normally consumed per day insignificantly influences the nutrition status of pupils in primary schools.

The findings with regard to how the number of times the pupil feels hungry during the day because of lack of food while at school affects his or her nutritional status in terms of overweight and obesity are as presented in the table below;

Table 7: Number of times the pupil feels hungry during the day because of lack of food while at school and waiting status

		Weight Status								Total	
		Underweight		Normal weight		Over weight		Obese			
		n	%	N	%	n	%	n	%	n	%
How often pupil feels hungry during the day because of lack of food while at school / home	Never	43	11.7	43	11.7	8	2.2	5	1.4	99	26.9
	Always	20	5.4	20	5.4	1	0.3	3	0.8	44	12.0
	Many times	18	4.9	14	3.8	0	0.0	0	0.0	32	8.7
	Occasionally	95	25.8	85	23.1	6	1.6	5	1.4	191	51.9
	Other	0	0.0	0	0.0	0	0.0	2	0.5	2	0.5
Total		176	47.8	162	44.0	15	4.1	15	4.1	368	100.0
Pearson Chi-Square = 57.481				**df = 12**				**P-Value =**		**0.000***	

Significant at 5%

Findings using the Pearson's' Chi-square analysis shows a P-Value of 0.000 which is less than 5% significance level. This implies that feeling hungry during the day because of lack of food while at school or home had a significant effect on the nutrition status of pupils attending primary school. This influence was in such a way that where the pupils ever feel hungry during the day because of lack of food many times, none was overweight or obese, however where pupils never feel hungry during the day because of lack of food 2.2% and 1.4% were respectively overweight or obese. This further confirms the fact that overweight and obesity increases with increase in the meals consumed per day by a given pupil.

4.5.2 Physical activity

The study also found out whether and how the pupils' involvement in physical activities especially after school, contributed to being overweight and obese. The findings in this regard are as presented in the table below;

Table 8: Activities after school and the nutrition status of pupils attending primary school

		Nutrition status								Total	
		Underweight		Normal weight		Over weight		Obese			
		N	%	n	%	n	%	n	%	n	%
Activities Done By Pupils After school	Watched TV	8	3.5	13	5.7	3	1.3	0	0.0	24	10.4
	Played video or computer games	4	1.7	3	1.3	0	0.0	0	0.0	7	3.0
	Played field games	12	5.2	4	1.7	1	0.4	0	0.0	17	7.4
	Did house cores	47	20.4	60	26.1	3	1.3	0	0.0	110	47.8
	Reading	24	10.4	39	17.0	3	1.3	5	2.2	71	30.9
	Others (specify)	0	0.0	1	0.4	0	0.0	0	0.0	1	0.4
Total		95	41.3	120	52.2	10	4.3	5	2.2	230	100.0
Pearson Chi-Square = 25.199				**df = 15**				**P-Value = 0.047***			

Significant at 5%

The findings using the Pearson's' chi-square found a P-Value of 0.047. This value is less than 5% level of significance, which implies that, the type of activities pupils involve themselves in after school significantly influenced their nutrition status. This relationship is in such a way that while overweight is higher with pupils who watch TV (1.3%) and spend time reading (1.3%), obesity was only significant amongst pupils who spent their time reading after school (2.2%).

Table 9: Transport means and the nutrition status of pupils attending primary schools

	Nutrition status								Total	
	Underweight		Normal weight		Over weight		Obese			
	n	%	n	%	n	%	n	%	n	%
Transport means										
Non motorized	90	31.9	85	30.1	4	1.4	2	0.7	181	64.2
Motorized	28	9.9	48	17.0	12	4.3	13	4.6	101	35.8
Total	118	41.8	133	47.2	16	5.7	15	5.3	282	100.0
Pearson Chi-Square = 35.063			**df = 3**				**P-Value = 0.000***			

Significant at 5%

Findings following the application of a Pearson's' chi-square analysis found a P-Value of 0.000 which value is less than 5%. This literally implies that the nutrition status of the pupils attending schools in overweight and obesity terms was significantly influenced by the means of transport they utilize while heading to their respective schools. In this, more pupils who used motorized means that's 4.3% and 4.6% were respectively overweight or obese compared to those who used other non motorized means where only 1.4% and 0.7% were overweight and obese respectively.

4.5.3 Sedentary behaviors

Findings with regard to whether sedentary behaviors of the pupils contributed to their nutrition status are as discussed herein. Findings regarding how the average time in hours spent watching television (TV) per day influenced the nutrition status of the children yielded the following results;

Table 10: The average time in hours of watching television (TV) per day and the nutrition of the pupils attending primary school

Number of hours watching TV per day	Nutrition Status								Total	
	Underweight		Normal weight		Over weight		Obese			
	n	%	n	%	n	%	n	%	n	%
≤1 hour	89	28.4	105	33.5	11	3.5	8	2.6	213	68.1
> 1 hour	43	13.7	45	14.4	5	1.6	7	2.2	100	31.9
Total	132	42.2	150	47.9	16	5.1	15	4.8	313	100.0
Pearson Chi-Square = 1.784					df = 3				P-Value = 0.618*	

Insignificant at 5%

Findings as manifested in the table above using the Pearson's' chi-square indicates that with a P-Value of 0.618 which is greater than 5%, the average time in hours of watching television (TV) per day did not have a significant influence on the nutrition status of the pupils attending primary school. In other words, whether the pupil spends more time watching television or not he or show cannot become overweight or obese.

