DIETARY DIVERSITY AND NUTRITIONAL STATUS OF LEARNERS IN SECONDARY SCHOOLS OF KAMPALA CITY, UGANDA

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DECLARATION

I TUKAHIRWA PATIENCE do hereby declare that this work is original and has not been presented for a degree in any university or institution.

Signature: ……………………………………

Date: ………………………………….......

APPROVAL

This dissertation has been written under our supervision and it is hereby approved to be submitted for examination.

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DEDICATION

This piece of work is dedicated to my dear parents Mr. Nkurunungi Samson and Mrs. Komugisha Gorretti

ACKNOWLEDGEMENT

ACRONYMS

AU   African Union

ANOVA   Analysis of Variance

BMI   Body Mass Index

CDC   Centre for Disease Control

DDS   Dietary Diversity Score

FAO   Food and Agricultural Organization of the United Nations

GOU   Government of Uganda

IFPRI   International Food Policy Research Institute

KCCA   Kampala Capital City Authority

LMIC   Low- and Middle-Income Countries

MAKSS REC   Makerere University School of Social Sciences Research Ethics Committee

MoES   Ministry of Education and Sports

SD   Standard Deviation

SDGs   Sustainable Development Goals

SDI   Socio-Demographic Index

SPSS   Statistical Package for Social Sciences

UBOS   Uganda Bureau of Statistics

UNCST   Uganda National Council of Science and Technology

USDA   United States Department of Agriculture

VAD   Vitamin A Deficiency

WFP   World Food Programme

WHO   World Health Organization

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ABSTRACT

Introduction: The diet one takes is very fundamental for boosting and sustaining one's health and nutrition's needs especially when it is a balanced diet. Dietary diversity is vital for exposing the learners to different nutrients. Proper dietary diversity boosts education of learners and sustains their health and nutrition. The main objective of the study was to assess diet adequacy, nutritional status and nutrition and health education of learners in Kampala City, Uganda. Specifically, to assess the nutritional status determinants, establish the existing school menu options and adequacy of diet accessed by learners and to identify nutrition and health education activities emphasised in schools in Kampala City.

Methodology: The study units included non-boarding secondary schools in the two divisions of Kampala Central and Kawempe. The study employed a cross-sectional design and descriptive in nature with qualitative and quantitative methods. The sample size of 240 respondents was selected. In addition, 24 key informants that is to say a head teacher and teacher responsible for nutrition matters were considered for the interviews from the 12 schools, 6 in each division. The study also employed multi-stage simple random sampling with three stages of sampling, criterion-based sampling and purposive sampling. Statistical analysis involved ANOVA techniques for finding mean differences while correlations were used for continuous variables at 0.05 statistical significance. The BMI z scores were got using WHO Anthro plus of 2007.

Results: The mean (SD) age of learners was 15.6 (1.6), BMI Z-score 0.5 (1.1) and DDS 6.1(2.3). Majority of learners 80.5% had normal nutritional status: 11.7% underweight, 5.9% overweight and 1.9% obese. There was a strong significant correlation between age and BMI of learners ($p < 0.001$; r = 0.721) which implies that BMI increases with age of learners. There was a relationship between mean BMI and parental level of education ($p = 0.001$) and grade of learners ($p = 0.031$). Majority of the respondents 66.8% consumed 6 or more food groups. The most provided school foods included; mingled maize meal (*posho*), beans, rice, greens and maize porridge with meat, fish, groundnuts, maize on the cob and Green cooked banana (*matooke*) accessed within a week. All schools offered nutrition and health education activities the commonly offered being emergency preparedness, physical activity and fitness and counselling.

Conclusion: It was established that majority of the learners had a normal nutritional status and it was positively associated with parental income source, grade and age of learners. Majority of the learners consumed 6 or more food groups and were getting lunch at school.

This study findings have implications on public health nutrition and quality education. Where possible, there is need for improving nutritional sensitivity of meals provided by providing animal source foods that are rich sources of essential nutrients as part of the menu. Being an urban setting and given that one of every 10 learners assessed were in the overweight and obesity risk category, school-focused policy measures and guidelines promoting healthy school meals and food environments might be needed to check this problem from increasing among learners.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Dietary diversity postulates the concept that increasing the variety of foods and food groups in the diet ensures adequate intake of essential nutrients and promotes good health (Avula *et al*., 2015). The dietary diversity of a learner's diet has been found to be very important and critical for their health and future wellbeing. Dietary diversity scores are created by adding individual food groups that have been consumed over a reference period of time (Anyika, 2009).

Inadequate dietary intake is a public health nutrition concern in most Low- and Middle-Income Countries (LMICs) where diets are predominantly starchy staples and the consumption of animal products, seasonal fruits and vegetables is generally absent or minimal (Afridi, 2005). Those most likely to suffer from diet and nutrition related deficiencies include infants and school going children, young children, adolescent girls and adult women. These vulnerable populations have been found to switch to cheaper foods that give satiety without regard to how nutritious the foods are (Avula *et al.,* 2015).

Diet adequacy is a proven pathway for optimal and conducive environment for enhanced quality education. School meals are thought to exert powerful incentives that increase school participation (West, Sweeting & Leyland, 2014). Additionally, consideration of dietary diversity in school meals addresses problems of underweight, overweight and obesity among learners.

Indirectly school meals lead to improved levels of learning through various channels; by boosting attendance, reducing 'classroom hunger', improving concentration hence productivity (Smith & Haddad, 2010).

Hunger and malnutrition in schools poses a threat to global, regional and national initiatives to ensure equitable access by all to quality education. Estimates from World Food Programme, WFP (2012) showed that there are an estimated 66 million primary school-age children who attend grades hungry across the developing world, with 23 million in Africa alone. Despite the limited information and national statistics on the levels of malnutrition in school going children in Africa, stunting and its consequences on education outcomes are of concern in most countries (Fink *et al.,* 2014).

Whereas school meals improve the immediate nutritional intake of children (Jacoby, 1997; Afridi, 2005) and school participation rates (Drèze & Goyal, 2003), most of the studies have been conducted in primary rather than secondary school setting. In effect there are few studies such as (Kissa Kulwa & Kolsteren, 2015) documenting the effect of dietary adequacy on nutritional status especially in resource constrained setting of Africa.

In Uganda, 66% of Uganda children are reported to be attending secondary school hungry mainly due to failure of parents/guardians/school to satisfactorily meet their responsibility of feeding their children while at school (GOU, 2017).

This problem compromises the gains from education and realization of other national goals, aspirations and targets including Uganda Vision 2040 and commitments enshrined in Sustainable Development Goals (SGDs) 2015-2030.

Therefore, the aim of the study was to assess dietary adequacy and nutritional status of learners in Kampala City, Uganda.

1.2 Problem statement

Optimal diets in children boost education and improve their nutritional status. In effect, a daily meal is an incentive to keep children in schools and it allows them to concentrate on their studies (Drake, Burbano & Bundy, 2015). On the other hand, schools provide a huge opportunity to reset norms about healthy diets and good nutrition practices (IFPRI, 2016) and enable learners to increase control over the determinants of health (Greenburg *et al.,* 2012). In Africa and Uganda in particular, hunger among school learners is a problem affecting their quality of education outcomes and nutritional status. WFP (2012) report, estimated that 23 million learners in Africa attended school hungry, while in Uganda 66% of learners were reported to be attending school hungry in 2017 (GOU, 2017). The magnitude of the problem could even be higher than is reported given the challenge of limited information on nutritional status of learners. In a situation where learners are not fed at school, they experience short-term hunger. This problem is faced by more than 50% of adolescents (UBOS, 2017). Adverse effects on learning and nutritional status due to temporary hunger are common in children who are not fed before going to school (WFP, 2014).

Therefore, given the limited information on nutritional status and diet in secondary schools in Uganda, it was of the essence to understand the extent to which dietary adequacy, nutritional status and health and nutrition education activities relate in Kampala schools.

The study was motivated to assess dietary adequacy, nutritional status and health and nutrition education activities of learners in Kampala City with a view of understanding the situation of diet adequacy, nutrition and health education activities and nutritional status related phenomena in urban setting.

1.3 Study objectives

1.3.1 General objective

The main objective of this study was to assess diet adequacy, nutrition and health education and nutritional status of learners in Kampala City, Uganda.

1.3.2 Specific objectives

The specific objectives of the study were to:

(i)   Assess the nutritional status and associated factors among adolescent learners in Kampala city.

(ii)   Establish the existing school menu options and adequacy of diet accessed by learners in Kampala city.

(iii)   Identify nutrition and health education activities emphasised in schools in Kampala city.

1.4 Research questions and indicators

Table 1 below links the research objectives to research questions and indictors.

Table 1: Research questions and indicators

S/No	Objective	Research question	Indicators
1	Assess the nutritional status and associated factors among adolescent learners in Kampala city	How does the nutritional status of learners vary among adolescent learners in Kampala city? What are the associated factors that define nutritional status?	• Body Mass Index for learners • BMI Z scores for learners. • Proportion of learners who are underweight • Proportion of learners who are overweight and obese
2	Establish existing school menu options and the adequacy of diet accessed by learners in Secondary schools in Kampala city.	To what extent are adolescent learners accessing meals of the desired frequency and quality at school?	• Number of meals eaten at school daily • Nutritional quality of food provided to learners • Diversity of meals and diet provided to learners
3	Identify the nutrition and health education activities emphasised in schools in Kampala city	What nutrition and health education activities are emphasised in secondary schools in Kampala city?	• Nutrition and health education activities carried out in schools • Health screen screenings carried out in schools • Water, sanitation and hygiene practices in secondary schools

1.5 Justification of the study

In Uganda, the prevalence of wasting due to poor nutritional status is 32.9% and 14.3% for schooling adolescent girls and boys respectively (Bibiana, 2015). Despite the fact that good nutrition maintains a healthy weight, absolute number of learners unable to access recommended calories has increased in secondary schools, uneven distribution of food, access constraints related to seasonality factors, poverty, inequality in wealth and diseases.

Despite policy guidelines about school feeding that were adopted in 2013, theses policy guidelines have never been tested and fully implemented. There is no clear programme and policy on dietary diversity being followed in secondary schools. This research therefore builds on the efforts to further strengthen the school feeding and nutrition policy environment.

1.6 Conceptual framework

The independent variables in this study included; dietary adequacy and nutrition and health education activities. The dependent variable was nutritional status which was measured in terms of Body Mass Index (BMI) based on height and weight of learners. The conceptual framework below shows the relationship between the independent variables, and the dependent variables.

Independent Variables

Dependent Variable

Dietery Adequacy
- Number of meals
- Dietery diversity score

Nutritional Status
- Body Mass Index
- BMI Z scores
- Proportion of underweight learners
- Proportion of overweight and obese learners

Health and nutrition education Activities
- Health screenings
- Physical exercises
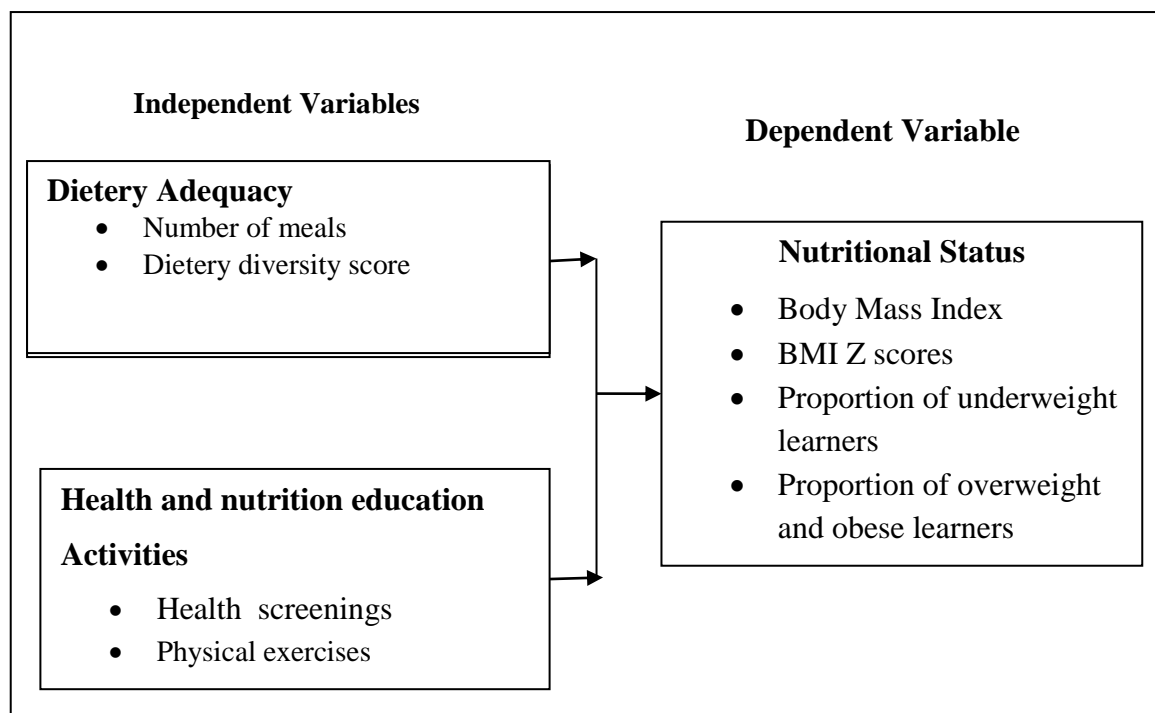
Figure 1: Conceptual Framework

Source: Adapted with amendments from Bond *et al.,* (2014)

Dietary diversity considers the quality of foods provided to the learners on a daily and weekly basis. The more the food varieties consumed by learners, the richer the diet and the better the nutritional status. Learners' lifestyle like doing physical exercises also influences their diet which in turn affects their nutritional status (Caniello *et al.,* 2016).

Nutrition and health education improves the knowledge of learners regarding their feeding and life style   hence influencing the food varieties provided to learners by school administrators. This enables learners to change their way of living and adopt a healthier lifestyle which improves their nutritional status (Adekunle, 2005).

Physical activity programmes like aerobics grades, basketball leagues, or walking or jogging clubs, health education and health counselling for learners can be provided when there are favourable health policies which also affect the learners' nutritional status (Stewart-Brown, 2006).

Nutritional status is considered an outcome of biological processes that involve food utilization. Normal nutritional status is associated with a number of improved outcomes such as nutrient adequacy, anthropometric indices and improved haemoglobin concentration (Azadbakht & Esmaillzadah, 2010).

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Dietary diversity

2.1.1 Definition

Dietary diversity has been continuously gaining popularity in developing countries, mostly among those affected severely by childhood hunger and malnutrition. It is the number of different food groups consumed over a reference period and it is measured using four methods, namely; Food variety score, Dietary diversity score, DDS-half serving and Dietary serving score (FAO, 2011). Healthy growth and development essentially need a balanced diet of nutrients and vitamins which includes a variety of foods from different food groups (vegetables, fruits, grains, and animal source foods).

Dietary diversity can be measured at the household or individual level. Most often it is measured by counting the number of food groups rather than the food items consumed (FAO, 2017). At the household level, dietary diversity is usually considered as a measure of access to food (e.g., of households' capacity to access costly food groups); while at the individual level it reflects dietary quality. Although the reference period can vary, it is most often the previous week. Dietary diversity provides insights into household access to a variety of foods and can be used as a proxy for nutrient adequacy of individuals (Kennedy, 2011).

