

**FACTORS AFFECTING GROWTH AND DEVELOPMENT IN CHILDREN
UNDER 5 YEARS IN KAMPALA INTERNATIONAL UNIVERSITY
TEACHING HOSPITAL (KIUTH).**

BY

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NOVEMBER 2014.

DECLARATION

I, MUDONDO EUNICE, (BMS/0091/91/DU) hereby declare that this dissertation is my original work and has never been submitted to this or any other university for an academic award.

Signature.....

MUDONDO EUNICE.

Date.....

APPROVAL

This is to certify that the research work leading to this dissertation was done under my supervision and has, to the best of my knowledge, not been presented anywhere else for another purpose.

Signature.....

Dr. ANDREW NDAMIRA, MBChB, MMed (Paediatrics& Child Health) - MUST.

Date.....

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DEDICATION

I dedicate this work to my beloved family especially to my parents, Mr. MUKAMA JOHN SAJJA and Mrs: MUKAMA THEOPISTA NAMULABI for their financial and moral support throughout my life. Without them, I would have yielded less than this. May the Almighty God harass you with more blessings and fight all your enemies.

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LIST OF ABBREVIATIONS.

AGA	: Appropriate for gestational age.
AIDS	: Acquired Immune Deficiency Syndrome.
BMI	: Body Mass Index.
CNS	: Central Nervous System.
ELBW	: Extremely Low birth Weight.
IUGR	: Intrauterine growth Restriction.
KIUTH	: Kampala International University Teaching Hospital.
LBW	: Low Birth weight.
MOH	: Ministry of Health.
MUAC	: Mid upper arm circumference.
SD	: Standard Deviation.
UN	: United Nations.
US	: United States.
VLBW	: Very Low Birth Weight.
WHO	: World Health Organization.

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ABSTRACT

Growth and development in children is affected by many factors for example malnutrition, disease, gestational age at birth, multiple pregnancy, birth spacing, number of siblings, breastfeeding, exposure to alcohol and drugs during pregnancy, genetic disorders, head injuries and prolonged maternal stress.

Many children in Uganda are stunted, wasted and underweight presenting late to health facilities which later affects their growth and development leading to mental retardation and learning disabilities. Growth and developmental problems are still a significant issue in Pediatrics yet actual epidemiological information in our setting is not available.

Broad objective: To assess the factors affecting growth and development in children under 5 years in KIUTH.

Specific objectives: To assess the prevalence of stunting. To assess the effect of birth weight, child spacing, number of siblings, breastfeeding, presence of chronic illness and care taker on growth and development of children.

Methodology: This is a cross sectional study in which 60 participants were enrolled by systematic sampling method (every 2nd child attending outpatient department pediatrics was enrolled in the study). Data was collected by use of a questionnaire, analyzed manually by use of a calculator and presented in tables, and bar graphs.

Results: These included the following: 6(10%) of the children were stunted and 16(26.67%) of the children had height below 5th percentile. There were no infants with weight for age less than 80% of the expected from the median. There was no direct relationship between birth spacing

and weight for age because affected children had birth space below and above 2 years. The number of siblings did not yield significant findings since KIUTH is a private hospital where mostly the ones who are able to pay come, this could have influenced the results obtained. There were children with less weight and height for age irrespective of the duration of breastfeeding including those who were breastfeeding. 1(1.67%) of the children who had a chronic illness had height for age less than 90% of expected from the median and 2(3.33%) of the children with chronic illness had weight for age less than 80% of expected from the median compared to 6(10%) and 7(11.67%) without a chronic illness had height and weight less than expected for age respectively. More children 5(8.33%) and 8(13.33%) stay with both parents had height and weight less than expected for age respectively.

CHAPTER ONE

1.1 Introduction

The study is entitled “factors affecting growth and development in children under 5 years in KIUTH” It was aimed at assessing prevalence of stunting and the effect of birth weight, birth spacing, number of siblings, breastfeeding, presence of a chronic illness and care taker on growth and development of children. It was carried out at the Pediatric outpatient department, the participants were children brought for medical attention from the areas around the hospital.

Growth is defined as the increase in the size of a human being or any of its parts occurring in the process of development while development is a process of natural progression in physical and psychological maturation from a previous lower or embryonic stage to a later stage, more complex or adult stage. (Stedman’s medical dictionary, 2004).

Growth and development in physical, intellectual, emotional and social terms are the essential biological characteristics of a child assessed at every health supervision visit After birth growth shifts from mainly cell division (multiplication growth) to enlargement of existing cells (auxetic growth) and laying down of intercellular matrix (accretionary growth). Growth involves addition in general size mainly, uniform growth throughout mass (interstitial), material added to existing substance (appositional), fat deposits (modification), subtractions of thymus gland and ductusarteriosus and substitutions for example of cartilage by bone (Robert et al, 2003).

Aspects of development include the following; Cognitive development includes changes that occur in mental activity like sensation, perception, memory, thought, and language. Psychosocial development includes personality, emotion, and relationship with others. (Jam, 1986).

Stunted growth is a reduced growth rate, a primary manifestation of malnutrition in early childhood which once established, has permanent effects. Stunted children may never regain the height and weight lost and may end with premature death because vital organs never fully developed during childhood. (Stanfield, 2008).

1.2 Statement of the problem.

Many children below 5 years experience faulty growth and development in a lifetime yet their growth is affected by a multitude of factors, such as maternal, environmental and childhood factors. It is very necessary to monitor growth and development of a child for early detection of malnutrition, health education and intervention in case of a social or health problem.

Few researches have been done on growth and development in children, most work has been done on malnutrition and nutritional assessment in Pediatric populations focusing more on dietary component rather than growth assessment, this indicates for more research in this area. The unanswered questions are; what factors affect growth and development in children under 5 years in KIUTH, what is the prevalence of stunting and the reasons why mothers do not take children for growth monitoring.