4.5.4 Psycho-social factors

The study using peer acceptance in terms of having friends at school or home, engagement in physical activity with friends besides support and encouragement from parents support in everything pupils at school or at home, established the pycho-social factors that contribute to overweight and obesity. The findings in this regard are as presented in the table below;

Table 11: The influence of peer acceptance and their importance and nutrition status of the pupils attending school in Mukono and Kampala schools

		Nutrition status								Total	
		Underweight		Normal weight		Over weight		Obese			
		n	%	n	%	n	%	n	%	n	%
Peer acceptance	Yes	188	48.2	169	43.3	16	4.1	15	3.8	388	99.5
at school / home	No	1	0.3	1	0.3	0	0.0	0	0.0	2	0.5
Total		189	48.5	170	43.6	16	4.1	15	3.8	390	100.0
Pearson Chi-Square = 0.180					**df = 3**				**P-Value = 0.981***		

Insignificant at 5%

The findings using the Pearson's' Chi-square statistic shows that with a P-Value of 0.981 which is greater than 5% significance level, overweight and obesity in pupils was not in any way influenced by peer acceptance at school or home.

Findings with regard to whether and how the number of siblings, contribute to the nutrition status of pupils attending school are as presented in the table below;

Table 12: The number of siblings and the nutrition status of pupils attending school

		Nutrition status								Total	
		Underweight		Normal weight		Over weight		Obese			
		n	%	n	%	n	%	n	%	n	%
Number of siblings	≤ 3	94	24.0	70	17.9	11	2.8	8	2.0	183	46.7
	> 3	94	24.0	103	26.3	5	1.3	7	1.8	209	53.3
Total		188	48.0	173	44.1	16	4.1	15	3.8	392	100.0
Pearson Chi-Square = 6.917					**df = 3**				**P-Value = 0.075***		

Insignificant at 5%

Evidence using the Pearson's' Chi-square analysis shows with a P-Value of 0.075 which is greater than 5% significance level, the number of siblings in a given household does not have a significant contribution to the nutrition status of pupils attending schools.

The study as well established how support and encouragement given to pupils by their parents in everything they do at home or at school influences the pupils' nutrition status. Findings in this regard are as presented in the table below;

Table 13: Parents support and encouragement in everything a child does both at school and at home and nutrition status

		Nutrition status									
		Underweight		Normal weight		Over weight		Obese			
		n	%	n	%	n	%			**Total**	
Parents support and encourages the pupil	Yes	173	45.2	165	43.1	14	3.7	15	3.9	367	95.8
	No	9	2.3	5	1.3	2	0.5	0	0.0	16	4.2
Total		182	47.5	170	44.4	16	4.2	15	3.9	383	100.0
Pearson Chi-Square = 4.339					df = 3					P-Value = 0.227*	

Insignificant at 5%

The results show that given the P-Value of 0.227 which value is greater than 5% significance level, overweight and obesity amongst pupils attending school was not in any way influenced by the parents support and encouragement they extend to them in everything they do at school or at home. This literally means that with or without parents support and encouragement, a given pupil may or may not become overweight or obese.

Table 14: Feelings of sadness within the past 24 hours and the pupils' nutrition status

		Nutrition status								Total	
		Underweight		Normal weight		Over weight		Obese			
		n	%	n	%	n	%				
Feelings of sadness in the past 24 hours	Yes	78	20.1	88	22.6	7	1.8	9	2.3	182	46.8
	No	111	28.5	82	21.1	9	2.3	5	1.3	207	53.2
Total		189	48.6	170	43.7	16	4.1	14	3.6	389	100.0
Pearson Chi-Square = 5.784 df = 3 P-Value = 0.123*											
***Insignificant at 5%**											

Findings as manifested in the table above using the Pearson's' chi-square also indicated that with a P-Value of 0.123 which is greater than 5%, the pupils' feelings of sadness within the past 24 hours had no influence on the nutrition status of the pupils.

The study in its efforts established how the level of self esteem influences the nutrition status of the pupils. The findings in this regard are as presented in the table below;

Table 15: Level of self-esteem in terms of feeling bad about the way a pupil looks and nutrition status

		Nutrition status									
		Underweight		Normal weight		Over weight		Obese			
		n	%	n	%	n	%	n	%	**Total**	
Do you feel bad About the way you look	Yes	77	20.0	56	14.5	4	1.0	6	1.6	143	37.1
	No	112	29.1	109	28.3	12	3.1	9	2.3	242	62.9
Total		189	49.1	165	42.9	16	4.2	15	3.9	385	100.0
Pearson Chi-Square = 2.836				df = 3						P-Value = 0.418*	

Insignificant at 5%

Study findings as well show that with a P-Value of 0.418 between level of esteem and the nutrition status, which is greater than 5% significance level, the pupil's level of esteem has got no significant effect on his or her nutrition status in overweight and obesity terms.