An increase in individual dietary diversity score is related to increased nutrient adequacy of the diet.

Eating healthy consists of a balanced and varied diet that constitutes; fresh and natural foods, fruits and vegetables and foods containing vitamins and minerals (WHO, 2006). It also includes

practices of good eating behaviours and habits that contribute to physical and psychological wellbeing. However, diets during adolescence are compromised by low socioeconomic status and food insecurity (Wassie, 2005).

2.1.2 Dietary Diversity and learning in schools

Food for education programmes promote dietary diversity by aiming at enhancing the concentration span and learning capacity of learners through providing different food groups in schools to reduce short-term hunger that may otherwise impair learners' performance (Adelman, Gilligan, & Lehrer, 2008).

These programmes exist in 70 of the 108 low- and lower-middle income countries, with most of them having been initiated and funded by the World Food Programme. Some of these programmes have evolved and been adopted nationally while others still rely on financial assistance with funding from WFP and its development partners in varying degrees (Caldes & Ahmed, 2004).

Paying attention to the nutritional requirements of adolescents is vital in ensuring healthy and productive lives. Adequate nutrition through diverse diets provides an opportunity to correct the deficits suffered in childhood by providing adequate stores of energy to prevent chronic diseases and obesity (WHO, 2006).

Dietary diversity intake provided during the critical period of rapid growth has the potential to reduce morbidity and mortality associated with pregnancy and delivery and reduces the risk of delivering low birth-weight babies, consequently preventing an intergenerational cycle of malnutrition (Azadbakht & Esmaillzadah, 2010). Dietary diversity has also shown a positive impact on adolescents' education capacity. It is recommended that adolescents should eat from a

variety of foods (low fat animal products, fruits, vegetable, grains, and staples), drink plenty of water, and should avoid high consumption of sugars.

Different food groups provide an important nutritional intervention during an often over looked critical growth period. By providing different food groups at school, there are two advantages. One of which is well-timed school meals alleviate short-term hunger, possibly improving learners' ability to concentrate and learn, secondly, they provide an incentive for school attendance directly to the child (Caldes *et al.,* 2004). Therefore, the impact of in-school dietary diversity on learning appears to operate both through improvements in school attendance and through better learning efficiency while in school.

Thus, well-run programms that provide reasonably nutritious meals should have positive impacts on school participation, learning, and learner dietary intake. However, the size of these effects depends on various programmatic and contex**t**ual factors. In some cases, they may be small or even null (Averett & Stifel, 2007).

In addition, Smith and Haddad (2010) reported that children aged between 6 and 11 in food insecure households scored lower on arithmetic tests, were more likely to have repeated a grade, and had difficulty getting along with other children. Kaestner and Grossman (2009) found out that children in the top and bottom of the weight distribution had lower achievement test scores than those who were in the middle of the weight distribution. Boys and girls who were in the lowest (0-5 percentiles) tail of the weight distribution had achievement test scores that were approximately 4-6 percent (10% of a standard deviation) lower than similar children in the middle of the weight distribution. In fact, they found consistent evidence of low weight effect than a high weight effect.

Food insufficiency is a serious problem affecting children's ability to learn. Offering a healthy diet is an effective measure to improve academic performance and cognitive functioning among undernourished populations. The long-term effects of eating different meals on the performance of learners who do not have physical signs of severe undernourishment are less certain (Owusu *et al.,* 2007).

2.2 Nutritional status determinants among adolescent learners

Adolescence, a period of transition between childhood and adulthood, occupies a crucial position in the life of human beings (WHO, 2002). Nutritional assessments among adolescents are important as they are the future parents and constitute a potentially vulnerable susceptible group to malnutrition.

Nutritional status is now recognized to be a prime indicator of the health of adolescents and the ultimate objective of nutritional assessments is the improvement of human health (Medhi *et al*., 2006). The prevalence of under nutrition is a major public health concern in many of the developing countries. Due to its immense population size, socio-economic disparities, illiteracy and inadequate access to health facilities. As a result, assessments of nutritional status have the potential to play significant roles in formulating developmental strategies in this country. Anthropometry is the single-most universally applicable, inexpensive and non-invasive technique available to researchers for the assessment of body size and proportion (WHO, 2002).

This technique has been widely utilized to assess the nutritional status of individuals belonging to different Indian and non-Indian communities (Chowdhury *et al.,* 2008).

The nutritional status of the adolescent girls is key as they are the future mothers, significantly contributing to the nutritional status of the community (Venkaiah et al, 2002). Inadequate

nutrition in adolescence can potentially retard growth and sexual maturation, although these are likely consequences of chronic malnutrition in infancy and childhood. Inadequate nutrition in adolescence can put them at high risk of chronic diseases particularly if combined with other adverse lifestyle behaviours (Panda, 2000).

2.3 School meals accessed by learners in Uganda

Up to eight million children attend school in Uganda, however the largest proportion go hungry, with only 33% of the children receiving meals at school. This has implications on cognitive development, school performance and achievement (WHO, 2016). Urban school children (41%) received school meals in comparison to their rural counterparts (32%) while 66% of learners were not feeding at school (UDHS, 2016). Most of this feeding is provided through parental contribution.

The Government of Uganda through the Ministry of Education and Sports recognizes that feeding is an essential component of a child friendly school as it improves physiological growth, school enrolment, learning and overall cognition.

2.4 Health and nutrition benefits of school meals

Different food groups taken adequately influence the cognitive ability of learners, their growth and development throughout the adolescence stage. Girls in secondary level especially need adequate calcium intake to reach peak bone mass and to minimize bone loss during menopause (WHO, 2004).

Bultenheim *et al*., (2011) noted that adequacy of balanced meals containing basic nutrients, such as carbohydrates, fats, and proteins, are the basis of all life activities. They constitute the carbon skeleton of various functional molecules and provide energy through oxidative decomposition.

Overweight, obesity and nutrition related NCDs especially absorption and storage of energy, can not only affect health but also cause many diseases such as Diabetes mellitus, cardiovascular disease, obesity, hypertension, and hyperlipidaemia.

Further, over nutrition reduces reproductive capacity and promotes the development of various cancers that will seriously affect quality of life, survival, and reproduction in human beings (Venkaiah *et al.,* 2002).

2.5 Nutrition and health education activities emphasized in schools

Nutrition education is a mechanism to enhance awareness, as a means to self-efficacy, surrounding the trigger of healthy behaviours (Stewart-Brown, 2006). Nutrition education contributes to all the pillars of food and nutrition security, but is mainly concerned with whatever influences food consumption and dietary practices: food habits and food purchasing, food preparation, food safety and environmental conditions (Grossman, 2009). It is also becoming critically necessary in countries affected by globalisation and urbanisation which are experiencing an unhealthy nutritional transition to cheap processed foods rich in sugar, fat and salt (Lamis *et al.,* 2011).

In Africa, nutrition education is coming into the limelight. It is now acknowledged as an essential catalyst for nutrition impact in food security, community nutrition and health interventions. It is also demonstrably capable of improving dietary behaviour and nutrition status on its own. Moreover, it has long-term effects on the independent actions of parents and through them on the health of their children (Lamis, Elaine & Claudia, 2011). At the same time, it is low-cost, practicable and sustainable. It also has very wide scope.

In Uganda health and nutrition education has helped in promoting healthy-eating and healthy life style. The work of nutrition educators takes place in educational institutions, health facilities, extension services, communications and public relations firms, the food industry, voluntary and service organizations (Missan, 2011).

Traditionally, the main aim of nutrition and health education is to prevent and treat nutritional deficiencies. However, when nutrition is adequate or excessive, the body faces the problems of quantitative control of the nutrient's absorption and storage (Bowman *et al.,* 2004).

Nutrition and health education focuses on encouraging balanced diet regularly and good dietary behaviours for example timely food intake, reduced snacking and consumption of energy rich foods. It also increases intake of essential micronutrients including iron, calcium and vitamin C, B and D and fibre. Skipping breakfast remains a very common practice among boarding secondary learners (WHO, 2016) while others exhibit unhealthy eating habits for example meal skipping and snacking on fast foods (Hong *et al.,* 2017).

During the secondary level period, most learners reach puberty with increased nutrient needs being similar for boys and girls at this stage (Olumakaiye, 2008). It is during puberty that body composition and biological changes (e.g., menarche) emerge which affect gender-specific nutrient needs.

Table 2: Energy and Nutrient recommendations in adolescence

Energy & Nutrient	Males			Females		
	11-14	15-18	19-22	11-14	15-18	19-22
Protein, gm	45	56	56	46	46	44
Vitamin A, ug, R.E	1000	1000	1000	800	800	800
Vitamin D, ug.	10	10	7.5	10	10	7.5
Vitamin E, T.E	8	10	10	8	8	8
Vitamin C, mg	50	60	60	50	60	60
Thiamine, mg	1.4	1.4	1.5	1.1	1.1	1.1
Riboflavin, mg	1.6	1.7	1.7	1.3	1.3	1.3
Niacin, mg, NE	18	18	19	15	14	14
Vitamin B_6, mg	1.8	2.0	2.2	1.8	2.0	2.0
Folacin, ug	400	400	400	400	400	400
Vitamin B_{12}	3.0	3.0	3.0	3.0	3.0	3.0
Calcium, mg	1200	1200	800	1200	1200	800
Phosphorous, mg	1200	1200	800	1200	1200	800
Magnesium, mg	350	400	350	300	300	300
Iron, ug	18	18	10	18	18	18
Zinc, mg	15	15	15	15	15	15
Iodine, ug	150	150	150	150	150	150

Source: Laftah *et al*., (2009).

Unfortunately, the dietary behaviours of a large proportion of secondary learners deviate from the recommended intake and increase their risks of nutrition-related health problems. Healthy eating habit among learners is essential for healthy growth, cognitive development and other aspects of health and wellbeing. In addition, adaption of healthy eating habit has been linked to reduced risk of chronic diseases in their future life (Smith & Haddad, 2010).

2.6 Prevalence of malnutrition among adolescents

The global prevalence of underweight (thinness) among children and adolescents defined as less than 2 SDs from median for Body Mass Index (BMI) by age and sex – is 8.4% for girls and 12.4% in boys. Prevalence has not declined much in the past 3 decades. The prevalence of moderate and severe underweight is highest in South Asia; one in 5 girls aged 5–19 years and nearly one-third of their male peers are underweight. According to the Global School-Based Learner Health Survey, about 4% of girls aged 13–15 years are underweight, although more than 10% of surveyed girls were underweight in Mauritius, Sudan, Bangladesh, Maldives, Cambodia, and Vietnam (Afridi, 2005).

In 2016, the mean BMI estimates for youths aged 10–19 in South Asia, Southeast Asia, East Africa, West Africa, and Central Africa were <20 for both male and female adolescents. The lowest BMIs were seen in Ethiopia, Niger, Senegal, India, Bangladesh, Myanmar, and Cambodia. While the lowest mean BMIs for children (aged 5–9 years) are found in East Africa, the lowest mean BMIs in adolescence are found in South Asia (Fink *et al.,* 2014).

Globally, the prevalence of obesity (BMI >2 SD BMI-for-age z score) has risen from <1% in 1975 to more than 5% in girls and nearly 8% in boys age 5–19 in 2016. Obesity has increased in all regions of the world, with the largest proportional increase in southern Africa–about 400% per decade from very low levels of 1975.

More than one in 4 adolescents are overweight or obese in most of countries in the Eastern Mediterranean, Western Pacific, and the Americas regions (Avula *et al.,* 2015). The burden of high-fasting plasma glucose and diabetes mellitus (types I and II) increases with age throughout the young adult period, and the burden of these diseases is highest among adolescents in Middle

East and North Africa and the Latin America and Caribbean regions. Overweight, obesity, and poor metabolic profile in adolescence are associated with chronic disease and mortality later in life (Drèze & Goyal, 2003).

Although the prevalence of overweight and obesity has increased globally, the prevalence of underweight has remained somewhat stagnant in recent decades. Thus, the global distribution of BMI has widened. Furthermore, the global burden of moderate or severe underweight remains higher than that of overweight and obesity. This is especially stark in South Asia and Sub-Saharan Africa where the prevalence of underweight is much higher than that of overweight and obesity (FAO, 2017).

2.7 Consequences of malnutrition on adolescent health

Adolescents, comprised of 10–19-year-olds, form the largest generation of young people in our history. There are an estimated 1.8 billion adolescents in the world, with 90% residing in low- and middle-income countries. The burden of disease among adolescents has its origins in infectious and injury-related causes, but nutritional deficiencies and under nutrition are major public health problems, even as overweight may be on the rise in many contexts (Ijarotimi & Ijadunola, 2007).

Stunting in adolescence reflects poor nutrition, infection, and environmental stress accumulated from the foetal period through young adulthood (Medhi, Barua & Mahanta, 2006). Limited data regarding adolescent stunting has been published to date, as BMI estimates have been favoured as a reporting metric for children and adolescents (GAIN, 2017).

Micronutrient deficiencies are a leading, underlying risk factor contributing to the global burden of disease. Iron deficiency and iron deficiency anaemia account for the majority of disability-

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adjusted life years (DALYs) associated with micronutrient deficiencies (>2,500 DALYs per 100,000 adolescents) (Grossman, 2009).

The prevalence of iron deficiency and iron deficiency anaemia is higher among adolescent females than males; more so among lower social development index (SDI) countries. Iodine deficiency contributes substantially to the burden of micronutrient deficiencies, and it is also more common among female adolescents. The prevalence among young adolescent girls in low SDI countries is 3.4%, and it is 4.6% among older (15–19 years) female adolescents (Ahn, Juon & Gittelsohn, 2008).

Vitamin A deficiency (VAD) contributes to relatively few DALYs in this age group, but this merely reflects the low burden of night blindness associated with VAD as this is the only symptom that contributes to DALYs.

The prevalence of VAD using biochemical indicators is estimated to be 20% among 10–14-year-old girls and 18% among 15–19-year-old girls in low SDI countries. In 2015, global estimates suggested that the burden of vitamins B, C, D, and calcium, zinc, and selenium, combined are relatively low, although this is based on somewhat few population-based micronutrient surveys (Drake *et al.,* 2015).

<div align="center">**CHAPTER THREE**</div>

3. METHODOLOGY

3.1 Study area and settings

The study was performed in non-boarding secondary schools in Kampala city, specifically in the Divisions of Kampala Central and Kawempe.

Kampala Central division includes the areas of Old Kampala, Nakasero and Kololo. These areas are the most upscale business and residential neighbourhoods in the city. The division also incorporates low-income neighbourhoods of Kamwookya, Kisenyi and Kampala's Industrial Area. The coordinates of the division were: 0°19'00.0"N, 32°35'00.0"E (Latitude: 0.316667; Longitude: 32.583333). The division comprises about 20 parishes. Some of the parishes included; Bukesa, Civic Centre, Industrial Area, Kagugube, Kamwokya I, Kamwokya II, Kisenyi I, Kisenyi II, Kisenyi III, Kololo, Mengo, Nakasero, Nakivubo, Old Kampala among others.