According to the Centre of Disease control and Prevention, developmental screening of April 2011, it was noted that 17% of children (0-18 years) have developmental problems and only 30% are identified before school entrance. Those who are detected after school entrance miss opportunity to participate in early childhood associated with long term benefits.

According to 2012 UN (United Nations) report, 162 million (25%) children under 5 years were stunted. More than 90% of the world's stunted children live in Africa and Asia (36% and 56% respectively). Prevalence of low height for age ranges between 5-65% in less developed countries. Once established, stunting and its effects become permanent. Stunted children will never gain corresponding weight. (WHO, 2013).

According to 2011 UN report, an estimated 53 million (8%) of children under 5 years were wasted in 2011 with (standard deviation (SD)) below -2 and are at a risk of death or impairment of growth and psychological development. 70% of these children live in Asia. The prevalence of wasting in poor countries is 5%. (WHO, 2012).

According to the Uganda Demographic and health survey April 2007, Uganda has reported a decline in wasting since 2000/01 from 6.1% to 4.1%, stunting from 39.1% to 38.1% and underweight at 5.9%. The south west region has the highest stunting (49.6%), underweight 19.3% and wasting 9.0% indicating need for special attention. The number of children estimated to be wasted in this region is the highest approximately 67000 under 5 years affected. Kampala has stunting 22.2%, wasting 7.4% and underweight 10.3%. Bushenyi, Bugiri and Kampala all estimated more than 10000 children affected by wasting at the time of survey. (Uganda Nutritional Bulletin, 2007). The unanswered questions are “why are the prevalences of wasting, stunting and underweight still high in Bushenyi?”

1.3 Objectives of the study.

1.3.1 General objective.

To assess factors affecting growth and development in children under 5 years in KIUTH.

1.3.2 Specific objectives.

1. To assess the prevalence of stunting in children less than 5 years.
2. To assess the effect of birth weight, child spacing and number of siblings on growth and development of children.
3. To assess the effect of breastfeeding, presence of a chronic illness and the care taker on growth and development of children.

1.4 Research Questions.

1. What is the prevalence of stunting in children less than 5 years?
2. What is the effect of birth weight, child spacing and number of siblings on growth and development of children.
3. What is the effect of breastfeeding, presence of a chronic illness and the care taker on growth and development of children.

1.5 Justification of the study.

Despite the government's efforts to provide free health service delivery in government facilities which involves growth monitoring on each visit, many children in Uganda are stunted, wasted and underweight, they present late to health facilities, these later lead to growth and mental retardation, learning disabilities and a less productive adult. Growth and developmental problems are still a significant problem in Pediatrics yet actual epidemiological information in our setting is not available, the study will provide information on the prevalence of stunting and the factors that affect growth and development in children under 5 years in KIUTH. The study will supplement current efforts to improve child welfare, reduce mortality and morbidity. The study will provide baseline information that will help parents, health workers and government officials to make good decisions regarding various practices and policies concerning children.

1.6 Significance of the study

Growth is the number one important indicator of overall nutritional status and hence health of the child and may be the only indicator of child abuse or neglect. Disorders of growth and development are associated with severe or chronic illnesses. In this study, anthropometric measurements such as head circumference, mid upper arm circumference, height, weight and body mass index were taken in order to determine their nutritional status and hence their health. The goal in childhood is surveillance, prevention and identification though universal screening is not recommended yet well child check up visits are necessary.

1.7 The scope of the study.

The study focused on factors affecting growth and development in children below 5 years in KIUTH and assessment of prevalence of stunting. These children came from neighboring villages around the hospital. The researcher took parameters like head circumference, mid upper arm circumference, height and weight. The researcher looked at birth order, gestation age, birth weight, birth spacing, any chronic illness, immunization status and breastfeeding.

CHAPTER TWO

LITERATURE REVIEW

INTRODUCTION.

Auxology, the scientific study of growth and development began 250 years ago and is still an indispensable tool in Pediatrics. The clinical assessment of growth of children less than 5 years is the single most useful parameter in diagnosing growth disorders and not the status of growth hormone measurement. One study revealed that only 1.4% of the laboratory studies performed in evaluating children with failure to thrive were useful diagnostically.(Tanner, et al, 1992).

Anthropometry requires accuracy in order to properly assess growth and development of the human body, therefore regular calibration of equipment is emphasized to ensure valid results. The positive aspect of anthropometric assessment are that they are quick to perform, inexpensive and easy way of determining both short and long term nutritional status (Mascarenhas et al, 1998).

According to Brooker Bauer (2002) who carried out a cross sectional study to construct a profile of nutritional status of preschool aged children enrolled in structured day care setting, the children in the study met normality of height and weight on the growth charts between the 5th and 95th percentile by 73.37%, 82.4% and 97.1% for height for age, weight for age, weight for height respectively. Drake (1991) studied 124 children enrolled in full time day care and home care, he used anthropometry parameters to assess growth according to Frisancho's standards of weight by height, and 93% of children's height and weight were within normal limits.

Weight is the first to be affected if there is under nutrition in a child; however prolonged periods of time affect the stature. Weight alone does not provide adequate information without comparing to height. Growth charts reflect normal and abnormal growth patterns which are most useful over a period of time. Nutrition intervention may be needed if the following growth patterns are present; weight loss, weight and/ or stature below 10th percentile or above 99th percentile for age, rate of weight gain less than expected for age and failure to maintain growth in percentiles (Grant and Dehoog, 1992).