4.5.5 Family history of obesity

The study examined whether the family history of obesity had a bearing in as far as obesity in the pupils is concerned. The findings are as presented and interpreted herein below.

Table 16: Family history of obesity and nutrition status of primary school pupils

		Nutrition status								**Total**	
		Underweight		Normal weight		Over weight		Obese			
		N	%	n	%	n	%	n	%		
Family history of obesity	Yes	55	14.0	78	19.9	8	2.0	5	1.3	146	37.2
	No	134	34.2	94	24.0	8	2.0	10	2.6	246	62.8
Total		189	48.2	172	43.9	16	4.1	15	3.8	392	100.0
Pearson Chi-Square = 11.408					df = 3				P-Value = 0.010*		

Significant at 5%

Study results using the Pearson's' Chi-square analysis showed that with a P-Value of 0.010 which is less than 5% level of significance, the family history of obesity significantly contributed to the nutrition status of primary school attending pupils in overweight and obesity terms. This influence is such that while the proportion of pupils with overweight is the same amongst those with and without a family history of obesity that's each 2%, obesity is higher among pupils with families without history of obesity that's 2.6% compared to those with obesity history that's 1.3%. This may be due to the fact that families with obesity history implement measures to control it amongst their school going children compared to families without obesity history.

4.5.5 School context factors

Finally, the study beginning with the type of school found out whether and how the school context factors contributed to overweight and obesity amongst the pupils. The study findings are as discussed herein.

Table 17: School type and the nutrition status of pupils attending school in Kampala city and Mukono district

	Nutrition status				**Total**
	Underweight	Normal weight	Over weight	Obese	

		Nutrition status									
		N	%	n	%	n	%	n	%	**Total**	
School type	Day	100	25.5	142	36.2	14	3.6	15	3.8	271	69.1
	Boarding	88	22.4	31	7.9	2	0.5			121	30.9
Total		188	48.0	173	44.1	16	4.1	15	3.8	392	100.0
Pearson Chi-Square = 45.207					df = 3					P-Value = 0.000*	

Significant at 5%

The findings following an analysis using the Pearson's' chi-square found a P-Value of 0.000. This value is less than 5%, which basically implies that the nutrition status in terms of overweight and obesity amongst others was significantly contributed to by the type of school in which the pupils study from. For instance while a higher proportion of 3.6% of pupils were overweight in the day schools compared to only 0.5% who were found overweight in the boarding schools. As well 3.8% of the pupils were found obese in the day schools compared to none who were found obese.

Table 18: Existence of an opportunity to carry out physical exercises in between classes and pupils nutrition status

		Nutrition status									
		Underweight		Normal weight		Over weight		Obese			
		n	%	n	%	n	%	n	%	**Total**	
Opportunity to carry out physical exercises in between classes	Yes	94	24.4	55	14.3	8	2.1	9	2.3	166	43.1
	No	94	24.4	111	28.8	8	2.1	6	1.6	219	56.9
Total		188	48.8	166	43.1	16	4.2	15	3.9	385	100.0
Pearson Chi-Square = 12.431					df = 3					P-Value = 0.006*	

Significant at 5%

Findings following an analysis in which a Pearson's' Chi-square was used to show that with a P-Value of 0.006 which is less than 5% significance level, the existence of opportunities to carry out physical exercises in between classes has got a significant bearing in as far as overweight and obesity in children is concerned. It is however quite surprising that much as equal proportions of pupils that's 2.1% are over weighted, more pupils constituting 2.3% who had opportunity to undertake physical exercises were found obese compared to a lower proportion of 1.6% who had no opportunities to undertake physical exercises.

CHAPTER FIVE

DISCUSSION OF THE STUDY RESULTS

5.0 Introduction

This chapter discusses the findings with regard to the determinants of childhood overweight and obesity among primary four to seven pupils attending schools in Mukono district and Kampala city. In particular, it discusses the study findings with regard to overweight and obesity

prevalence, the socio demographic characteristics of overweight and obese pupils alongside their socioeconomic characteristics amongst others.

5.1 The prevalence of overweight and obesity among primary pupils attending schools

Findings in the current study established that Kampala city had 3.6% and 3.6% of its pupils overweight and obese respectively compared to Mukono district that had a lower proportion of children with overweight and obese constituting 0.5% and 0.2% respectively. The overall prevalence of overweight and obesity status was 4.1% and 3.8% in both districts. These findings are quiet similar to those early found by Petronella (2011) that indicated that the prevalence of overweight and obesity in a sample of primary school children was 13% of which 9% were overweight and 4% obese. They are also similar to those done by Mosha et al (2010) where 3.9% of the children aged between 10–12 years in Dodoma were obese compared to 5.8% of their counterparts in Kinondoni municipality.

