FACTORS ASSOCIATED WITH STUNTING IN CHILDREN UNDER FIVE YEARS OF AGE: A CASE OF BUHARA SUB COUNTY KABALE DISTRICT

BY

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DECLARATION

This dissertation is my original work and has not been presented to any other institution for academic purposes.

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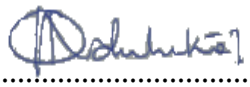

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This work is dedicated to my wife Mrs. Tumusime Mary Agness, Daughter Namanya Anita and my sons Anthony Maguru, Amanya Emmanuel, Yesiime Adulius who were my greatest inspiration.

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LIST OF ABBREVIATIONS

ANC:	Antenatal Care
CAO:	Chief Administrative Officer
CBOs	Community Based Organizations
CDC:	Centre for Disease Prevention and Control (USA)
CHDC	Child Health Development Centre
:DHO	District Health Officer
DHT:	District Health Team
EDHS:	Ethiopia Demographic and Health Survey
GDP:	Growth Development
HIV:	Human Immune-Deficiency Virus
LG:	Local Government
MOH:	Ministry of Health
NGOs:	Non-Governmental Organizations.
PNS:	Post Natal Stunting
SD:	Standard Deviation
SDG:	Sustainable Development Goals.
UDHS:	Uganda Demographic and Health Survey
UNAIDS:	Joint United Nations Programme on HIV/AIDS
UNAP:	Uganda Nutritional Action Plan
UNDP:	Uganda National Development Plan
UNICEF:	United Nations International Children Educational Fund
WHO:	World Health Organization

DEFINITION OF KEY TERMS

Complementary feeding: This refers to the provision of semi- solid and solid foods to children from 6 months of age in addition to breast milk to meet their daily nutrient requirements (UNICEF, 2017).

Nutritional status: This refers to the anthropometric status for children, weight for age, weight for height and height for age indices (UDHS 2016).

Anthropometry: Is the measurement of the human body used to assess the nutritional status of individuals and population groups and as eligibility criteria for nutrition support programme (38).

Stunting: Moderate and severe: height-for-age Z-score between -2SD to -3 SD and < −3 SD, respectively from the median (Ismail 2010)

Food group/Dietary diversity: Proportion of children 6–23 months of age who receive foods from 4 or more food groups; The 7 food groups used include; grains, roots and tubers; legumes and nuts; dairy products (milk, yogurt, cheese); flesh foods (meat, fish, poultry and liver/organ meats); eggs; vitamin-A rich fruits and vegetables; and other fruits and vegetables. (UDHS, 2016).

Malnutrition: It is the condition that results from an imbalance between dietary intake and requirements. It includes under nutrition, which results from less food intake and hard physical work and over nutrition results from excess food intake and less physical activities (UNICEF, WHO, (2011).

ABSTRACT

Under nutrition, especially stunting has continued to be a health burden among children of less than five years of age living in low- and middle-income countries. Kigezi sub region, Kabale District is faced with the problem of child stunting with 30 percent of the under-five years stunted. The study assessed factors associated with stunting among children less than five years of age in Buhara Sub County Kabale District. The study employed a cross-sectional descriptive design with qualitative and quantitative strategies in data collection from 380 participants drawn from a population of 5728 households. Data were collected using validated questionnaires and interviews over a period of one month with the help of trained research assistants. Generated data were exported to Statistical Package for Social Sciences (SPSS) version 21 and analysed in frequencies, percentages, confidence intervals, chi-square test and multinomial regression and presented in tables and charts. The study made the following findings in line with the objectives: low household income, child illness in the last few weeks incomplete child vaccination (p- Value = 0.005 < 0.05 and p- value = 0.001 < 0.05), the child's guardian ethnicity with (p- value = 0.013 < 0.05 and 0.000), open defecation, indiscriminate waste disposal, 18(4.7%) 95 CI= 028311725 - .073831273) and use of unprotected water sources, were the major factors associated with stunting. The child gender, child's care taker and child's birth order were equally linked with stunting with (p-Value = 0.023 < 0.05, p- value = 0.003 < 0.05 and, p- value = 0.002 < 0.05) respectively. The MUAC of children in the study with yellow result was 2.6% (.012690006 - .047862066), standard deviation of height 11.3cm and weight 2.7kg. The household financial security was seen to have influenced household food security, diversification, and supplementation. About 82(21.6%, CI; 175466713 - .260603736 eat supplements once a months, while 187(49.2%, CI; (.440755412 - .543579017 do not eat any food supplements at all. The child's household source of drinking water was significant to nutritional status of children under 5 years especially with regards to drinking water from unprotected source which is the predisposing factor to gastrointestinal infection that is among the risk factor for stunting. The study recommended that, Kabale District local government in conjunction with Buhara Sub County leadership should come up with ordinances and byelaws on how to improve community sanitation and hygiene practices especially improving toilet coverage, hand washing and proper disposal of the wastes to avoid stunting as they pose great risk to diarrheal diseases leading to mal-absorption food.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter provides the basic information about the study. It includes background, problem statement and study objectives, significance of the study, research questions, justification of the study and conceptual frame work.

1.1 Background of the study

Globally, there are about 2.2 billion children and of these 155 million children below five years suffer from stunting with Africa contributing 59 million of them, (EDHS, 2014).

Child stunting occur across all wealth quintiles (UNICEF, 2017). Stunting refers to children who are too short for their age and have suffered from a reduced rate of linear growth. (Next & OF, 2018). Children are classified as being stunted when their length/height for age fall below-2 standard deviation. It is also viewed as the devastating result of poor nutrition in early childhood (UNICEF; WHO, 2016).

Stunting remains a major public health concern worldwide (Vonaesch et al., 2017). In Sub - Saharan Africa, 34 percent of children less than five years of age are stunted, and this continue to cause detrimental impact at individual and societal levels (Nshimyiryo et al., 2019). Children are classified as being stunted when they have a height that is two standard deviations below the median height for children of the same sex and age in an internationally standardized index. (Next & of, 2018). Stunting is devastating result of poor nutrition in early childhood (UNICEF, WHO, 2016). It reflects chronic under nutrition during the most critical periods of growth and development in early life. In children it can be assessed by physical growth performance through height measurement for age and growth faltering happens mostly from 18 to 24 months of age (Victoria, 2010).

The causes of stunting among others included poor food, health and care practices, and are classified as immediate (individual level), intermediate (individual/household level) and underlying (maternal, household and regional characteristics) and environmental causes (UNAPII, 2016). The immediate causes of stunting are intrauterine growth retardation, inadequate nutrition after the recommended period of exclusive breastfeeding for the high demand of nutrient and frequent infections during early life (UNICEF; WHO 2015).

A study conducted in Bangladesh on the prevalence of stunting found out that about 41 percent of children aged below 60 months were stunted, the rate was found higher in rural setting than in urban areas that is, 43 percent versus 36 percent. Adjusted model revealed that several factors were influencing stunting, parents' education were significantly associated with stunting (Haribondhu et al., 2017).

Another study conducted in Zambia on prevalence of stunting among children below five years showed prevalence rate of 40 percent of the 4937 children, stunting was higher among male children as compared to female children (42.4 percent and 37.6 percent respectively). Children whose source of drinking water was improved (33.7 percent) were less likely to be stunted unlike (47.7 percent). Stunting in children whose mothers had higher education showed a 75% reduction of odds compared to children whose mothers had no education (AOR = 0.35, 95%CI: 0.22, 0.54; $p < 0.05$). Similarly, children who came from rich households showed a 32% reduction of odds compared to children who came from poor households (AOR = 0.68, 95%CI: 0.57, 0.82; $p < 0.05$). (Phoebe B., Hikabasa H., Raider M. & Jeremiah B. 2018).

In a study conducted in South Sudan findings revealed that, 32.2 percent of children below five years were stunted, 28.2 percent wasted while 32.3 percent of children were underweight respectively. The main associated factors of stunting in the study were age older than one year (p= 0.004), children from households who were renting their houses and children who defecate in open spaces with no latrine at their homes (p= 0.015). Underweight cases were associated with child's age (p=0.001), loss of appetite (p=<0.001), children who ate from own plate (p=0.001) and children who didn't consume meat (p=0.007). Also male genders (p=0.022), households with two or more children aged zero to five years (0.010) not consuming vitamin A rich vegetable (p=0.002), diarrheal disease within two weeks prior to interview (p=0.006) and those from households with water sources other than piped (<0.001) were also associated with wasting (Martin A. I., Ndeezi G., Nabukeera B. N. and Hassan C. (2020)

A prevalence study conducted in Bala Sub County, Kole district in northern Uganda on stunting showed that the prevalence rate of 30.6 percent, with Males leading the majority of the households. Stunting was found to be more common among children under five and related socio-demographic factors and other factors like diseases comorbidity, inadequate

dietary intake, family size, breast-feeding, exclusive breast-feeding and sanitation. (Francis, Odia.2021-04).

According to Gilbert Habaasa (2015), Stunting was found to be the most common malnutrition condition with the highest prevalence at 38.5 percent in the two districts of Kole and Nakasongola followed by wasting at 16.5 percent and underweight at 13.5 percent respectively. Furthermore, the findings presented that children aged between 39–59 months were less likely to be underweight than those aged below twelve month. Children of peasant farmers were more likely to be stunted than their counterparts with mothers in pastoralist's families. No significant association was found with wasting among the under-five children in the two districts although the prevalence was slightly higher than that of child underweight.

While efforts towards the reduction of stunting have succeeded globally (Lundeen 2014), stunting rates have unfortunately remained largely static in Uganda (Bhutta et al 2013). Achieving 2025 World Health Organization global health targets to reduce stunting by 40 percent in children under five years old remains a night mare unless continuous efforts to prevent stunting within in rural areas is sustained. This can be achieved through evidence based interventions like Multi-sectoral Food Production and Consumption, which encourages production of foods rich in iron and zinc while targeting women of reproductive age and primary schools in the community (UDHS, 2016).

In Kabale District, nutrition interventions have been on going over recent decades by implementing partners as well as government programs that have initially supported the communities in eliminating malnutrition. For instance, Uganda multi-sectoral food production and consumption, this encourages production of foods rich in iron and zinc (Kabale District production report, 2019).

In addition to the above programme, there has also been support from Operational Wealth Creation which is a government programme that support in provision of improved seeds, animals, seedlings to communities in Kabale District to boost their Agriculture. The district has also been receiving support by use of extension workers such as Agriculture officers, Fisheries, and Veterinary officers. Despites all these measures and interventions in place by various stakeholders, the prevalence of stunting still stands at 39 percent in Kabale District compare to the national percentage which stands at 29% especially among children of 0-5 years (Rukundo, 2016). However, the main determinants of these prevalence increases

remained unknown hence there was a need to understand exactly the factors influencing this increases in stunting particularly in Buhara Sub- County.

Although stunting levels remain unacceptably high in Uganda-Kabale District and Buhara Sub County in particular, there is limited information to explain why levels continued to be high. Stunting was underlined by numerous factors. To contribute to the understanding of the problem of stunting, this study took advantage of the Uganda Demographic and Health Survey data base. The data was obtained to investigate factors that were associated with high levels of stunting in the Buhara sub county-Kabale District.

1.2 Statement of the problem

Globally, 2.2 billion people are children, of these 155 million children under five years of age suffer from stunting and in Africa there are about 59 million stunted children (UNICEF, 2017). According to Gilbert-Habaasa (2015) in Uganda stunting was found to be the most common malnutrition condition with the highest prevalence (38.5 percent) in the two districts, followed by wasting (16.5 percent) and underweight (13.5 percent) respectively.

Under nutrition is a health burden among children living in low- and middle-income countries, (WHO 2015). Government of Uganda, launched the Uganda Vision 2040 and National Development Plan (2010-2015) and IYCF was recognized and has been directed towards the promotion, protection and support of optimal feeding all aimed at dressing stunting growth in Children. (Health, 2007). Today in Uganda, 33 percent of children under the age of 5 are stunted (too short for their age) and almost half (49 percent) suffer from anemia, according to the 2011 Uganda Demographic and Health Survey (UDHS 2011).

Uganda reduced stunting from 33 percent of 2011 to 29 percent in 2016 (UDHS, 2016). Though the reduction is observed, Uganda is still ranked among the high stunting burdened countries as many communities live in low socio-economic backgrounds and slum areas (UDHS, 2016). Stunting may start as early in pregnancy, infancy and early childhood due to poor quality nutritional diets that may lead to inadequate nutrient intake. Furthermore, poor socio-economic conditions and increased risk of frequent exposure to certain conditions, such as illness or inappropriate feeding practices may give rise to high levels of stunting (Rukundo, 2016).

In Kigezi sub region, Kabale District is faced with the problem of child stunting with 30 percent of the under-five years stunted. In 2016 stunting affected at least one of every five

children in the population and evidence shows that urban children generally have a better nutritional status than their rural counterparts where Buhara Sub County falls with the male child being affected more compared to female child (UDHS 2016).

Buhara Sub County remains the most affected with 40 percent of children affected by stunting based on Kabale District (HIMS, 2019).

The Government launched the Uganda Vision 2040 and National Development Plan (2010-2015) that focused on nutritional wellbeing of children and other several initiatives aimed at reducing under-five malnutrition especially the food and nutrition policy 2016 as well as the implementation of the Sustainable Development Goals (SDG, 2016). Despite all these policies and national guiding principles in place, still the country records high cases of malnutrition with 16 percent of children being underweight, 38 percent left stunted and 6.1 percent being wasted which has devastated the economy of the region (UBOS, 2016).

Thus, in order to address the problem of lack of information on the magnitude and causes of child stunting in Buhara, the researcher was motivated to undertaken this study with the aim of determining the factors influencing stunting of children under five years of age in Buhara Sub County as a case study.

1.3 Research Questions

1. What are the environmental factors associated with stunting in children of under five years of age at Buhara sub-county in Kabale District?

2. What are the social economic factors that associated with child stunting in Buhara sub-county?

3. What is the nutrition interventions provided in Buhara Sub County to address stunting in children of under five years of age?

1.4. Objectives of the study.

1.4.1 General objective

The main objective of the study was to determine the factors associated with stunting among children below five years in Buhara sub-county, Kabale District.

1.4.2 Specific objectives

1. To determine the environmental factors associated with stunting in children of under five years of age at Buhara Sub- County in Kabale District.

2. To identify the socio-economic factors associated with the child stunting in Buhara Sub-County.
3. To establish the nutrition interventions used for preventing stunting among children under five years of age in Buhara sub-county, Kabale District.

1.5 Significance of the study

Despite the fact that the government of Uganda health sector has increased its efforts to enhance good nutritional practices, child under nutrition and stunting is still among the highest in the world. Children under five years of age are the most vulnerable groups to malnutrition. Malnutrition is one of the main health problems in Kabale District. It is predominantly seen among the rural population since the food source of this population is based on production of crops and the awareness how to prepare and give value to food is limited.

Kabale District Local Government and Buhara Sub County prioritized interventions to address child stunting in the local context of the district. The study will add information to body of knowledge and serve as point of reference for future researchers. The findings may also guide in development of nutrition behavior communication change and may be useful tool for resource mobilization. It will assist the health system and other concerned stakeholders to plan appropriate and efficient nutrition interventions. This makes a great a need of a comprehensive study on the nutritional status and associated factors for child stunting.

1.6 Scope of the study

1.6.1 Geographical Scope

The study was carried out in Buhara Sub County, Ndorwa East Health Sub District in Kabale District. The area of study has four Health Centres that are fully operational that is, Buhara H/CIII, Buhara NGO, Kafunjo H/CII and Rwene H/CII.

According to Buhara Health Center III Outpatient Register (2021), the facility receives seventy patients per day on average from the 5 parishes in the Sub County and cross borders of Rwanda. The topography of the Sub County is mainly green and has interlocking heavily cultivated lands with spectacular valleys. Kabale and Buhara are approximately at 1219 meters to 2341 meters above sea level which makes it cooler than many other parts of the country. A daily temperature ranges between 15^0C to 25^0C but at night drops up to 10^0C. April is the coolest month while July is the warmest month. All Health Centers are

government facilities (public), except for Buhara NGO Health Center which Not for Profit meaning that all services are free of charge.

Health Centers in the area of study cover a wide range of services both curative and preventive measures including; General out patient, Diagnosing and treating the patients, laboratory services, ART services, TB management, Dental services, HIV/AIDS counseling and testing services, Nutrition services, Health education, home visiting, Maternity services, Postnatal care, ANC care, Family planning, PMTCT services, community outreaches, and Immunization services.

1.6.2Time Scope

The study took about 10 months (May 2021 to March 2022) to complete the process of data collection, analysis and report writing.

1.6.3 Content Scope

The study determined the factors associated with stunting among children less than five years of age. The target group were children under five years old in the Sub County for a period of 10 months and the study was carried out in Buhara sub-county, Kabale District. The content of study was guided by the objectives and that was to; determine the environmental factors associated with stunting in children of under five years of age at Buhara Sub- County in Kabale District, identify social economic factors associated with the child stunting in Buhara Sub- County and establish the nutrition interventions provided and used to combat stunting among children under five years of age in Buhara sub-county, Kabale District. Findings of this study is to be used for academic purpose and also used to inform policy makers on problems related to stunting among children below five years.

1.6.4. Methodological scope

Although there are other measures of chronic malnutrition the study used height for age to measure stunting.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter review related literature from textbooks, journals, magazines, and internet on factors influencing stunting among children of under five years from around the world. It focused on the following subheadings; description of the concept of stunting, proportion of children affected by stunting, environmental factors, nutritional interventions provided for child stunting and caregiver/family/household factors influencing child stunting.

2.2 Social ecological model

According to Dahlberg and Krug, (2002), Social ecological model takes A Closer look at each level that is Individuals, Relationships, Societal and Community. Individual identifies biological and personal history factors; such as age, education, income, substance use, or history of abuse, that increase the likelihood of becoming a victim of stunting of children under 5 years of age. Relationship Examines close relationships that may increase the risk of experiencing stunting of children under 5 years of age as a victim. A person's closest social circle-peers, partners and family members-influences their behavior and contributes to their range of experience. Community Explores the settings, such as schools, workplaces, and neighborhoods, in which social relationships occur and seeks to identify the characteristics of these settings that are associated with becoming victims or perpetrators of stunting growth of children under 5 years of age. Societal Looks at the broad societal factors, such as health, economic, educational and social policies, that help create a climate in which stunting is encouraged or inhibited and help to maintain economic or social inequalities between groups in society.