Kawempe Division is in the North Western corner of the city, bordering Wakiso District to the West, North and East, Nakawa Division to the South-East, Kampala Central to the South, and Lubaga Division to the South-West. The coordinates of the division are 00 23N, 32 33E (Latitude: 0.3792; Longitude: 32.5574). The neighborhoods include: Kawempe, Kanyanya, Kazo, Mpererwe, Kisaasi, Kikaya, Kyebando, Bwaise, Komamboga, Makerere, Mulago, Makerere, and Wandegeya. Kawempe Division is the largest division in Kampala, with an estimated population in excess of 265,000 according to 2002 population census. Kawempe Division has a high mortality and morbidity burden compared to the other four divisions in the city.
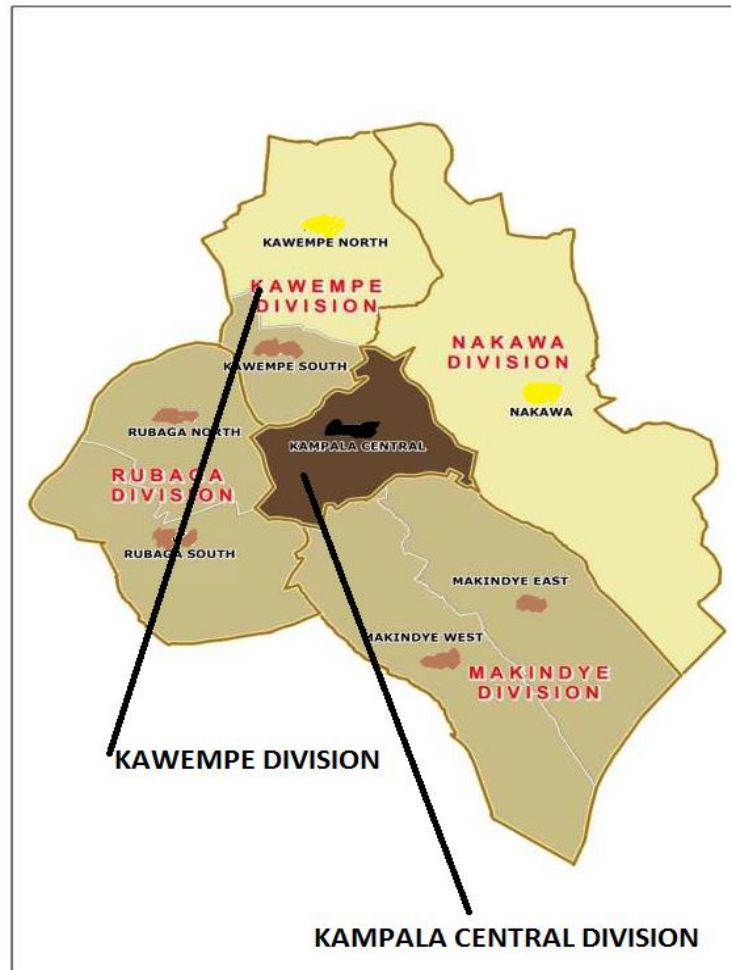
Figure 2: Map of Kampala City showing the location of the sampled Divisions.

3.2 Research Design

The study employed a cross-sectional and descriptive study design with mixed methods; qualitative and quantitative. The choice of design was mostly premised on resource constraints and the need to maximise on a representative sample size with minimum economic implications. As Rowley (2002) noted, cross-sectional design saves time and improves the accuracy of the information obtained.

As such, the scope of two divisions was considered so as to provide information to inform future studies and interventions.

3.3 Study population

The study population consisted of school going adolescents in non-boarding Secondary Schools in Kampala City. It included both boys and girls drawn from all grades of secondary level education; senior one to senior six.

3.4 Determination of the Sample size

Sample size for the secondary adolescent learners was determined using the Kish Leslie formula:
Where:

$$N = \frac{z^2 pq}{d^2}$$

Where N = the required minimum sample size

Z is a constant =1.96 at the 95% Confidence Interval.

P = prevalence of overweight and obesity among adolescents as indicators related to nutritional status of learners. A 16.5% prevalence of overweight and obesity among adolescents reported in the Uganda Demographic and Health Survey (UDHS) report of 2016 (UBOS & ICF, 2018) was used a suitable prevalence estimator to compute a representative sample size.

q = 1-p

d = 5% confidence which is 0.05

The prevalence of malnutrition among secondary school adolescents is 13%.

$$N = \frac{(1.96)^{2*} 0.165*(1-0.165)}{(0.05)^2}$$

N = 211.7 = 212 respondents.

In order to cater for possible non-response, the sample size was increased by 13.2% giving a target 240 respondents. This percentage was used as reported by (Naing, 2006) to cater for non-response rate in such a study.

Given the mixed methods design, two (2) key informants were considered for an interview in each selected school, making a total of twenty-four (24) key informants who all participated in the study.

3.5 Sampling techniques and procedures

3.5.1 Criterion-based sampling of divisions in Kampala

Criterion-based sampling was used in the selection of schools where by Kampala Central division was selected as it is the urban division that is highly commercial and regarded as the Central Business District (CBD). It provides market access to most foods needed for dietary diversity bought in markets. On the other hand, Kawempe Division was selected on the basis that it is also in urban division but highly residential with access to both farm and market foods (KCCA, 2018). This provided a rationale for selecting schools so as to understand school food environment in the central and periphery of the city.

3.5.2 Simple random sampling of schools and participants

The study involved simple random sampling and adopted multi-stage simple random sampling procedure in the selection of study learners. The first stage involved listing of all secondary schools in the two divisions of Kampala and selecting six schools from each division.

The schools that were selected from central division included; Kololo Secondary School, Old Kampala Secondary School, Kampala Secondary School, Kololo High School, City High School and Ahmadiyya Muslim High School. The schools were all randomly selected for the study. The schools that were selected from Kawempe division include; Emma High School, Devine High School, Caltec Academy Makerere, Pimbas Secondary School, Praise Integrated High School, Oxford Muslim High School.

The second stage involved categorization of learners by their respective class level and by sex to ensure equal representation of both boys and girls. To prevent bias, random numbers were given to boys and girls from each class independently and those who picked the unique numbers for inclusion were enrolled into the study. A total of 10 boys and 10 girls from each school were targeted hence a total of 20 learners per school and 240 in the entire Kampala City.

3.5.3 Purposive sampling of school administrators

Purposive sampling was used in the selection of two (2) key informants per school hence a total of twenty four (24) key informants. Key informants were the Head teacher of the school and the teacher in charge of health and nutrition activities.

3.6 Inclusion and exclusion criteria

3.6.1 Inclusion criteria

All non-boarding secondary schools in Kampala city's Central and Kawempe divisions had a chance to participate in the study.

3.6.2 Exclusion criteria

This study excluded boarding secondary schools as well as learners who did not have parental consent to participate in the study and those with special health conditions like heart disease and blood pressure. For purposes of gender sensitivity, the study also excluded all single sex secondary schools in the two divisions.

3.7 Data collection methods

3.7.1 Assessment of school meals

Using structured interviews, school meals were assessed for dietary diversity and variety of foods consumed, frequency of meals, foods commonly availed and procured at the school canteen and methods of food preparation commonly used. Interview appointments were secured following establishment of rapport with the school authorities during the pre-visit. An interview schedule for the schools was then drawn to ensure appointment dates for each school were honoured.

3.7.2 Nutritional status assessment of learners

This involved use of anthropometry assessment of weight and height for categorization of Body Mass Index (BMI) using the Z-score classification system. Weight and height were assessed to the nearest one decimal place. Age for each learner was recorded in months to facilitate analysis of BMI z scores.

3.7.3 Assessment of nutrition and health education activities

Key informant interviews applied to the head teacher and teachers responsible for health and nutrition matters. They were used to identify existing school nutrition and health education and activities and their routineness, health and nutrition services offered to learners as well as challenges affecting nutrition and health education in schools. Where available, term-based activity plans were observed to identify scheduling of nutrition and health education activities/

3.8 Data collection tools and standardization

3.8.1 Structured questionnaire

A structured questionnaire for adolescents was used (Annex 1). It included sections on: socio-demographic characteristics, dietary diversity and nutrition and health education. The tool was pre-tested on 10 learners in one of the schools to adapt the questions for the required purpose.

3.8.2 Anthropometric tools

The height board was important for measuring the height of learners and measurements were read to nearest 0.1cm. Two persons were used to assist in height taking as per the standard procedure. The measurements were taken twice and the average figure was the one considered to minimise errors.

Digital weighing scale was important to record body weight in kilograms to the nearest 0.1 kg. The digital weighing scale was calibrated to zero before each measurement was taken. The measurements were taken twice and the average figure was the one considered to minimise errors.

3.8.3 Key informant interview guide

The purposively selected key informants were engaged in in-depth interviews using an interview guide (Annex 2 and Annex 3). The targeted persons were the Head teacher and the teacher in-charge of food and nutrition matters.

3.9 Data analysis

3.9.1 Body Mass Index determination and classification

Computation and categorization of BMI was done. BMI Z-scores is a proxy for nutritional status. The BMI was calculated as a ratio of weight in kilogrammes and height in meters squared. The obtained BMI was read on the BMI Z score chart for age and sex to report the nutritional status category. WHO Anthroplus was also used in analysing the anthropometric data (WHO, 2009).

The procedure to calculate and categorise BMI z-scores for each learner are shown in Table 3 below.

Table 3: BMI Z-Scores and categorization

BMI Z-Scores	Category
Less than -2SD	Underweight
-2 to 2SD	Normal nutritional status
2SD to 3SD	Overweight
3SD and Above	Obese

3.9.2 Scoring dietary diversity and food varieties consumed

Dietary diversity is the number of different food groups consumed over a reference period (FAO, 2011). In this study, a one week recall period was used.

Given that there is no standard food group in Uganda, dietary diversity score was scored using 11 food groups (Cereals, vegetables, Starchy roots and tubers, Legumes/nuts, fruit and juice/fruits, milk and milk products, meat, fish, fats and oils, confectionaries and bottled or canned drinks). Each food consumed was scored as one giving a total of 11 scores (Megan A McCrory, 1999). Confectioneries, refined sugar and condiments were considered as one food

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group Food Variety Score (FVS) was got by adding the individual number of foods consumed by learners in a period of one week.

3.9.3 Statistical analysis

Statistical analysis was performed to test association between variables. Using the 95% confidence interval, chi-square test applied for analysis between categorical variables, ANOVA techniques applied for mean differences while Pearson correlation coefficient were used for continuous variables. Statistical significance was reported at $p < 0.05$. Tables, pie-charts, frequencies and percentages were employed in presenting and analysing data. The BMI z scores and BMI Z score curves were obtained using WHO Anthro plus of 2007, while Microsoft office excel was used in presentation of bar graphs.

3.9.4 Content analysis

This was employed in the analysis of the qualitative data that was obtained from key informants. This data was transcribed, edited, coded organised into thematic topics to ensure that right content was considered and included in the report.

3.9.5 Triangulation of qualitative data

Qualitative data was analysed using triangulation whereby information was transcribed, coded and arranged under thematic topics and factors relevant to the study based on the various issues being investigated. Where necessary, quotes from respondents were used to strengthen the interpretation.

3.10 Ethical considerations

The study was approved by Uganda National Council for Science and Technology (Annex 4). It was also cleared by Makerere University College of Humanities and Social Science Research Ethics Committee (MAKSS REC) (Annex 5) and Kampala City Council Authority (Annex 6). An introductory letter was obtained from Kyambogo University Graduate School (Annex 7).

Separate information sheets and consent forms were deployed targeting the learners (Annex 8 and 9), key Informant (Annex 10) and guardians of the learners (Annex 11). These helped to obtain consent from learners, ascent from guardians and consent of key informants respectively. Confidentiality and other requirements emphasized in the Helsinki Declaration on Health and Medical Research were adhered to at all levels.

CHAPTER FOUR

4. RESULTS

4.1 The socio-economic and demographic characteristics of the respondents

Information from 205 learners was analysed out of 240 that were targeted hence a response of 85.4%. Table 4 shows that 95 (46.3%) learners were from Kampala Central Division while 110 (53.7%) were from Kawempe Division as shown in Table 4 below.

Table 4: Participants and divisions selected

Divisions	Frequency	Percent
Kampala central division	95	46.3
Kawempe division	110	53.7
Total	205	100.0

Table 5 below shows that 53.7% of respondents were females, while 68.8% were aged between 15 to 19 years. Less than half of the respondents (32.2%) had parents educated up to college or university level. The mean (SD) age of respondents was 15.6 (1.6) years with boys having an average of 15.8 (1.6) years and girls 15.4 (1.6).

Table 5: Characteristics of the respondents

Variable	Characteristics	Mean (SD)	Frequency	Percentage
Sex of respondent	Boys		95	46.3
	Girls		110	53.7
Parents' education level	None		2	1.0
	Primary		8	3.9
	O level		62	30.2
	A level		61	29.8
	College and University		66	32.2
	Do not know		6	2.9
Parents' main income source	Peasant		6	2.9
	Business		75	36.6
	formerly employed		52	25.4
	Self Employed		72	35.1
Parents' marital status	Single		15	7.3
	Married		143	69.8
	Divorced		38	18.5
	Deceased		9	4.4
Class of respondent	S1		42	20.5
	S2		33	16.1
	S3		33	16.1
	S4		28	13.7
	S5		41	20.0
	S6		28	13.7
Age of learners	All	15.6 (1.6)		
	Boys	15.8 (1.6)		
	Girls	15.4 (1.6)		
Household size		6.2(2.3)		

4.2 The nutritional status of adolescent learners based on BMI

4.2.1 Body Mass Index Z-score categorization

The results indicated that a majority of the respondents (80.5%) had normal nutritional status between -2 to 2SD, 11.7% were underweight (less than -2SD), 5.9% were overweight (between 2SD to 3SD) while 1.9% were obese as shown in the Table 6.