In a survey of 1000 parents in the U.S, nearly two-thirds responded that it was important to see their child's growth chart, however, 36% incorrectly determined a child's weight when shown a point plotted on a growth chart, 32% incorrectly identified the percentile associated with a plotted point, and up to 77% inaccurately interpreted data plotted on combined height and weight graphs (Ben-Joseph, 2009). In another survey of 279 parents who were asked to rank six growth charts, almost one-half selected the curve with consistent growth along the 10th percentile as "least healthy" and 29% chose growth patterns along the 90th percentile as the "healthiest". It is necessary to help parents to understand the growth charts of their children. (Laraway, 2010).

Factors affecting growth and development in children.

Prenatal influences

The pre-pregnancy weight and weight gain during pregnancy are generally responsible for about 10% of the variance in fetal weight. However, severe maternal starvation during pregnancy can have a major impact on fetal growth for example, the Dutch population suffered severe famine during the winter of 1944 to 1945; the mean maternal caloric intake fell from 450 to 750 kcal a day as a result, the average infant birth weight during this period decreased by 250 grams.

Similarly, in Leningrad during the World War II German siege, which resulted in a longer and more profound starvation period (down to 300 kcal of mostly carbohydrates and no protein), average birth weight, fell by more than 500 grams (Berghella, 2007).

Chronic maternal hypoxemia due to pulmonary disease, cyanotic heart disease, or severe anemia is associated with diminished fetal growth. In a study of 96 pregnancies in women with cyanotic congenital heart disease, it was reported that the mean birth weight of full term infants was only 2575 grams.(Presbitero, 2004).

Worldwide, women take an average of four drugs during pregnancy and 40% of these drugs are taken in the first trimester, when the risk of teratogenesis is highest. Approximately 60% of all pregnant women take a prescribed medication during pregnancy. A study of a rural US population revealed that 97% of the pregnant women took an over-the-counter medication, and 60% used herbal medications. Studies of drugs approved by the US Food and Drug Administration (FDA) from 2000-2010 found that the teratogenic risk in human pregnancy was “undetermined” for 98% of the drugs approved for human use. More concerning is that of the 640 prescription drug treatments approved by the food and drug administration (FDA) since 1980, the teratogenic risk has been determined for only 9%, and of those only approximately 30 are deemed “safe” in pregnancy (Adam et al,2011).

Infections that develop early in pregnancy have the greatest effect on growth, accounting for less than 5% of all cases of fetal growth restriction. Viruses and parasites for example rubella, toxoplasmosis, cytomegalovirus, varicella-zoster, malaria, syphilis, and herpes may gain access to the fetus transplacentally or across the intact fetal membranes and impair fetal growth. (Eggermann et al, 2004).

Malnutrition

According to the integrated management of acute malnutrition report, growth failure is evident in children with kwashiorkor or marasmus commonly at the age of 6 to 30 months of age. (MOH, 2010).

Gestational age.

A study of 4438 premature infants from the National Institute of Child Health and Human Development (NICHD) Neonatal Research Network demonstrated that 99% of appropriate for gestational age (AGA) extremely low birth weight (ELBW) and 97% of AGA very low birth weight (VLBW) had weights ≤ 10 th percentile at 36 weeks postmenstrual age. In another multicenter report, most of the 1660 VLBW infants grew along a trajectory below that of a reference fetus of the same postmenstrual age. A multicenter study of 382 larger preterm infants (30-35 weeks gestation, mean birth weight of 2024 g), demonstrated weight growth velocity that was less than in utero growth standards. In these patients, growth velocity from seven days to discharge averaged 13.3 g/kg per day, and only 2% of the group achieved intrauterine growth rates of 15 g/kg per day. (Lunde et al, 2007).

Genetics

Population-based intergenerational studies of birth weight have found that genetic factors contribute 30-50% of the variation in birth weight, with the remainder being due to environmental factors. (Lemons et al 2001).

Sex

Boys are 4% heavier and 2% taller than girls. More boys than girls are referred earlier for short stature. In one retrospective study, 288 children referred for assessment of short stature the male to female ratio was 1.9:1, normal height was more common among boys (40% versus 15%). (Grimberg et al, 2005).

Environmental Factors.

Bigger families usually have smaller and lighter children. Exercise increases circulation and stimulates muscular development. A child with high intelligence is likely to be taller and better developed than one who is less gifted as intelligence influences mental and social development. Relationships with significant persons, mother, father, siblings, and teachers play a vital role in the emotional, social and intellectual development of a child. (Robert et al, 1987).

Endocrine disorders: Growth failure occurs in children with hypothyroidism and Cushing syndrome. Growth hormone deficiency leads to slow growth while excess secretion leads to gigantism. Rickets lead to weakness, bone pain, anorexia, refusal to walk, bow legs. (Eldryd, 2004).

Childhood Disease and infections.

Nutritional disorders are common in hospitalized children, in a study of pediatrics in patients of a tertiary care facility, more than half had nutritional disorders, and the prevalence of acute and chronic malnutrition among them was 25% and 27% respectively. Malnutrition is present at diagnosis of cancer in more than 50% of children in developing countries. (Hendricks et al, 1995).

According to North American Pediatric Renal transplant collaborative Studies (2011), growth impairment is a common problem in children with chronic kidney disease stages 2-5. In 2008, it was reported that more than 35% of children at the time of enrollment in the chronic kidney disease registry had impaired growth (height less than the third percentile) (Dialysis <https://web.emmes.com/study/ped/ann/rept/annual rept 2011>)

Short stature is seen in children with congenital cyanotic heart disease, chronic respiratory failure, chronic renal disease, poorly controlled diabetes mellitus, sickle cell disease. Children with tuberculosis suffer poor growth and wasting. More than 50% of children who have HIV/AIDS have neurological abnormalities, delayed motor development, loss of milestones. (Stanfield, 2008).

In a population based study from United Kingdom, 13% of patients with celiac disease and 3% with ulcerative colitis had heights less than the third percentile. In a population based study in France, 9.5% children with celiac disease had growth failure, 32% had severe malnutrition. During a mean follow up from 1988 to 2004, growth failure persisted in nearly 7% and malnutrition 15% despite treatment. (Sawzenko et al,2003).