Table 2.1: Showing Theoretical concepts that are useful in understanding the study variables relationship.

Theories	Areas of Application in the study
Theory of perception	Perceived ignorance, food taboos, health seeking behavior
Theory of development	Chronic malnutrition and child behavior: effects of early caloric supplementation on social and emotional functioning at school age', Development Psychology,
Behavioral theory	Early termination of exclusive breastfeeding, a short lactation period and an unsanitary living environment are critical factors that affect nutritional status of the children
The health belief model	The health belief model deals with the beliefs that influence health behavior. The model further explains that people will not change their health behavior unless they believe that they are at risk of an illness, it is severe illness, benefit of health action and barriers to health action. For example, female sex workers will utilize HIV testing services if they believe they are at risk of acquiring HIV hence belief influencing behavior.

Source for the table content: (Kirst – Ashman, K. K., & Hull, G. H., Jr. 2015 & Becvar, R. J., & Becvar, D. S. 1982).

2.3. Conceptual Review of stunting.

Stunting is defined as a low height for age of the child compared to the standard child of the same age. Stunted children have decreased mental and physical productivity capacity. Height-for age is an index used for assessing stunting (chronic malnutrition in children) (UNMHCP, 2016)

Stunting is a measure of chronic under nutrition and it is measured by length or height for age standard deviation z-score. (De Onis M, and Yang H-2019). There are different determinants of stunting, among these factors includes; parental, socio-demographic, economic status, cultural practices, environmental and other health related variables. Including, poverty, low parental education, lack of sanitation, low food intake, poor feeding practices, inadequate

breastfeeding, repeated infections, family size and birth interval. (Gelano T, Birhan N, and Makonnen M. 2018). Similarly, other studies indicate that stunting is influenced by child age, age of the mother, child sex, family size, wealth index, marital status of mother, and number of livestock of the family (Central Statistical Agency Addis Ababa, Ethiopia. 2014). Another study reported that family socio-economic status was the most important factor associated with stunting (Chitwan. Health Prospect, 2011).

Stunted children have poor physical and intellectual performance and lower work output leading to lower productivity at individual level and poor socioeconomic development at the community level. Stunting of children in a given population indicates the fact that the children have suffered from chronic malnutrition so much so that it has affected their linear growth (Gelano T, Birhan N, and Makonnen M. 2018).

Prevalence of underweight, stunting and wasting among children under five is estimated by comparing actual measurements to an international standard reference population (UNICEF, 2015). The historic agreement among world leaders at the United Nations (UN) in 2015 on a universal 2030 Agenda for Sustainable Development committed all countries to pursue a set of 17 Sustainable Development Goals (SDGs) that would lead to a better future for all (WHO 2017).

For the first time in 20 years, UNICEF's The State of the World's Children examines the issue of children, food and nutrition, providing a fresh perspective on a rapidly evolving challenge. Despite progress in the past two decades, one third of children under five years of age are malnourished - stunted, wasted or overweight - while two thirds are at risk of malnutrition and hidden hunger because of the poor quality of their diets. These patterns reflect a profound triple burden of malnutrition - under nutrition, hidden hunger and overweight - that threatens the survival, growth and development of children and of nations. At the center of this challenge is a broken food system that fails to provide children with the diets they need to grow healthy. This report also provides new data and analyses of malnutrition in the 21st century and outlines recommendations to put children's rights at the heart of food systems (UNICEF, 2019).

In developing countries nearly one-third of children are underweight or stunted. Under nutrition interacts with repeated bouts of infectious disease, causing an estimated 3.5 million preventable maternal and child deaths annually and its economic costs in terms of lost national productivity and economic growth are huge (Yalew BM, Amsalu F, Bikes D (2014).

A Study done in Vietnam revealed that the prevalence of underweight, stunting and wasting in Nghean was found to be 31.8%, 44.3% and 11.9%, respectively (Hien NN1, Kam S (2008). Other study done in developing countries shows, 32% or 186 million children below five years of age are stunted and about 10% or 55 million are wasted (FoNSE (2010). In East Africa 48 percent of children fewer than five are defected by stunting (Woldemariam G, Timotiows G (2012).

In Ethiopia It is estimated that malnutrition contributes to an estimated 270,000 deaths of children under five years of age each year (FMOH, 2011). Many nutritional studies have demonstrated that malnutrition in Ethiopia is serious and 44 percent of children were stunted, 10 percent wasted and 29% underweight with wide regional variations, in Amhara National Regional State stunting, wasting and underweight were found as 52 percent, 9.9 percent and 33.4 percent, respectively.

A study conducted by Concern Worldwide in Tanzania regions of Iringa, Njombe and Mbeya in 2016 found out that 35% of children under five years of age were stunted, with prevalence reaching 50 percent in those regions (Walker SP, et al 2018). In 2014, one hundred fifty-nine (159) million under 5-year-old children were stunted worldwide (WHO, 2017). More than half of all stunted under-five children lived in Asia 57 percent are more than one third lived in Africa 37 percent. Africa was the only region where the number of stunting among under five-year-old children increased over the past decade, around fifty-two (52) million children (with some overlap with the 155 million stunted) suffered from wasting, of which 17 million were severely wasted. Children suffering from wasting are dangerously underweight for their height, and may also be affected by stunting, which puts them at increased risk of disease and death (WHO, 2016).

In 2015, Africa had the highest prevalence of stunting at 37.6 percent, followed by Asia at 22.9 percent (EDHS, 2014). Western Africa accounts for half of the stunting increase in Africa; there were 4 million more stunted children in Western Africa in 2016 than in 2000 while less than half of all children under-five live in lower-middle income countries, two-thirds of all stunted children and three-quarters of all wasted children live there (WHO 2018).

2.4. The Conceptual Framework of the Study

The Stunting Framework described below includes sub-sections on the caregiver/household, and home environment factors affecting stunting. Caregiver/household factors can influence stunting through two distinct pathways: in utero and postnatal. Factors influencing in utero

growth include maternal infection, adolescent pregnancy, maternal short stature and short birth spacing as seen in table below. Poor nutrition during preconception and pregnancy is not discrete and measurable factor but represents a wide range of potential indicators. Maternal infection with malaria, helminthes and HIV may lead to intrauterine growth restriction and later stunted growth in the infant. Globally, few studies have investigated the association between infection during pregnancy and birth outcomes or stunting in early childhood. Maternal factors influencing postnatal child growth includes poor nutrition during lactation and mental health where for instance children whose mothers' milk had low concentrations of zinc were more likely to be stunted than children of mothers with normal levels of breast milk zinc. Short maternal stature and other anthropometric measures are common proxies of maternal nutritional status, which can affect in utero and postnatal growth. Studies from Ethiopia have repeatedly shown significant associations between maternal height and weight and child stunting (Stewart et al. 2013).

The 'home environment' sub-section includes six factors: Place of residence (Living in slums), Comorbidity with other bacterial infections which reduce appetite of food intake, inadequate child stimulation and activity which leads to poor suckling effect, lack of hygiene during feed may lead to diarrhea hence loss of nutrients, Poor environmental sanitation and inadequate water supply and poor hand washing practices are associated with safety and distance of the drinking water source and the type of toilet used, diarrhea episodes and housing condition. Food contamination and food borne infection can affect maternal dietary intake during pregnancy.

Therefore; nutritional interventions and food hygiene practices such as Hand washing with soap, proper hygienic disposal of stool, provision of adequate water supply and safe food, breastfeeding, multiple micronutrient supplement, improved sanitation, deworming, and fortification of food are emphasized.

Articles were searched in the following databases: PubMed, Google Scholar, Science Direct, Sabinet African Journals, and the University of Zululand library catalog search for journals. Key Sabinet African Journals, Key terms that were used to search studies from the selected databases were: risk factors, child nutrition, status, children under five years, South Africa, malnutrition, underweight, stunted, wasting, and children under five years, In addition to the key terms, factors influencing the nutritional status of children addition to the key terms, factors associated with the nutritional status of children under the age of five were

hypothesized based on the theoretical framework of causes of child malnutrition provided by the United Nations International Children's Emergency Fund (UNICEF). Factors included basic factors (human, economic, and organizational resources), underlying Factors included basic factors (human, economic, and organizational resources), underlying factors (such as household food insecurity, illiteracy, insufficient maternal and child care, inadequate health services, and poor environmental conditions), and immediate factors (such as diseases and services, poor environmental conditions), and immediate factors (such as diseases and inadequate dietary intake). Figure 1 illustrates the causes of stunting per UNICEF's theoretical dietary intake).

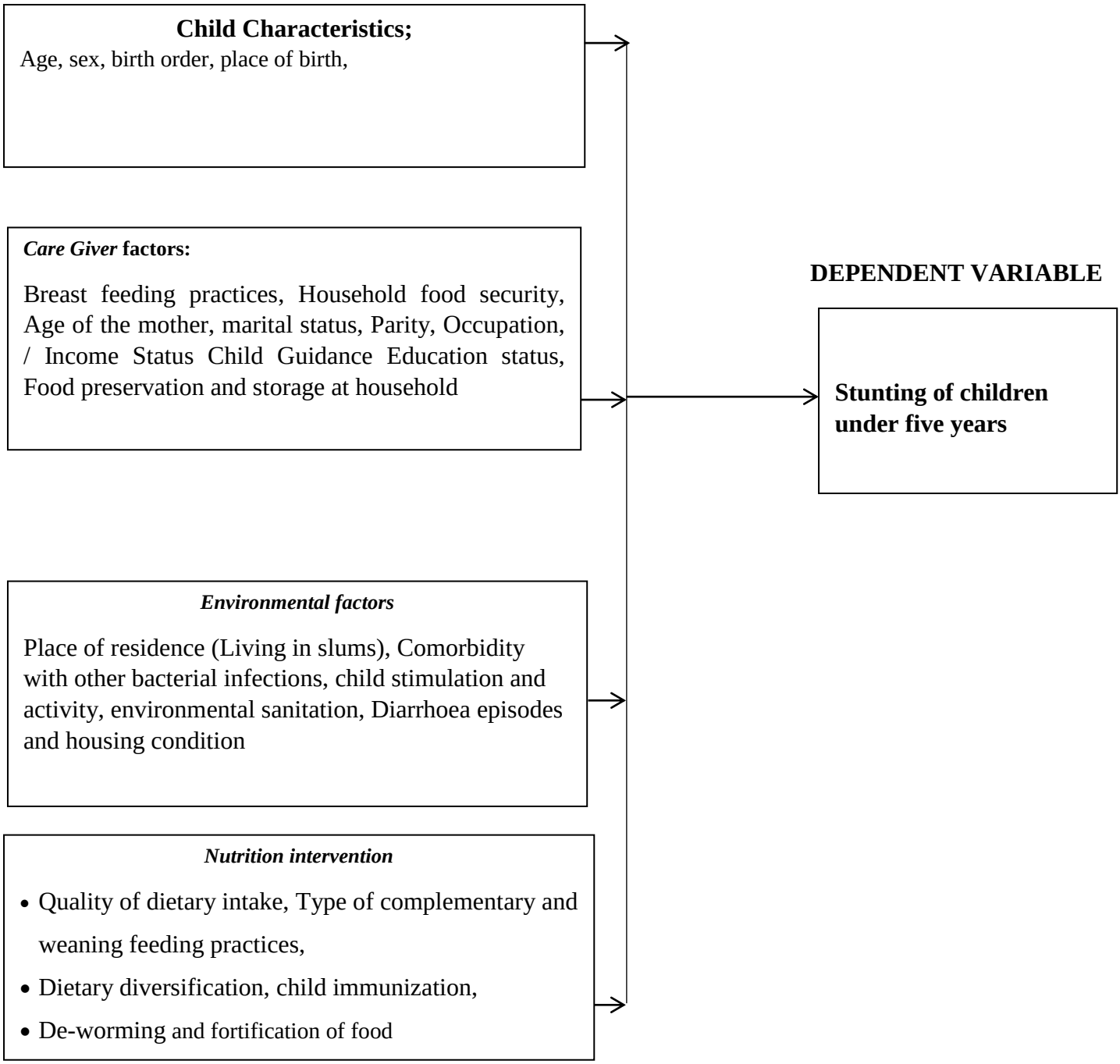
The conceptual framework of children affected by stunting children: There is a consensus among many researchers that a complex set of factors determine child stunting among young children while inadequate and inappropriate dietary intake and infectious diseases appear the immediate/direct causes, also, numerous socioeconomic and demographic factors influence feeding patterns and health of children which in turn results in decreased food intake, poor diet quality, and a high burden of early childhood infections that contribute to significant growth faltering, morbidity and mortality.

2.5. Factors associated with stunting among children under five years

2.5.1 Social demographic factors related to stunting.

According to the Uganda Poverty Assessment, the proportion of the population living in extreme poverty (on less than US$1.90 a day) fell from 62 percent in 2002/03 to 35 percent in 2012/13, representing one of the fastest reductions in poverty in Sub-Saharan Africa. Good weather and favorable prices in international and regional markets increased real income from crops, with agricultural households accounting for up to 79 percent of the poverty reduction during this period. However, the likelihood of falling back into poverty is very high for every three Ugandans who rise out of poverty, two falls back into it, demonstrating how fragile the gains can be. Extreme poverty is concentrated in the north and east of the country, accounting for 84 percent of those living below the national poverty line (USAID-DHS, 2018.

Figure 3. 1 Study conceptual framework of Factors associated with stunting among children under five years



Study conducted in Indonesia shows that rural children are less likely to be severely, mildly and moderately stunted as compared to urban children. 32 percent of rural children are malnourished against 27 percent of urban (Gobotswang K. 2018). Also, in Vietnam the study reveals that residence had significant association with the level of stunting (Nguyen NH, Nguyen NH2 (2009). Also, Ethiopia National baseline survey 2010 shows a noticeable

difference between urban children (25 percent) and rural children (41 percent) in stunting (EHNRI, 2012). Children in rural areas are one and a half times more likely to be stunted (46%) than those in urban areas (32 percent) (Central Statistical Agency, 2011). Female children are more likely to be stunted as compared to male but the association is significant only in case of moderate stunting (Gobotswang K. 2018). Male children were 1.5 times more likely to be stunted as female children. Boys were more likely to be either stunted and/or underweight than girls.

A study done in South Africa has shown that male preschoolers were at higher risk of being stunted than their female counterparts (Lesiapeto MS, 2016). One in every ten (10) children born to educated mothers are stunted (UDHS 2016). Childhood stunting remains one of the world's most fundamental challenges for improved human development and it is a risk factor for overweight and obesity later in life.

A study done to southern region of Ethiopia identified, low socioeconomic status of household, low maternal education, having many children aged under five years and older age of infant as risk factors for child under nutrition (Alive & Thrive. (2010). A similar inverse relationship is observed between the household wealth index and the stunting levels of children; that is, a higher proportion of children in the lowest household wealth quintile are stunted (49 percent) than of children in the highest wealth quintile (30 percent) (Central Statistical Agency, 2011). Study conducted by Addis continental institute of public health shows the primary occupation of father was farmers (91 percent) (Addis Continental Institute of Public Health (2009).

Another study done in democratic republic of Congo shows, the prevalence of stunting was higher among boys (46.1%) compared to girls (41.7 percent), has an inverse linear association with the age of the child (lower in the age groups ranging from 1-5 years (Kandala NB1, et al. (2011).

In Vietnam the study indicated that the highest risk of stunting was among children aged 12-23 months and children in the youngest age group, 6-11 months had a significantly lower risk of being stunting than children in the older age groups (Nakamori M, et al. (2010). Study conducted in Bangladesh indicated that odds of being severely stunted was significantly ($p<0.05$) lower for first, third and fourth birth orders than fifth or higher birth orders, while the effect of this variable for being moderately stunted was not significant (Mostafa KS (2011).

Other study in Vietnam also shows that the risk of malnutrition increases with age and a higher prevalence of malnutrition were observed in boys than girls (Hien NN1, Kam S (2008), also in Nairobi the study shows that, the prevalence of stunting among children aged 6-59 months was 47 percent, and the prevalence increased with age through 36-47 months (58 percent) (Olack et al., 2011).

Female headed households are more likely to have moderately and mildly stunted children. Families with higher monthly per capita income had significantly lower prevalence of underweight children (p=0.005). Prevalence of stunting was not found to be significantly associated with the number of siblings in India. Those with no siblings, had the lowest proportion of underweight children (12.8 percent), higher in those with 1-2 siblings (30.6 percent) and highest (51.7 percent) in those with >3 siblings (Paramita S, Nina P, Benjamin A. I. 2010). Although marginally significantly, mothers who had no formal education were five times more likely than mothers who had completed more than primary education to have stunted children. Among all the socio-economic factors studied, mother education was found to be the most powerful significant factor associated with malnutrition. Thus, up to 90 percent of the children whose mothers were illiterate were found to be malnourished (Abuya et al., 2012).

Studies by Black et al. (2016) indicated that, male children were more at risk of stunting than female children, with risk peaking in the second and third year of life. Furthermore, the nutritional status of a child was directly related to maternal presence and maternal reproductive status. Younger children were particularly affected by maternal absence, while older children were affected by their mother breastfeeding the younger sibling. The authors conclude that interventions that increase household wealth and improve water and sanitation conditions should be implemented to reduce stunting, family planning activities, support to mothers during pregnancy and lactation can have positive effects both on the newborn and older siblings.

A study done by Islam et al. (2013) on factors associated with stunting and underweight among under five revealed that, children born to a mother who gave birth to more than five children were more likely to be underweight when compared to children from a mother who gave birth to less than five children. This could be because families with more children experience more economic strain for food consumption and hence, they are more likely to suffer from chronic stunting. As of 2013, life expectancy at birth in Uganda was 58 years,

lower than any other country in the East African Community except for Burundi. As of 2015, the probability of a child dying before reaching age five was 5.5 percent (55 deaths for every 1,000 live births (WHO, 2017).

Children born to very young mothers are at increased risk of sickness and death. Teenage mothers are more likely to experience adverse pregnancy outcomes and are more constrained in their ability to pursue educational opportunities than young women who delay childbearing. Child stunting occurs across all wealth quintiles not only in low-income households. Rates are high even in the two highest wealth quintiles with 32 percent of children in the lowest wealth quintile compared to 17 percent in the highest wealth quintile (UDHS, 2016).