5.2 The pupils demographic characteristics, overweight and obesity

Findings with regard to demographics found out that the sex of the pupils attending primary school had a significant contribution towards the pupil's nutrition status in terms of overweight and obesity with a P-Value of 0.007 which is less than 5% significance level. This is in a way that more males were obese at 2% by proportion compared to the 1.8% of the females. It was also found out that with a P-Value of 0.000 which is less than 5% significance level, the age influenced overweight and obesity outcomes in the pupils in such a way that as age increased, the proportion of pupils who were obese or overweight respectively decreased from 3.8% in children less than 13 years to 0.3% in children 13 years and above. These findings are quite

similar to those earlier found by Juliusson (2010) that showed a positive relationship between the age groups and sex, with an additional risk for being overweight or obese in girls compared with boys in the youngest age group. They are also similar to those findings earlier found by Sharma et al (2008) where sex, age, genetics and ethnicity are the non-modifiable determinants of childhood and adolescent obesity.

5.3 The socio-economic characteristics of parents /guardians of overweight and obese pupils

In as far as the socioeconomic characteristics of the families to the pupils were concerned, current results established that with a P-Value of 0.00 which is less than 5% significance level, the nutrition status of the pupils in overweight and obesity terms was significantly influenced by the family vehicle ownership in such a way that a bigger proportion of up to 3.9% of the pupils whose families owned a vehicle were obese compared to families without a family vehicle where none of the pupils were found obese. These findings are quite similar to those earlier done by Mendis et al (2011) who in a way postulated that increased sedentary leisure options, greater use of motorized transport, and less activity in daily chores have a bearing in obesity.

5.4 The factors influencing development of overweight and obesity in children

The study with regard to pupil feeding habits found out that with a P-Value of 0.542 which was greater than 5%, the number of meals normally consumed per day had no significant influence on the pupils' nutrition status. However, a P-Value of 0.000 which was less than 5% significance level meant that feeling hungry during the day because of lack of food while at school or home had a significant effect on the nutrition status of pupils attending primary school. This was in such a way that none of the pupils that ever felt hungry many times were overweight or obese

compared to those who never felt hungry at 2.2% and 1.4% overweight and obese respectively. These findings are quite similar to those done by Kuteesa (2010) which indicated dieting behaviors, breakfast consumption, and fast food consumption from convenient stores were predictive factors of obesity in children.

The current study with regard to physical activity found out that with a P-Value of 0.047 and 0.000 for the type of activities pupils involved themselves in and the means of transport they utilize while heading to school respectively, physical activity amongst pupils significantly influenced their nutrition status in terms of overweight and obesity. This was in such a way that overweight was higher in pupils who never involved themselves in physical activities than in those involved. These findings were similar to those earlier found by Sharma et al (2008) in which physical activity was considered to be a protective factor against the development of obesity. They are also similar to those earlier found by Page et al (2005) who after examining the levels and patterns of physical activity in obese and non-obese children in United Kingdom found that obese children had less physical activity and spent less time in physical activity of vigorous intensity than their non-obese counterparts.

The current study also indicated that with a P-Value of 0.618 which was greater than 5% significance level, being overweight or obese was not influenced by pupils sedentary behaviors such as the average number of hours spent watching the Television. These findings are quite different from those earlier done by Vandewater et al (2004) who showed that over weighted children spent more time in sedentary activities, such as TV watching and playing video games than those with underweight. This could be due to the fact that such children receive better physicals if chance strikes and have got better feeding habits.

The current findings found out that with a P-Value of 0.981 which is greater than 5% significance level, the nutrition status of the pupils in terms of overweight or obesity was not in any way influenced by peer acceptance at school. Similar results also showed that with a P-Value of 0.227 and 0.075 which were all greater than 5% significance level, the nutrition status amongst pupils attending school was not in a way influenced by the parents support and encouragement number of siblings respectively. Overweight and obesity was neither dependant on pupils' feeling of sadness that had a P-Value of 0.123 nor the level of esteem that had a P-Value of 0.418 which were all greater than 5% significant level. However, these findings were quite different from those found by the obesity society (2010) in which the negative psychological and health consequences in childhood obesity included depressive symptoms, poor body image, low self-esteem, risk for eating disorders, and behavioral and learning problems.

The current study results using the Pearson's' Chi-square analysis, showed that with a P-Value of 0.010 which is less than 5% level of significance, the family history of obesity significantly contributed to the nutrition status of primary school pupils in overweight and obesity terms. Overweight was at the same level in both pupils with and without a family history of obesity at 2%. However, obesity was higher among pupils without a family history of obesity at 2.6% compared to 1.3% of those with a family history. This may be due to the fact that families with obesity history implement measures to control it amongst their school going children compared to families without obesity history.