CHAPTER THREE.

METHODOLOGY AND MATERIALS.

3.1 STUDY AREA.

The study was conducted from outpatient Department of pediatrics (KIUTH), which receives an average of 35 Children per week, working from 8:00am to 5: 00pm, Monday to Friday. There are 4 consultant pediatricians, 4 Medical officers who manage patients.

Kampala International University Teaching Hospital is a private not for profit Hospital located in Ishaka town, Bushenyi District, Uganda offering inpatient and outpatient health services, with a total bed capacity of 1000, it is located in Igara west subcountyIshaka Division, Bushenyi District.

3.2 STUDY POPULATION.

In 2002, National census estimated the population of Bushenyi district at 22400 while in 2008; Uganda Bureau of statistics estimated it at 25200 and 26800 at midyear in 2011, the male to female ratio in urban area 1:1 with a growth rate 2% per annum. The population density is at 282 people per square km with household size of 6(5.4). Children under five years constitute about 20% of the total district population.

The study participants were children under 5 years of age who came for health services at outpatient department of pediatrics, Kampala International University Teaching Hospital.

3.3 STUDY DESIGN

The study design is a cross-sectional study where the questionnaires were given to the respondents (mothers) to fill in by the assistance of the researcher and the assistants. It is a quantitative study as the data collected is represented in numerical values and percentages. The participants are children who were brought to hospital for medical care.

3.4 SAMPLE SIZE AND METHOD.

The children below 5 years brought by their mothers to outpatient department of pediatrics for Medical care during the time of the study were enrolled by systemic sampling method where every 2nd child was taken until a sample size of 60 was obtained. The sample size was determined scientifically using fisher's formula where; Sample size (n) = $\frac{z^2 p q}{d^2}$

$$d^2$$

n = desired sample, z = standard deviation at the standard degree of accuracy which is 95%.

Therefore z = 1.96 and P = prevalence of wasting in Uganda, 2000/01 was 4.1% (Uganda Demographic and health survey April 2007).

In this case p = 0.05. q = 1 – p 1 – 0.041 = 0.959 Therefore q = 0.959

d = degree of error which am ready to accept. The standard is 5. Therefore d = 0.05.

n = $\frac{1.96^2 \times 0.041 \times 0.959}{0.05^2}$ = 60. Therefore sample size is 60 participants.

$$0.05^2$$

The sampling method used was systematic sampling method where every k^{th} element will be taken, N is population size, n is sample size, k is interval number. $N = nk$

N is 140 children seen per month, n is 60, k will be N/n , $140/60 = 2.33$

Therefore every 2nd child below 5 years was included in the study.

3.5 SELECTION CRITERIA.

3.5.1 Inclusion Criteria

Participants were children below 5 years brought by their mothers to outpatient department of Pediatrics for Medical care.

3.5.2 Exclusion Criteria

- a. Seriously ill to be admitted on ward or requiring emergency care
- b. The ones whose mothers refused to consent.

3.6 PROCEDURE AND DATA COLLECTION.

3.6.1 Equipment

Questionnaire, pen, tape measure, weighing scale, board for measurement of length.

3.6.2 Procedure, measurement, data collection and storage.

Children below 5 years brought to Outpatient department (pediatrics) for medical care were the participants and their mothers the respondents in this study. They were offered seats. The researcher participated in the management of these patients after which they were enrolled for the research. Parameters taken included head circumference, mid upper arm circumference, height and weight. Participants were required to answer the open and closed ended questions of

the questionnaire. Data was collected by the researcher and research assistant and stored in a locked area unavailable to other participants or other persons not involved in the study.

3.7 QUALITY CONTROL.

The questionnaire was approved by the supervisor, and data collection was carried out by the researcher and the research assistant that are knowledgeable on the subject in order to increase validity and reliability.

3.8 DATA ANALYSIS.

Data was handled manually by use of a calculator and computer.

3.9 ETHICAL CONSIDERATION.

An introductory letter was obtained from the Faculty of Clinical Medicine and Dentistry before data collection. The intentions of the study were explained to participants before obtaining their consent. Confidentiality was kept.

3.10 DISSEMINATION.

The report will be given to the following authorities:

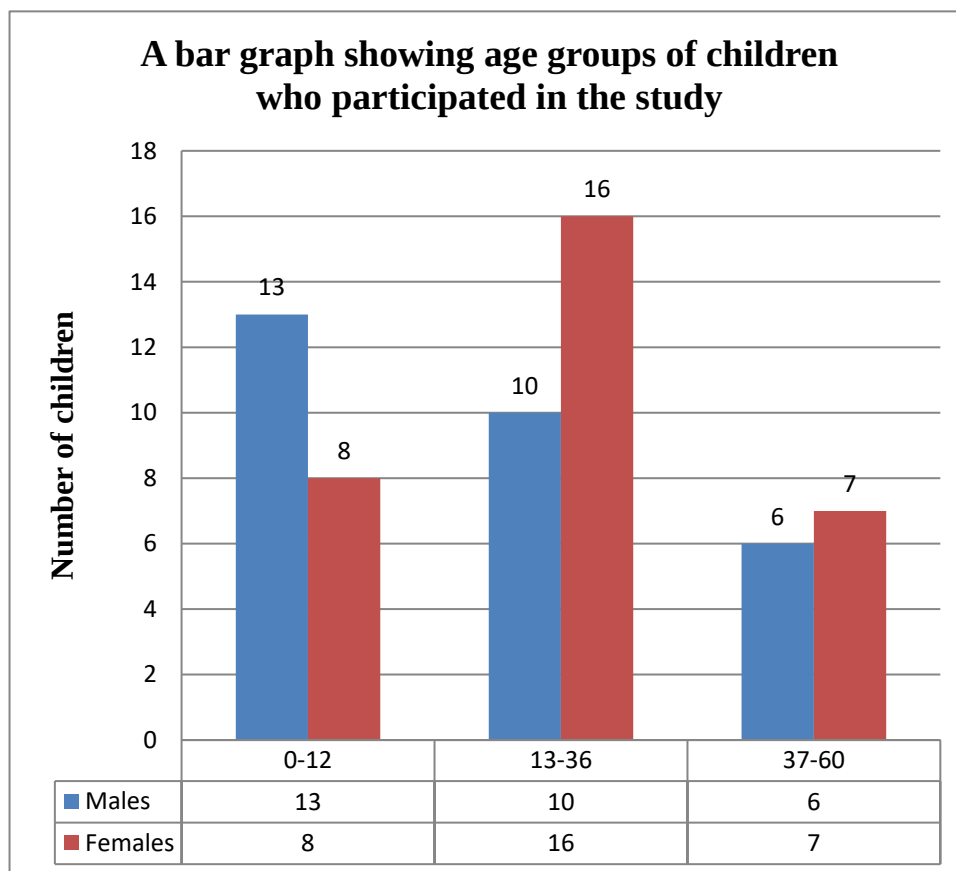
A copy to the hospital director's office, the District Health officer Bushenyi District, to the library Kampala international university western campus and one submitted for marking.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS.