In the study of Mercedes et.al (2016), showed; stunting in early life is associated with adverse functional consequences, including poor cognition and educational performance, low adult wages, lost productivity and, when accompanied by excessive weight gain later in childhood, increased risk of nutrition-related chronic disease. It is apparent that malnutrition remains to be a persistent problem in the country. Childhood stunting, a devastating indicator of chronic malnutrition, affects 33 percent of children aged 6 - 59 months while an estimated 26 percent of the population is at risk of undernourishment due to food insecurity (UNAP 2011-2016).

The factors leading to any Anthropometric deficiency (stunting, wasting, and underweight) differ from one context to the other. For example, according to the recent national report the prevalence of stunting increases as the age of children increases and male children are slightly more likely to be stunted than female children (46 percent and 43 percent, respectively) (UDHS 2016). A study conducted in Sudan that involves 780 households' shows that the main contributing factors for under-five stunting were found as sex and age of the child (Nguyen NH & Nguyen NH2, 2009).

According to the three most recent Uganda Demographic Health Surveys (UDHS), nutrition indicators for young children and their mothers have not improved much over the past 15 years, with some indicators showing a worsening trend. For example, in 1995, 45 percent of children under five years old in Uganda were stunted, ten years later, the prevalence of stunted under-5years had fallen only to39 percent (UDHS, 2006). Stunting indicates chronic malnutrition in children, the stunting prevalence rate of 39 percent means that about 2.3 million young children in Uganda today are chronically malnourished (UNAP, 2016).

2.5.2 Environmental factors associated with child stunting among under five years

Malnutrition in childhood and pregnancy has many adverse consequences for child survival and long-term well-being. It also has far-reaching consequences for human capital, economic productivity, and national development overall. The consequences of malnutrition should be a significant concern for policy makers in Uganda, where 2.2 million children under 5 years (29 percent) suffer from stunting (low height-for-age), according to the most recent Demographic and Health Survey (DHS) (UBOS and ICF 2018). Stunting is the result of growing under limited provision of food, health, and care (USAID-DHS, 2018).

Conflict, climate change and growing inequalities add additional challenges. After a prolonged decline, the number of undernourished people rose from 777 million in 2015 to 815 million in 2016, mainly due to conflicts and drought and disasters linked to climate change (Sustainable & Goals, 2011). By providing poor people with services, they need to make investments and manage unexpected expenses; financial inclusion facilitates the first SDG: eliminating extreme poverty (Klapper, El-zoghbi, & Hess, 2016).

A study conducted in Ghana showed that the most significant factors that affect nutritional status of under five children were found as, not washing hands after coughing 65 percent, not washing hands after handling rubbish 11 percent and improper washing of raw food 9 percent. Also, the Study done in Srilanka, shows 57 percent of the households got drinking water from unprotected well, 10 percent from protected/ common well with tube wells, 11 percent from boreholes and 10 percent from Piped water (Jayatissa, Moazzem H, Laksiri N, 2012).

Approximately 23 percent of households did not use a method of treating drinking water. Among those who used such a method, the most common method used was boiling (34 percent), with 24 percent of the households using chlorination and another 19 percent, using filtration. More than 80 percent of households wasted less than 15 minutes to access a source of water. In 14 percent of all households, there were no toilet facilities (Nguyen NH, 2009).

Based on national data, Patricia (2017) indicated that environmental factors such as access to water and sanitation at the community level were predictors of underweight children in Ethiopia. Another study based on a large sample size drawn from five zones of Southern Ethiopia by Gugsa (2017) determined that women's education, household economic status, age of the child and infant feeding practice were the significant predictors of stunting.

According to studies by Ryan et al (2011) poor access to health care and a healthy environment predisposes children to infections due to inadequate food intake. In many cases, young children do not live in a healthy environment with good access to toilets and other sanitation services, safe water supply, and effective health care services, including nutrition services such as micronutrient supplementation and nutrition education. Such children are greatly stunted. Incidence of diarrhea with two weeks prior to the study showed a significant association with child stunting (Alive & Thrive, 2010). All the three indices of under-nutrition were higher in those with worm infestation, the prevalence of underweight children was significant (p=0.02) (Ajao KO1, et al, 2010).

A Study conducted in Bangladesh shows, after adjustment with other factors, the variables namely household size, number of children in the household and sources of drinking water, appeared to have no significant effect on nutritional status of the children but toilet facilities showed to have a net significant ($p<0.001$) effect after controlling for other socio-economic and family related factors (Sumonkanti d, 2008). Two studies found that, as the percentage of homes with access to a latrine increased, rates of stunting in the study areas (mostly villages) decreased (Spears D, Ghosh A and Cumming O, 2013).

Another study found that reducing the percentage of open defecators in a village was more effective in reducing stunting than increasing individual latrine ownership (Gugsa, 2017). The study suggested that a measure of number of open defecators per square kilometer can account for 65 percent of the variation in children's heights globally. It was also found that a 10 percent increase in open defecation leads to a 0.7 percent increase in the prevalence of stunting (Spears D, 2013). Lastly, residing in a village with a WASH program raised average heights by 0.3–0.4SD (Silveira et al., 2010). Even children who did not have access to a latrine but lived in the village experienced a similar increase in their height-for-age Z-score. Half of the papers (4/8) reported that poorer-quality housing materials were associated with stunting (Silveira KBR, et al, 2010), while the other half reported that it was not (Briceno B, Coville A and Martinez S, 2015). Flooring type was shown to be important, with all the studies that examined flooring showing dirt floors were associated with stunting (100 percent (5/5) (Silveira KBR, et al, 2010).

Two studies did examine hygiene practices as independent variables, and both found that improved hygiene practices (such as appropriate hand washing and presence of soap and water near latrine) was associated with reduced rates of stunting (Adekanmbi et al, 2013).

One study used an environmental quality index, which combined scores for water source, sanitation, and hygiene into a single index figure (Sue Horton, et al, 2018). They found that communities with a lower-quality index had higher stunting. Within those same lower-indexed communities were individual households that had higher incidence of stunting compared to households with higher-quality index scores. The second study used a survey to rate environments as satisfactory or poor based on the responses on overcrowding and safe drinking water as well as sanitary waste disposal. This study found that poor environmental conditions were associated with stunting (Silveira, et al, 2010).

Another factor influencing the effect of sanitation on height-for-age Z-score is the appropriate use of latrines. One study found that the sanitation part of a WASH program did not result in improvements in height-for-age Z-score for children (Gugsa, 2017) attributing the results to an inadequate change in toileting habits as open defection still occurred despite having a new latrine.

2.5.3 Social-economic factors associated with child stunting among under five years

The Republic of Uganda is a landlocked country of East-central Africa endowed with large fresh-water resources and a high agricultural potential. The population, young and predominantly rural, is mostly engaged in subsistence rain-fed farming (Food and Agriculture Organization of the United Nations (FAO, 2010). Adequate nutrition is a prerequisite for human development and socioeconomic well-being. The Government of Uganda is committed to fulfilling the constitutional obligation of ensuring food and nutrition security for all Ugandans (The 1995 Constitution of Republic of Uganda XXII).

There are several interacting causes of stunting in children under five years in Uganda ranging from policy issues to immediate household conditions, underlying community and cultural situations. The immediate causes of child stunting in Uganda are; inadequate dietary intake and high disease burden which is due to; Household food insecurity -mainly related to poor access to the range of foods needed for a diversified diet in addition to the foods that households frequently consume are relatively deficient in micronutrients (WHO, 2016).

A study conducted in Sudan shows that the main contributing factors for under-five stunting were found as deprivation of colostrum's, duration of breastfeeding, pre-lacteal feeds, type of food, age of introduction of complementary feeding and method of feeding (Nguyen NH, Nguyen NH2 (2009). Also, another study conducted among 25 ethnic groups in central,

eastern and southern parts of Ethiopia shows that, not practicing exclusive breastfeeding was experienced in the area (Alive & Hrive. (2010).

According to the findings by de Onis M, Frongillo EA, Blossner M, (2018), maternal illiteracy was significantly associated with the risk to develop malnutrition in children under the age of five. Child caregivers or mothers hand washing only at the time of visiting latrine strongly contributes to malnutrition which were three-fold higher than whose mothers had practices hand washing at each activity.

A study by Wamani et al. (2017) reported that low social economic status of the care givers/parents predisposes the child to stunting. The parents/caretakers have very poor social economic status; owing to several years of deprivation, homelessness, loss of their wealth, lack of farming and employment opportunities.

Inadequate maternal and child care. Care-related constraints lead to both inadequate dietary intake and a high disease burden in young children who are due to the heavy workload those women as primary caregivers in the household do (Ryan AS, et, al, 2011).

A study by Sue Horton, et al, (2018) has shown that a large household may restrict the mother's ability to monitor her children's feeding habits because they assume the child has been fed elsewhere. Due to their heavy workload, mothers said they needed to leave their children with alternative caregivers, such as hired help or older siblings. They felt that these caregivers sometimes failed to provide adequate care, forgetting or neglecting to feed the children properly hence resulting to chronic stunting. Frequent child births may also limit a woman's ability to properly care for her children. In addition, social dislocation in many households and communities in Uganda has led to changes in traditional gender roles and increased family breakups. These changes tend to worsen the quality of the nutrition and health care women and young children receive (Sue Horton, et al, 2018).

Malnutrition and related deprivation have been associated with failure to ensure adequate dietary intake in infancy and childhood, inadequate intake of especially animal sourced foods, poor micronutrient intake, and socio-economic constraints on the household among others.

Moreover, the costs of malnutrition on the economy are an apparent latent challenge as an estimated 5% of the Gross Domestic Product (GDP) is being lost due to combined effects of stunting and other consequences of under nutrition. It is of the essence that nutrition specific and nutrition sensitive interventions are financed as strategic national development

investments given the implications of nutrition on sustainable human and economic development (UNDP, 2018).

According to Uganda Nutrition Action plan 2016, there are a number of problems that women and children experience in Uganda which are due to micronutrient deficiencies, these include:

Vitamin A deficiency which affects one out of five young children and women of reproductive age, resulting into low resistance to infection and consequently higher levels of illness and mortality.

Iron-deficiency anemia which affects three-quarters of children age 6 to 59 months and half of women of reproductive age which may lead to low productivity earnings, care-giving abilities and Pregnancy complications such as premature birth, low birth weight, and even maternal mortality, in children, anemia leads to a significant slowdown in cognitive development and low resistance to infections. (Uganda Nutrition Action Plan, 2016).

According to Giudici et al., (2013), more than a half (56 percent) of the respondents did not understand what a balanced diet was. Majority (70 percent) of those who did not understand said that a balanced diet consisted of carbohydrates and proteins, while one-tenth (10 percent) said that a balanced diet had to be adequate in amount (quantity) in order to give satisfaction. There was a positive correlation between the respondents' knowledge of nutrition and factors determining the choice of food which resulted to stunting.

As a global public health recommendation, infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health. Nonexclusive breastfed children in the first 4 months had 3.95 times higher incidence of underweight and thereafter, to meet their evolving nutritional requirements. Infants should receive nutritionally adequate and safe complementary foods while breastfeeding continues up to two years or beyond (Mohieldin et al., 2010).

Appropriate child feeding practices are age-specific, and they are also defined within very narrow age ranges. They follow a continuum from exclusive breastfeeding, starting soon after birth, to the complete adaptation of the child to the family diet (Babasaheb, 2011). Breastfeeding is an integral part of infant feeding and is the natural form of supplying nourishment to a mammalian infant.

Children who were breastfed for less than six months were 1.6 times more likely to be stunted than those breastfed long (Beka et al., 2009). Apparently, an inverse association is observed between duration of breastfeeding and long-term nutritional status, with longer (more than 6 months) of breastfeeding without starting complementary food associated with increased incidence of stunting.

A study conducted in Sudan shows that the main contributing factors for under-five stunting were found as deprivation of colostrum, duration of breastfeeding, pre-lacteal feeds, type of food, age of introduction of complementary feeding and method of feeding (Nguyen NH, et al, 2009). The study conducted among 25 ethnic groups in central, eastern and southern parts of Ethiopia shows that, not practicing exclusive breastfeeding was experienced in the area (Alive & Thrive. (2010).

A study done on 51 selected wards from Amhara, Tigray, Oromia and SNNPR 2007 shows that the breast-feeding practice is estimated to be 98 percent but breast feeding was initiated within one hour of birth for 50.4 percent of the children who are ever breastfed. 26 percent of the children have been given fluids other than breast milk in the first three days of delivery and it is only 59 percent of the children who were fed with colostrum's (Addis Continental Institute of Public Health, 2009). The study on the association between dietary factors and stunting showed that deprivation of colostrum, duration of breastfeeding, pre-lacteal feeds, age of introduction of complementary feeding, frequency of feeding, mode of feeding and first food given at time of complementary feeding were significantly associated with stunting.

Another study conducted by Bukusuba et al. (2010) among breastfeeding women in Eastern Uganda explored those practices revealed that about 62 percent of study participants had inadequate imbalance diet. Only 21.8 percent of them had 3 or more meals per day and 60.2 percent of study participant reported consumption of less than 6 food groups in a day such as carbohydrates, proteins, fruits and vitamins.

2.6. Nutritional interventions to address stunting among children under five

As a global public health recommendation, studies by Mohieldin A, Ibrahim M, Alshiek M.A.H (2008-2010) proclaimed that nonexclusively breastfed children in the first 4 months had 3.95 times higher incidence of stunting and therefore, to meet their evolving nutritional requirements. Infants should receive nutritionally adequate and safe complementary foods while breastfeeding continues up to two years or beyond. All the Districts have been directed to develop nutrition action plans for intervening child stunting which include; regular

deworming service to children should be strengthened. Encouraging and strengthening appropriate complementary feeding with breast feeding child after six months of ages.

The government has introduced a policy of protecting children under five against killer diseases through immunization (NRM Manifesto, 2016). For example, Kanungu District Nutrition Action plan (2016) suggested interventions as indicated below, Promote and support health and nutrition education to increase the level of awareness and integration of nutrition services in all routine and outreach health services and programmes targeting children under five years. Promote and support breastfeeding policies, programmes, and appropriate complementary feeding practices. Promote proper food handling, hygiene, and sanitation through increased knowledge, use of safe water, and hand washing practices at household level. Promote male involvement in family health services and in food security and nutrition programmes also addressing detrimental food taboos and norms that impair nutrition of women, and children. Promote consumption of fortified foods such as fortified cooking oil, orange flashed sweet potatoes through increased awareness of their benefits,

Pass bylaws and ordinances that promote nutrition and food security at district and sub-county levels and Integrate nutrition issues into District plans and budgets.

According to guidelines by Health Canada organization in 2011, the diet for children below five years of age should include starchy food, such as bread, pasta, potatoes, rice, fruits all smashed which should comprise one third of food intake each day so as to have proper intake of carbohydrates, minerals, vitamins and fiber (Government of Canada ministry of health, 2011). It also recommends that one should include fruit and vegetables in the diet with a portion size of 80g each day and milk and dairy products. For those who cannot tolerate milk other sources of calcium such as apricots, dark green leafy vegetables, nuts, etc., are recommended. The guide also recommends high intake of fish, meat and eggs, as they are valuable sources of proteins. At least 15 percent of food intake each day should include proteins. Also, it is of importance to include food that is high in unsaturated fats. In general, food and drinks that are high in fat or sugar should be consumed in the smallest portions (MOH Canada, 2011).

Adequate nutrition is a prerequisite for human development and socioeconomic well-being which makes a foundation for a heavy and development of general wellbeing of an individual in the adult life hence the need to investigate factors influencing Stunting of children under five years of Buhara sub county Kabale District.

A study by Menonetal (2000) pooled DHS data sets from11 countries and found that residence (urban/rural) of a child appeared to be a major factor in influencing nutrition and stunting. The study further argued that certain comparisons might actually mask large differentials that exist between socio-economic groups within urban and rural areas. The study revealed the risk of stunting was up to 10 times higher for urban children of low social- economic status (SES) than children from rural areas. Men on further argues that a strong socio-economic gradient was found in urban area simply that average statistics to allocate resources between rural and urban areas could be misleading. This is contrary to other researches that have shown that children in rural areas are more likely to be stunted than their counter parts in urban areas. According to a study by the National Institute of Population Research and Training (NIPOR Tetal, 2009), in Bangladesh found that, stunting in children less than five years of age was in one-fourth of the riches to households. In Indonesia, a study highlighted that child's age, sex, number of family meals and income were significantly linked to stunting (Ramli et al., 2009).

2.7. Empirical Literature Review

Though there are many studies conducted child's malnutrition including stunting but the impact is yet to be felt in most Sub-Saharan African Countries, Uganda communities have not effectively combat these problems. Many existing studies are either not conducted in all the vulnerable communities, moreover some of the study titles are not really capturing the main issues faced by some communities in Uganda.

Study conducted in Bangladesh on the prevalence of stunting found out that about 41% of children aged less than 60 months were stunted, rate is higher in rural setting than in urban areas (43 percent Versus. 36 percent). Adjusted model revealed that several factors were influencing stunting. The children living in households with moderate food-insecurity had higher odds of becoming stunted (odds ratio [OR] ¼ 1.27, 95 percent confidence interval [CI]: 1.05-1.54, P ¼ .01) compared to the children living in household with food-security. The derived ORs of stunting for children delivered at institutions facilitated particularly by public (OR ¼ 0.80, 95% CI: 0.67-0.96; P ¼ .02) or private (OR ¼ 0.81, 95% CI: 0.67-0.97; P ¼ .02) sectors were less than for children delivered at home. Similarly, wealth index, exposure of mother to the mass media, age of child, size of child at birth, and parents' education were significantly associated with stunting (Haribondhu, Jahidur, and Mohammad A. 2017).

Another study conducted in Zambia on prevalence of stunting among under five children showed prevalence rate of 40 percent. From the 4937 children, stunting was higher among male children as compared to female children (42.4 and 37.6 percent respectively). Additional analysis revealed that children whose source of drinking water was improved (33.7 percent) were less likely to be stunted compared to children whose source of drinking water was poor (47.7 percent). Stunting was associated with sex and age of a child; mother's age and education; residence; wealth and duration of breastfeeding. As reflected in children whose mothers had higher education showed a 75 percent reduction of odds compared to children whose mothers had no education (AOR = 0.35, 95%CI: 0.22, 0.54; $p < 0.05$). Similarly, wealth status showed an inverse relationship. Children who came from rich households showed a 32% reduction of odds compared to children who came from poor households (AOR = 0.68, 95%CI: 0.57, 0.82; $p < 0.05$). (Phoebe B., Hikabasa H., Raider M. & Jeremiah B. 2018).