The current study findings using the Pearson's' chi-square found out that with a P-Value of 0.000, the nutrition status of the pupils in terms of overweight and obesity was significantly affected by the type of school. This is because a higher proportion of 3.6% of pupils were overweight in the day schools compared to only 0.5% who were overweight in the boarding

schools. Also, while 3.8% of the pupils were found obese in the day schools, none of them were found to be obese in boarding schools. This may be due to the fact that boarding schools offer more physical activities to their pupils or even provide and impart better feeding habits than in private where pupils after reaching home do or eat whatever they want.

Also, current findings following Pearson's' Chi-square analysis showed that with a P-Value of 0.006 which is less than 5% significance level, overweight and obesity was affected by amount of chances pupils received to carry out physical exercises in between classes. This was quite surprising in that while overweight was the same in both cases, obesity was highest among pupils with opportunity to carry out physical exercises in between classes at 2.3% compared to those without opportunity to carry out physical exercises. These findings are quiet similar to those done by Zhu et al (2010) which found that some of the school and policy factors that impacted on the students' fitness included teachers' training, recess time, and availability of physical activity space. This can be explained by the fact that having opportunity to carry out P.E doesn't necessary mean utilizing such chance.

5.5 Summary of results

From the findings we realized that while overall prevalence of overweight and obesity in Kampala and Mukono is 4.1% and 3.8% respectively, it is more prevalent in the male sex than the female. We also realized that prevention of overweight and obesity should be more marked at early years of age in pupils than in older years. It has also been learnt that a number of factors influenced overweight and obesity amongst children including the number of times a child feels hungry, physical activity, the family history of obesity, type of school and number of chances to carry out physical exercises in between classes. Pupils in families with a better socioeconomic status are more prone to overweight and obesity than those with a lower socio economic status.

What was quite surprising was that overweight and obesity were neither influenced by the number of meals normally consumed per day as a feeding habit, the average number of hours spent watching the Television as a sedentary behavior, peer acceptance nor parents support. It was as well neither influenced by pupils' feeling sadness nor the level of esteem which were expected otherwise.

What is new is that while overweight and obesity was influenced by the existence of an opportunity to carry out physical exercises, many pupils fail to utilize it and thus many more are obese as portrayed in case of those with an opportunity to carry out physical exercises in between classes compared to those without opportunity to carry out physical exercises.

Generally, the high prevalence of overweight and obesity implies that a heavy burden of diseases like coronary heart disease, cancers, high blood pressure and stroke amongst others exists. Therefore as a policy, schools need to establish a safe and supportive environment characterized with practices that support healthy behaviors amongst pupils.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This section makes conclusions and recommendations for possible improvements based on the objectives alongside suggesting the areas of further inquiry.

6.1 Conclusions

The prevalence of overweight and obesity among primary pupils attending schools is in such a way that though most of the pupils attending schools are underweight with yet a good proportion

possessing normal weight, the prevalence of overweight and obesity stands at 4.1% and 3.8% in Mukono and Kampala districts respectively.

Over weight and obesity is significantly attributed to the gender of the pupil in that more males were obese compared to their female counterparts, the effect of age was in such a way that as age increased, the proportion of pupils who were obese or overweight respectively declined.

The nutrition status that's overweight and obesity in the pupils attending schools is significantly influenced by their parents' economic status in terms of ownership of a family vehicle. More pupils whose families owned vehicles were respectively overweight or obese compared to those whose families did not own vehicles.

The behavioral factors like feeding habits in terms of the number of meals normally consumed per day did not significantly contribute to the nutrition status in terms of overweight and obesity but feeling hungry contributed to the pupils' over weight and obesity outcomes in such a way that where the pupils ever felt hungry many times none was overweight or obese. However, where pupils never felt hungry overweight or obesity was common.

Pupils' involvement in physical activity after school and the means of transport they use to go to school significantly influenced the pupils' nutrition status in terms of overweight and obesity in that while overweight frequency was higher among pupils who did not, obesity was significantly noticeable amongst pupils who spent their time reading after school. The sedentary behaviors such as the average number of hours spent watching Television did not result in overweight or obesity.

The psycho-social factors amongst which is peer acceptance at school, the parents support and encouragement extended to pupils in everything they did at school or at home, and the level of esteem had no significant effect on the pupils' nutrition status in overweight and obesity terms.

The school context factors like the type of school were contributing factors to overweight and obesity in a way that higher proportions of pupils who were overweight and obese studied in private day schools compared to those who studied in boarding schools where no pupil was overweight or obese. Much as overweight and obesity were affected by amount of opportunities pupils receive to carry out physical exercises in between classes, its effect was in such a way that obesity was highest among pupils with opportunity to carry out physical exercises in between classes compared to those without opportunity to carry out physical exercises. This is can be explained in such a way that pupils who have this opportunity did not necessarily use it to carry out physical exercise.

6.2 Recommendations

The government and non-governmental organizations ought to leverage items of knowledge through sensitization to both the parents and pupils the implications of being overweight or obese in terms of risk to other conditions diabetes mellitus and hyper tension among others.