Table 6: Body Mass index Z score categories of learners

Status	BMI-Z Scores	Frequency	Percentage	Mean (SD) BMI Z scores
Underweight	Less than -2SD	24	11.7	-2.1(1.67)
Normal weight	-2 to 2SD	165	80.5	1.6(1.7)
Overweight	2SD to 3SD	12	5.9	2.4(0.8)
Obese	3SD and Above	4	1.9	3.2(1.3)
Total		**205**	**100.0**	1.2 (1.4)

4.2.2 Nutritional status of learners

The results showed that majority of the learners had a normal nutritional status with females contributing the highest number than males as shown in figure 3.
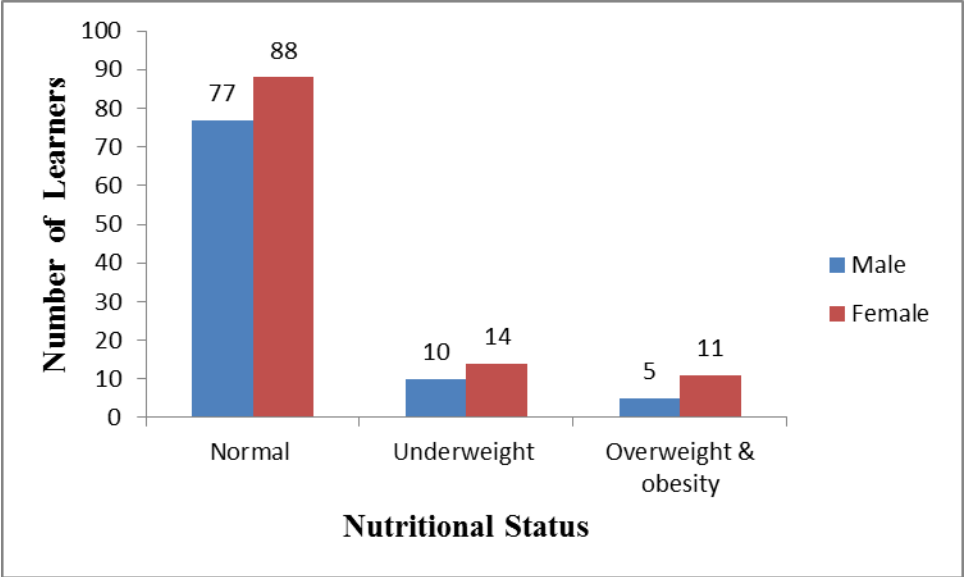
Figure 3: Learners' nutritional status categorisation

The results in figure 4 show that girls were more underweight than boys with a difference of 4 (p= 0.840) as well as overweight and obesity than boys by 6 (p = 0.240). The differences however were not statistically significant.
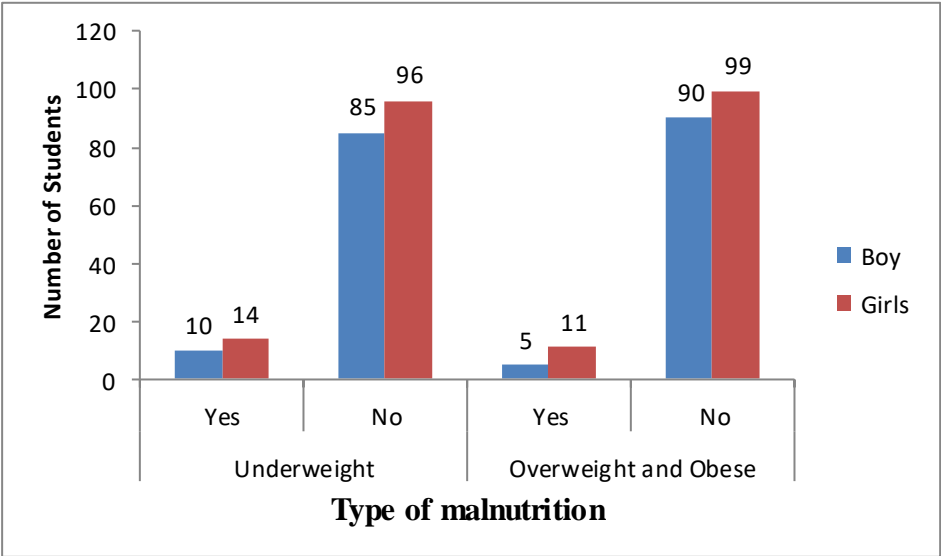
Figure 4: Underweight, overweight and obesity by learner gender

4.2.3 Body Mass Index Z-scores curves

The curves for Z-scores for both males and females were slightly normally distributed.

However, the female curve had a higher peak than the WHO standard and this implies that most of the girls over weight and obese. The males curve had a more deviation from the normal as illustrated in figure 5 below.
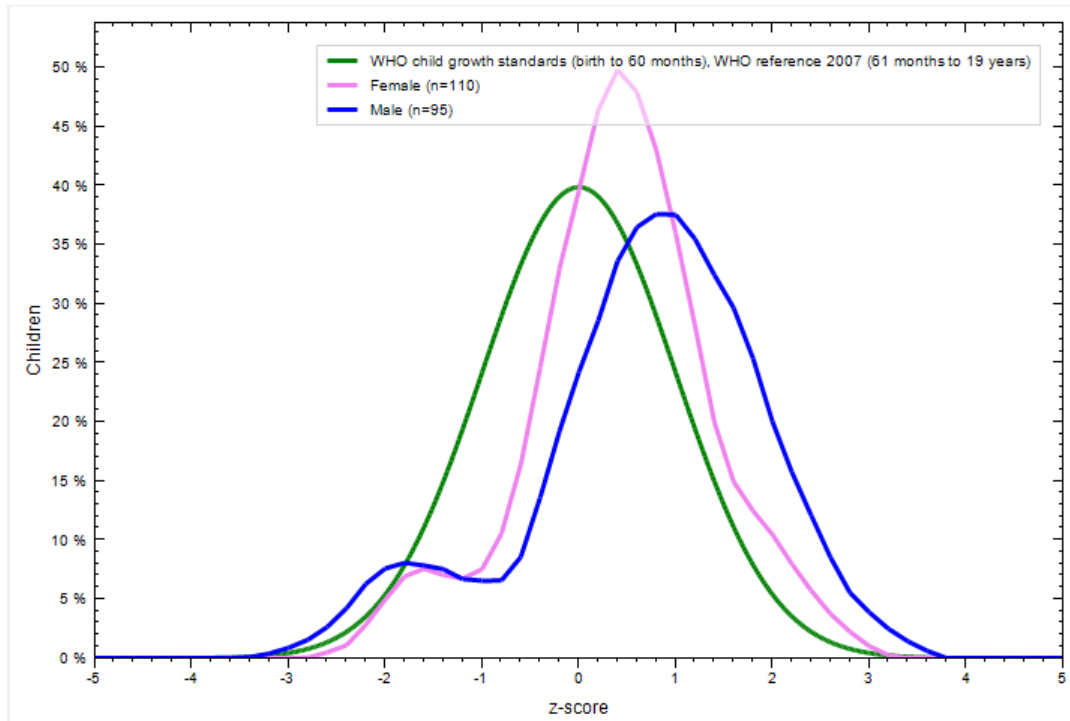
Figure 5: A Z-score curve of BMI for age by Sex

4.2.4 Differences in Body Mass Index Z-scores

There was a significant difference between mean BMI Z scores and parental level of education ($p < 0.001$) with higher means for learners who parents had higher levels of education. This implies that mean BMI of learners increases with parental level of education. There was also a significant relationship between mean BMI Z-score and class level of learner ($p = 0.031$). This implies that BMI increases with the class level of learners.

Table 7: The socio-demographic characteristics and mean BMI Z scores

Characteristics	Mean BMI Z scores (SD)	*P*-Value
Gender		
Boy	1.3(0.9)	0.312
Girl	1.5(0.5)	
Education of Parent		
None	2.1(0.7)	
Primary	1.1(0.9)	
O' Level	1.3(0.2)	0.001
A' Level	1.3(0.6)	
College and University	1.5(0.4)	
Parents' Main Income		
Peasant	-1.5(0.7)	
Business	1.1(0.6)	0.712
Formerly employed	1.6(0.4)	
Self employed	-1.1(0.3)	
Parent's Marital Status		
Single	-1.3(0.7)	
Married	1.4(0.4)	0.312
Divorced	1.7(0.6)	
Class of Participant		
S1	-1.1(0.6)	
S2	1.1(0.9)	
S3	1.4(0.7)	0.031
S4	1.3(0.6)	
S5	-1.2(0.8)	
S6	1.5(0.8)	

4.2.5 Association between Body Mass Index, age and household size of learners

There was a strong significant correlation between age and BMI (p < 0.001; r = 0.721) as shown in Table 8 below. This implies that BMI increases with age of the learners. There was also a strong significant correlation between household size and BMI (p < 0.021; r = 0.812).

Table 8: Correlation of BMI Z-score with age and household size

Variable	Mean (SD)	Mean BMI z score (SD)	r value	*p*-Value
Age	15.6 (1.6)	0.5 (1.1)	0.721	< 0.001
Household size	6.2(2.3)	0.7(1.3)	0.812	0.021

The association of household size with BMI Z-score diminished when stratified for categories of less than 5 members, 6 – 10 members and above 10 members as shown in Table 9 below.

Table 9: Household size and BMI Z-scores

Number of members in a household	BMI- Z-scores				*P*-Value
	Less than -2SD	-2 to 2SD	2SD to 3SD	3SD and Above	
Less than 5	7	50	2	1	
6 to 10	20	103	7	4	0.742
Above 10	4	5	2	0	
Total	31	158	11	5	

4.2.6 BMI and dietary diversity score correlation

There was a positive correlation between age of respondents and DDS (*P* = 0.001, r = 0.45). The results also showed positive correlation between age and FVS (*P* = 0.071, r = 0.74) as shown in Table 10.

Table 10: Relationship between age dietary diversity and food variety Score

Variables	n	Mean (SD)	r	*p*-value
Age	205	15.59(1.63)	0.45	0.001
DDS	205	6.14(2.3)	0.52	0.367
FVS	205	35.41 (11.4)	0.74	0.071

DDS= Dietary Diversity Score, FVS= Food Variety Score

4.2.7 Factors associated with nutritional status

There was a relationship between education level of the learners and overweight and obesity ($P =$ 0.012) measured at 0.05 respectively as shown in Table 11.

Table 11: BMI z scores by means of Learner's Characteristics

Characteristics	n (205)	Overweight and Obese		*p-Value*
Gender		Yes	No	
Boy	95	5	90	0.207
Girl	110	11	99	
Education/Class level				
O' Level	136	8	128	0.012
A 'Level	69	8	61	

Results further showed a significant relationship between underweight with learner educational level (p = 0.011) with more underweight among learners in Ordinary level of education, parent source of income (p = 0.002) with more underweight among learners whose parents' income source was trade and whether the learner was living with parents, (p = 0.001) with more underweight among learners not living with parents as presented in Table 12 below.

Table 12: Underweight by learners and parents' characteristics

Characteristics	n	Underweight		p-Value
		Yes	No	
Gender				
Boy	95	10	85	0.840
Girls	110	14	96	
Education level of learner				
Ordinary	136	21	115	0.011
Advanced	69	3	66	
Education of parent				
None	2	1	1	0.381
Primary and below	8	0	8	
O' Level	62	9	53	
A 'Level	61	7	54	
College/University	66	8	58	
Do not know	6	2	4	
Parents' main source of income				
Farming	6	0	6	
Trade	136	29	107	0.002
Wage	72	7	65	
Parent's marital status				
Single	15	2	13	
Married	143	19	124	0.824
Divorced	38	4	34	
Deceased	9	2	7	
Living with parents				
Yes	112	40	72	0.001
No	93	67	26	

4.3 Dietary diversity and Food Variety Scores

4.3.1 Dietary diversity scores (DDS) and its categories

The overall mean DDS in the last 24 recall hour period was 6.1 compared to 10.1 for the last 7days was 10.1(1.1). This implies that dietary diversity increases with increase in number of days.

Table 13: Dietary Diversity Score for learners

Food Groups	Last 24 hours			Last 7 days			*p-value*
	n	**Percent**	**Mean (SD)**	**n**	**Percent**	**Mean (SD)**	
0-3	30	14.6	0.3(0.8)	0	0	0	<0.001
4 -6	72	35.1	1.8(2.6)	2	1	0.05(0.5)	<0.001
7 and above	103	50.2	3.9(4.0)	203	99	10.1(1.4)	0.01
All (11)	205	100.0	6.1 (2.3)	205	100	10.1(1.1)	

SD = Standard Deviation

Furthermore, majority of the respondents (99%) consumed 7 or more food groups and 1(1%) consumed 4 to 6 food groups as the lowest. No respondent consumed 3 or less food groups. The mean dietary diversity score was 10.1 food groups. The food groups consumed in the past seven days were; cereals and grains, vegetables, starchy roots and tubers, legumes/nuts, fruit juice and fruits, milk and milk products, meat, fish, fats and oils, confectionaries and bottled or canned drinks.
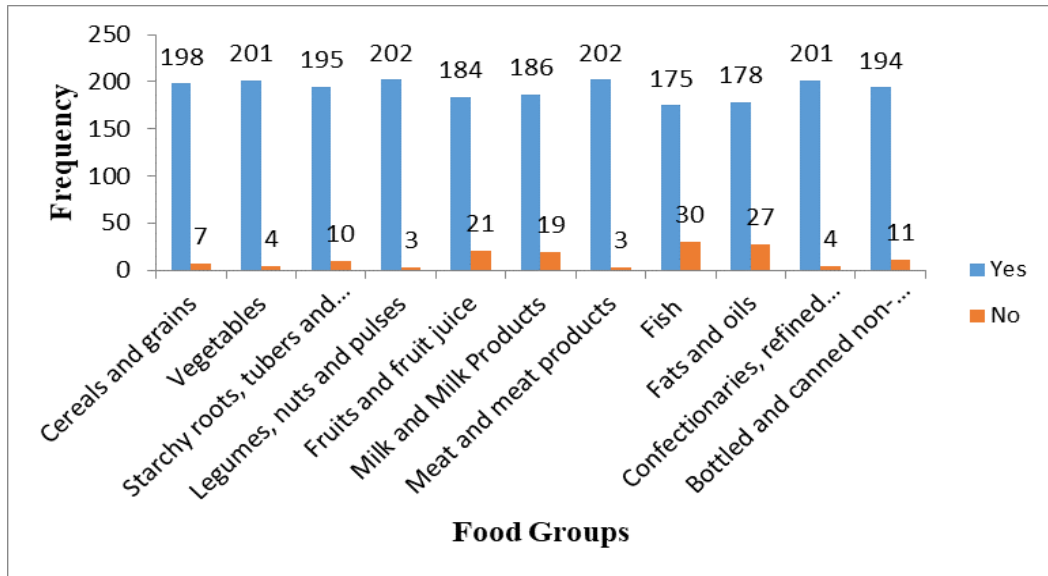
Figure 6: The foods consumed by the respondents in the past 7 days

4.3.2 Food varieties scores

Results revealed that majority of the respondents 92(44.9%) consumed between 26 to 40 food varieties weekly. The mean consumption consisted of 28 food varieties with standard deviation 8.5 as presented in table 14 below;

Table 14: Food Variety Score of learners

Food varieties	Frequency	Percentage
Less than 25	81	39.5
26 to 40	92	44.9
41 to 55	19	9.3
56 and above	13	6.3
Total	**205**	**100.0**

4.3.3 Factors associated with DDS over a seven days recall period

It was established that there was a weak positive significant relationship between Parental source of income and mean DDS ($p = 0.04$) as well as a strong positive relationship between household size and mean DDS ($p = 0.011$) as in table 15.

Table 15: Dietary diversity and demographic characteristics of learners

Variable	Characteristics	Mean (SD) DDS	*P*-Value
Sex of respondent	Male	6 (1.7)	0.07
	Female	4(1.9)	
Age of respondent	13-14	4(1.8)	0.32
	15-19	8(2.1)	
Parents' education level	None	9(2.3)	0.21
	Primary	4(2.1)	
	O level	3(1.6)	
	A level	8(2.6)	
	College/University	5(1.8)	
	Do not know	4(2.5)	
Parents' income source	Peasant	6(2.5)	0.04
	Business	9(1.5)	
	Formerly Employed	4(1.6)	
	Self Employed	7(1.8)	
Parents Marital Status	Single	6(2.1)	0.17
	Married	5(2.1)	
Household size	Less than 5	5(2.3)	0.011
	6 to 10	4(1.6)	
	Above 10	6(2.4)	

Results in table 16 below showed that there was a positive significant relationship between school breakfast and mean DDS ($p = 0.021$).