This chapter consists of data collected from 60 children under 5 years whose mothers were the respondents to the questionnaires; data was analyzed in tables, bar graphs.

Figure 1: Showing age and gender distribution of children.



Out of 60 respondents, 31 (51.7%) children were females while 29 (48.3%) children were males. The age group 13-36 months had the highest number of respondents 26(43.3%). There were 21(35%) infants in the study.

Table1: Showing Anthropometric Data and other Data

Parameter	Range	Median	Frequency	Percentage
Height/Length(Cm)	50-69	59.5	19	31.67
	70-89	79.5	22	36.67
	90-109	99.5	14	23.33
	110-129	109.5	5	8.33
Weight (kg)	1-5	3	8	13.33
	6-10	8	20	33.33
	11-15	13	24	40
	16-20	18	8	13.33
MUAC(cm)	<11.5		3	5
	11.5-12.5		2	3.33
	12.5-14.5		15	25
	>14.5		40	66.67
Head circumference(cm)	36-45	40.5	15	25
	46-55	50.5	39	65
	56-65	60.5	6	10
BMI(Kg/m2)	< 18.5		41	68.33
	18.6-25		17	28.33
	25.1-30		2	3.33

Table 1 shows that 22(36.67%) children had a height/length of 70-89cm and 5 (8.33%) of children 110-129cm. The shortest child was 52cm at 1 month while the tallest was 112cm at 3 years while there were 24 (40%) children who weighed between 11-15 kg; the lightest child was 3.5 kg at one month while the heaviest were 3 children who weighed 18 kg.

The highest number of children 40 (66.67%) had MUAC greater than 14.5 cm and 2 (3.33%) less than 11.5 cm. 39 (55%) of the children had head circumference of 46-55 cm, followed by 15 (25%) of the children with 36-45 cm and 6 (10%) of the children between 56-65 cm. The lowest value was 37cm at 14 months while the greatest was 62 cm at 5 years.

41(68.33%) children had BMI values of less than 18.5, 17 (28.33%) had values of 18.6-25, 2 (3.33%) had values within 25.1-30, the highest value was 27.4 and lowest 11.8.

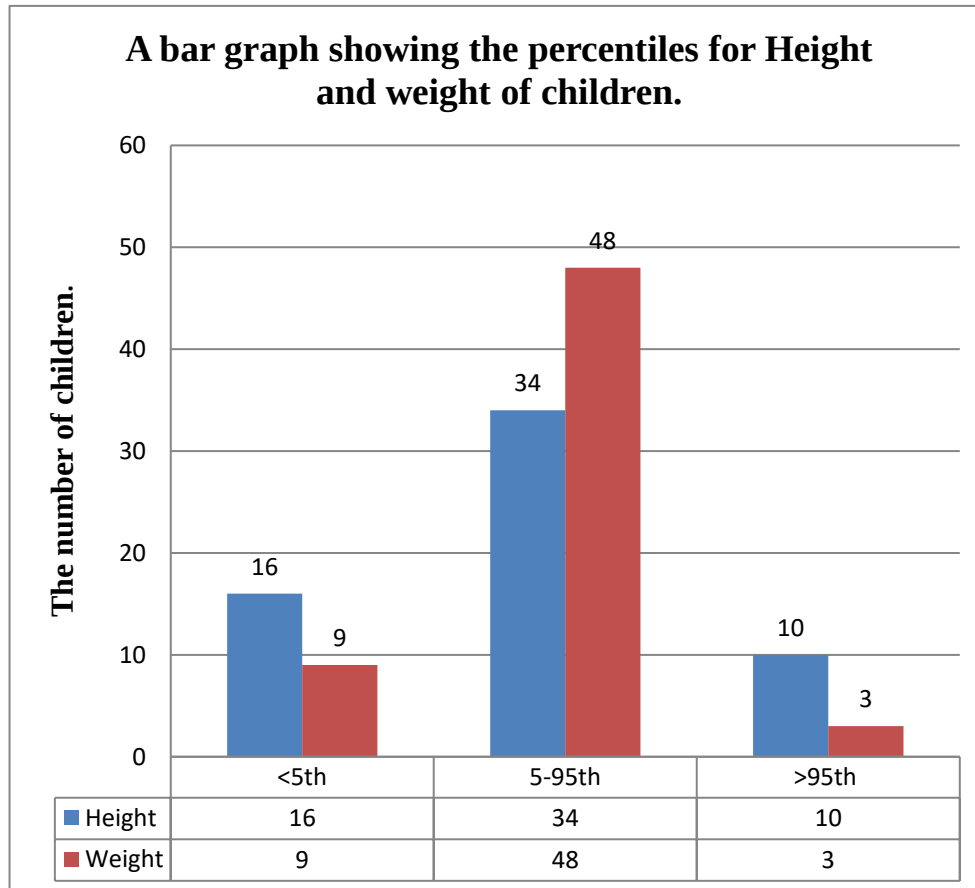
Table 2: Showing the Waterlow's classification of malnutrition.