The leaders in the public should be mobilized to include messages that dwell on items of what should be consumed, what not to be consumed and in what proportions but with emphasis on averting overweight and obesity amongst their fans.

The parents should encourage their school going children to embrace footing and where possible cycling as a way of helping them to achieve and maintain normal body weight for better productivity and health.

School teachers and administration should teach their pupils proper feeding habits in terms of the number of meals normally consumed per day with emphasis on the appropriate food proportions all geared towards achieving healthy weights amongst their pupils.

The ministry of education and sports through its examining body the Uganda National Examinations Board (UNEB) should find ways of extending some marks to children involved in school physical activities. This will help schools, parents and pupils into pushing for physical education activities which will in term reduce incidences of overweight and obesity amongst the pupils.

6.3 Areas of further inquiry

The current study may not hold much policy implication due to the fact that it has been based on a small sample size of only 409 pupils, moreover in only two districts within the country's central region. These findings would vary if a larger area and sample were to be carried out. It's therefore recommended that further studies be carried out considering this limitation and increase the sample size for a more optimal corrective Intervention. It's also recommended that a more inclusive study be carried out that can put the case of magnitude in this context.

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APPENDICES

APPENDIX A; INFORMED CONSENT FORM FOR PARENTS OR GUARDIANS

[English version]

Introduction: My name is Nawangi Kevin Teckla. Am a student pursuing a Master's of Science Degree in Public Health (MScPH) at International Health Sciences University (IHSU). I am doing a study entitled **'Determinants ofoverweight and obesity among primary four to seven pupils attending schools in Mukono and Kampala districts, Uganda'.**

Purpose of the study: The general purpose of the study is to assess the determinants of childhood overweight and obesity among primary four to seven pupils attending schools in Mukono and Kampala districts with an overall aim of contributing to closing the existing knowledge gap in this area, such that information gathered may be used to come up with appropriate interventions such as prevention programs.

Procedures: This study will take place before the end of the year (2013) at your child's school. The procedures will include administering questionnaires to your child for answers and taking weight and height measurements.Face to face interviews with the children will be conducted by the researcher to fill the questionnaire. During the survey the interviewer will explain any of the questions that will seem to be unclear. Questions will be both yes/no and multiple choice questions. The measures to be taken will include height and weight using a stadiometer and a digital weighing scale, respectively.

Voluntary Participation: Your child's participation is voluntary although we encourage you to permit him or her to participate. Even if he or she does not participate, he / she will lose no benefits at school.

Risk, Harm and Discomfort: There are no anticipated risks as a result of the study. Appropriate, medically and nationally approved methods will be used to conduct the study and report the findings.

Benefits: One of the potential benefits to your child will be to know his nutritional status in the form of body mass index (BMI). If the BMI is found adverse, we shall provide him / her with relevant nutritional knowledge.

Confidentiality: Information gathered in the study will not be shared outside the research team. All information gathered will be kept confidential. Information will be kept under lock and key. Individual respondents will not be identified by their names, only codes will be used.

Who to Contact

If you wish to contact the principal researcher before or during the course of the study to ask any questions or seek more information, you may use the following: Name: KEVIN TECKLA NAWANGI Mobile phone number: 0771-416217	The principal researcher has got a supervisor who can provide more information. He may be contacted on the following: Name: PROFFESSOR DAVID NDUNGUTSE Mobile phone number: 0772-425924

Consent statement for the Parent or Guardian

As a guardian or parent, I have been given full explanation about this study and been told that participation is voluntary. The purpose and nature of the study, the benefits and risks have been explained to me. I have been given great opportunity to ask questions. I have been informed that the information will be kept confidential and that no consequences will result if I refuse to include my child in the study.

I am voluntarily consenting for my child to take part in this study as a participant.

Serial Number of child:
Name & Signature of Parent or Guardian:
Date (Day / month / year):

Witness: Name of research assistant……..Signature……..

Date……

APPENDIX B; INFORMED CONSENT FORM FOR PARENTS OR GUARDIANS

[Luganda version]

Ennyanjula: NzeNawangi Kevin Teckla. NdimuyizikuInternational Health Sciences University (IHSU) ngansomabyasayansikuby'obulamubwabantu. Ndi mu kukolaokunyonyerezaokutumiddwa 'Ebireteraomugejjooguyitiridde mu baanaabatoabasoma mu masomerogapulayimaleabekibiinakyokunaokutuuukakukyomusaanvu mu disitulikitize Mukono ne Kampala mu Uganda'.

Ekigendererwaky'okunonyerezakuno:

Ekyawamukirintitwagalakumannyakiekireteraomugejjooguyitiridde mu baanaabatoabasoma mu masomerogapulayimale mu disitulikitize Mukono ne Kampalane kigendererwantitujjakwongerakubimanyiddwakunsongaenongaganoamagezigajjakukozesebwaok uteekamunkolaebintuebiziyizakinoekizubuobuteyongera mu maaso.