The study done in South Sudan findings revealed that, 32.2 percent were stunted, 28.2 percent wasted while 32.3 percent of children were underweight respectively. The main associated factors of stunting in the study were age older than one year (p= 0.004), children from households who were renting their houses and children who defecate in open spaces with no latrine at their homes (p= 0.015). Underweight cases were associated with child's age (p=0.001), loss of appetite (p=<0.001), children who ate from own plate (p=0.001) and children who didn't consume meat (p=0.007). Also, male genders (p=0.022), households with two or more children aged zero to five years (0.010) not consuming vitamin A rich vegetable (p=0.002), diarrheal disease within two weeks prior to interview (p=0.006) and those from households with water sources other than piped (<0.001) were also associated with wasting (Martin A. et al., 2020).

The prevalence study conducted in Bala Sub County Uganda on stunting showed the prevalence of 30.6%, with Males headed majority of the households. The stunting was found to be more in fewer than five children and related socio-demographic factors and other factors like diseases comorbidity, inadequate dietary intake, family size, breast-feeding, exclusive breast-feeding and sanitation. (Francis, Odia.2021-04).

Similarly, the study in Uganda showed that 13.7 percent of the children were wasted, 49.7 percent stunted while 23.9 percent were underweight. Children who were not breastfeeding had 3 times higher odds of being wasted (OR=3.1, 95%CI=1.015, 7.405) and more than 2

times higher odds of being underweight (OR=2.2, 95%CI=1.076, 4.503). While children eating less than 4 food types had 59 percent higher odds of being stunted (OR=1.59, 95%CI=1.036, 2.435). Older children 13-24 months had 58 percent higher odds of being stunted as compared to the children aged 6-12 months (OR=1.58, 95%CI= 1.029, 2.436). Girls had 81 percent higher odds of being underweight as compared to the boys (OR=1.81, 95 percent CI=1.096, 2.979). (Byawaka J. M. 2019).

Lastly, Stunting was found by Gilbert-Habaasa. (2015) in Uganda to be the most common malnutrition condition with the highest prevalence (38.5 percent) in the two districts, followed by wasting (16.5 percent) and underweight (13.5 percent) respectively. Further findings showed that children aged 39–59 months were less likely to be underweight than those aged below twelve months. Children of peasant farmers were more likely to be stunted than their counterparts with mothers in pastoralist's family. No significant association was found with wasting among the under-five children in the two districts although the prevalence was slightly higher than that of child underweight.

2.8. Summary of the literature review

To be frank maternal and child mal- nutrition remains unacceptable throughout the world; showing that a lot more need to be done to get rid of stunting. In India 48 percent of children are stunted, 20 per cent of children under five years of age suffer from wasting due to acute under nutrition(htt://www.ijpediatrics.com). They further stated that, Children suffering from stunting may never grow to their full height and their brains may never develop to their full cognitive potential.

The joint estimates, published in May 2017, covering indicators of stunting among children under 5, reveals insufficient progress to reach the World Health Assembly targets set for 2025 and the Sustainable Development Goals set for 2030 (UNICEF, WHO& WORLD BANK 2017). The World Health Organization (WHO) has adopted a target of reducing the number of stunted children under the age of five by 40 percent by 2025. The most crucial time to meet a child's nutritional requirement is in the first 1,000 days which is from conception up to the child's second birthday. During this period (first 1000 days), the child has increased nutritional needs to support rapid growth and development (Berhe K, and Seid O, 2019).

According to Rothman's sufficient-cause model, WASH could well be an important component of interventions to reduce stunting, but not sufficient to reduce stunting in

isolation. To this end, the intermediate outcomes reported (diarrheal morbidity) and not reported (environmental enteric dysfunction) are important. Although WASH interventions did not reduce diarrhea in Kenya and Zimbabwe.

The causes of stunting are multifactorial and interlinked, spanning biological, social and environmental spheres. Water, sanitation and hygiene (WASH), the focus of this paper, feature at various levels in these frameworks with varying degrees of proximity to the outcome of stunting, as immediate or proximate risk factors but also as more distant causes or determinants of stunting. For example, different aspects of WASH have been plausibly linked to all five 'pillars' of the food and nutrition security framework (Cumming et al. in press 2017).

The literature surrounding stunting demonstrates that factors are in exhaustible and vary from place to place. Prendergaz et al. (2014) in his study conducted in Zimbabwe were veiled that stunting was influenced by both maternal and infant factors. The study highlighted that at antenatal, maternal nutritional and inflammatory status may impact fetal growth, leading to intrauterine stunting and low birth weight while at postnatal, low-grade inflammation early in life was associated with stunting. The study was a case control study among HIV-unexposed infants who were stunted (cases) on-stunted (controls).He further noted that stunting began in utero and was also influenced by poor maternal health. In Malawi, a study highlighted that childhood stunting was significantly associated with low circulating essential amino acids (Sembaet al., 2015).Children who were stunted had lower levels of serum concentrations of essential amino acids as compared to children who were not stunted.

Stunting is a chronic condition which reflects poor growth and is more difficult to treat than a cute forms of under-nutrition like wasting. It continues to be a worldwide phenomenon affecting growth potential in children. In Zambia the prevalence of stunting among children below five years of age is 40 percent which is un acceptably high. The government is working towards the prevention of stunting in children through nutrition policies such as the National Health policy and the National Food and Nutrition policy. There are also nutrition programmes such as Scaling up Nutrition Programme, which was launched in 2010 and which calls for intensive efforts to improve global nutrition in the period leading up to 2015(http://scaling up nutrition.org/sun-countries/Zambia). Other programmes

include the First 1,000 Most Critical Days Program and the Nutrition and HIV programme among others .All these efforts aim to improve nutrition in the country.

Despite these efforts the prevalence of stunting is still high. The question remains as to what continues to drive the high levels of stunting among under-five children in the country. In Zambia, a few studies have highlighted risk factors of stunting among children below five years of age. According to a study by Bwalyaetal. (2015), stunting was closely associated with mothers' age, birth weight, mothers taking iron tablets whilst pregnant and breastfeeding. This study only included children aged six to twenty-three months from the 2007 ZDHS. According to Nzalaetal.(2011) his study revealed a significant association between stunting and male gender, older age and mothers "education. The study also highlighted that child from rural areas were more likely to be wasted and less likely to be stunted and underweight.

Since nutrition has now been recognized as one of the key strategies to global development this calls for a better understanding of issues surrounding stunting. With changes in weather Patterns for instance the current ElNino, droughts, slow economic growth which may in turn affect nutrition therefore; there is still need to understand risk factors of childhood stunting. There is limited information on factors associated with stunting in Zambia. Therefore, to be able to deal with stunting there is still need to understand major factors that areas associated with stunting as factors are diverse and may vary with country o rgeographic location.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter covered a description of the methodology which were adopted in the study. It described, research design, area of the study, study population, sample size and its determination, study variables data collecting methods and instruments, quality control (reliability and validity of the data and instruments), data analysis techniques and ethical consideration.

3.1. Research design

The study used a cross sectional descriptive survey design employing the use of both qualitative and quantitative methods of data collection. This design involved data collection on the outcome and factors affecting it at the same point in time, the design were chosen because it was faster and not very costly.

3.2. Study Site /Area of the Study

The study were conducted in Buhara Sub County-Kabale District which is located in South-Western Uganda. The majority of people are subsistence farmers, speak and understand Runyankore-Rukiga language. Kabale District is bordered by Rukiga District to the north Rubanda District to the west, and the Republic of Rwanda to the south, It comprised of three counties of Ndorwa West, Kabale Municipality, and Ndorwa East where Buhara is located.

3.3. Study Population

The target population were all the children in Buhara Sub-County aged 0-5 years.

The total population of the sub county was 27942; According to UBOS 20.5% of the total population in Uganda are children under 5years of age. (UBOS census 2014)Total target Population less than 5 years in the study was 5728.

The Population distribution as by Parish is shown in the table below,

Table 3 1: The study population distribution of children aged 0 to 5 according Parishes

Parish	Total Population	20.5% (Total target Population Under 5 years,
Bubara	4476	918
Bugarama	3382	693
Kafunjo	4591	941
Kitanga	1668	342
Muyebe	3621	742
Ntarabana	3537	725
Rwene	6667	1367
Total	**27942**	**5728**

Source: Kabale District planning unit 2020/2021

3.4. Inclusion criteria.

The study included all children between 0 to 5 years of age in Buhara Sub County resident in Buhara Sub County at that time of data collection.

3.5. Exclusion criteria

All children who were under-5 year of age but with no adult to answer the questions at home during the study were excluded.

3.6 Sample size determination.

, n=N/(1+Ne2)

The resulting value of n=sample size

The resulting value of n=sample size to be used. Slovin's formula is used when northing is known about the behavior of population.

, n=N/ (1+Ne2).

, n=required sample size

, e=level of precision

N=population size=5728

, n=?

, e=5 %(0.05)

Using the precision level of 0.05

, n= N/ (1+Ne2)

, n= 5728/ (1+5728x0.05x0.05)

, n= 5728/ (1+5728x0.0025)

, n= 5728/1 +14.32

, n= 5728/15.32

, n= 373.8

5% is added to cater for non-respondents.

, n = 0.05 x 373.8

, n = 18.6

, n = 373.8 + 18.6

, n = 392.49

, n= 392 Respondents

3.7 Sampling procedure.

The study used a mult-stage sampling design. Buhara Sub County was purposively selected for the study based on HMIS report for Kabale District local government 2019/2020 that indicated Buhara Sub County had the highest rates of stunting amongst children under five years. The seven parishes were selected purposively to represent the all-sub county to ensure representation of the whole sub county. At Parish level the entire village in the Parish were listed and assigned computer generated random numbers and there after villages were sorted in ascending order according to their random numbers, the top three villages per parish were picked for the study before proceeding to the village level.

At village level, the researcher started in the residence of village leader chairperson LC1, then after self-introduction and obtaining the permission to conduct the study from the leader, the researcher tossed a ball point pen in the air and allowed it to fall by gravity and the researcher followed the direction of the tip of the pen and go checking household by house for eligible children until the end of the village upon reaching the end of the village, researcher tossed the pen again to obtain a new direction in the village again, if the pen

points in the direction outside the village, the researcher would repeatedly toss the pen until it points in the village again next to the house hold level.

At household level the researcher identified the number of eligible children in the household, where there was no eligible children the researcher would move to the next house hold in the same direction, where there were eligible children the researcher would look for the mother or available adult caretaker.

3.8. Study Variables.

Study Independent Variables:

Independent variables are factors associated with stunting in children under five years. They were analyzed in line with social ecological model, the individual factors were, age of the child sex, birth order, place of birth, immunization status morbidity history (fever, measles, diarrhea, frequent ARI). Family factors, the family factor were health care seeking behavior, income, marital status, Religion, family size. ANC history, agriculture practices, feeding practices, hygiene and sanitation the following were community factors-health facility, employment opportunities, and workplace policies health extension workers. Others were Nutrition programmes, safe water sources. And the nutrition intervention. Society level influences may be cultural norm and briefs, policies Environmental factors included environmental degradation, natural calamities and methods of agriculture.

Study Dependent Variable: The nutrition status of children aged 0-5 years of age were captured as stunted or not stunted are the outcome of the study was dependent.

The primary dependent variable was stunting other outcome variable included acute and chronic malnutrition.

3.9 Variables

Ages of the children were taken as completed month of life. The information was obtained from the mother and we confirmed it with the immunization card, Sex was captured as male or female. For Place of birth, the mother or caretaker was asked where the child was born from. Immunization status were recorded as yes or no birth order of the child were captured as order of birth in ascending numbers irrespective of the vital status of the preceding children. Care takers age were captured as completed years of life, sex was captured as male or female, care takers education was captured as the highest level of education attained by care taker. Occupation was the main source of livelihood of the care taker. Income was the

amount of money earned per months. Marital status captured current civil state of the care taker.

For environmental sanitation, house hold environmental sanitation status was measured by asking about water source, inspection of availability, accessibility usage and cleanliness of latrine, Availability was measured as yes or no. house hold was recorded as having a latrine if that latrine was used only by people who cook and eat together. Accessibility was measured by a distance from the main house, Latrines which were beyond 30 ft. from the main house were considered inaccessible at night.

Latrine use was confirmed by observation of fecal matter and urine at the opening of the stance. Environmental cleanliness was observed by absence of indiscriminately scattered domestic wastes and presence of human wastes.

For water source, availability and handling of water and safety of the water source, we considered piped water, protected water spring being protected water while harvested rain water from the roof and other sources were considered unprotected. Accessibility to water was captured by the time taken to go and fetch water and back, going and coming back was within 30min, anything above 30min would be considered inaccessible. Handling of water was measured by observation of the safe water chain.

Food security was measured by, availability of food, compound gardening, stored food and food in the garden, fruit trees in the compound, availability of food was measured at three levels 1, ready food at the home, food in the gardens, stored food, garden where food was growing. Reared animals at home, were measured by existence of small edible animals and poultry.

Food distribution at home was measured by the feeding methods for example do children eat alone on individual plate or they share plates (saving food - do they keep for the family or children e.g., Beans, eggs, chicken).

Food diversity how often were they eating meat, milk. Dietary intake, weaning practices at what age the child did introduce other foods, food supplements.

Health services captured, existence of health facilities, existence of extension workers, nutrition education, health services included a facility with 5km would be considered facility within easy reach, home Visits by agriculture extension workers, home visits by VHTSs,

nutritional education messages received in the community, rehabilitation unit at the sub county, deworming of the children.

At society level, the researcher captured community culture norms, totems taboos and policies, norms for example were they food Taboos, does your religion prohibits you to eat certain foods, society policies that provides supply of fortified foods, child days programme.

For the dependent variables, the primary dependent variable (stunting would be determined as height for age below 2 standard deviation), height would be captured using the height board supplied by UNICEF. Secondary dependent variables would be acute malnutrition measured by MUAC tape.

Table 3.2: measurement of variables

Objective 1	**To assess the environmental factors associated with stunting in children of 0-5 years in Buhara Sub- County, Kabale District**
Variables	Place of residence (Living in slums, non-slums), Co-morbidity, child stimulation and environment friendly for child play and activity Sanitation level
Data collected	Place of residence: (Roofing materials, floor, ventilation, lighting and location of the house hold. Environmental sanitation: Latrine (Y/N), If yes, distance from the main house (mtrs), If yes, clean (Y/N), Was the compound visibly clean or soiled (Observed the compound – Y/N), feaces in the compound (Y/N) etc. Water storage
Data sources	Were from households of the care takers of children under 5years
Methods used in data collection	Interviews and observations.
Tools used	An interviewer-administered questionnaire and an observational checklist
Objective 11	**To determine the social economic factors associated with the child stunting in Buhara Sub- County**
Variables	Breast feeding practices, preservation and storage of food at household, Hand washing with soap, household food safety practices, family size.

Data to be collected	Level of education, Occupation, Income, Marital status.
Data sources	Mothers, care takers and respondents
Methods used in data collection	Interview through questionnaire
Tools used	Administered Questionnaire and checklist
Objective 111	**To identify the nutrition interventions for combating stunting among children 0-5 years**
Variables	Quality of dietary intake, proper complementary and weaning feeding practices, dietary diversification, de-worming and fortification of food
Data collected	Food security, Food distribution at home, Reared animals at home, Food distribution at home, Food diversity and dietary intake.
Data sources	House hold
Methods of data collected	Interviewed with questionnaire and observation.
Tools to be used	Questionnaire.

3.10. The instrument for data collection

The researcher used different tools in collecting data; both primary and secondary data from the House hold record. This study instrument sought data about nutrition interventions and the factors that influence care givers in the IYCF (Richardson and Rabbiee 2001). These were utilized to give opportunities to respondents to describe freely their life experiences about the area of investigation. This was chosen because it provides firsthand information from experiences of respondents. To assess personal characteristic and other study variables of interest, the researcher adopted 5 points likert scale to asses' opinion about factors associated with stunting. Quantitative data was used to describe the phenomena in details to give indebt information regarding factors affecting stunting. The questionnaire was designed in form of table.

The qualitative and in-depth interview was used to complement the data generated from the questionnaire on the study variables. The interview was lasting for 15-20 minutes and the study used this tool in order to exhaust the information from respondents about factors influencing stunting. Only consented participants were conducted.

3.11. Validity and Reliability

For data collection we used four researcher assistants. These Research Assistants were female experienced health extension workers who were selected and trained for the purpose of collecting the data, Female research assistant were preferred for this study because the study handled women and children mostly and they would be more comfortable with female Research Assistant, the researchers were trained for two days on the objectives and tools of the study .To ensure internal validity, the questionnaires were reviewed by the supervisors who were experts in research methods and public health nutrition, then after it was pre-tested in ten homesteads of Kyanamira sub county. Which was the rural sub county like Buhara Sub County to see if the questionnaires were clear whether they captured what they were supposed to capture and weather would yield similar responses in another location? After the test, the tools were corrected in order to make them understandable.

For external validity the investigator adhered to the calculate sample size and make call backs if necessary in order to maintain an adequate number of the participants, in addition although the questionnaire was developed in English, it was translated in Rukiga language and back to English. It was translated into Rukiga language using Professional's from Kabale University Institute of language.

3.12 Data Collection methods

Questionnaires were used to help the researcher keep on track in utilizing the research tools. Interviews were conducted daily with the questionnaires and we also employed interview guides so as to record any incidents which occurred during data collection.

3.13 Ethical consideration

Ethical approval was obtained from the Mbarara University Research and Ethical committee. An introductory letter from the Faculty of Medicine which was presented to the district health officer together with research proposal seeking permission to carry out the study in Buhara Sub County. After entrance to Buhara Sub County, the researcher introduced himself to the local authorities in the respective villages mentioned before; there and then later meet the respondents to orient them about the purpose of the study. Informed Consent was sought

from respondents who were requested to voluntarily participate and those who accepted to participate in the study were asked to sign an informed consent form (see appendix). Rapports was emphatically established delicately considering Respect and attention to the comfort of the participant.

The researcher respected every participant regardless of their status and their norms and values, and assured them of ultimate confidentiality about information that was collected from them. Children who were found stunted in the study would be referred to the health facility for management. The interview was limited to 30minutes. the data was collected. Professionally taking care of the participant's confidentiality, secrecy, sensitivity, autonomy and questions were repeated where requested by the participants.