Height for age	Weight for age		Total
	Greater than 80% of median weight for age.	Less than 80% of median weight for age	
Greater than 90% of median height for age.	45 (75%)	8 (13.33%)	53 (88.33)
Less than 90% of median height for age.	6 (10%)	1 (1.67%)	7 (11.67)
Total	51 (85%)	9 (15%)	60

From the table above, 60 children who participated in the study, 45(75%) were normal (not classified for malnutrition), 51(85%) had weight for age greater than 80%, 53(88.33%) had

height for age greater than 90%, 8(13.33%) were wasted, 6(10%) were stunted and 1(1.67%) was wasted and stunted.

Figure 2: Showing the percentiles for height and weight of children.



From the figure two above, 34 (56.67%) children had height between 5th -95th percentile, 16(26.67%) children were below 5th percentile and 10(16.67%) were above 95th percentile.

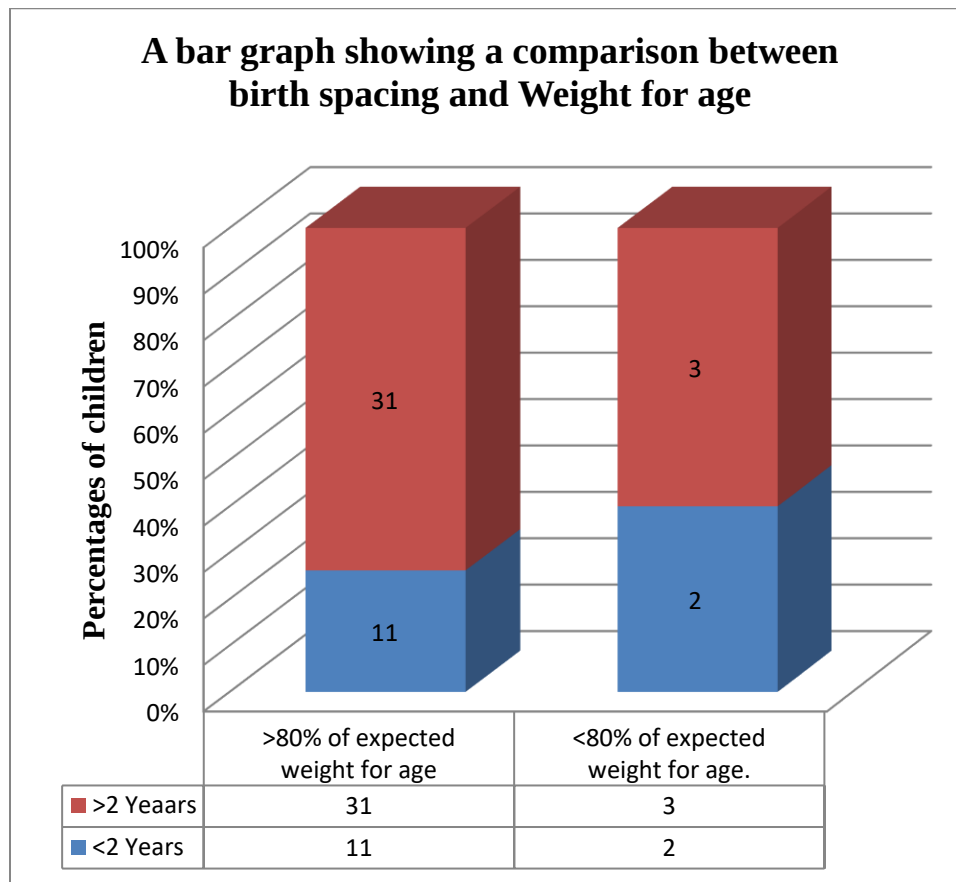
While 48(80%) children had weight between 5th -95th percentile, 9(15%) children were below 5th percentile and 3(5%) children were above 95th percentile.

Table 3: Showing a comparison between Birth weight and current weight for age of Infants.

Birth Weight (g)	Current Weight for Age of infants	
	Less than 80% of expected weight for age from median.	Greater than 80% of expected weight for age from median.
1500-2499	0	1 (1.67%)
2500-3499	0	9 (15%)
>3499	0	11 (18.33%)
Total	0	21

From table 3, there were no infants with weight for age below 80% of expected weight for age from the median irrespective of birth weight, 11(18.33%) infants had birth weight greater than 3499g, 9(15%) infants had birth weight between 2500-3499g and 1(1.67%) infant between 1500-2499. The Lightest infant was 1800g born preterm.

Figure 3: Showing a comparison between birth spacing and weight for age.



The figure above shows that 2(3.33%) children had a birth spacing less than 2 years had a weight for age less than 80% of expected value while 3(5%) children with a birth space of more than 2 years had weight for age less than 80% of expected. Other children 13(21.67%) were alone so there was no birth spacing

Table 4: Showing a comparison the number of siblings with height for age and weight for age.

Number of siblings.	Height for age from median.		Weight for age from median	
	Greater than 90%	Less than 90%	Greater than 80%	Less than 80%
0-3	43	7	42	8
4-7	9	0	8	1
>7	1	0	1	0
Total	53	7	51	9

From the table above, 7(11.67%) of the children who had less or equal to three siblings had height for age less than 90% of expected from the median while 8(13.33%) of the children withless or equal to three siblings had height for age less than 90% of expected from the median.