Entambulay'okunonyerezakuno:

Okunyonyerezakunokujjakubaawongagunoomwakategunagwakusomeroly'omwanawo. Tujjakubuuzaomwanawoebibuuzokunsongaz'okulyan'okuzanya, era tupimeobunnenen'obuwanvubw'omwana.

Okukirizakwakyeyagarire: Oliwaddembeokusalawoomwanawookwetabaobaobutetaba mu kunyonyerezakuno. Omwanawotajjakubonerezebwa mu ngeriyonnasingaobeeraoganye.

Obulabe: Tewalibulabebusuubirwasingaomwanawoabeerayetabye mu kunyonyerezakuno. Ebinakozesebwabyonnabikilizibwa mu mateekangasibyabulabekubulamubwo'muntun'omwana.

Okuganyulwamu: Omwanawoajjakuganyulwamumungerintiajjakumannyaobunenebwe. Wetusangantimuzitonnyotujjamubulirakoengerijasobolaokubaomulamuobulungingatumuwaama gezi..

Okukuumaebyaama: Information Ansabaanaz'ebanatuwazijjakutwaalibwang'azakyaamannyojetuli. Bulikimukijjakusibwa mu kabaddaelikokufulu ne kisumuluzo.Tekyetagisamwanakutuwalinnya lye wabulatujjakozesanambazokkaokubawadensite.

B'oyinzaokwogeran'abbokubikwatakukunoonyerezakuno:

Amannyagano'onyereza: KEVIN TECKLA NAWANGI- 0771-416217	Amu'supavayizinga: PROFFESSOR DAVID NDUNGUTSE - 0772-425924

Statimentiy'omuzzaddeey'okukiriza:

Bambuliddekukunyoonyerezaokweekuusakumugejjooguyitiridde mu baanaabato.Ekigendererwan'ekikakyokunyoonyereza, okuganyulwamun'obulabbebabinyinyonyodde.Bambuliddeantibyonaomwanaby'anababuulirabijj akuterekebwangabyakyaama ate era okwetaba mu kunyoonyerezakunokwakyeyagaride era ntitewalikijjakubeerawosingambeeranganyeomwanawangeokwetabamu.

Nzikirizaomwanawangeyetabe mu kunonyeerezakuno.

Enambay'omwana:
Ammanyan'ekinkumiky'omuzadde:
Deeti (Olunaku / omwezi / omwaka):

……. …… ……...

Elinnyaly’omubuuzisaEkinkumiDeeti

APPENDIX C; INFORMED CONSENT FORM FOR KEY INFORMATS

Introduction: My name is Nawangi Kevin Teckla. Am a student pursuing a Master's of Science Degree in Public Health (MScPH) at International Health Sciences University (IHSU). I am doing a study entitled **'Determinants ofoverweight and obesity among primary four to seven pupils attending schools in Mukono and Kampala districts, Uganda'.**

Purpose of the study: The general purpose of the study is to assess the determinants of childhood overweight and obesity among primary four to seven pupils attending schools in Mukono and Kampala districts with an overall aim of contributing to closing the existing knowledge gap in this area, such that information gathered may be used to come up with appropriate interventions such as prevention programs.

Procedures: This study will take place before the end of the year (2013) at your school or office. If you accept to participate, you will be asked to have an interview with the help of a key informant interview guide with the researcher to answer some questions. During the interview, we will ask you to sit down comfortably. Only two people (you and the researcher) will be present. The information you provide will be written down.

Voluntary Participation: Your participation is voluntary although we encourage you to participate. Even if you do not participate, you will lose no benefits at your job.

Risk, Harm and Discomfort: There are no anticipated risks as a result of the study. Appropriate, medically and nationally approved methods will be used to conduct the study and report the findings.

Benefits: One of the potential benefits to you is that children will be able to know their nutritional status in the form of body mass index (BMI). If the BMI is found adverse, we shall provide them with relevant nutritional knowledge.

Confidentiality: Information gathered in the study will not be shared outside the research team. All information gathered will be kept confidential. Information will be kept under lock and key. Individual respondents will not be identified by their names, only codes will be used.

Who to Contact

If you wish to contact the principal researcher before or during the course of the study to ask any questions or seek more information, you may use the following: Name: KEVIN TECKLA NAWANGI Mobile phone number: 0771-416217	The principal researcher has got a supervisor who can provide more information. He may be contacted on the following: Name: PROFFESSOR DAVID NDUNGUTSE Mobile phone number: 0772-425924

Consent statement for the Key informant

As a key informant, I have been given full explanation about this study and been told that participation is voluntary. The purpose and nature of the study, the benefits and risks have been explained to me. I have been given great opportunity to ask questions. I have been informed that the information will be kept confidential and that no consequences will result if I refuse to participate in the study.

I am voluntarily consenting to take part in this study as a participant.