3.1.4. Quality control

The data collection process lasted for about I month, then data sorting and data transcription was carried out and returns rate calculated. Data was carefully stored to avoid loss of data, while data analysis plan was being developed to facilitate data analysis.

3.1.5 Data management and analysis

Data were reviewed on the same day after collection and cross checked for completeness and accuracy. The data collected was cleaned and coded to ease data entry. The checked and completed checklists and questionnaires were entered in Statistical Package for Social Sciences (SPSS) version 23. The data cleaning was done and data was protected using password to ensure confidentiality.

3.1.6. Data Analysis Plan

Quantitative data was entered and analyzed using SPSS version 23. The first level of analysis was descriptive analysis which was done by generating frequencies, proportions, percentages and confidence intervals of various variables such as prevalence and in text, figures and tables, to describe demographic variables like age, birth order, ethnicity, gender, etc. Same was used to address the socio – economic factors influencing child's stunting, Environmental factors and intervention / practice used to control child's stunting.

Secondly, bivariate data analysis was used to determining the relationship between the dependent and independent variables using cross tabulation between individual independent variables and the dependent variable and chi-square test were used at a test level of 0.05 to determine the associative factors of stunting in children under five years.

Lastly, multivariate analysis was used to determine the study relationships with odds ratio, p-value and their 95% confidence interval calculated.

Qualitative data was sorted, and arranged in themes and coded with themes in relation with study objectives and analyzed thematically and compared with the findings from the quantitative findings to make conclusion.

3.1.7 Study Limitation and delimitation

The researcher anticipated the following constraints;

Being a self-funded project, insufficient funds limited the course of the study most especially in form of expenditure on Transport, typing, printing research tools and report. To solve these problems, the researcher revised the expenditure by hiring a room within the area of study, doing self-typesetting, and buying a cheap printer for printing purposes.

The researcher also faced a problem of language barrier at a time of data collection while interacting with the respondents who were unable to read and write hence a big setback for the researcher, asking them certain questions were a problem and in the same way answering them was another challenge. As a way of avoiding the above problems, the researcher translated the data collection tools such that it becomes very easy for the respondents to answer all the questions correctly and a budgeted was made and saved accordingly to raise the required funds. For language barrier, the researcher hired research assistant who was conversant with the language to help in interpretation.

Time was another factor which put pressure on the researcher forcing him to develop a rigid but flexible time management to ensure that the study was completed on schedule.

3.1.7 Dissemination plan

The results of the study will be disseminated to Kabale University Post Graduate department, University library, and other stakeholders on request, but to gain larger audience the study will also be published as a journal or an article on line.

CHAPTER FOUR

PRESENTATION OF STUDY FINDING

4.1 Demographic Characteristics of the Study Participants

Profiles of the respondents in this study are described according to age, education level and professional categories. Data was collected from total of 380 participants, consequently; out of the 380 participants, 209 (55.-%, 95% CI. =.498439884 – .600775274) were within the age cohort of 2 Years and 3 – 5 Years 99 (26.1%, 95 CI. = .217095167 – .30773274). About the status of the mother, 355(93.4%, CI. .90441123 - .956975479) of mothers were alive, while 25(6.6%, 95 CI. .043024521 - .09558877) of the children do not have mothers but live with guardians. About the status of the father, 345(90.8%, 95 CI. 874233338 - .935005536) of father were alive, while 35(9.2%, 95 CI. 064994464 - .125766662) of the children do not have father but live with mother/guardians.

In regards to child's birth order, 168(44.2%, 95 CI. .391477557 - .493641784) were in the second birth order, 152(40.0%, 95 CI. .3503762 - .451194277) belong to the first birth order, 48(12.6%, 95 CI. .094623185 - .163968133) were in the third birth order, while 12(3.2%, 95 CI. 016421652 - .054511945) were in the fourth birth order. Other details are presented in the table below (table 4.1.0).

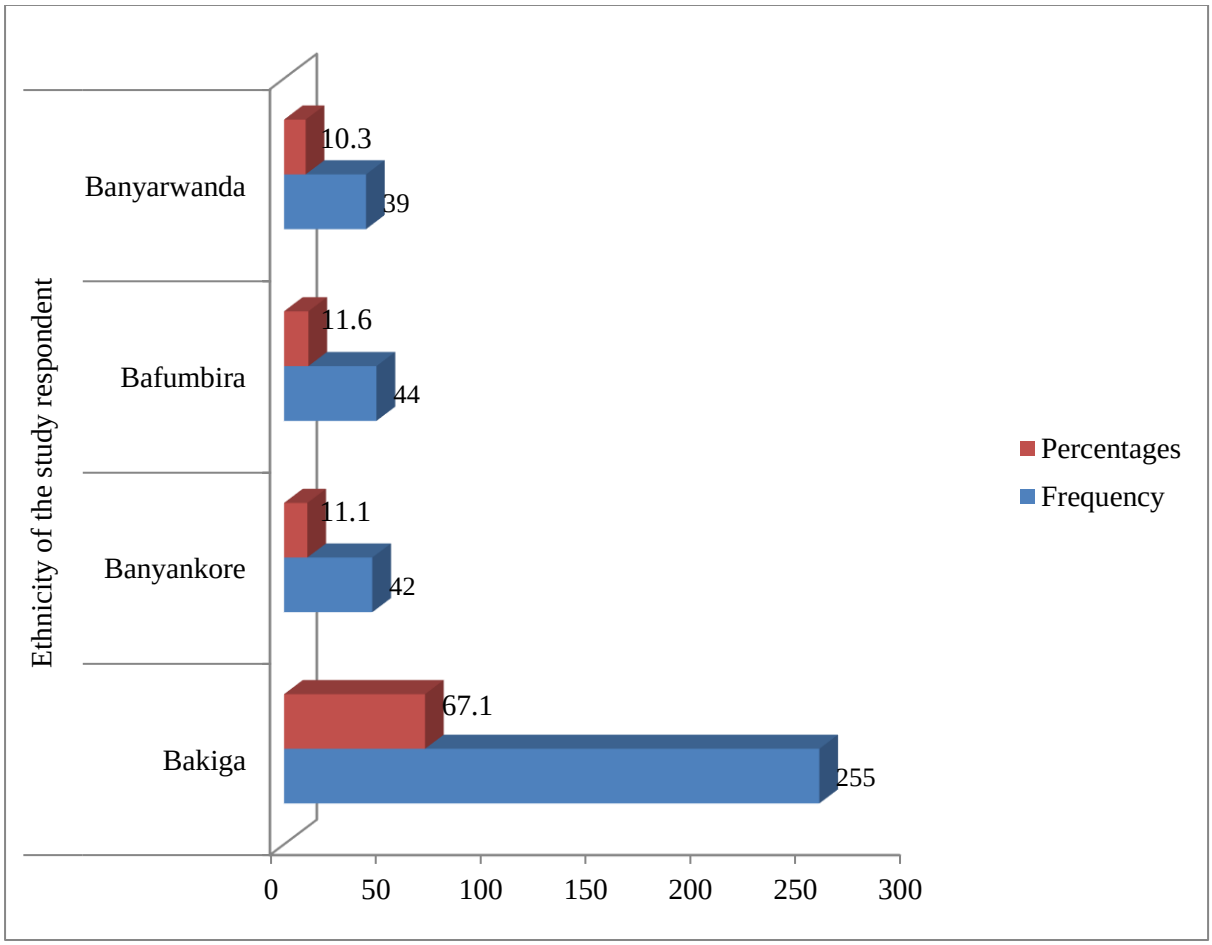
Table 4. 1: The Socio-demographic characteristics of the respondents (n=380)

Study item questions	Variables Options	Frequency	%	95% Confidence Interval
Respondent's age group	Below 1 year	72	18.9	(.151307943 -.23255626)
	2 Years	209	55.0	(.498439884 - .600775274)
	3 – 5 Years	99	26.1	(.217095167 - .30773274)
Gender	Male	216	56.8	(.516935749 - .618832207)
	Female	164	43.2	(.381167793 - .483064251)
Who is the main care taker of the Child	Mother	290	76.3	(.717137644 - .805024579)
	Father	72	18.9	(.151307943 - .23255626)

	Brother or Sister	1	0.3	(6.66236E-05 - .014574325)
	Others Specify	17	4.0	(.02627357 - .070663389)
What is his/ her birth Order	1	152	40.0	(.3503762 - .451194277)
	2	168	44.2	(.391477557 - .493641784)
	3	48	12.6	(.094623185 - .163968133)
	4	12	3.2	(.016421652 - .054511945)
Is the mother of this child alive?	Yes	355	93.4	(.90441123 - .956975479)
	No	25	6.6	(.043024521 - .09558877)
Is the Father of this child alive?	Yes	345	90.8	(.874233338 - .935005536)
	No	35	9.2	(.064994464 - .125766662)

.According to the table 4.1.0 above, the study found out that, more than half of the children 55% were 2 years old, male children were the majority of the children with 216 (56.8%). Furthermore, the second birth order of the children were the majority with the 168 (44.2%) and the predominantly study participants were the Bakiga255 (67.1%) as shown in the figure below.

Figure 4. 1: Shows the ethnicity of the study respondents



4.1.1 Types of illness usually experienced by the children

Study finding on common diseases suffered by the children in the study showed that majority of the children suffered from diarrhea 129 (33.9%, 95 CI. .291961198 - .389510076) followed by worm infections, 98 (25.8%, 95 C.I ...214628924 - .304977773. This is in line with what community thinks about what causes stunting according to responses from study stakeholders generated from qualitative data.

Finding from the study on whether the child had fallen sick in the last two weeks, showed that about, 130 (34.2%, 95 CI .294483734 - .392209165) of children in the study had episodes of illness while 250 (65.8%, 95 CI .607790835 - .705516266) had not fallen sick.

The study also wanted to assess the type of illness usually experienced by the child. Results show that majority of the children suffered from diarrhea with 129(33.9%, 95 CI .291961198 - .389510076). While 98(25.8%, 95 CI .214628924 - .304977773) suffered from worm infections,74%suffered from cough and malaria.

Figure 4. 2: Type of illnesses commonly experience by the children in the study

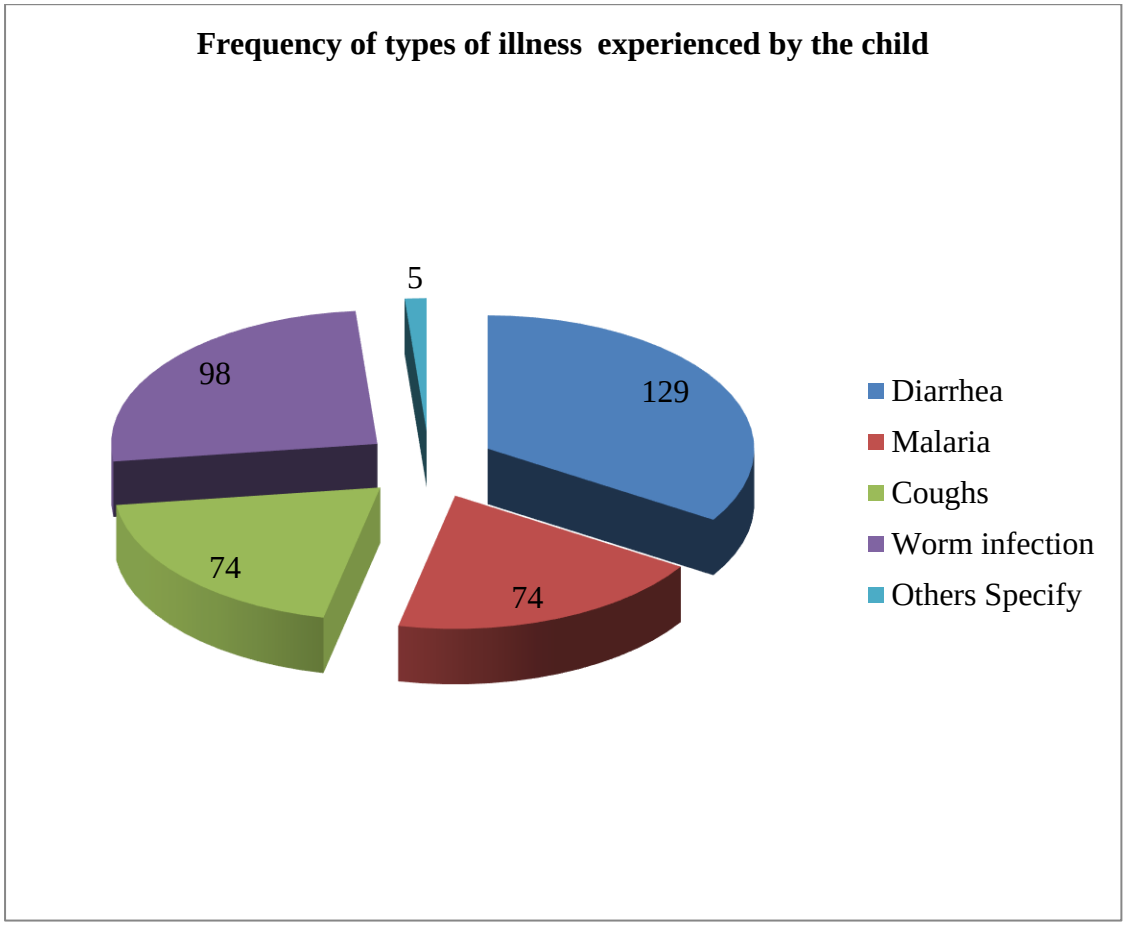


Table 4. 2: The relationship between the child age and type of illness experience

The relationship between Age of the child and the type of illness experiences										
	Childs Age	Freq. / % Diarrhea	Freq. / % Malaria	Freq. / % Coughs	Freq. / % Worms	Others specify Freq. / %	Chi-square	DF	P – Values	Interpretation
Age of the child	Below 1 year	35 (48.6)	14 (19.4)	7 (9.7)	15 (20.8)	1 (1.4)	31.248a	12	0.002	Significant
	2 years	61 (29.2)	48 (23.0)	37 (17.7)	60 (28.7)	3 (1.4)				

	3-5years	32 (35.6)	10 (11.1)	27 (30.0)	21 (23.3)	0				
	6 and above	1 (11.1)	2 (22.2)	3 (33.3)	2 (22.2)	1 (11.1)				
Childs sex relationship with the type of illness experiences										
Childs Gender	Male	89 (41.2)	44 (20.4)	36 (16.7)	43 (19.9)	4 (1.9)	17.802a	4	0.001	Significant
	Female	40 (24.4)	30 (18.3)	38 (23.2)	55 (33.5)	1 (0.6)				

When try to crosstab between the child's age and child's gender with the types of illness suffered in the last two weeks with chi-square test of significance at 0.05 level, they both appears to be strongly significant showing relationship. Study findings were 0.002 and 0.001 respectively as presented in table above.

4.2 Proportion of stunted children less than 5 years of age in Buhara Sub – County

About 10 (2.6%, 95C.I. 012690006 - .047862066) Children were stunting based on the MUAC result that was yellow and standard deviation of height of 11.39 and weight 2.7 respectively. Though the number is few but could multiply if nothing is done to combat it.

Table 4. 3: Test Statistics of the stunted children

Statistics	Height	Weight	MUAC
Mean	88.0026	11.5450	2.9737
Median	89.4000	11.1000	3.0000
Mode	98.00	13.00	3.00
Std. Deviation	11.39040	2.71889	.16028
Range	51.00	13.00	1.00

4.3 Socio – economic factors that is associated with child's stunting in children less than 5 years Buhara sub – county.

Finding from the socio – economic factors that is associated with child's stunting in children less than 5 years Buhara Sub – County revealed that majority of the child's guardian were within the age cohort of 18-35years about 339 (89.2%, 95% C.I of .856483548 - .921452703), Child's Guardian Gender majority were female about 285 (75%, 95%. C.I.703299524 - .792757288) and mostly house wife 254 (66.8%, 95%, C.I. = .618596966 - 71559658). The predominant occupation of Child's Fathers were daily laborer and government worker of about 150 (39.5%, 95% C.I. 34526468 - .445862261 and 127 (33.4%, 95% C.I. 286921031 - .38410702).respectively.

Table 4. 4: The Socio-economic factors associated with stunting of children under five years of age

Socio-economic factors item questions	Variables Options	Frequency	%	95% Confidence Interval
Age of the child's care taker	18 – 35 years	339	89.2	(.856483548 - .921452703)
	36 and above	41	10.8	(.078547297 - .143516452)
Child's caretaker	Male	95	25	(.207242712 - .296700476)
	Female	285	75	(.703299524 - .792757288)

Gender				
	Muslim	88	23.2	(.190084139 - .277311642)
	Seventh Day Adventist	41	10.8	(.078547297 - .143516452)
Religion of the Child caretaker	Catholic	83	21.8	(.177896901 - .263394364)
	Anglican	154	40.5	(.355493611 - .45652042)
	Others Specify	14	3.7	(.020285674 - .06104271)
	House wife	254	66.8	(.618596966 - .71559658)
Occupation of Child's caretaker	Government employee	25	6.6	(.043024521 - .09558877)
	Private business	60	15.8	(.122704765 - .198517931)
	Others	41	10.8	(.078547297 - .143516452)
	Government employee	127	33.4	(.286921031 - .38410702)
Occupation of Child's Fathers	Private business	68	17.9	(.141722919 - .221259932)
	Farmer	32	8.4	(.058312117 - .116800928)
	Daily laborer	150	39.5	(.34526468 - .445862261)
	Others	3	.8	(.001631053 - .022897269)
education status	No formal education	96	25.3	(.209702675 - .299461662)
	Had Formal education	284	74.7	(.700538338 - .790297325)
How many people including you live in	below 5	132	34.7	(.299533666 - .397602507)
	Above 5	248	65.3	(.602397493 - .700466334)

your house hold?				
What is the average estimated income of the family per month	Below 100000 (UGS)	102	26.8	(.224506127 - .315985524)
	Above 100000(UGS)	278	73.2	(.684014476 - .775493873)
Number of household meals per day and if eating together	One meal	84	22.1	(.18032955 - .266182561)
	Two meals	185	48.7	(.435544626 - .53834609)
	Three Meals	100	26.3	(.219563462 - .310485675)
	More than three meals	11	2.9	(.014537154 - .051203675)
Do your children eat other foods between meals	Yes	223	58.7	(0.535501297 -.636819308)
	No	157	41.3	(.363180692 - .464498703)

2b. In addition, after categorizing the socioeconomic associated data into three groups comprising high, moderate and low level socioeconomic associated factors to child's stunting as shown below.