Table 5: Showing the comparison of the duration of breastfeeding with the height for age and weight for age of children.

Duration of Breastfeeding.	Height for age from the median		Weight for age from median	
	Greater than 90%	Less than 90%	Greater than 80%	Less than 80%
0 Months	2	1	2	1
12 Months	10	2	10	2
18Months	10	0	7	3
24 Months	9	0	8	1
Still Breastfeeding	22	4	24	2
Total	53	7	51	9

Table 5 shows that 4(6.67%) children still breastfeeding had height for age less than 90%, 2(3.33%) children still breastfeeding had weight for age less than 80%.

Table 6: Showing the comparison of a chronic illness to height for age and weight for age.

Chronic illness	Height for age from median.		Weight for age from median	
	Greater than 90%	Less than 90%	Greater than 80%	Less than 80%
Yes	4	1	3	2
No	49	6	48	7
Total	53	7	51	9

The table above shows that 1(1.67%) children had a chronic illness and height for age less than 90% while 2 (3.33%) children who had chronic illness had height for age less than 80%.

Table 7: Showing the comparison between the care taker and the height for age and weight for age.

Care taker	Height for age from median.		Weight for age from median	
	Greater than 90%	Less than 90%	Greater than 80%	Less than 80%
Both parents	40	5	37	8
Mother only	13	2	14	1
total	53	7	51	9

The table above shows that 2 (3.33%) children who stay with mother only had height for age less than 90% and 1 (1.67%) children who stay with mother only had weight for age less than 80%. Other factors which affect growth and development included the following;

Out of 60 participants, only 7(11.67%) were born preterm, 2(3.33%) were multiple birth and 24(40%) were not fully immunized.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS.

DISCUSSION.

The main purpose of the study was to determine factors affecting growth and development of children under 5 years in KIUTH and the prevalence of stunting. A total of 60 participants who were interviewed and the discussion of results follow below.

From figure 1, 31 (51.7%) of the children were females, while 29 (48.3%) of the children were males (male to female ratio of 1;1).

The results in table 2, reveal that the level of wasting in children under 5 years is high, 8(13.33%) compared to the UN reports (WHO,2012), where the prevalence of wasting was 8%, and the Uganda Demographic health survey April 2007 which reported wasting at 7% in the South West region of Uganda. The prevalence of stunting 6(10%) is within the range given by the UN estimates as 5-65% (WHO,2013) but lower than that of the Uganda Demographic health survey April 2007 which was 49.6% for the Southwest region.

From the figure two, 34 (56.67%) children had height between 5th -95th percentile, 16(26.67%) children were below 5th percentile and 10(16.67%) were above 95th percentile. While 48(80%) children had weight between 5th -95th percentile, 9(15%) children were below 5th percentile and 3(5%) children were above 95th percentile. This is different from the results of a Nutritional assessment of children in a structured child care setting by Brooke Bauer 2002 which showed normal values between 5th and 95th percentile 73.7%, 82.4% and 97.1% for height for age, weight for age and weight for height respectively. An infant at 5th percentile may be growing

normally, may be failing to grow or may be recovering from growth failure depending on the trajectory of the growth curve that is why it is necessary to plot growth curves on each visit.

39 (55%) children had head circumference of 46-55 cm, followed by 15 (25%) children with 36-45 cm and 6 (10%) children with 56-65 cm. The lowest value was 37cm at 14 months while the greatest was 62 cm at 5 years. This is because head circumference is 35 cm at birth, it increases rapidly to 47 cm by one year, and the rate grows slowly reaching 55 cm by 6 years. Therefore most children had normal head circumferences. Slow head growth is associated with developmental delay.

The measurements of MUAC showed that 3 (5%) of children were less than 11.5cm a sign of severe malnutrition, 2(3.33%) children were at 11.5-12.5cm, moderate malnutrition, 15 (25%) were at 12.5-14.5cm, mild malnutrition and 40 (66.67%) above 14.5 cm were normal. The MUAC of children between 1-5 years is almost constant; it is an indicator of severe current malnutrition. It is easy to perform although a less effective method.

BMI, a height to weight index ratio is used to assess obesity in children, 41(68.33%) of the children had BMI values of less than 18.5(underweight), 17(28.33%) of the children had values of 18.6-25(normal) and 2 (3.33%) of the children had values of 25.1-30(overweight), there were no obese children which is in agreement with results obtained from a Nutritional assessment of children in a structured child care setting by Brooke Bauer 2002 and the highest BMI was 18.5. The BMI of all children was taken yet its use is more effective in those above 2 years.

From table 3, there were no infants with weight for age below 80% of expected weight for age from the median irrespective of birth weight , 11(18.33%) infants had birth weight greater than 3499g, 9(15%) infants had birth weight between 2500-3499g and 1(1.67%) infant between

1500-2499g (actual weight 1800g born preterm). There was no significant relationship between birth weight and the current weight for age of infants.

The figure 3 shows that 2(3.33%) children had a birth spacing less than 2 years had a weight for age less than 80% of expected value while 3(5%) children with a birth space of more than 2 years had weight for age less than 80% of expected value. There was no significant relationship between birth spacing and weight for age but if the birth interval is very short less than 2 years, time for breastfeeding is limited and the nutritional care for the child may not be adequate leading to malnutrition and compromise to the child's growth and development.

From the table 4, 7(11.67%) of the children who had less or equal to three siblings had height for age less than 90% of expected from the median while 8(13.33%) of the children with less or equal to three siblings had height for age less than 90% of expected from the median.