Title of key informant:

Signature of key informant:
Date (Day / month / year):

Witness:

……. …… ……

Name of research assistant **Signature** **Date**

APPENDIX D: RESEARCH QUESTIONNAIRE FOR CHILDREN

PART I

DISTRICT:…….....

NAME OF SCHOOL:…….

QUESTIONNAIRE SERIAL CODE:…..(corresponding to anthropometric checklist number)

RESEARCH ASSISTANT / INTERVIEWER:……..……..……

DATE:…….....

PART II

SECTION I; DEMOGRAPHIC CHARACTERISTICS OF PUPIL

A. The gender of the child

1. Male
2. Female

B. What is your age?

1. 5 – 7 years
2. 8 – 10 years
3. 11 – 13 years
4. Greater than 13 years
5. Unknown

C. How many siblings do you have?

1. None
2. 1-3 siblings
3. 4 – 6 siblings
4. >6 siblings

SECTION II; SOCIO-ECONOMIC STATUS OF PARENTS / GUARDIAN

D. Does your family own a vehicle?

1. Yes
2. No

E. Family history of obesity: are some of your family members very fat?

1. Yes
2. No

SECTION III; BEHAVIOURAL FACTORS

I. Feeding habits

A. Do you ever feel hungry during the day because of lack of food while at school / home?

1. Never , 2. Always

2. Many times

3. Occasionally

II. Physical activity

B. What did you do yesterday after school?

1. Watched TV

2. Played video games

3. Played field games

4. Did house / home chores

5. Reading

C. Other (specify) What kind of field games does your school have?

1. Football

2. Basket ball

3. Volley ball

4. Netball

5. None

III. Other (specify)*Sedentary behavior*

D. On average, how many minutes of television (TV) do you watch per day?

1. Zero minutes (No watching)

2. Less than 30 minutes

3. 30 to 60 minutes

4. 60 to 120 minutes

5. More than 120 minutes

6. Other (specify)

SECTION IV; PSYCHO-SOCIAL FACTORS

A. Peer acceptance: do you have friends at school / home?

1. Yes

2. No

B. Do your parents support you and encourage you in everything that you do at school / at home?

1. Yes

2. No

C. Have you had any feelings of sadness within the past 24 hours?

1. Yes

2. No

D. Level of self-esteem: do you feel bad about the way you look?

1. Yes

2. No

SECTION V; SCHOOL CONTEXT FACTORS

A. Do you have physical education (PE) as part of your syllabus at this school?

1. Yes

2. No

B. Do you get an opportunity to carry out physical exercises in between classes?

1. Yes

2. No

THE END

APPENDIX E; KEY INFORMANT GUIDE FOR HEAD TEACHER / ADMINISTRATOR

District:…….Name of school:……Position of key informant: ……..…Name of interviewer……..… Date:……

QUESTIONS

1. What forms of physical activities does the school involve P4- P7 pupils in this school? What frequency per week and for how long?
2. Is physical education (PE) part of syllabus coverage in this school?
3. Is nutrition education part of the syllabus coverage in this school?
4. What is your perceived importance of physical activity for children?
5. Do you have a playing field (not compound) for games at your school?
6. Apart from school meals, what other competitive food environments do you have here at school (e.g. vendor, canteen)?
7. If the canteen exists, what do students buy from there? (list them)
8. Do you think the current school curriculum your school is following in one way or another has / will contribute to childhood obesity?
9. What do you think are the main causes of childhood overweight and obesity among primary school children?
10. What can government do to help prevent this escalating problem of childhood obesity among these primary pupils?

END

APPENDIX F; CHECK LIST FOR ANTHROPOMETRIC MEASURES

Topic: 'Determinants of overweight and obesity among primary four to seven pupils attending schools in Mukono and Kampala districts, Uganda'

District:……

Name of the school:…….....

Class:……

Serial number of child	Sex of the child (Female / male)	Age of the child (in months)	Height (in meters)	Weight (in Kg)	Height (in m^2)	BMI (Kg / m^2)	Z-Score

Name of researcher:…….... Signature:……

APPENDIX G; PICTURES

Stadiometer

Height Meter

INTERNATIONAL HEALTH SCIENCES UNIVERSITY

PART OF INTERNATIONAL MEDICAL CITY

Institute of Health Policy & Management

Kampala, 13th September 2013

District Education Officer
Mukono District

r Sir/Madam,

Assistance for research

etings from International Health Sciences University

is to introduce to you, **Nawangi Kevin Teckla, Reg No. 2012-MPH-FT-015** who is a student ur University. As part of the requirements for the award of a Masters Degree of Public lth of our University, the student is required to carry out field research for the submission Research Dissertation.

vangi would like to carry out research on issues related to: **Determinants of Overweight Obesity among Primary Four to Seven Pupils in Selected Schools in Mukono District and npala City, Uganda**

erefore request you to render the student such assistance as may be necessary for her earch.

nd indeed the entire University are thanking you in anticipation for the assistance you will der to the student.

ncerely Yours,

of. David Ndungutse Majwejwe
rector, Institute of Health Policy & Management