Table 4. 5: Categories of Respondents socioeconomic variables

Categories of Respondents socioeconomic variables	Frequency	Percent
High level Socioeconomic Associated Factors	147	38.7
Moderate level Socioeconomic Associated Factors	128	33.7
Low level Socioeconomic Associated Factors	105	27.6

Range 14, Maximum Value 30 Minimum Value 16

2(c) As we further computed a crosstab calculation with some of the study variables. Findings revealed about five variables in the study that was statistically significantly

associated with the socioeconomic factors including; child's age and birth order, child's immunization update status, ethnicity and whether child's mother and father is alive as shown in the table below.

Table 4. 6: Distribution of study variables relationship in crosstab socioeconomic Associated Factors

The relationship in crosstab between different study variables and Socioeconomic Associated Factors								
Study Variable Items		High level Socioeconomic Linked Variables	Moderate level Socioeconomic Linked Variables	Low level Socioeconomic Linked Variables	Chi-square	DF	P - Value	Interpretation
Sex of the child	Male	88 (40.7)	77 (35.6)	51 (23.6)	4.048 a	2	0.132	Not Significant
	Female	59 (36)	51 (31.1)	54 (32.9)				
The relationship in crosstab between child's birth order and Socioeconomic Associated Factors								
Child's Birth Order	1	57 (37.5)	45 (29.6%	50 (32.9)	15.532a	8	0.05	Significant
	2	57 (33.9)	69 (41.1)	42 (25)				
	3	27 (56.3)	12 (25)	9 (18.8)				
	4	5 (45.5)	2 (18.2)	4 (36.4)				
	5	1 (1oo)	0	0				
The relationship in crosstab between main caretaker of the child and Socioeconomic Associated Factors								
Main Child's care taker	Mother	106 (36.6)	109 (37.6)	75 (25.9)	4.954 a	2	0.084	Not Significant
	Father	32 (44.4)	16 (22.2)	24 (33.3)				

	Brother or sister	1 (100)	0	0				
	Others specify	8 (47.1)	3 (17.6)	6 (35.3)				
The relationship in crosstab between child immunization and Socioeconomic Associated Factors								
Child immunization up-to-date?	Yes	134 ((42.9)	108 (34.6)	70 (22.4)	25.679a	2	.000	Significant
	No	13 (19.1)	20 (29.4)	35 (51.5)				
The relationship in crosstab between Ethnicity of the respondent and Socioeconomic Associated Factors								
Ethnicity of the respondent	Bakiga	127 (49.8)	84 (32.9)	44 (17.3)	59.205a	6	.000	Significant
	Banyankore	8 (19)	17 (40.5)	17 (40.5)				
	Bafumbira	9 (20.5)	14 (31.8)	21 (47.7)				
	Banyarwanda	3 (7.7)	13 (33.3)	23 (59)				
The relationship in crosstab between Age of the child and Socioeconomic Associated Factors								
Age of the child	Below 1 year	16 (22.2)	30 (41.7)	26 (36.10	48.986a	6	.000	Significant
	2 years	65 (31.1)	79 (37.8)	65 (31.10				
	3-5years	61 (67.8)	15 (16.7)	14 (15.6)				
	6 and above	50 (55.6)	40 (44.4)	0				
The relationship in crosstab between the child's mother being alive and Socioeconomic Associated Factors								
Is Child's mother	Yes	144 (40.6)	119 (33.5)	92 (25.9)	10.719a	2	0.005	Significant

alive?	No	30 (12)	90 (36)	13 (52)					
The relationship in crosstab between the child's Father being alive and Socioeconomic Associated Factors									
Is the Child's father alive?	Yes	140 (40.6)	119 (34.5)	86 (24.9)	14.118a	2	0.001	Significant	
	No	7 (20)	9 (25.7)	19 (54.3)					

2(d). Result of Multinomial analysis on the relationship between the different study variables and socioeconomic associated factors to stunting.

Further statistical analysis to determine the real socioeconomic factors that influence the child's stunting in the study from multinomial analysis showed two variables that are statistically significant. The Child fell sick in the last two weeks and whether child immunization is up-to-date? (p- Value = 0.005 < 0.05 and p- value = 0.001 < 0.05) respectively other study variables that is statistically significant are whether the mother is alive and the child's guardian ethnicity with (p- value = 0.013 < 0.05 and 0.000) respectively. (Table 4:3:3.).

Table 4. 7: Table of Multinomial analysis on the relationship between the different study variables and socioeconomic associated factors to stunting.

Multinomial analysis on Socioeconomic associated factors relation with respondents characteristics in the study									
Socioeconomic Factors	Associated	B	Std. Error	Wald	df	Sig.	Exp .(B)	95% Confidence Interval for Exp (B)	
								Lower Bound	Upper Bound
High level Socioe	Intercept	2.184	1.334	2.678	1	0.102			

conomic Associated Factors									
	Age	1.347	0.259	27.007	1	0	3.846	2.314	6.391
	Sex	-0.002	0.321	0	1	0.995	0.998	0.532	1.874
	Child's birth order	-0.109	0.22	0.248	1	0.618	0.896	0.583	1.379
	Child's Care Taker	0.322	0.205	2.483	1	0.115	1.38	0.924	2.061
	Child fallen sick in the last two weeks	0.898	0.33	7.408	1	0.006	2.455	1.286	4.687
	Whether child immunization is up-to-date?	-1.449	0.421	11.842	1	0.001	0.235	0.103	0.536
	Is the Child's mother alive?	-1.891	0.765	6.117	1	0.013	0.151	0.034	0.675
	Is the Child's father alive?	-0.738	0.538	1.878	1	0.171	0.478	0.167	1.374
	Ethnicity of the respondent	-1.129	0.183	38.141	1	.000	0.323	0.226	0.463
Moderate level	Intercept	2.494	1.166	4.575	1	0.032			

Socioeconomic Associated Factors									
	Age	0.361	0.239	2.296	1	0.13	1.435	0.899	2.291
	Sex	-0.23	0.289	0.63	1	0.428	0.795	0.451	1.401
	Child's birth order	0.021	0.206	0.01	1	0.92	1.021	0.682	1.528
	Child's Care Taker	-0.391	0.235	2.777	1	0.096	0.676	0.427	1.071
	Child fallen sick in the last two weeks	0.602	0.302	3.969	1	0.046	1.825	1.01	3.3
	Whether child immunization is up-to-date?	-0.772	0.35	4.859	1	0.028	0.462	0.233	0.918
	Is the Child's mother alive?	-0.401	0.484	0.686	1	0.408	0.67	0.259	1.73
	Is the Child's father alive?	-0.874	0.462	3.578	1	0.059	0.417	0.169	1.032
	Ethnicity of the respondent	-0.408	0.128	10.243	1	0.001	0.665	0.518	0.854

The reference category is: Low level Socioeconomic Associated Factors.

4.4 Environmental factors associated with child's stunting in children less than 5 years in Buhara Sub – County.

With regards to availability of latrines on the household compound, 363(95.5%, 95%, CI .929336611 - .97372643) have latrines on their compounds, while 17(4.5%) 95, CI. 02627357 - .070663389).do not have latrine, although the majority of the respondents have latrines a few do not have which is dangerous to the community as whole. On issue of where do they go to ease self-19(5%).95 CI. (.030368152 - .076982135) use neighbors latrine while 361 (95%,),95 CI923017865 - .969631848 us pit latrine. However, it is not clear whether even children also use neighbor's latrine or use open defecation thus, predisposing factor to gastrointestinal infection that is among the risk factor for stunting.

Source of drinking water, 296(296%, 95% CI. 733817439 - .81967045) get water from protected source, while 84(22.1%), 95, CI .18032955 - .266182561) get water from unprotected source which is also a predisposing factor to gastrointestinal infection that is among the risk factor for stunting.

On waste disposal generated from the compound, Much as the majority use pit and burning of the waste,at,216(56.8% and 94(24.7%) respectively, the 18(4.7%) 95 CI= 028311725 - .073831273 us indiscriminate disposal a predisposing factor for diseases. Results also indicate that, the low hand wash among the community, only 220(57.9) CI527536031 - .629119174 reported that, they were practicing hand washing, while 160(42.1) CI; 370880826 - .472463969 were not practicing hand washing on critical times which is a very predisposing factor for infections.

Table 4. 8: Environmental factors associated with child stunting

Study item questions	Variables Options	Frequency	%	95% Confidence Interval
Availability of any fruit tree in the compound	Yes	241	63.4	(.583570683 - .68274143)
	No	139	36.6	(.317258567 - .416429317)
Do you have a latrine on the household compound?	Yes	363	95.5	(.929336611 - .97372643)
	No	17	4.5	(.02627357 - .070663389)
How do you dispose of	Pit	216	56.8	(.516935749 - .618832207)

waste generated in the compound?	Burning	94	24.7	(.204784886 - .293937174)
	Open field (indiscriminate)	18	4.7	(.028311725 - .073831273)
	Garden	52	13.7	(.103917095 - .175549877)
Source of drinking water	Protected source	296	77.9	(.733817439 - .81967045)
	Unprotected source	84	22.1	(.18032955 - .266182561)
Compound garden	Yes	272	71.6	(.667561788 - .760618605)
	No	108	28.4	(.239381395 - .332438212)
Hand washing facilities	Yes	220	57.9	(.527536031 - .629119174)
	No	160	42.1	(.370880826 - .472463969)

The study revealed that, more than half of the homesteads had a fruit tree in their compound and compound gardening.

The majority of the household had toilets, however 4.5%of the household had no toilets and they were practicing open defecation. The majority of the household had their water from protected water source however, 22.1%got there water from unprotected water source,

Hand wash was being practiced with 57.9% but 42.1% were not carrying out hand wash.

3b. The study variables relationship in crosstab with environment linked factors to child's stunting.

Chi-square test result of the study variables relationship with environment linked associated factors to child's stunting were age of the child and child's birth order, showed (p- Value = 0.005 < 0.001 and p- value = 0.000 < 0.05) respectively.

Table 4. 9: Distribution of study variables relationship in crosstab socioeconomic Associated Factors

Study Items	Variable	High level of Environment linked factors	Moderate Environment linked factors	Low level of Environment linked factors	Chi-square	DF	P - VALUE	Interpretation
The relationship in crosstab between Age of the Child and Environment linked Factors								
Age of the child	Below 1 year	25 (34.7)	33 (45.8)	14 (19.4)	22.583a	6	0.001	Significant
	2 years	103 (49.3)	74 (35.4)	32 (15.3)				
	3-5years	25 (27.8)	35 (38.9)	30 (33.3)				
	6 and above	2 (22.2)	3 (33.3)	4 (44.4)				
The relationship in crosstab between Child's birth order and Environment Linked Factors								
What is his /her birth order	1	71 (46.7)	61 (40.1	20 (13.2)	32.426a	8	.000	Significant
	2	70 (41.7)	66 (39.3)	32 (19)				
	3	11 (22.9)	15 (31.3)	22 (45.8)				
	4	3 (27.3)	3 (27.3)	5 (45.5)				
	5	0	0	1 (10)				
The relationship in crosstab between Sex of the child and Environment Linked Factors								
Sex of the child	Male	90 (41.7)	89 (41.2)	37 (17.1)	4.970a	2	0.083	Not Significant
	Female	65 (39.6)	56 (34.1)	43 (26.2)				

3(c). Tracing the relationship between the study variables and environment linked factors in child's stunting in the study.

To determine the real study variables influencing environmental factors in child's stunting in the study from multinomial analysis showed three variables are statistically significant. The Child gender, Child's care taker and Child's birth order with (p- Value = 0.023 < 0.05, p-value = 0.003 < 0.05 and, p- value = 0.002 < 0.05) respectively.

Table 4. 10: The Multinomial analysis on the relationship between the different study variables and environment linked factors to stunting.

Multinomial analysis on Environment associated factors relation with respondents characteristics in the study									
Environment Linked Factors		B	Std. Error	Wald	df	Sig.	Exp (B)	95% Confidence Interval for Exp (B)	
								Lower Bound	Upper Bound
High level of Environmental linked factors	Intercept	0.95	1.422	0.446	1	0.504			
	Age	-0.315	0.222	2.016	1	0.156	0.73	0.472	1.127
	Sex	-0.705	0.309	5.189	1	0.023	0.494	0.27	0.906
	Child's Birth Order	-0.616	0.201	9.4	1	0.002	0.54	0.364	0.801
	Child's Care Taker	0.793	0.271	8.542	1	0.003	2.21	1.299	3.762
	Child fallen sick in the last two weeks	-0.005	0.33	0	1	0.989	0.995	0.521	1.9
	Is the child's mother alive?	0.454	0.639	0.505	1	0.478	1.574	0.45	5.507
	Is the child's father alive?	0.309	0.542	0.324	1	0.569	1.361	0.47	3.941
	Ethnicity of the respondent	-0.054	0.142	0.144	1	0.704	0.947	0.717	1.252
	Highest education	0.499	0.337	2.203	1	0.13	1.64	0.852	3.187

	attained by the caretaker					8	8		
Moderate level of Environmental linked factors	Intercept	1.002	1.474	0.462	1	0.497			
	Age	-0.352	0.227	2.405	1	0.121	0.703	0.451	1.097
	Sex	-0.789	0.314	6.328	1	0.012	0.454	0.246	0.84
	Child's Birth Order	-0.482	0.202	5.695	1	0.017	0.618	0.416	0.917
	Child's Care Taker	0.11	0.306	0.129	1	0.719	1.116	0.613	2.035
	Child fallen sick in the last two weeks	-0.527	0.327	2.595	1	0.107	0.59	0.311	1.121
	Is the child's mother alive?	0.47	0.665	0.498	1	0.48	1.6	0.434	5.894
	Is the child's father alive?	0.464	0.548	0.718	1	0.397	1.591	0.544	4.653
	Ethnicity of the respondent	-0.231	0.154	2.237	1	0.135	0.794	0.587	1.074
	Highest education attained by the caretaker	1.456	0.371	15.43	1	.000	4.29	2.074	8.875

The reference category is: Low level of Environmental linked factors.

4.5 The nutrition intervention provided in Buhara Sub County to address stunting in children less than 5 years

Results below show that 312(82.1%, 95% CI .778740068 - .858277081) have been immunized up to date, 68(17.9%, 95% CI.141722919 - .221259932) have not been immunized to date. This is in line with what health workers gave when asked about intervention of stunting majority mentioned immunization as one of the interventions of stunting and here 17,9% are not fully vaccinated. On issue of family eating food supplements, results in the table below indicate that, once a week 102(26.8%CI; (.224506127 -

.315985524) eat food supplements, 82(21.6%) CI; 175466713 - .260603736 eat supplements once a moths, while 187(49.2%) CI; (.440755412 - .543579017 do not eat any food supplements at all.

On health/nutritional related information regarding child care 276(72.6%) CI; 67852253 - .770543233 had received the information while 104(27.4); (.229456767 -.32147747 had not received any health/nutrition related information regarding the child care, Not receiving information about nutrition was also mention by Buhara sub county nutrition committee as one of the factors that are associated with child stunting.

Table 4. 11: Nutrition practices

Nutrition intervention questions	Variables Options	Frequency	%	95% Confidence Interval
Is the child Immunization up to date	Yes	312	82.1	(.778740068 - .858277081)
	No	68	17.9	(.141722919 - .221259932)
Duration of breast feeding	Yes	131	34.5	(.297007893 - .394906639)
	No	249	65.5	(.605093361 - .702992107)
At what age did this child stop breast feeding? Give age in complete months	less than 9months	57	15.0	(.115630288 - .18993341)
	10-15 months	199	52.4	(.472136383 - .574860318)
	16-24 months	124	32.6	(.279373191 - .375990097)
When did you start giving your child other foods other than breast milk?	6 months	188	49.5	(.443362882 - .546193404)
	4-5 months	160	42.1	(.370880826 -

				.472463969)	
	7-8 months	32	8.4	(.058312117 .116800928)	-
How often does your family eat on food supplements?	Once a week	102	26.8	(.224506127 .315985524)	-
	Once a month	82	21.6	(.175466713 .260603736)	-
	Once in three months	9	2.4	(.010885821 .044482509)	-
	None	187	49.2	(.440755412 .543579017)	-
List the food Supplements you usually eat in your household	Food Paste	17	4.5	(.02627357 .070663389)	-
	Ghee	49	12.9	(.096939846 .166870222)	-
	None	314	82.6	(.784406244 .863051286)	-
Have you ever received any health or nutrition related information regarding the child care?	Yes	276	72.6	(.67852253 .770543233)	-
	No	104	27.4	(.229456767 .32147747)	-
Where do you get the Nutrition information	From the health facility	162	42.6	(.376021447 .477766966)	-
	From the VHT	189	49.7	(.445971735 .548806408)	-
	Radio	29	7.6	(.051703218 .107764592)	-

Results above show that 312(82.1%) have been immunized up to date, 68(17.9%) have not been immunized to date. This is in line with what health workers gave when asked about intervention of stunting majority mentioned immunization as one of the interventions of stunting and here 17 (9%) are not fully vaccinated. On issue of family eating food supplements, results in the table below indicate that, once a week 102(26.8%) eat food supplements, 82(21.6%) eat supplements once a moths, while 187(49.2%) do not eat any food supplements at all.

On health/nutritional related information regarding child care 276(72.6%) had received the information while 104(27.4%) had not received any health/nutrition-related information regarding the child care, Not receiving information about nutrition was also mentioned by Buhara sub county nutrition committee as one of the factors that are associated with child stunting.