The Table 5 showed that 4(6.67%) children still breastfeeding had height for age less than 90%, 2(3.33%) children still breastfeeding had weight for age less than 80%. There were children with less weight and height for age irrespective of the duration of breastfeeding. 57(95%) of children were breastfed, this was good because breastfed children grow extremely well over the first 3-4 months of life but with introduction of weaning foods, growth begins to falter, but 3 (5%) children were not breastfed because they had HIV/AIDS.

Other factors that affect growth and development included the following also: The number of household members of most children 35(58.33%) was 5-7, 21(35%) children had 2-4 members, the highest number was 9. It is in agreement with is the household size 6 in Bushenyi District according to the National census 2002, though for the entire country is 4.7 people. The number of people determines how resources are shared including food. The number of siblings and

number of household members did not make a significant change in weight for age partly also because of a small sample size.

The table 6 showed that 1(1.67%) children had a chronic illness and height for age less than 90% while 2 (3.33%) children who had chronic illness had weight for age less than 80%. Presence of a chronic illness has effect on growth and development, according to Richard 2003, because major chronic illnesses have an additional stress and demands for the individuals and families with twice frequency of psychological and behavior problems.

The table 7 showed that 2 (3.33%) of the children who stay with mother only had height for age less than 90% of expected value and 1 (1.67%) children who stay with mother only had weight for age less than 80% of the expected value.

CONCLUSION

Growth and development in children is affected by many factors. If height, weight and head circumference are less than expected for age we suspect a utero insult or genetic or chromosomal factor. If the weight and height delay with normal head circumference we suspect an endocrinopathy or constitutional delay and if only weight delayed, it is a recent energy (calorie) deprivation.

The prevalence of stunting, wasting and underweight are still high among children under 5 years in KIUTH

Anthropometry is easy to perform and body measurements are sensitive over full spectrum of malnutrition. The disadvantage is lack of specificity as changes in body measurements are also sensitive to severe factors like altitude, stress and genetic heritage.

There was no significant relationship between birth spacing, birth weight and weight for age. There were children with less weight and height for age irrespective of the duration of breastfeeding. The presence of a chronic illness has effect on growth and development, because of additional stress and demands for the individuals and families with twice frequency of psychological and behavior problems.

RECOMMENDATIONS.

Medical staffs involved in child care should be trained on measuring techniques including standardization, plotting growth charts and growth monitoring.

Health Education to the community on nutrition, growth monitoring and the available health services.

A more comprehensive study on the topic which will include anthropometric, clinical and biochemical tests be carried out

ANNEX:1 QUESTIONNAIRE

TITTLE: Assessment of factors affecting growth and development of children below 5 years in KIUTH.

This research is being carried out by MUDONDO EUNICE, a fifth year medical student doing Bachelor of Medicine and Bachelor of surgery of KIU.

CONSENT ,

Dear respondent (mother), I seek your permission to allow your child to participate in the research which is aimed at assessing the prevalence of stunting, factors affecting growth and development in children under 5 years in KIUTH. It will involve measurement of parameters that are usually taken on routine visits like head circumference; mid upper arm circumference, weight and height. The results of the measurements will be availed to the parents and their interpretation. The mother will be required to answer a few questions concerning the child. No painful procedures will be carried out on the child and information obtained will be handled with confidentiality in order to improve on pediatrics' services in KIUTH. No names will be indicated on the questionnaire.

Thank you for your cooperation.

I, do consent to the participation of my child in this research.

Signature of mother.....Date

Instructions: Fill in the gaps left or tick appropriate answers where options are given.

1. Age a) 0-12months b) 13-36 months c) 37-60 months

2. Sex. a) Male b) Female.
3. Weight..... Height.....MUAC.....Head circumference.....BMI.....
4. Birth order of the child.....
5. The number of siblings.....Birth space.....
6. The child stays withat home a) Father only b) Mother only c) Both parents
7. Was the baby at term before delivery? a) Yes b) No
8. Was it a multiple birth a) Yes b) No.
9. Was the child breastfed? a) Yes b) No.
10. How long was the child breastfed? a) 0-6months b) 7-12 months
c) 13-18 months d) 19-24 months e) still breastfeeding.
11. Has the child suffered from any chronic illness? a) Yes b) No
If yes specify.....
12. Was the child fully immunized? a) Yes b) No.

ANNEX 2: THE BUDGET.

	Cost per item	Total cost
1 rims of plain paper	15.000	15.000
Pens and markers	2000	10,000
Typing of research materials		10,000
Printing of research materials		50,000
Photocopy of research materials	10000	10,000
Binding of documents		20,000
Data statistical analysis		20,000
Flash disc (2)	60.000	60.000
Purchase of internet modem	100.000	100,000
Internet subscription		20.000
Research assistants (2)	25000	50.000
Burning a CD		5000
TOTAL		370,000

Three hundred seventy thousand shillings only.

ANNEX 3: TIME PLAN.

This is the work plan for the research project that assessed the factors affecting growth and development of children under 5 years in KIUTH. Activities were carried out within the duration specified in the table below.

Month	Activity	Person responsible
June ,2014	Identifying the research topic and supervisor.	Researcher.
July, 2014	Writing research proposal and approval.	Supervisor. Researcher.
September,2014	Data collection.	Researcher Research Assistants.
October, November,2013	Data compilation, analysis and presentation. Submission of report.	Researcher Data analyst.

[illegible]

The map displays the Karamoja District, which is divided into four sub-counties: Kyamuhunga (pink), Kakanju (green), Nyabubare (light green), and Bumbaire (blue). Each sub-county is further divided into numerous parishes. The district is bordered by Rubirizi to the west, Kanyoma-Kigoma to the north, and Sheema to the south. A legend in the bottom left corner defines the symbols for District Boundary, County Boundary, Sub county Boundary, Parish Boundary, and Road. A scale bar at the bottom right indicates distances up to 10 km, and a north arrow is located in the top left corner.

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