Table 16: The relationship between DDS and meal provision.

Variable	Characteristics	Mean (SD) DDS	P-Value
School Breakfast	Yes	4(2.8)	
	No	5(1.7)	0.021
Main Food Source	Dining Hall	4(2.9)	
	School Canteen	3(1.7)	
	Eat at Home	4(1.6)	
	Eat food packed from Home	6(1.6)	0.12
	Does not eat food at all	8(1.6)	
School Meals	None	5(2.2)	
	One Meal	4(1.5)	
	Two Meals	9(1.5)	0.000

4.3.4 Factors associated with food variety scores

It was established that there was a positive significant relationship between sex of the respondent and mean FVS ($p = 0.009$) as shown in table 17.

Table 17: FVS and demographic characteristics of the respondents

Variable	Characteristics	Mean (SD) FVS	p value
Sex of respondent	Male	53	
	Female	38	0.009
Parents' education level	None	41	
	Primary	38	
	O level	45	
	A level	49	0.009
	College/University	55	
	Do not know	33	
Parents' income source	Peasant	42	
	Business	31	
	Formerly Employed	39	0.592
	Self Employed	28	
Parents' marital status	Single	86	
	Married	39	0.125

4.4 Meal provision at school

4.4.1 Source of food

According to key informants' interviews, 91.7% noted that schools provided meals while 65.9% of learners noted that they did not receive breakfast at school.

Results further showed that foods mostly given to leaners on daily basis were *posho* cited by 83.3% key informants and beans cited by 91.7%. However, learners also accessed other foods like; Porridge, Maize, Rice, *Matooke*, Meat, Fish and Groundnuts on either weekly or monthly basis as shown in table 18 below.

Table 18: Status of meal provision at school

Variable	Characteristics	Frequency	Percentage
School provides meals	Yes	11	91.7
	No	1	8.3
Foods given to learners	*Posho*	11	91.7
daily at school	Beans	10	83.3
	Tea	6	50
	Maize Porridge	8	66.7

4.4.2 School menu options

It was established that majority of the schools (75%) were taking maize porridge for breakfast and 58.3% were taking *posho* and beans for lunch daily as shown in table 19.

Table 19: School menu options

Meal type	Menu type	No of schools	Percent
Break fast	Maize Porridge	9	75
	Maize Porridge mixed with milk	3	25
	Total	12	100
Lunch	*Posho* and beans	7	58.3
	Posho, beans and *matooke*	3	25
	Rice, *posho* and beans	2	16.7
	Total	12	100

4.5 Health and nutrition education activities in schools

The study established that 66.7% noted that the schools did not offer health screenings to learners, 83.3% of schools did not offer oral health screening and 83.3% did not offer height and weight measurement as shown in figure 7 below.
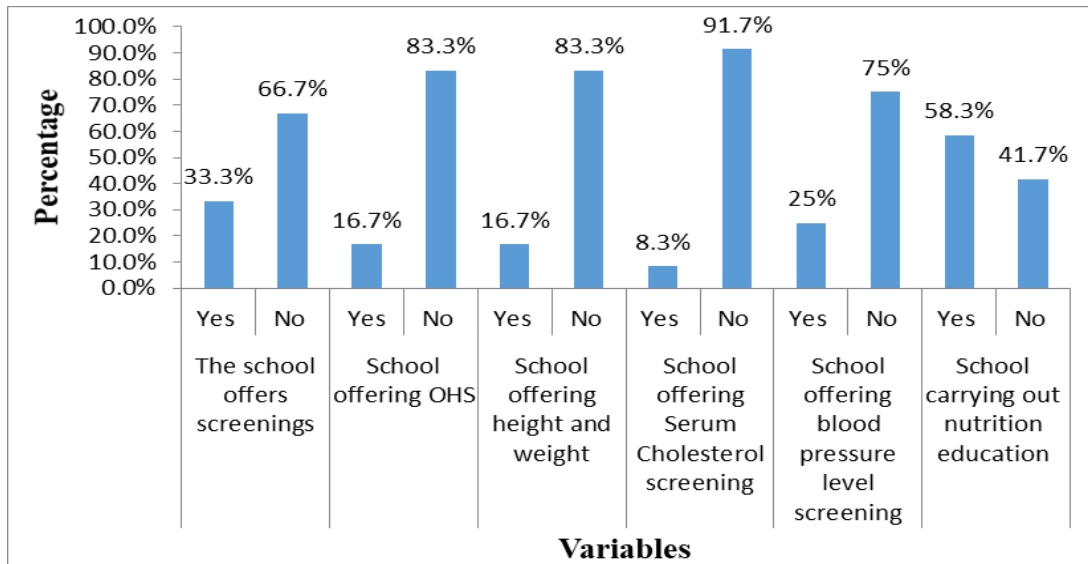
Figure 7: Learner screening Activities

A majority of the key informants (66.7%) informed us that their schools had carried out health risk appraisals for learners in the past 12 months, while 58.3% noted that school assessment for learner satisfaction with nutrition and health education programmes/activities had not been conducted in the past 12months. However, 17.5% of schools offered oral health screening and height and weight measurements as shown in figure 8 below
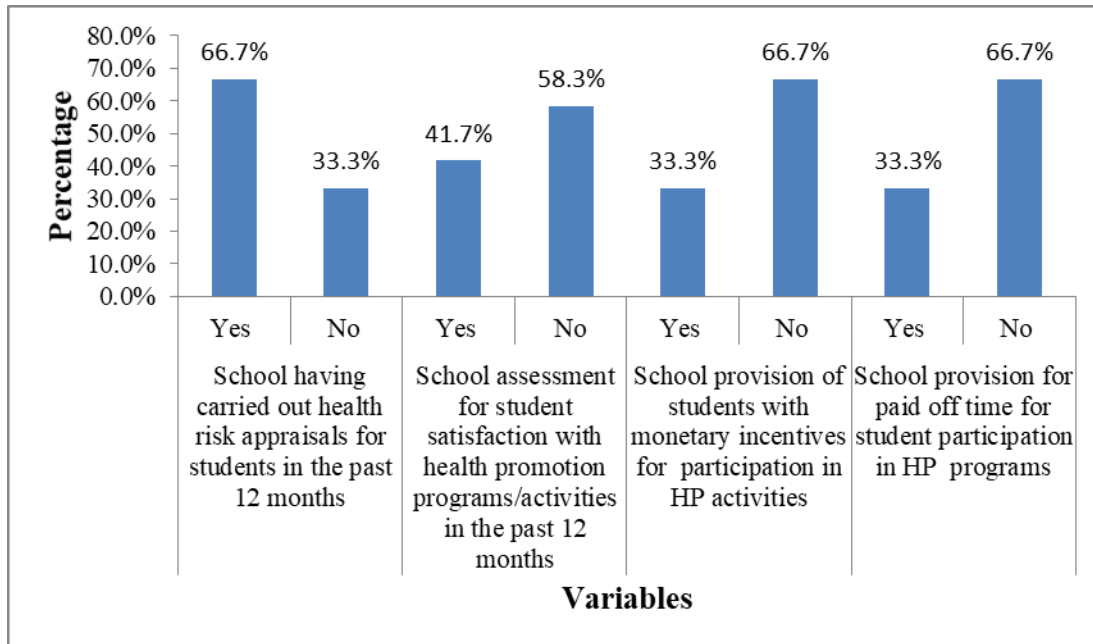
Figure 8: Learner health education activities

It was established that all schools offered nutrition and health education activities such as; emergency preparedness, physical activity and fitness, counselling and school safety education. They also had people to coordinate nutrition and health education activities/programmes in the past 12 months.

One head teacher noted that: *"The school ensures that learners participate in most of the health activities ...such activities are necessary as they help in controlling diseases that are behavioural related for example pressure and diabetes..."*

However, weight and height measurements for nutritional status assessment were not conducted due to lack of equipment and technical capacity.

Another head teacher stated that:

"We do not screen. The school lacks equipment's for conducting health screenings... those equipment are very expensive and yet not provided by the Government…"

On the same point, another head teacher opined that:

"Most of the health screenings require technical people e.g., doctors and nurses yet it is expensive for the school…there is a need for KCCA to provide these services especially regular health screening and assessment of learners"

However, some schools could not carry out nutrition and health education activities because they had a lot of work load to complete. One head teacher said that;

"We do not conduct nutrition and health education activities because of limited time…We are given lot of content on the syllabus to cover so getting time for such activities becomes difficult."

CHAPTER FIVE

5.1 Summary

This study established that that majority of the learners had a normal nutritional status with few having underweight, overweight and obesity; girls dominating in each case. There was a significant relationship between education level of learners and nutritional status (p = 0.012) with most obese and underweight learners being in ordinary level of education. Results further showed a significant relationship between parent source of income (p = 0.002) with more underweight among learners whose parents' income source was trade and whether the learner was living with parents, (p = 0.001) with more underweight among learners not living with parents.

Majority of the learners consumed 6 or more food groups in the past 24 hours with very few that consumed less than three food groups. Most of the key informants (91.7%) noted that schools provided meals while 65.9% of learners noted that they did not receive breakfast at school. Furthermore, foods mostly given to leaners on daily basis were mingled maize (*posho*) (83.3%) and beans (91.7%). However, learners also accessed other foods like; maize porridge, rice, *green banana (matooke)*, meat, fish and groundnuts on either weekly or monthly basis.

The commonly offered nutrition and health education activity in all schools was emergency preparedness, physical activity and fitness and counselling.

5.2 Discussion

5.2.1 Nutritional status and associated factors in adolescent learners

The study showed that majority of the learners had a normal nutritional status with girls having higher numbers of underweight and obese cases. These findings on nutritional status, particularly those over weight (12%) and obese (8%) among adolescents was still higher than 7% at national level (UBOS & ICF, 2018).

In this study, being underweight was more common among girls. Adolescent girls could be deliberately eating less proportions and varieties of meals due to a misconception that they will diminish their image or gain excess weight (Ornella, 2019). He further noted that learners tend to practice poor eating habits for instance skipping meals and low frequency of vegetables, fruits and fish consumption and prefer fatty foods, yet a balanced and adequate diet is essential to maintain a health and active life. Other reasons that could have contributed to more girls being underweight could have been that they were from low socio-economic status households and having a lot of workload before going to school (Haddad, 2010).

Our findings showed that nutritional status of the learners was associated with whether learners were living with their parents or not where by learners not living with their parents were more vulnerable to being underweight. Adolescents not living with their parents are more likely to suffer malnutrition challenges since child abuse is more common in such homesteads (Grantham-McGregor, 2007).

Learners whose parents were formally educated were more likely to have a normal nutritional status compared to their counter parts whose parents were peasants. This could have been associated with the fact that most peasants were of a lower social economic status, had larger

house hold size hence more people to feed (Ornella, 2019). Younger learners were more likely to be underweight since they had less nutrition knowledge hence making poor food choices (Kissa Kulwa & Kolsteren, 2015)

5.2.2 School menu options and quality of meals in accessed by learners

This study established that food groups like vegetables, legumes, nuts and pulses, meat and meat products were accessed by all learners in a period of 7 days. Learners accessed very many food groups and food varieties and this was attributed to the fact that most learners accessed foods from canteen and from home as they were purely non-boarding learners. The foods accessed contributed to improving the learners' nutritional status as the majority had normal nutritional status.

Our findings are consistent with those of Caldes *et al.,* (2004) who noted that school meals provide an important nutritional intervention during an often-overlooked critical growth period. By providing food at school during the school day, they have two advantages. First, well-timed school meals alleviate short-term hunger, possibly improving learners' ability to concentrate and learn. Second, they provide an incentive for school attendance directly to the child.

Similarly, West *et al.,* (2014) also noted that school meals are premised on expectations of significant gains in education and nutritional outcomes; in developing country contexts particularly, school meals are thought to exert powerful incentives that increase school participation.

Additionally, school meals help in addressing problems of undernourishment among learners by supplementation of household diets. It is also expected that indirectly school meals lead to improved levels of learning through various channels; by boosting attendance, reducing

'classroom hunger' and thus improving concentration, and by improving the children's overall nutritional and health status, and thereby productivity.

The high diversity scores of learners in this study are consistent with findings of Mawuse (2015) who indicated that most secondary school learners are at the peak of their growth velocity where they require large quantities of nutrients. They require twice the amount of calcium, iron, zinc, magnesium and nitrogen in their bodies as these are their key years of growth spurt as compared to that of other years in other institutions of learning. Moreover, nutrition influences the cognitive ability of learners, their growth and development throughout the adolescence stage (WHO, 2004).

Despite the emphasise of schools on cheaper sources of calories especially rice and maize, Arimond (2004) noted that diets that are predominantly starchy staples and low consumption of animal products seasonal fruits and vegetables is generally a risk factor in populations living in resource limited settings.

Furthermore, Forshee and Storey (2006) noted that adolescents are influenced by the consumption of poor-quality foods with many of them eating high-calorie foods with less nutritional value, often eating outside meal times which together with a sedentary lifestyle, increases their risk of health problems. It was observed that the most learners were snacking on wheat based products: *chapatti, samosa, biscuits and soda*. This is in agreement with Mikolajczyk, Ansari & Maxwell (2009) who noted that secondary learners lack knowledge on healthy food choices that may affect their eating habits and nutritional status negatively. Secondary learners had frequent snacking habits and had a higher frequency of fast-food consumption.

We also established that there was a positive relationship between quality of meals accessed by learners and parental level of education. Educated parents ensure to pay for meals for their children at school and this mostly includes both breakfast and lunch. This is because such parents understand the effects of school meals on performance and they also have the financial capacity to pay for such services compared to uneducated parents.

5.2.3 Health and nutrition education activities and actions in schools

The study showed that very few schools offered Oral Health Screening (OHS), height and weight measurements for nutritional status and blood pressure screening. Most schools highlighted lack of required equipment and technical capacity. This has contributed to the poor monitoring of nutritional status among some of the learners.

In spite of our findings on limited screening for health and nutrition, Adekunle (2005) noted that nutrition and health education improve knowledge of learners and school administrators on dietary diversity and health lifestyles, hence influencing foods provided to the learners. This helps learners to adopt healthier lifestyle, thus improving their nutritional status. Stewart-Brown (2006), also noted that health school policies resulting from health education influence curriculum activities carried out in schools. Activities like; aerobics grades, basketball leagues, walking and jogging improve learners' nutritional status. Therefore, schools should put emphasis on nutrition and health education.

5.3 Study limitations/ challenges

Despite the positive findings, the study faced a number of limitations. In terms of scope, two out of the five divisions of Kampala were selected.

In effect, not all schools and divisions were sampled in Kampala. However, standard sample size determination and multi-stage simple random sampling were applied to minimise lack of generalizability bias that would affect external validity of the findings.

In this study, only non-boarding schools were considered and as such the findings could have been different if all categories of schools were included. It is therefore not viable to generalizing these results to boarding school learners.

Only the proxy BMI z-score was used for nutritional status. In some studies, it reports higher under nutrition in girls compared to use of percentiles to classify nutritional status. Nutrition related biomarkers were not used due to cost limitations and this affected rigor and application of the findings.