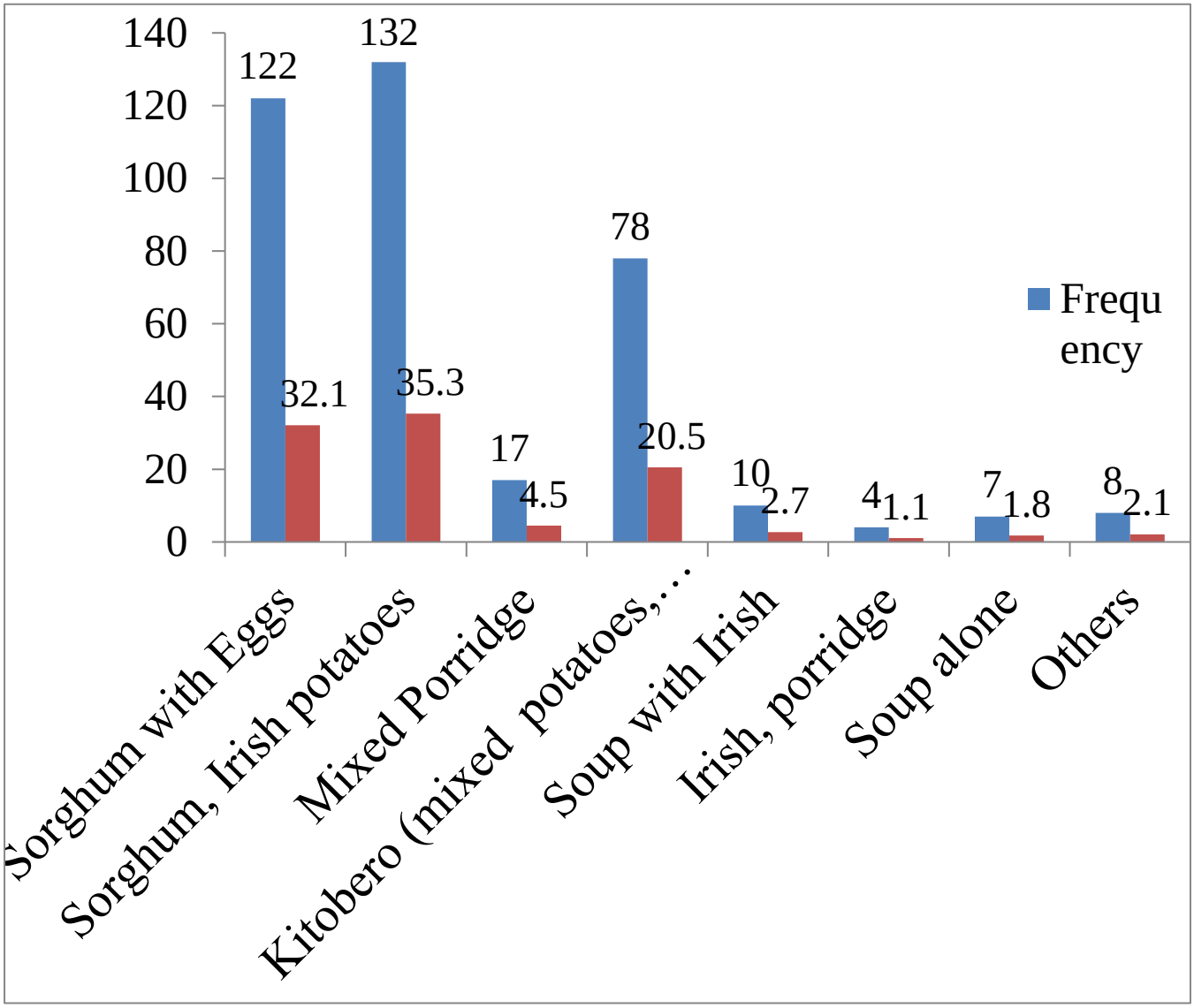
4(b) Items on the type of food fortification / Supplementation given to the child

Study findings showed that about78 (20.5%, 95C.I - .165771243 - .249416269) children household are eating a more rich and fortified food which would boost the child's immunity and fight stunting commonly known as Kitobero and majority 132(35.3):95CI 299533666 - .397602507 are fed on sorghum, and Irish potatoes which is locally produced.

Table 4. 12: Distribution of study respondent's responses on weaning foods

Study item questions	Frequency	%	95% Confidence Interval
Sorghum with Eggs	122	32.1	(.274349689 - .370570474)
Sorghum, Irish potatoes	132	35.3	(.299533666 - .397602507)
Mixed Porridge	17	4.5	(.02627357 - .070663389)
Kitobero (mixed potatoes, beans, peas, Matoke / irish and small fish)	78	20.5	(.165771243 - .249416269)
Soup with Irish	10	2.7	(.012690006 - .047862066)
Irish, porridge	4	1.1	(.002875307 - .026730896)
Soup alone	7	1.8	(.0074375 - .037584573)
Others	8	2.1	(.00913181 - .041059186)

Figure 4. 3: shows the distribution of supplementary foods



4(c) Further statistical analysis to determine the real nutrition intervention factors that reduce the child's stunting in the study from multinomial analysis showed two variables that are statistically significant. High level nutritional practices and intervention was used as reference variable to assess the other study variables. The Child fell sick in the last two weeks and whether child immunization is up-to-date? (p- Value = 0.005 < 0.05 and p- value = 0.001 < 0.05) respectively other study variables that is statistically significant are whether the mother is alive and the child's guardian ethnicity with (p- value = 0.013 < 0.05 and 0.000) respectively.

Table 4. 13: Multinomial analysis on Nutrition Intervention associated factors relation with respondent's characteristics in the study

Stunting prevention Approach		B	Std. Error	Wald	df	Sig.	Exp (B)	95% Confidence Interval for Exp (B)	
								Lower Bound	Upper Bound
Good Nutrition Intervention Used	Intercept	-3.252	1.646	3.904	1	0.048			
	Age	-0.139	0.339	0.167	1	0.683	0.871	0.448	1.693
	Sex	0.863	0.464	3.466	1	0.063	2.37	0.955	5.881
	Child's Birth	1.745	0.422	17.071	1	0	5.727	2.502	13.105
	Child's Care Taker	0.479	0.376	1.624	1	0.203	1.615	0.773	3.374
	Child fallen sick in the last two weeks	2.5	0.467	28.662	1	0	12.183	4.878	30.425
	Whether child immunization is up-to-date?	-1.072	0.484	4.901	1	0.027	0.342	0.132	0.884
	Is the Child's mother alive?	-0.425	0.714	0.355	1	0.552	0.654	0.161	2.649
	Is the Child's father alive?	-0.269	0.652	0.17	1	0.68	0.764	0.213	2.744
	Ethnicity of the respondent	-0.682	0.191	12.795	1	0	0.506	0.348	0.735
Moderate Nutrition Intervention Used	Intercept	-1.839	1.567	1.377	1	0.241			
	Age	-0.19	0.332	0.329	1	0.566	0.827	0.432	1.583
	Sex	0.623	0.451	1.91	1	0.167	1.865	0.771	4.512

	Child's Birth	1.762	0.416	17.957	1	0	5.826	2.579	13.165
	Child's Care Taker	0.518	0.369	1.975	1	0.16	1.679	0.815	3.457
	Child fallen sick in the last two weeks	1.724	0.449	14.767	1	0	5.608	2.327	13.511
	Whether child immunization is up-to-date?	-1.174	0.464	6.4	1	0.011	0.309	0.124	0.768
	Is the Child's mother alive?	-0.235	0.649	0.131	1	0.717	0.791	0.221	2.822
	Is the Child's father alive?	-0.146	0.623	0.055	1	0.814	0.864	0.255	2.928
	Ethnicity of the respondent	-0.558	0.182	9.437	1	0.002	0.572	0.401	0.817

4.6 Study findings from the qualitative data

Finding interview conducted on sub county nutrition committee showed that they believe that the most common factor that contributes to children is frequent child morbidity (illness including malaria, warms and diarrhea) and poor household food supply. With regards to socioeconomic relationships to stunting they said that poverty, unemployment and food insecurity were the associated factors to child's stunting.

While in the area of food intervention majority of them said that household are provided with high bred seed to boost their harvest and fight child stunting.

Table 4. 14: Sub-county Nutrition committee

Questions Items	
Obj.2: In your opinion what are social economic factors associated with child stunting in your area?	Unemployment (poverty)
	Frequent childhood illnesses
	Lack of care of children by their parents
	Lack of enough food in some homesteads
	Many children in homes
	Lack of information about good nutrition
Obj.2: What are issues or problems in the community you think that could contribute to child stunting?	Lack of information
	Misconception
	Disease among children
	Some community beliefs'
Obj.3: What is being done by sub county to promote nutrition activities?	Health education on proper food nutrition.
	Providing high bride seedlings, yellow sweet potatoes and fruit trees to community
	Formation of nutrition committees at parish and village level.

5(b), Furthermore, from the interview conducted on Health workers it showed that absence of kitchen/compound gardening, lack of fruit trees and some particular foods such as green leafy vegetables were the most common factor that contributes to children stunting and poor household food supply. With regards to socioeconomic relationships to stunting they said that poverty, unemployment and food insecurity were the associated factors to child's stunting While in the area of food intervention majority of them said that household are provided with high bred seed to boost their harvest and fight child stunting.

While in the area of nutrition interventions used for combating stunting among children under five years of age majority of them said that sensitization of community on child nutrition,

giving de-wormers and Vitamin A would reduce child stunting, also health workers revealed that, mothers who come for antenatal-care services are screened for other infection and treated, given mosquito nets to reduce chances of infecting their newborn babies which is an intervention on child stunting, carrying out nutrition counseling and growth monitoring also contribute to reduction of child stunting.

Table 4. 15: Responses from Health workers

Questions Items	
Obj.no.3, What kind of different service / treatment are you giving to children under five years for stunting at your facility?	Assessment at OPD, screening
	Treatment with Vitamin A, mebendazole
	Counseling of the caretaker
	Referral
	Managing with therapeutic feeds(Micro nutrient powder and RUTF)
How do you determine stunting of children in your catchment area?	After taking measurement
	Assessment height for age
	Biometric assessment
	Population survey/census of the children
Objective No.3 What measures do you put to combat stunting in children	Health education
	Giving de-wormers and Vitamin A
	Advice to mother on kitchen/compound gardening
	ANC (folic acid, ion supplementation, deworming mothers, counseling on balanced diet
	Screening and treatment of infections in pregnancies
	Vaccination of mothers and children
	Prevention services like ITN(mosquito nets to prevent

	malaria in pregnancy)
	Screening and treatment of infections in pregnancies
	Carrying out Growth Monitoring
	Carrying out Nutrition counseling
Objective No.1 What are issues or problems in the community you think that could contribute to child stunting?	Absence kitchen garden /compound gardening
	Lack of fruit tree in the compound
	Domestic violence in homes and communities,
	Lack of particular food' crops in the community
	Community cultures/Tabboos
	Religion beliefs

4.7 Analysis for the study dependent variables

The purpose of the study was to determine independent factors associated with stunting of children less than five years of age in Buhara Sub County.

Findings revealed about five variables in the study that was statistically significantly associated with the socioeconomic factors including; child's age, child's care taker and birth order, child's immunization update status, ethnicity and whether child's mother and father is alive.

4.8 Analysis of study independent variables.

The study main independent variables include socioeconomic factor, environmental factors and nutrition intervention.

In a nutshell, The study findings from quantitative data revealed that, stunting was influenced by: lack of compound gardening, using water from unprotected water sources, caretakers of children being house wives, inadequate fruit tree in the compound, this coincides with qualitative data which showed that stunting was contributed by: diseases, lacking enough food in households, absence of kitchen/compound gardening and lack of fruit trees in the compound.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.0 Discussions

The study was about the factors associated with stunting of children under five years of age in Buhara Sub County, Kabale district. The research was guided by three objectives and analysis of these objectives was presented in chapter four. Discussions of findings related to the findings are discussed below;

5.1 Demographic factors

Data was collected from a total of 380 participants consequently, out of this, participants 55% children in the study were within the age cohort of 2 years and 26% of the study participants were in age cohort of 3-5 years more than half of the study participants were males with 56.8%. The majority of children were found to be in second birth order with 40% about the status of the mother 93.8% of the mothers were alive. This is similar to the study by Gelano et al. (2018) that states that stunting influenced by child age, age of the mother, child's sex, marital status of the mother and family size. Studies by Black et al. (2016) indicated that male children were more at risk of stunting than female children.

5.2 Environmental factors associated with child stunting.

The environmental factors associated with stunting in children of under five years of age in Buhara Sub- County in Kabale District found out that (4.5%) have no latrines and are practicing open defecation, (4.7%) of the participants use indiscriminate waste disposal and (22.1%), get water from unprotected source, this even why diarrhea cases among the children of Buhara are leading followed by worms infestation, still those poor methods of hygiene and sanitation have led to high morbidity and mortality in the area.

A similar study done by KirK A. Dearden (2017) showed that, Access to improved toilets had relative stunting risk at 8 years by 0.62-0.68 than that of 5years old with no access to improved toilets, In Uganda nationally 5% of households use open defecation (malaria indicator survey 2018-19) However, the odds of drinking water from unprotected well was found higher (57%) in Srilanka, (Jayatissa, Moazzem H, Laksiri N, 2012).

Findings revealed that that, 139 (36.6%) have no fruit trees in their compound and 108 (28.4%) have no compound gardening. Absence of fruit trees and compound gardening predisposes children to stunting. This is because children may lack fruits to supplement on

other foods. This is in line with Uganda Multi-sectoral food security and Nutrition project (2017) that aims at increasing production consumption, utilization of community based nutritional services in small holder households such as compound gardening, and fruit trees in the compound. According to guidelines by Health Canadian Organization (2021), the diet for children below five years of age should include; starchy foods smashed with fruits and vegetables and comprise one third of food intake each day so as have to have proper intake of carbohydrates, minerals, vitamins and fiber.

5.3 Social-economic factors associated with stunting

The socio-economic factors associated with stunting of children under the five years of age showed that, 39.5%, of Occupation of the fathers were daily casual laborers associated with low household income, average income of the family earned was less than UGX100, 000($ 26) per month and eating one meal per day in that order were the major social economic factors associated with child stunting. In a similar study by Wamani et al. (2017) reported that low social economic status of the care givers/parents predisposes the child to stunting.

Families with many members in their household have high chances of their children being stunted. This is in line with the study conducted by Sue Horton, et al (2018) showed that large household member restricts the mother's ability to monitor her children's feeding habit.

On education status, findings indicate that 25% of the respondents had no formal education. This brings a knowledge gap in food and nutrition by caregiver which predisposes children to stunting. This is in line with the study conducted in Ethiopia by Gugsa (2017) determined that women's education status were the significant predictors of stunting. On the other hand, 74.7% of the respondents had formal education. To small extent, these mothers leave their children at home with grandmothers, house maids who have little knowledge in child feeding and the child is not breast fed continuously. This is line with UDHS (2016) which indicated that 1 in 10 children of educated mothers are stunted.

5.4 Intervention practices

The establish nutrition interventions used for combating stunting among children under five years of age in Buhara sub-county, Kabale District. The study indicated that fully immunization of children, eating of food supplements, sensitization of community on food, nutrition and child care, eating of rich and fortified foods in that order were the major innervations practiced. This is in line with government of Uganda policy of protecting children less than five years against killer diseases through immunization (NRM Manifesto,

2016). Incomplete immunized children are prone to infections which is the one of the etiological factor for stunting. On the contrary, study conducted by Mike LT Berendsen 2016, did not support that immunization intervention reduced stunting.

Findings further indicate that majority of the caregivers had received health nutritional related information regarding the child's care 72.6%. However, more than a quarter of the respondents had not received any health related information 27.4%. Lack of health related information such as food and nutrition, balanced diet personal hygiene, child growth monitoring predispose child to stunting. This is in line with the study findings by De M. et al. (2018), maternal illiteracy was significantly associated with the risk of stunting in children under the age of 5.

On breastfeeding, findings show that majority of caregivers breast fed their children for 10-15 months. This breast feeding category is lower than the required period of breast feeding of 24 months and breastfeeding less than 24 months is a predisposing factor for stunting in children. This is in line with the study conducted in Sudan which showed that the main contributing factor for under-five stunting were found as deprivation of colostrum, duration of breast feeding, pre-lacteal feeds, and age of introduction of complementary feeding (Nguyen NH., et al 2009)

5.5 Conclusion

Existing policies on food and nutrition, Infant and Young Children fund (IYCF) and existence of government extension workers was not effective in addressing child stunting (Health, 2007). The local leaders, the media and extension workers especially health and agriculture are all in play against child stunting however, their effort requires stepping up.

Poor households waste disposal system from household generated waste and indiscriminate dumping of waste and poor practices of hand washing in the community in critical times of COVID pandemics and other water borne, Wash related and food borne diseases could predispose child illness, infections that may contribute to child stunting.

The child's household source of drinking water was significant to nutritional status of children under 5 years especially with regards to drinking water from unprotected source which is the predisposing factor to gastrointestinal infection that is among the risk factor for stunting.

Awareness of food and nutrition is still very low as the communities are only aware of the fact that there is only food to eat but are not aware of the balanced diet and food nutrients.

Child's household composition was a variable in the study, as the child's birth order, the child's caretaker, child's immunization update status and other illnesses suffered in the past are influencing factors to stunting. While the household financial security influence household food security, diversification, supplementation in the study.

5.6 Recommendations

The study makes the following recommendations in line objectives.

Kabale District local government in conjunction with Buhara Sub County leadership should come up with ordinances and byelaws on how to improve community sanitation and hygiene practices especially improving toilets coverage, hand washing and proper disposal of the wastes to avoid stunting as they pose great risk to diarrheal diseases leading to mal-absorption food.

The Sub County should embrace government programmes such as wealth creation, parish modal development which aims at improving household income.

The government need to empower girl child nutrition education and poverty alleviation to contribute to household income and proper interpretation of the guidelines concerning breast feeding and nutrition of children.

The District to emphasis the Implementation of Government of Uganda policy of protecting children under five against killer diseases through immunization (NRM Manifesto, 2016), that promotes and supports health and nutrition education to increase the level of awareness and integration of nutrition services in all routine and outreach health services and programmes targeting children under five years.

The Buhara sub county leadership should empower the Village Health Committees and the mass media and draw programmes on sensitizing communities on breastfeeding, complementary feeding practices, proper food handling, hygiene, and sanitation.

Creation of awareness campaigns and sensitization of communities about immunization services, attending antenatal and postnatal cares so that everyone can understand what good nutrition is all about.

5.7 Suggestion for further studies

- To study risk factor associated with malnutrition among children under-five years in Kabale District.
- To assess the level of care givers commitment to Childs' care and malnutrition prevalence.
- To asses quality of care for children less than 5 years of age at health center IVs in Kabale District.