Recall bias could have also affected the quality of information received on diet diversity and food frequency since the study relied on a 24 hour food recall frequency. In addition, due to use of recall, some foods accessed away from schools could have been under-reported.

CHAPTER SIX

6. CONCLUSION AND RECOMMENDATION

6.1 Conclusion

This study has established that the nutritional status of most learners in Kampala schools is mostly normal based on BMI Z-scores. However, the overweight and obesity levels in adolescents are higher than the national average which is a concern to public health nutrition. Whereas girls were more underweight, nutritional status was generally associated with parental income source, class grade and age of learners. Underweight was also associated with age of the learners, parental level of education, grade of the learner and underweight.

The diversity score of the diet was modest across schools. A majority of the learners consumed 6 or more food groups over 24 hours with very few that consumed less than three food groups. In these non-boarding schools, the improved dietary diversity could be attributed to the fact that in addition to school lunch, learners supplemented their diet with foods from canteens and home. The most provided foods include; mingled maize (*posho)*, beans, rice, vegetables, maize porridge, meat, rice, fish, groundnuts, maize and green cooked banana (*matooke)*   accessed within a week and month.

Despite the seemingly available schedules for nutrition and health education activities in most schools, few schools offered oral health screening, height and weight measurements for nutritional status and blood pressure screening despite its importance to monitoring overall health and wellbeing.

As such, monitoring of nutritional status was inadequate in most schools. This could in effect contribute to the poor nutritional status among some of the learners since monitoring could help rectify most of the cases that would be detected at screening.

The implications of this study on public health nutrition policy and practice points to a gap in school health and nutrition programming. The Government and city authorities have not put in place an environment that promotes, monitors and evaluates nutritional status as part of performance in education. As such, the role and value of nutrition in improved educational outcomes has not been fully harnessed to benefit human capital development. A robust multi-sectoral institutional mechanism and framework policy on school health and nutrition could help operationalize actions that will improve nutritional health of learners, enhance educational outcomes and foster inclusive and quality education for all.

6.2 Recommendation

6.2.1 Schools

(i)   School administration should provide routine screenings for nutritional status are done to help in managing the learners' health status.

(ii)   Schools should integrate equity and universal health programmes to create uniformity among schools.

(iii)   Nutrition and health education should be provided as part of routine school activities.

(iv)   Schools should consider investing in health screening and nutritional status assessment equipment as a key priority. This is because it helps in improving learners' nutritional status which affects their academic performance.

(v)   The school managers/head teachers should be sensitized on the ways of improving diet and managing the nutritional status of learners.

6.2.2 Relevant Government Ministries, Departments and Agencies

(i)   The relevant Ministries Departments and agencies should provide school nutrition registers to help in managing records for the learners' health status.

(ii)   The Ministry of Education and Sports (MoES) should promote capacity building among school authorities and learners.

(iii)   The MoES should support schools to access equipment that are required for height and weight screening, Serum Cholesterol screening, blood pressure level screening and diabetes screening so as to help in managing the learners' nutritional status.

(iv)   Government should adopt guidelines about the foods that should be served to learners in standard menu plans to ensure optimal diets are accessed by all learners.

(v)   The Ministry of Health should set standards for schools regarding the compulsory possession and use of standardised health screening equipment relevant to schools. This will support routine nutrition and health promoting activities in all schools.

REFERENCES

Adekunle, L. (2005). The effect of family structure on a sample of malnourished urban Nigerian children, *Food & Nutrition Bulletin*, *26 (1),* 230-3.

Adelman, S., Gilligan, D & Lehrer, K (2008). How effective are Food for Education Programs: A Critical Assessment of Evidence from Developing Countries. *International Food Policy Research Institute*. Washington DC, USA.

Afridi, F. (2005). Midday Meals in Two States*: Comparing the Financial and Institutional Organisation of the Programme*. 40(15), 9-15.

Ahn MK, Juon H-S, & Gittelsohn J. (2008). Association of race/ethnicity, socioeconomic status, acculturation, and environmental factors with risk of overweight among adolescents in California. *Prevention of Chronic Diseases Journal*, 5(3), 30-35.

Anyika, J. U (2009). Nutrient intakes of adolescent girls in secondary schools and universities in Abia State of Nigeria. *Pakistan Journal of Nutrition*. 8 (10): 1596-1602.

Arimond. M. (2004). Dietary diversity is associated with child nutritional status: evidence from 11 demographic and health surveys. *Journal of Nutrition* 134: 2579–85.

Averett, S., L & Stifel, D., C (2007). *Food for Thought: The Cognitive Effects of Childhood Malnutrition in the United States.* Paper presented at the 2006 Population Association of America Annual Conference. Department of Economics & Business, Lafayette College.

Azadbakht, L. and Esmaillzadeh A (2010). Dietary diversity score is related to obesity and abdominal adiposity among Iranian female youth. *Public Health Nutrition*, 14 (1), 62-69.

Avula, R., Kim, S., Chakrabarti, S., Tyagi, P., Kohli, N., & Menon, P. (2015). Delivering for Nutrition in Odisha: Insights from a Study on the State of Essential Nutrition Interventions. POSHAN Report 7. *International Food Policy Research Institute,* New Delhi, India, 56-60.

Bibiana, A. (2015). *Nutritional status of secondary school adolescents and associated factors in Gulu district.* Kampala: Makerere University Institutional report: Kampala, Uganda.

Bond, L., Patton, C., Glover, S., Carlin, J., B, Butler, H & Thomas L. (2014). The Gatehouse Project: can a multilevel school intervention affect emotional wellbeing and health risk behaviours? *Journal of Epidemiology and Community Health*.58 (1): 997–1003.

Bowman S. A. Gortmaker, S. L., Ebbeling C. B., Pereira M. A., & Ludwig D. S, (2004). Effect of Fast Food Consumption on Energy Intake and Diet Quality among Children in a National Household Survey. *Paediatrics*, *113 (1),* 111-120.

Bultenheim, A.M., Alderman, H., & Friedman. J (2011). Impact Evaluation of Feeding Programs in LAO PDR. *World Bank Policy Research Working Paper Series*, 5518.

Caldes, N. & Ahmed, A. (2004). Food for Education (Food for Schooling and School Feeding. Impact Review Paper Draft. Unpublished, *World Food Program Series*, 23 (1). 117-120.

Caniello, M., Schneider, S., Pauli, R., & Hunter, D. (2016). Revaluing institutional food procurement. *Revista Raízes*, 36 (2), 5-9

Chowdhury, C. T. (2008). Prevalence of undernutrition in Santal Children of Puruliya district. *West Bengal Indian Pediatr 45:43-6.*

Dietary diversity and associated factors among adolescents in eastern Uganda: a cross sectional study2020*BMC Public Health*

Drake, L., Burbano, C., & Bundy, D. (2015). The Impact of School Feeding. *Handbook of International Education and Development*, *Routledge* 168-169.

Drèze, J. & Goyal, A. (2003). *Future of Mid-Day Meals*. 38 (44), 4673-4683

FAO. (2011). Guidelines for Measuring Household and Individual Dietary Diversity. *Food and Agriculture Organization of the United Nations*.

FAO (2017). Building resilience for peace and food security. Rome, Italy: FAO *The State of Food Security and Nutrition in the World 2017*

Fink, G., Sudfeld, C.R., Danaei, G., Ezzati, M. & Fawzi, W.W. (2014). Scaling-Up Access to Family Planning May Improve Linear Growth and Child Development in Low and Middle Income Countries. *PLoS ONE 9(7), 5-9.*

Food variety -a good indicator of nutritional adequacy of diet? A case study from Urban area in Mali west Africa, 1998. *European Journal of clinical Nutrition* 52, 891-898

Forshee, R. & Storey, M. (2006). Demographics, not beverage consumption, is associated with diet quality. *International Journal of Food Sciences and Nutrition* 57(7-8): 494-511.

Global Alliance for Improved Nutrition, GAIN (2017). *Fortification Assessment Coverage Tool (FACT) Survey in Uganda*. Geneva, Switzerland.

Government of Uganda, GOU (2017). T*owards Zero Hunger. A Strategic Review of the Sustainable Development Goal 2 in Uganda*. Kampala: National Planning Authority.

Grantham-McGregor, M., Powell, C., Walker, S. & Himes, C. (2007). Early Childhood Stunting is Associated with Poor Psychological Functioning in Late Adolescence and Effects Are Reduced by Psychosocial Stimulation. *The Journal of Nutrition*, 1 (1), 2464-2467.

Greenburg, M., Weissberg, R., Zins, J., Fredericks, L., Resnik, & Hand E., M. (2012). Enhancing school based prevention and youth development through coordinated social, emotional and academic learning. *American Psychologist* 58: 6-7, pp466-474.

Grossman, M. (2009). *The Demand for health: A theoretical and empirical investigation*. (4th Ed.), Columbia University press, New York.

Hong, L., Benson, M., Russell, M., Powers, A., & Sanderson, M. (2017). Summarizing common achievements, challenges, and lessons learned of USDA farm to school grantees. *Journal of Nutrition Education & Behavior,* 49, (7), S97-S98.

Horton, S., M. Shekar, C. MacDonald, A. Mahal, & Brooks, J.K. (2010). *Scaling Up Nutrition Roadmap: What Will It Cost?* Washington, DC: World Bank.

Ijarotimi, O.S. & Ijadunola, K.T. (2007). Nutritional status and intelligence quotient of primary learnersin Akure community of Ondo State, Nigeria. *Tanzania Health Research Bulletin, 9(2),* 69-76.

Jacoby, H. (1997). *Is there an intra-household flypaper effect? Evidence from a school Feeding program, Food Consumption Nutrition Division Discussion Paper* (DP no. 31) IFPRI, Washington DC.

Kaestner, R. & Grossman, M. (2009). Effects of Weight on Children's Educational Achievement. *Economics of Education Review* 28(6):651-661.

Kampala Capital City Authority, KCCA, (2018). *Kampala Capital City Authority report on tax collection.* KCCA- City Hall, Kampala: Uganda.

Laftah, A.; Latunde-Dada, G., Fakih, S.; Hider, R., Simpson, R. & McKie, A.T. (2009). Haem and folate transport by proton coupled folate transporter/haem carrier protein. *British Journal on Nutrition, 101(2)*, 1150-1156.

Lamis, H., Jomaa, E., McDonnell, Y. & Probart, C (2011). School feeding programs in developing countries: impacts on children's health and educational outcomes. *Public Medical Journal*, 7(1), 1753-4887.

Medhi, G.K., Barua, A. & Mahanta, J. (2006). Growth and nutritional status of school age children (6-14) years) of tea garden worker of Assam. *Journal of Human Ecology, 19(1), 83-85.*

Memis, E. (2010). Analysis of Nutrition habits of the teachers and nurses. *Pakistan Journal of Nutrition* 1(1), 1176-1182.

Mikolajczyk, T., Ansari, E., & Maxwell, E. (2009). Food consumption frequency and perceived stress and depressive symptoms among learners in three European countries. Retrieved August 20, 2019 from http://www.nutritionj.com/content/8/1/31

Missan, H. (2011). *School Meals. Tanzania Food and Nutrition Centre* cited from http:www.tennet/org/public hmtl/School%20MealsHM.pdf (Accessed on May 2018).

Nutrition in adolescents: physiology, metabolism, and nutritional needs. 2017*Ann N Y Acad Sci. 2017; 1393 (1): 21-23*

Nutritional Status of Ugandan School-children: The effect of age impression 2019 *PubMed*DOI: 10.1002/ajpa.23895

Olumakaiye, M. Ogbimi G, Ogunba B, & Soyebo K. (2010). Snacking as a contributor to overweight among Nigerian undergraduate learners. *Nigerian Journal of Nutritional Sciences* 31 (2), 76-80.

Owusu, S., Colecraft, E., K. Aryeetey, R. Vaccaro, J. & Fatma G. (2007). Nutrition Intakes and Nutritional Status of School Age Children in Ghana. *Journal of Food Research* 6(2), 27-95.

Panda P, Benjamin AI, Singh S, Zachariah P. (2000). Health status of school children in Ludhiana city. Indian J Community Med. Oct-Dec;XXV(4):150-5

Practical Issues in calculating the sample size for prevalence studies 2006 *Medical statistics*1: 9-14

Predictors of nutritional status of Ethiopian adolescent girls; a community based cross sectional study2005*BMC Nutr. 2015;1(1):20*

Rowley, J. (2002). Using Case Studies in Research. *Management Research News* 25(1), 23-24

Smith, L.C., & Haddad, L., (2010). Explaining Child Malnutrition in Developing Countries: A Cross-Country Analysis. *International Food Policy Research Institute*, Food Consumption and Nutrition Division, Discussion Paper No. 60.

Stewart-Brown, S. (2006). *What is the evidence on school nutrition and health education in improving school health or preventing disease and specifically what is the effectiveness of the health promoting schools' approach?* Copenhagen: World Health Organization, Denmark.

Sulliman, P. B., Rodas-Fortier, A. M.., Thomas, A., G, Lamber, B, Vernon-Roberts A, Grant H. W, Eltumi M, Alder, N. & Jenkinson C. (2004). Impact of gastrostomy tube feeding on quality of life of carers of children with cerebral palsy. *Development, Medical Journal for Child Neurology*, 46(1):796–800.

Tan, J., Lane, J. & Lassibille, G (2009). Learner Outcomes in Philippine Elementary Schools: An Evaluation of Four Experiments. *World Bank Economic Review*, 13(3): 493– 508.

Uganda Bureau of Statistics (2016). National Housing and Population Census: Final Report 2017. *UBOS secretariat, kampala Uganda*.

Uganda Bureau of Statistics & ICF (2018). Uganda Demographic Health Survey report 2016. Kampala: Uganda.

Upton, J., Lentz, C., Barrett, C. & Garg, T. (2012). Local Food for Local Schools: An analysis of the impact of local procurement for a school feed in program in Burkina Faso. *Cornell University Working Paper*.

Venkaiah, K., Damayanti, K., Nayak, M. & Vijayaraghavan, K. (2002). Diet and nutritional status of rural adolescents in India. *European Journal of Clinical Nutrition, 56(1),* 1119-25.

Mawuse, C. (2015). An Investigation into the Adolescents Nutritional and Dietary Requirements among Secondary Schools in the Volta Region of Ghana. *Global Research Journal of Science and Nature,* 1(1), 1-5

Megan A McCrory, P. J. (1999). Dietary variety within food groups: association with energy intake and body fatness in men and women. *The American Journal of Clinical Nutrition*, Volume 69, Pages 440–447.

West, P., Sweeting, H. & Leyland, L (2014). School effects on pupils' health behaviours: evidence in support of the health promoting school. *Research Papers in Education,* 19 (31), 261-291.

World Health Organization. (2002). Physical status: use and interpretation of anthropometry. In: WHO, eds. WHO Technical Report Series No. 854. Geneva: World Health Organization; 1-439.

World Health Organisation (2004). *Improving Child Nutrition: The achievable imperative for global progress.* UNICEF United Nations Plaza, New York, USA.

World Health Organisation (2016). Global Nutrition. Policy Review 2016–2017. Country Progress in Creating enabling Policy Environments for Promoting Healthy Diets and Nutrition. UNICEF United Nations Plaza, New York, USA.