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APPENDICES

Appendix I: Research Ethic Committee Informed Consent Form

MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY

RESEARCH ETHICS COMMITTEE

P.O. Box 1410 Mbarara, Tel: +256-48-543-3795, Fax: +256-48-542-0782

E-mail: irc@must.ac.ug, mustirb@gmail.com

INFORMED CONSENT FORM

This document outlines the research study and expectations for potential participants. It should be written in layman terms and typed on MUST-REC letterhead.

Instructions

1. The wording of this document should be directed to the potential participant not MUST-REC.
2. If a technical term must be used, then define it the first time it is used and any acronyms or abbreviations used should be spelled out the first time they are used.
3. All the sections of this document must be completed without any editing or deletions.
4. Please use a typing font that is easily distinguishable from the questions of this form. Preferably the font size should be 12.

Study title – This should be the same as on all other documents related to the study.

FACTORS ASSOCIATED WITH STUNTING IN CHILDREN UNDER FIVE YEARS OF AGE: A CASE OF BUHARA SUB COUNTY KABALE DISTRICT.

Principal Investigator(s)

NAMANYA OLIVER

Introduction

What you should know about this study:

1. You are being asked to join a research study.

Leave blank for REC office only:	REC OFFICE USE ONLY:
MUST-REC Stamp: RESEARCH ETHICS COMMITTEE, MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY, P.O. BOX 1410, MBARARA	APPROVAL DATE: 08/12/2021 APPROVED CONSENT IRB VERSION NUMBER: 2021-12-03 PI NAME: Namanya Oliver IRB NO: MUST-2021-247

2. This consent form explains the research study and your part in the study.
3. Please read it carefully and take as much time as you need.
4. You are a volunteer. You can choose not to take part and if you join, you may quit at any time. There will be no penalty if you decide to quit the study.

Brief background to the study

According to UNICEF (2017), globally, there are about 2.2 billion children, of these 155 million children under five years of age suffering from stunting and in Africa there are about 59 million stunted children. The prevalence of stunting in Uganda stands at 29 percent while in Kabale District the prevalence of stunting stands at 30 percent (UDHS 2016).

Stunting remains a major public health concern worldwide (Vonaesch et al., 2017). In Sub - Saharan Africa with Uganda inclusive, 34 percent of children less than five years of age are stunted, and this continue to cause detrimental impact at individual and societal levels (Nshimyiryo et al., 2019).

Therefore, the main objective of this study is to determine the factors influencing stunting and the intervention used for combating stunting among children less than five years of age in Buhara Sub- County, Kabale District.

Purpose of the research project

Include a statement that the study involves research, estimated number of participants, an explanation of the purpose(s) of the research procedure and the expected duration of the subject's participation.

The subject's information collected as part of the research, even if identifiers are removed, will not be used or distributed for future research studies.

The estimated number of participants will be 400 and the expected duration of the subject's participation will be 3 months.

Leave blank for REC office only:	REC OFFICE USE ONLY:
MUST-REC Stamp: RESEARCH ETHICS COMMITTEE, MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY, SUCCEED WE MUST, P.O. BOX 1410, MBARARA	APPROVAL DATE: 08/12/2021 APPROVED CONSENT IRB VERSION NUMBER: 2021-12-03 PI NAME: Nanamya Olivier IRB NO: MUST-2021-247

Why you are being asked to participate?

Explain why you have selected the individual to participate in the study.

You are selected to participate in this study due to experience and knowledge on handling malnourished cases and treatment at your respective facility.

Procedures

Provide a description of the procedures to be followed and identification of any procedures that are experimental, clinical etc. If there is need for storage of biological (body) specimens, explain why, and include a statement requesting for consent to store the specimens and state the duration of storage.

An Introductory letter will be got from Mbarara University REC introducing the researcher to the district and sub county Administration of Buhara sub county. The meeting will be planned and conducted with research Assistants and selected health workers.

Risks or discomforts

Describe any reasonably foreseeable risks or discomforts-physical, psychological, social, legal or other associated with the procedure, and include information about their likelihood and seriousness. Discuss the procedures for protecting against or minimizing any potential risks to the subject. Discuss the risks in relation to the anticipated benefits to the subjects and to society.

Special treatment will be observed in case of participant's discomfort to the subject that are currently unforeseeable

Benefits

Describe any benefits to the subject or other benefits that may reasonably be expected from the research. If the subject is not likely to benefit personally from the experimental protocol note this in the statement of benefits.

There is no direct short-term benefit for participants. However, it may use the policymakers to evaluate the service and help them to improve newborn and maternal health services.

Incentives or rewards for participating

It is assumed that there are no costs to subjects enrolled in research protocols. Any payments to be made to the subject, e.g., travel expenses, token of appreciation for time spent, must also be stated, including when the payment will be made.

Refreshments in form of water will be provided and transport refund shall be provided to the participants

Protecting data confidentiality

Leave blank for REC office only:	REC OFFICE USE ONLY:
MUST-REC Stamp:	APPROVAL DATE: 08/12/2021
	APPROVED CONSENT IRB VERSION NUMBER: 2021-12-03
	PI NAME: Namanya Olivia
	IRB NO: MUST-2021-247

Provide a statement describing the extent, if any, to which confidentiality or records identifying the subjects will be maintained. If data is in form of tape recordings, photographs, movies or videotapes, researcher should describe period of time they will be retained before destruction. Showing or playing of such data must be disclosed, including instructional purposes.

Your name will not be written in this form and will never be used in connection with any information you tell us. All information given by you will be kept strictly confidential.

Protecting subject privacy during data collection
Describe how the privacy of the participant will be ensured during the process of data collection.

Anonymity and confidentiality will be strictly observed during data collection, description and reporting of findings. This will be achieved by eliminating names on questionnaires and during reporting of findings they will be given pseudo names and keeping the data under lock and key.

Right to refuse or withdraw
Include a statement that participation is voluntary and that refusal to participate will involve no penalty or loss of benefits to which the subject is otherwise entitled.

There will be no consequences of a subject's decision to withdraw from the research and procedures for orderly termination of participation by the subject;

What happens if you leave the study?
Include a statement that the subject may discontinue participation at any time without penalty or loss of benefits.

The participation will be based on your voluntarism and you are not obligated to answer any question you do not wish to answer. This interview will take about 25-35 minutes. If you feel discomfort with the interview, please feel free to withdraw from the interview at any time.

Leave blank for REC office only:	REC OFFICE USE ONLY:
MUST-REC Stamp:	APPROVAL DATE: 08/12/2021
	APPROVED CONSENT IRB VERSION NUMBER: 2021-120
	PI NAME: Namanya Oliver
	IRB NO: MUST-2021-247

Who do I ask/call if I have questions or a problem?
Include contact for the researcher and Chairperson, MUST-REC.

Dr. Francis Bajunirwe

Chairman, MUST-REC

P.O. Box 1410 Mbarara

Tel: 0485433795/0772 576 396

What does your signature or thumbprint on this consent form mean?

Your signature on this form means

- You have been informed about this study's purpose, procedures, possible benefits and risks
- You have been given the chance to ask questions before you sign
- You have voluntarily agreed to be in this study

Name of adult participant	Signature/Thumbprint of participant/ Parent/Guardian/Next of Kin	Date
Name of person obtaining consent	Signature	Date
Print Name of witness	Signature or thumbprint or mark	Date

Leave blank for REC office only:

MUST-REC Stamp:

RESEARCH ETHICS COMMITTEE
MBARA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SUCCEED WE MUST
P.O. BOX 1410, MBARARA

REC OFFICE USE ONLY:
APPROVAL DATE: 08/12/2021
APPROVED CONSENT IRB VERSION NUMBER: 2021-12-03
PI NAME: Namanya Oliver
IRB NO: MUST-2021-247

Appendix II: Covid 19 Risk Management Plan

It is challenging to predict the impact of COVID-19 on human population during conduct of research but the safety of study participants, researchers and the integrity of research remain paramount. To build more sustainable world, using evidence, action and influence, working in partnership with others conducting research in the midst of a global pandemic presents new ethical issues that require precaution and strictness to COVID protection is required.

Therefore the COVID risk management plan will assist the researcher with COVID-19 prevention and promote compliance with investigation and conduct of research involving human population adopted in this study as listed below:

i. Continue with data collection as previously planned.

ii. Modify data collection methods to take account of the need to protect research assistants and research participants and to comply with local regulations that includes social distancing, wearing of mask and use of hand sanitizer and promotion of vaccination among non-immunized study participants.

iii. Where possible to consider shifting to virtual methods of data collection, or modifying protocols for face-to-face engagement.

iv. Reconsider the choice of focus group data collection method that involve group gatherings, if possible (number of people determined by local regulations or advice).

v. \Where possible to have pre-assessment of vulnerable groups and ensuring they are not involved in face-to face data collection.

vi. Ensuring that face-to-face data collection takes place outdoors with suitable physical distancing between researcher and research participants.

vii. To postpone data collection in area of high vulnerability until the situation improves or changes.

viii. Total cancellation of data collection in places with severe challenges.

Note: the researcher considers carefully how best to proceed with the research on a case-by-case basis, and to seek support and expert advice from relevant authority.

Appendix III: Questionnaire

I am Namanya Oliver, a final year student of Master's degree in Public Health at Kabale University. I am conducting research on "**Factors associated with stunting in children under five years of age at Buhara Sub- County in Kabale District".**

I kindly request for your participation in this study such that we will be able to address these issues using the study results. The interview requires about 30 minutes of your time and l will be available to clarify on any information or questions that will not be clear, and if you need further information it will be provided. In this study, a structured questionnaire requiring giving response will be given. Your agreement to participate in this study will be highly appreciated.

The participation is based on your voluntarism and you are not obligated to answer any question you do not wish to answer. This interview will take about 30 minutes. If you feel discomfort with the interview, please feel free to withdraw from the interview at any time.

Your name will not be written in this form and will never be used in connection with any information you tell us. All information given by you will be kept strictly confidential. This study is for my academic's study so that I can get my degree. However, I request permission to use the information and publish papers.

If you have any problems with interview you can contact- DR Francis Bajunirwe Chairman MUST-REC. 0772576396, DR Marcy Nyakwo-0780407850, Dr. Nduhukire Timothy 0782841235 my supervisors.

4.1 Demographic Characteristics of the child.

Variables Question	Variables Options	Tick as applied to you
Childs age group	Below 1 year	
	2 Years	
	3 – 5 Years	
Gender	Male	
	Female	
Who is the main care taker of the Child	Mother	
	Father	
	Brother or Sister	

	Others Specify	
What is his/ her birth Order	1	
	2	
	3	
	4	
Is the mother of this child alive?	Yes	
	No	
Is the Father of this child alive?	Yes	
	No	
Ethnicity of the respondent	Bakiga	
	Banyankore	
	Bafumbira	
	Banyarwanda	

1 What is the proportion of stunted children less than 5 years of age in Buhara Sub – County?

Statistics	Height	Weight	MUAC

Study item questions	Variables Options	Frequency	%
MUAC			

2 What are the socio – economic factors that are associated with child's stunting in children less than 5 years of age in Buhara Sub – County

Socio-economic factors item questions	**Variables Options**	**Tick as applied to you**
Age of the child's Guardian	18 – 35 years	
	36 and above	
Child's Guardian Gender	Male	
	Female	
Religion of the Child Guardian	Muslim	
	Seventh Day Adventist	
	Catholic	
	Anglican	
	Others Specify	
Occupation of Child's Guardian	House wife	
	Government employee	
	Private business	
	Others	
Occupation of Child's Fathers	Government employee	
	Private business	
	Farmer	
	Daily laborer	
	Others	
Highest education attained by the caretaker	No formal education	
	Had Formal education	

How many people including you live in your house hold?	below 5	
	Above 5	
What is the average estimated income of the family per month	Below 100000 (UGS)	
	Above 100000(UGS)	
Number of household meals per day and if eating together	One meal	
	Two meals	
	Three Meals	
	More than three meals	
Do your children eat other foods between meals	Yes	
	No	

Table B:

Study item questions	**Variables Options**	**Tick as applied to you**
Has this child fallen sick in the last two weeks	Yes	
	No	
What type of illness did He / she experience	Diarrhea	
	Malaria	
	Coughs	
	Worm infection	
	Others Specify	

3 What are the environmental factors associated with child's stunting in children less than 5 years in Buhara Sub – County

Study item questions	**Variables Options**	**Tick as applied to you**
Availability of any fruit tree in the compound	Yes	
	No	
Do you have a latrine on the household compound?	Yes	
	No	
Where do you go to ease yourself?	Neighbor's latrine	
	Bush	
How do you dispose of waste generated in the compound?	Pit	
	Burning	
	Open field (indiscriminate)	
	Garden	
Source of drinking water	Protected source	
	Unprotected source	
Compound garden	Yes	
	No	
Hand washing facilities	Yes	
	No	
How long will it take to reach the nearest health facility in hours	less than one 30 minutes	
	1 hour	
	more than one hour	

3. What is the nutrition intervention provided in Buhara Sub County to address stunting in children less than 5 years?

Nutrition intervention questions	**Variables Options**	**Tick as applied to you**
Is the child Immunization up to date	Yes	
	No	
Is this child still breast feeding	Yes	
	No	
At what age did this child stop breast feeding? Give age in complete months	less than 9months	
	10-15 months	
	16-24 months	
When did you start giving your child other foods other than breast milk?	6 months	
	4-5 months	
	7-8 months	
How often does your family eat on food supplements?	Once a week	
	Once a month	
	Once in three months	
	None	
List the food Supplements you usually eat in your household	Food Paste	
	Ghee	
	None	
Have you ever received any health or nutrition related information regarding the child care?	Yes	
	No	
Where do you get the Nutrition information	From the health facility	

	From the VHT	
	Radio	
Do you have adequate food in your house hold?	Yes	
	No	
How long will it take to reach the nearest health facility in hours	Less than one 30 minutes	
	1 hour	
	More than one hour	

Question on type of food fortification / Supplementation given to the child

Study item questions	Tick as applied to you
Sorghum and Eggs	
Sorghum, Irish& sweet potatoes	
Mixed Porridge	
Kitobero (mixed potatoes, beans, peas, Matoke / irish and small fish)	
Soup with Irish	
Irish, porridge	
Soup alone	
Others	

Part I: Informant Interview guide for Sub County nutrition committees

This interview aims to identify the factors associated with stunting in children under five years of age in Buhara Sub County, Kabale District. It will focus on identifying factors associated to stunting. Participation is based on voluntarism and the discussion will take about 30 minutes and if you feel discomfort with the discussion, feel free to withdraw from the discussion

1. (a) In your opinion what are social economic factors associated with child stunting in your area?

……..……

……..……

……..……

……

(b) What are things in the community you think causes child stunting?

……

……

……

……

2. What is being done by the Sub County to promote nutrition Activities?

……

……..……

……..……..…

……..……

Part II: Informant Interview guide for Health workers

This interview aims to identify the factors associated with stunting in children under five years of age in Buhara Sub County, Kabale District. It will focus on identifying factors associated to stunting. Participation is based on voluntarism and the discussion will take about 30 minutes and if you feel discomfort with the discussion, feel free to withdraw from the discussion.

1. What kind of different services/treatment are you giving to children under five years for stunting at your facility?

……
……..……
……..……..…
……..……

2. How do you determine stunting of children in your catchment area

……
……..……
……..……..…
……..……

3. What measures do you put to combat stunting in children

……
……..……
……..……..…
……..……

END.

Thank you

Appendix IV: Approval Letter

MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY
RESEARCH ETHICS COMMITTEE
E-mail: sec.rec@must.ac.ug

Mbarara University of Science & Technology
P. O. Box 1410, Mbarara
RESEARCH ETHICS COMMITTEE
08 DEC 2022
APPROVED
VALID UNTIL DATE SHOWN ABOVE

08/12/2021

To: NAMANYA OLIVER

KABALE UNIVERSITY
0773448654

Type: Initial Review

Re: MUST-2021-247: Factor associated with stunting in children under five years of age: a case of Buhara Sub County, Kabale District, 2, 2021-12-03

I am pleased to inform you that at the **137th** convened meeting on **03/12/2021**, the MUST Research Ethics Committee, committee meeting, etc voted to approve the above referenced application.
Approval of the research is for the period of **08/12/2021** to **08/12/2022.**

As Principal Investigator of the research, 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 protocol or the consent form must be submitted to the REC for re-review and approval **prior** to the activation of the changes.
3. Reports of unanticipated problems involving risks to participants or any new information which could change the risk benefit: ratio must be submitted to the REC.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by participants and/or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits.
5. Continuing review application must be submitted to the REC **eight weeks** prior to the expiration date of **08/12/2022** in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record.
7. You are required to register the research protocol with the Uganda National Council for Science and Technology (UNCST) for final clearance to undertake the study in Uganda.

The following is the list of all documents approved in this application by MUST Research Ethics Committee:

Appendix V: Introductory Letter

KABALE UNIVERSITY

P.O Box 317
Kabale - Uganda
Email: info@kab.ac.ug
admissions@kab.ac.ug

Tel: 256-392-848355/04864-26463
Mob: 256-782860259
Fax: 256-4864-22803
Website: www.kab.ac.ug

DEPARTMENT OF COMMUNITY HEALTH

KABALE SCHOOL OF MEDICINE (KABSOM)

Kabale, 28th March 2022

To
The Responsible Officer,

Dear Sir/Madam,

RE: INTRODUCTION OF Mr. OLIVER NAMANYA DOING RESEARCH IN YOUR COMMUNITY

This is to introduce to you Mr. Oliver Namanya, a Master of Public Health (MPH) student of Kabale University, requesting to do research in your community.

Mr. Namanya is a *bona fide* second year MPH student in the Department of Community Health at Kabale University (Reg. No. 2018/MPH/1847/W). He has fulfilled all the requirements of Kabale University School of Medicine to proceed with his dissertation. His research has been approved by the Uganda National Council for Science and Technology, represented by the Research Ethics Committee of Mbarara University of Science and Technology. It is entitled:

"FACTORS ASSOCIATED WITH STUNTING IN CHILDREN UNDER FIVE YEARS OF AGE: A CASE OF BUHARA SUB-COUNTY, KABALE DISTRICT"

Any assistance given to him in this regard will be very well appreciated.

Yours Sincerely,

Dr. Everd BIKAITWOHA MANIPLE, PhD (RCSI), MPH (MAK), MBChB (MAK), FAIPH
Professor of Public Health
Ag. Head, Department of Community Health
Tel: +256 772 592506 e-mail: ebmaniple@kab.ac.ug

Appendix VI: Map of Kabale District showing Buhara Sub County