World Food Programme (2009). World Food Programme: School Feeding Reduces Hunger and Improves Education. *Annual Report for 2009.* Rome: Italy, FAO.

World Food Programme (2012). *Fighting hunger worldwide*. The State of Food Insecurity in the World. ROME: Italy, FAO.

World Food Programme (2014). Improving Nutrition, Improving Lives. *Annual Performance report for 2013*. May 21, 2014, Rome: Italy, FAO.

ANNEXES

Annex 1: Questionnaire for adolescent learner

Section A: Socio-Economic Characteristics of the respondents

Learner ID...

School ID..

1). What is the sex of the learner

☐ Male ☐ Female

2).what is your date of birth?

3). What is your religion?

4). What is your parents' level of education?

☐ Primary ☐ O'Level ☐ A' Level ☐ Degree

☐ 5 Post Graduate

5). What your parents main source of income?

☐ Peasant ☐ Businessman ☐ Formally Employed

☐ Self Employed

6). What is your parents' marital status

☐ Single ☐ Married ☐ Divorced
☐ Deceased

Section B: Nutritional Status of Adolescents

7). what is the weight of the learner in kilogram

W1	W2	Average

8). what is the height of the learner in centimeters

H1	H2	Average

Section C: SCHOOL MEALS

9). Are you given breakfast at school

☐ Yes   ☐ No

10). How many meals do the school provides per day

☐ One meal   ☐ Two meals   ☐ Three meals   ☐ More than three meals

11). What is the main source of food eaten at school?

☐ Dining Hall   ☐ Canteen   ☐ Home   ☐ Restaurant
☐ Packed Food from Home

12). What are the examples of foods packed from home (list them)

………

……………………………………………………………………………………..

Section D: FOOD FREQUENCY QUESTIONNAIRE

13) Have you eaten the following foods in the last 30 days? If yes how many times?

S/n		Yes/ no	yesterday	7 days	30 days	Main source
1.0	**Cereals and grains**					
1.1	**Cereals and grains**					
1.2	Maize					
1.3	Millet					
1.4	Rice					
1.5	Sorghum					
1.6	Wheat					
2.0	**Legumes , nuts and pulses**					
2.1	Dry Groundnuts					
2.2	Fresh Groundnuts					
2.3	Cow peas					
2.4	Kidney beans					
2.5	Lentil					
2.6	Soybean seed					
2.7	French beans					
2.8	Beans					
3.0	**Starchy roots, tubers and plantain**					
3.1	Sweet potatoes					
3.2	Irish potatoes					
3.3	Cassava					
3.4	Yams					
3.5	Matooke/plantain					
4.0	**Vegetables**					

4.1	Dodo					
4.2	Nakati					
4.3	Cabbages					
4.4	Spinach					
4.5	Buga					
4.6	Carrots					
4.7	Egg Plants					
4.8	Green Pepper					
4.9	Pumpkin					
4.10	African eggplants					
5.0	**Fruits and fruit juice**					
5.1	Avocado					
5.2	Passion fruits					
5.3	Oranges					
5.4	Mangoes					
5.5	Sweet Banana					
5.6	Guavas					
5.7	Mixed fruit juice					
5.8	Cock tail juice					
5.9	Yellow bananas					
6.0	**Milk and Milk Products**					
6.1	Cheese					
6.2	Milk					
6.3	Butter					
6.4	Yoghurt					
7.0	**Meat and meat products**					

7.1	Beef					
7.2	Rabbit					
7.3	Heart					
7.4	Kidney					
7.5	Liver					
7.6	Pork					
7.7	Goats meat					
7.8	Mutton					
7.9	Chicken					
7.10.	Eggs					
7.11	Turkey					
7.12	Duck					
8.0	**Fish**					
8.1	Fresh fish					
8.2	Dried Fish					
8.3	Fish fillet					
8.4	Silver fish					
8.5	Mud fish					
8.6	Cat fish					
8.7	Tilapia fish					
9.0	**Fats and oils**					
9.1	Ghee					
9.2	Margarine					
9.5	Lard or other Animal fat					
9.6	Vegetable oils					
10.0	**Confectionaries, refined sugar and condiments**					

10.1	Sugar					
10.2	Salt					
10.3	Cakes					
10.4	Sweets					
10.5	Biscuits					
10.6	Seasonings					
11.0	**Bottled and canned non-alcoholic beverages**					
11.1	Soda					
11.2	Mineral water					
11.3	Juice					
11.4	*Busheera*					
11.5	Energy drinks					

Annex 2: Questionnaire for the teacher responsible for health and nutrition

Respondent ID...

School ID of the respondent...

Section A: Foods Usually Given To Learners

Does your school provide food items to learners? Please answer Yes or No

....

If yes which food items are they?

Food items provided in the school menu	Number of times the food is consumed	Method of preparation	Main source

SECTION B: School Canteen Food Options.

Does your school have a canteen? Please answer Yes or No

....

If yes, which food items are usually sold at the school canteen? Please tick on the frequency appropriately

Food items	Frequency/number of times a given food item is consumed		
Food/drink	Daily	Weekly	Monthly

Annex 3: Questionnaire for the head teacher

Respondent ID

School ID of the respondent

1).Does your school offer nutrition and health education programmes? Please tick in the box

☐ Yes ☐ No

a).If yes which ones?..

....

....

b).If no why?..

....

....

2a). During the past 12 months, has your school offered the following screenings for learners?

Please answer Yes or No.

a. Oral health screening..

b. Height and weight or body mass screening..

c. Serum cholesterol screening..

d. Blood pressure level screening..

e. Diabetes screening..

b). Name other screening services offered by the school in the past 12months..............................

....

....

3).During the past 12 months, has your school offered activities for learners related to the following? Please answer Yes or No

a. Nutrition education ....

b. Weight management ....

c. School safety education..

d. Emergency preparedness ....

g. Diabetes management education..

h. Physical activity and fitness counselling ....

4).During the past 12 months, has your school offered the following services for learners? Please answer Yes or No.

a. Referrals for child care……………...

b. Referrals for oral health problems..

5).During the past 12 months, have any physical activity programs, such as aerobics grades, Basketball leagues, or walking or jogging clubs been offered to this school's learners? Please tick in the box from question 5 to 9

☐   Yes   ☐   No

6).During the past 12 months, has your school provided health risk appraisals for learners?

☐   Yes   ☐   No

7). During the past 12 months, if the health risk appraisal identified individual problems, were follow-up services or referrals offered?

☐   Yes   ☐   No   ☐   Health risk appraisal did not identify any problems

8). During the past 12 months, was information from health risk appraisals used to develop nutrition and health education programs such as health screenings, health education, or health counselling for learners?

☐   Yes   ☐   No

9) During the past 12 months, has your school assessed learner satisfaction with nutrition and health education activities or services?

☐   Yes   ☐   No

10) During the past 12 months, has your school provided any of the following incentives for Learners participation in nutrition and health education programs? Please answer Yes or No

a. Monetary incentives..

b. Gifts...

c. Paid time off..

d. Certificates or awards..

e. Public recognition..

11). currently, does someone at this school oversee or coordinate nutrition and health education activities or services for this school's learners? Please tick in the box.

☐   Yes   ☐   No

Annex 4: Uganda National Council for Science and Technology Approval Letter

Uganda National Council for Science and Technology
(Established by Act of Parliament of the Republic of Uganda)

UNCST

Our Ref: SS 4942

2nd April 2019

Ms. Patience Tukahirwa
Principal Investigator
C/o Foundation for AIDS Orphaned Children
Isingiro

Dear Ms. Tukahirwa,

**Re: Research Approval: Schools Meals, Health Promotion and Nutritional Status of
Learners in Kampala City, Uganda**

I am pleased to inform you that on **19/03/2019**, the Uganda National Council for Science and Technology (UNCST) approved the above referenced research project. The Approval of the research project is for the period of **19/03/2019** to **19/03/2020**.

Your research registration number with the UNCST is **SS 4942**. Please, cite this number in all your future correspondences with UNCST in respect of the above research project.

As Principal Investigator of the research project, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the research protocol or the consent form (where applicable) must be submitted to the designated Research Ethics Committee (REC) or Lead Agency for re-review and approval **prior** to the activation of the changes. UNCST must be notified of the approved changes within five working days.
3. For clinical trials, all serious adverse events must be reported promptly to the designated local IRC for review with copies to the National Drug Authority.
4. Unanticipated problems involving risks to research subjects/participants or other must be reported promptly to the UNCST. New information that becomes available which could change the risk/benefit ratio must be submitted promptly for UNCST review.
5. Only approved study procedures are to be implemented. The UNCST may conduct impromptu audits of all study records.
6. An annual progress report and approval letter of continuation from the REC must be submitted electronically to UNCST. Failure to do so may result in termination of the research project.

LOCATION/CORRESPONDENCE

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Uganda National Council for Science and Technology

(Established by Act of Parliament of the Republic of Uganda)

UNCST

Below is a list of documents approved with this application:

	Document Title	Language	Version	Version Date
1.	Research proposal	English	N/A	February 2019
2.	Questionnaires	English	N/A	February 2019
3.	Information sheets and declaration of consent	English	N/A	February 2019
4.	Information sheet and declaration of assent of the child below 18 years	English	N/A	February 2019
5.	Parental consent form for child participation in the research	English	N/A	February 2019

Yours sincerely,

Winfred Badanga Nazziwa
For: Executive Secretary
UGANDA NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Copied to: Chair, Makerere University School of Social Sciences, Research Ethics Committee

Annex 5: Makerere University College of Humanities and Social Science Research Ethics Committee (MAKSS REC) Approval Letter

MAKERERE

P .O. Box 7062,
Kampala, Uganda
Cables: MAKUNIKA

UNIVERSITY

Tel: 256-41-545040/0712 207926
Fax: 256-41-530185
E-mail: makssrec@gmail.com

WE BUILD FOR THE FUTURE

COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
SCHOOL OF SOCIAL SCIENCES
RESEARCH ETHICS COMMITTEE

Your Ref:

Our Ref: MAKSS REC 10.18.223

7th January 2019

Tukahirwa Patience
Principal Investigator (MAKSS REC 10.18.223)
Telephone contact: +256 781 055481 / +256 700 635902
Email: tukahirwapatience143@gmail.com

Dear Sir,

Initial – Full Board
Re: Approval of Protocol titled: "Schools meals health promotion and nutritional status of learners in Kampala City"

This is to inform you that, the Makerere University School of Social Sciences Research Ethics Committee (MAKSS REC) granted approval to the above referenced study. The MAKSS REC reviewed the proposal using the full board review on **18th October 2018**. This has been done in line with the investigator's subsequent letter addressing comments and suggestions.

Your study protocol number with MAKSS REC is **MAKSS REC 10.18.223.** Please be sure to reference this number in any correspondence with MAKSS REC. Note that, the initial approval date for your proposal by **MAKSS REC was 18th October 2018**. This is an annual approval and therefore; approval expires on 17th October 2019. **Please note that, final approval should be done by Uganda National for Science and Technology. You should use stamped consent forms and study tools/instruments while executing your field activities at all times.** However, continued approval is conditional upon your compliance with the following requirements.

Continued Review
In order to continue on this study (including data analysis) beyond the expiration date, Makerere University School of Social Sciences (MAKSS REC) must re-approve the protocol after conducting a substantive meaningful, continuing review. This means that you must submit a continuing report Form as a request for continuing review. To avoid a lapse, you should submit the request six (6) to eight (8) weeks before the lapse date. Please use the forms supplied by our office.

Makerere University School of Social Sciences Research Ethics Committee
Valid Thru.
1 7 OCT 2019
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Please also note the following:
- No other consent form(s), questionnaires and or advertisement documents should be used. The Consent form(s) must be signed by each subject prior to initiation of my protocol procedures. In addition, each research participant should be given a copy of the signed consent form.

Amendments

During the approval period, if you propose any changes to the protocol such as its funding source, recruiting materials or consent documents, you must seek Makerere University School of Social Sciences Research and Ethics Committee (MAKSS REC) for approval before implementing it.

Please summarise the proposed change and the rationale for it in a letter to the Makerere University School of Social Sciences Research and Ethics Committee. In addition, submit three (3) copies of an updated version of your original protocol application- one showing all proposed changes in bold or "track changes" and the other without bold or track changes.

Reporting

Among other events which must be reported in writing to the Makerere University School of Social Sciences Research and Ethics Committee include:
  i. Suspension or termination of the protocol by you or the grantor.
  ii. Unexpected problems involving risk to participants or others.
  iii. Adverse events, including unanticipated or anticipated but severe physical harm to participants.

Do not hesitate to contact us if you have any questions. Thank you for your cooperation and commitment to the protection of human subjects in research.

The legal requirement in Uganda is that, all research activities must be registered with the National Council for Science and Technology. The forms for this registration can be obtained from their website www.unsct.go.ug

Please contact the Administrator of Makerere University School of Social Sciences Research and Ethics Committee at makssrec@gmail.com OR bijulied@yahoo.co.uk or telephone number +256 712 207926 if you counter any problem.

Yours sincerely,

Dr. Stella Neema
Chairperson
Makerere University School of Social Sciences Research and Ethics Committee

c.c.: The Executive Secretary, Uganda National Council for Science and Technology

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Annex 6: KCCA Approval Letter

DIRECTORATE OF EDUCATION & SOCIAL SERVICES

KCCA
KAMPALA CAPITAL CITY AUTHORITY
For a better City

REF: DES/KCCA/201/17

29th October, 2018

Ms. Patience Tukahirwa
Kyambogo University
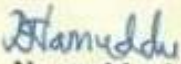
RE: PERMISSION TO CARRY OUT RESEARCH IN KAMPALA

The above subject refers;

Permission is hereby granted to you to carry out research on *"School meals, Health Promotion and Nutritional Status of Learners in Kampala City"*

You are expected to exercise utmost ethical treatment of study subjects, consented participation and that the results of the study will be used for academic purposes only. You are also expected to share the research report with KCCA.

For a better City

Namuddu
Namuddu Juliet Nambi
DIRECTOR EDUCATION AND SOCIAL SERVICES

Copy: All Supervisors Education Services

P.O. Box 7010 Kampala - Uganda
Plot 1-3 Apollo Kaggwa Road
Tel: 0204 660 000
WhatsApp: 0794274444, Toll free line: 0800990000
Web: www.kcca.go.ug, Email: info@kcca.go.ug
f:facebook.com/kccaug, t: @KCCAUG

Annex 7: Kyambogo University Graduate School Approval Letter

KYAMBOGO UNIVERSITY

P. O. BOX 1 KYAMBOGO
Tel: 041 - 4286792 Fax: 256-41-220464
Website: www.kyu.ac.ug

Office of the Dean, Graduate School

25th October 2018

To Whom It May Concern

RE: LETTER OF INTRODUCTION

Dear Sir/Madam,

This is to introduce **Ms Patience Tukahirwa** Registration Number **17/U/14735/GMHN/PE** who is a student of Kyambogo University pursuing a Masters Degree.

She intends to carry out research on **"School Meals, Health Promotion and Nutritional Status of Learners in Kampala City, Uganda"** as partial fulfillment of the requirements for the award of the Master of Science in Human Nutrition.

We therefore kindly request you to grant her permission to carry out this study in your institution.

Any assistance accorded to her will be highly appreciated.

Yours sincerely,

Assoc. Prof. Muhammad N. Wambede
DEAN, GRADUATE SCHOOL

Annex 8: Information Sheet and Declaration of Consent of learners of 18 years and above.

Tukahirwa Patience

MSc student Human Nutrition

Kyambogo University,

P. O. Box 1, Kyambogo

Kampala, Uganda.

Tukahirwapatience143@gmail.com

Tel (Mob): +256781055481

Dear Respondent,

Re: Declaration of informed consent to participate in this study on School meals, health promotion and nutritional status of learners in Kampala City, Uganda.

1.   **Background**

I am humbled to seek your consent to participate in this study. The researcher is a Ugandan and student at Kyambogo University, Kampala, Uganda. It is part of the requirements in partial fulfilment for the award of Master of Science in human nutrition of kyambogo University.

2.   **Aim of the study**

The study aims to assess the school meals, health promotion and nutritional status of learners in secondary schools in Kampala city, Uganda.

3.   **Ethical clearance**

In accordance to existing legal requirements in Uganda, the study will seek ethical approval and research clearance from the Uganda National Council of Science and Technology (UNCST). Independent review will be sought from Makerere University School of Social Sciences Research and Ethics Committee (MAKSS REC)

4.   **Participation in the study**

Participation in the study will be voluntary. It targets two categories of participants:

   (i) two key informants who are considered to have relevant information for the study
        specifically (a) the Head teacher who is the overall manager of the school and
   (b) The teacher in charge of health and nutrition activities.
   (ii) The learners who are the non-boarding secondary student adolescents aged 13   to 19
        years.

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Valid Thru.

1 7 OCT 2019

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5. **Procedures involved in data collection**

The learners will be assessed for the nutritional status by taking weight and height to find out their body mass index and also interviewed on their family socio economic status and dietary intake for a period of 20 to 30 minutes.

6. **Collection, storage and management of information**

(a)   Anthropometric (weight and height) data and Questionnaire based information shall be collected through face to face interviews at the location of the school and subsequently stored in original and duplicate at Kyambogo University in Kampala. It will be entered into a computer data-base and analysed.

7. **Risk**

We shall envisage no risks related to this study. Working with secondary schools in Kampala City on all nutritional status assessment procedures will ensure integrity and professionalism of the process than would be if the process would happen outside the schools.

8. **Confidentiality**

All details will be kept confidential and will only be used for purposes of this study i.e. solely for scholarly purposes whose main outcome will be research publications. Data in physical form will be stored in locked cabinets in secure rooms with lock and key. Computers with data will be password protected.

9. **Compensation**

No compensation will be given however; a refreshment (one bottle of water and a snack) worth 5000 Ug.Sh will be given to the study participants.

10. **Withdraw from the study**

The study participant has a right to withdraw from the study before the commencement of data analysis in January, 2018.

11. **Dissemination of information**

The study outcomes will be disseminated through publications, seminar presentations and conference presentations.

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12. **Contacts of key persons involved in the study**

Further enquiries can be made through the address: Tukahirwa Patience,

MSc student Human Nutrition, Kyambogo University Department of Human Nutrition and Home Economics, Kampala. Tukahirwapatience143@gmail.com, Tel; +256-781055481

If you would like to talk to someone other than the researcher(s) about concerns regarding this study.

Dr Stella Neema

The Chair

Makerere school of social sciences

Research ethics committee

Telephone 256 772 457576

Email; sheisim@yahoo.com

Executive Secretary

The Uganda national council of science and technology

Kimera road, ntinda, p.o box 6884 kampala, Uganda

Telephone; 256 414 705500

Email; info@uncst.go.ug

Thank you very much for your cooperation.

Respondents Name...

Respondent ID #: ....Signature:............................. Date:............

Researchers Signature:....................... Date:............................

Valid Thru.

1 7 OCT 2019

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Annex 9: Information Sheet and Declaration of Asset of the Child Below 18years

APPENDIX 5: Information sheet and Declaration of Assent of the child below 18 years

Tukahirwa Patience

Msc student Human Nutrition

Kyambogo University Human

P. O. Box 1, Kyambogo

Kampala, Uganda

Tukahirwapatience143@gmail.com
Tel (Mob): +2567810554

Dear Respondent,

Re: Declaration of Assent to participate in this study on School meals, health promotion and nutritional status of learners in Kampala City, Uganda.

1. **Background**

I am humbled to seek your consent to participate in this study. The researcher is a Ugandan female and master's student of human nutrition at Kyambogo University, Kampala, Uganda. It is part of the requirements in partial fulfilment for the award of Master of Science in human nutrition of Kyambogo University.

2. **Aim of the study**

The study aims to assess the school meals, health promotion and nutritional status of learners in secondary schools in Kampala city, Uganda.

3. **Ethical clearance**

In accordance to existing legal requirements in Uganda, the study will seek ethical approval and research clearance from the Uganda National Council of Science and Technology (UNCST). Independent review will be sought from Makerere University School of Social Sciences Research and Ethics Committee.

4. **Participation of participants in the study**

Participation in the study will be voluntary. It targets two categories of participants:

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(iii) two key informants who are considered to have relevant information for the study specifically (a) the Head teacher who is the overall manager of the school and

(b) The and the teacher in charge of health and nutrition activities.

(iv) The learners who are the non-boarding secondary student adolescents aged 13 to 19 years.

4. **Procedures involved in data collection**

All participants will be assessed for nutritional status by taking weight and height to find out your body mass index and also interviews on your family socio economic status and dietary intake for a period of 20 to 30 minutes.

6. **Risk**

The study envisages no risks related to this study working with secondary day schools in Kampala City on all nutritional status assessment procedures will ensure integrity and professionalism of the process than would be if the process would happen outside the schools.

6. **Confidentiality**

All details will be kept confidential and will only be used for purposes of this study i.e. solely for scholarly purposes whose main outcome will be research publications. Data in physical form will be stored in locked cabinets in secure rooms with lock and key. Computers with data will be password protected.

7. **Compensation**

No compensation will be given however; refreshment (one bottle of water and a snack) worth Ug.Sh 5,000 will be given to each study participant.

8. **Withdraw from the study**

The respondent has a right to withdraw from the study before the commencement of data analysis in January 2019.

9. **Dissemination of information**

The study outcomes of this research will be disseminated through publications seminar presentations and conference presentations.

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Research Ethics Committee

10   **Contacts of key persons involved in the study**

Further enquiries can be made through the above address

Tukahirwa Patience, MSc student Human Nutrition, Kyambogo University Department of Human Nutrition and Home Economics, Kampala. Tukahirwapatience143@gmail.com

If you would like to talk to someone other than the researcher(s) about concerns regarding this study.

Dr Stella Neema

The Chair

Makerere school of social sciences

Research ethics committee

Telephone 256 772 457576

Email; sheisim@yahoo.com

Executive Secretary

The Uganda national council of science and technology

Kimera road, ntinda, p.o box 6884 kampala, Uganda

Telephone; 256 414 705500

Email; info@uncst.go.ug

By signing below, I..agree to take part in this research study entitled school meals, health promotion and nutritional status of learners in Kampala City.

I declare that I have read and heard and fully understood this information and assent form and it is written in the language which i am fluent and comfortable with.

I have had a chance to ask questions and all my questions have been adequately answered.

I understand that taking part in this study is voluntary and I have not been pressurized to take part.

Respondent ID......Signature................. Date....................

Researcher's signature:................................Date.......

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Annex 10: Information Sheet and Declaration of Consent for the key informants

APPENDIX 7: Information Sheet and Declaration of Consent for the key informants

Tukahirwa Patience

Msc student Human Nutrition

Kyambogo University Human

P. O. Box 1, Kyambogo

Kampala, Uganda

Tukahirwapatience143@gmail.com

Tel (Mob): +2567810554

Dear Respondent,

Re: Declaration of informed consent to participate in this study on School meals, health promotion and nutritional status of learners in Kampala City, Uganda.

1. **Background**

I am humbled to seek your consent to participate in this study. The researcher is a Ugandan female and masters student of human nutrition at Kyambogo University, Kampala, Uganda. It is part of the requirements in partial fulfilment for the award of Master of Science in human nutrition of Kyambogo University.

2. **Aim of the study**

The study aims to assess the school meals, health promotion and nutritional status of learners in secondary schools in Kampala city, Uganda.

3. **Ethical clearance**

In accordance to existing legal requirements in Uganda, the study will seek ethical approval and research clearance from the Uganda National Council of Science and Technology (UNCST). Independent review will be sought from the Makerere University School of Social Sciences Research and Ethics Committee

4. **Participation in the study**

Participation in the study will be voluntary. It targets two categories of participants;

(vii)   two key informants who are considered to have relevant information for the study specifically (a) the Head teacher who is the overall manager of the school and

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(b) The and the teacher in charge of health and nutrition activities.

   (viii)   The learners who are the non-boarding secondary student adolescents in all levels aged 13 to 19 years.

5.   Procedures involved in data collection

The two key informants will be interviewed:

(a)The Head teachers will be asked questions concerning health promotion and nutrition in the schools as they are the overall managers of the school.

(b)The teacher responsible for health and nutrition matters will be asked about the diet they feed learners as well foods and drinks usually sold to the learners at a school canteens on while the teacher on duty will be asked about foods usually sold at the school canteen.

6.   Collection, storage and management of information, biomarkers and food samples

(c)   Questionnaire based information shall be collected through face to face interviews at the location of the school and subsequently stored in original and duplicate at Kyambogo University in Kampala. It will be entered into a computer data-base and analysed.

7.   Risk

We shall envisage no risks related to this study. Working with secondary schools in Kampala City on all nutritional status assessment procedures will ensure integrity and professionalism of the process than would be if the process would happen outside the schools.

8.   Confidentiality

All details will be kept confidential and will only be used for purposes of this study i.e. solely for scholarly purposes whose main outcome will be research publications. Data in physical form will be stored in locked cabinets in secure rooms with lock and key. Computers with data will be password protected.

9.   Compensation

No compensation will be given however the key informants will be interviewed at their time of convenience

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10.   **Withdrew from the study**

You have a right to withdraw from the study before the commencement of data analysis in January, 2018.

12 Dissemination of information

The study outcomes will be disseminated through publications seminar presentations and conference presentations.

11.   **Contacts of key persons involved in the study**

Further enquiries can be made through the above address

Tukahirwa Patience, MSc student Human Nutrition, Kyambogo University Department of Human Nutrition and Home Economics, Kampala. Tukahirwapatience143@gmail.com

If you would like to talk to someone other than the researcher(s) about concerns regarding this study.

Dr Stella Neema

The Chair

Makerere school of social sciences

Research ethics committee

Telephone 256 772 457576

Email; sheisim@yahoo.com

Executive Secretary

The Uganda national council of science and technology

Kimera road, ntinda, p.o box 6884 kampala, Uganda

Telephone; 256 414 705500

Email; info@uncst.go.ug

Thank you very much for your cooperation.

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Respondent ID #............Signature:...........................Date:..............

Researcher's signature.......................................Date...............

Makerere University School of Social Sciences
Research Ethics Committee

Valid Thru.

1 7 OCT 2019

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Annex 11: Parental consent form for child participation in the research

APPENDIX 6: Parental consent form for child participation n in the research

Tukahirwa Patience

MSc student Human Nutrition

Kyambogo University Human

P. O. Box 1, Kyambogo

Kampala, Uganda

Tukahirwapatience143@gmail.com

Tel (Mob): +2567810554

Dear Parent,

Re: Declaration of informed consent to participate in this study on School meals, health promotion and nutritional status of learners in Kampala City, Uganda.

1. Background

I am humbled to seek your consent for your child to participate in this study. The researcher is a Ugandan female and master's student of human nutrition at Kyambogo University, Kampala, Uganda. It is part of the requirements in partial fulfilment for the award of Master of Science in human nutrition of Kyambogo University.

2. Aim of the study

The study aims to assess the school meals, health promotion and nutritional status of learners in secondary schools in Kampala city, Uganda.

3. Ethical clearance

In accordance to existing legal requirements in Uganda, the study will seek ethical approval and research clearance from the Uganda National Council of Science and Technology (UNCST). Independent review will be sought from Makerere University School of Social Sciences Research and Ethics Committe.

4. Participation in the study

Participation in the study will be voluntary. It targets two categories of participants:

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1 7 OCT 2019

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(v) two key informants who are considered to have relevant information for the study specifically (a) the Head teacher who is the overall manager of the school and

(b) The and the teacher in charge of health and nutrition activities.

(vi) The learners who are the non-boarding secondary student adolescents aged 13 to 19 years.

5. Procedures involved in data collection

The study will involve assessment of the child's nutritional status by taking weight and height to find out his/her body mass index and also interviews on his/her family socio economic status and dietary intake for a period of 20 to 30 minutes.

6. Risk

We envisage no risks related to this study working with non-boarding secondary schools in Kampala City and all nutritional status assessment procedures will ensure integrity and professionalism of the process than would be if the process would happen outside the schools.

7. Confidentiality

All details will be kept confidential and will only be used for purposes of this study i.e. solely for scholarly purposes whose main outcome will be research publications. Data in physical form will be stored in locked cabinets in secure rooms with lock and key. Computers with data will be password protected.

8. Compensation

No compensation will be given however, a refreshment (one bottle of water and a snack) will be given to the study participants.

9. Withdraw from the study

Your child has a right to withdraw from the study before the commencement of data analysis in January, 2018.

10. Dissemination of information

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Makerere University School of Social Sciences
Valid Thru.
1 7 OCT 2019
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Research Ethics Committee

The study outcomes will be disseminated through publications seminar presentations and conference presentations.

11.   Contacts of key persons involved in the study

Further enquiries can be made through the above address

Tukahirwa Patience, MSc student Human Nutrition, Kyambogo University Department of Human Nutrition and Home Economics, Kampala. Tukahirwapatience143@gmail.com

If you would like to talk to someone other than the researcher(s) about concerns regarding this study.

Dr Stella Neema

The Chair

Makerere school of social sciences

Research ethics committee

Telephone 256 772 457576

Email; sheisim@yahoo.com

Executive Secretary

The Uganda national council of science and technology

Kimera road, ntinda, p.o box 6884 kampala, Uganda

Telephone; 256 414 705500

Email; info@uncst.go.ug

I………………………………………………….being above the age of 18 years hereby consent to my child……………………………………………………… to participate in this study as requested on School meals, health promotion and nutritional status of learners in Kampala City.

(i)   I have read the information provided.
(ii)   Details of the procedure and any risks involved in the study have been explained to my satisfaction.
(iii)   I agree of my child to participate in the study.

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(iv) I am aware that I should retain a copy of the information sheet and consent form for future reference.

I understand that:

- My child may not directly benefit from this research.
- My child will have no injury or any form of pain got from participating in this research.
- My child is free to withdraw from the study at any time.
- While information gained from this study will be published as explained, my child will not be identified and individual information will remain confidential.
- I understand that only the researchers will have access to my child's research data and raw results, unless I explicitly provide consent for it to be shared with other parties.

Parent/Guardian's signature OR Thumb print...................**Date**...........................

Researcher's signature...................................**Date**.................................