FACTORS ASSOCIATED WITH UNDERWEIGHT AMONG CHILDREN BELOW FIVE YEARS AT MUNUKI PRIMARY HEALTH CARE CENTRE SOUTH SUDAN

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AN UNDERGRADUATE RESEARCH REPORT SUBMITTED TO THE INSTITUTE OF PUBLIC HEALTH AND MANAGEMENT IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF A BACHELOR'S DEGREE OF SCIENCES IN PUBLIC HEALTH OF CLARKE INTERNATIONAL UNIVERSITY

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DECLARATION

I, **Ngonga Rebecca** hereby declare that this research report submitted to the IPHM in partial fulfillment for the award of a Bachelor's Degree in Science in Public health of Clarke International University has never been presented by anyone for the award of a degree. The work I have presented in this research report is my own and any other materials contained herein.

Signature.....

NGONGA REBECCA

Date.....

APPROVAL

This research report entitled "**Factors associated with underweight among children below five years at Munuki Primary Health Care Centre South Sudan**" I hereby approve and submitted this proposal to the IPHM of Clarke International University formerly International Health Science University.

Signature: ..... **Date:** .....

MRS. ALIMAH KOMUHANGI

SUPERVISOR

DEDICATION

This work is dedicated to all my family Miss Tumalu Suzan, Mr. Fraser Joseph and Isa Moses

ACKNOWLEDGEMENT

A journey of success is attained with the support of many people in one's life. I take this opportunity to thank God for the gift of life, granting me the grace, wisdom, and knowledge and enabling me to go through this course successfully.

I would also like to appreciate my supervisor Mrs. Alimah Komuhangi

May God bless you all.

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LIST OF ABBREVIATION

CIU	Clarke International University
IEC	information, Education Communication
IPHM	Institute of Public Health and Management
MOH	Ministry of Health
PTSD	Post-Traumatic Stress Disorder
TV	Television
USA	United States of America
WHO	World Health Organization

OPERATION DEFINITION

Anthropometry: This refers to measurements done on the human body like height or length.

Complementary feeding: Refers to the transition from breastfeeding to family foods and generally covers a period 6 to 24 months of age.

Low birth weight: Birth weight that is less than 2,500 grams at birth.

Malnutrition: Various forms of poor nutrition that are caused by a multifaceted array of factors that may include dietary inadequacy, infections and socio-cultural factors. It takes the forms of underweight or stunting and overweight.

Over-nutrition: A situation where an individual consumes more nutrients than the body requires.

Overweight: A condition where an individual more weight that does not match with their height.

Stunting: It is the height-for-age that is <-2SD from the NCHS/WHO reference median value.

Under-nutrition: A condition where an individual receives nourishment that is below the recommended body requirements.

Body mass index: Is the weight of a child or adult in kg divided by their height in metres squared.

Breastfeeding practices: Refers to the act of feeding an infant or child with his or her mother's breast milk either on the breast or inform of expressed milk.

Child under 5 years of age: In this study, a child under the age of 5 years refers to a young human being whose age ranges from 6 to 59 months from his date of birth.

Child's birth weight: The child's birth weight refers to the heaviness of the child, as measured by a weight scale at birth.

Immunization: Is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine" (WHO, 2011).

Wasting: Is defined as a low weight for the height of the child compared to the standard child of the same height.

ABSTRACT

Background: Globally, approximately 200 deaths per 100,000 in children below five years are due to under nutrition (GBD, 2018). In South East Asia, under nutrition is a leading public health problem particularly in Pakistan, Bangladesh, and India (Akhtar *et al*, 2018). Moreso, 428 deaths per 100,000 in children below five years in Pakistan were due to under nutrition (GBD, 2018). In developing countries like Burkina Faso, malnutrition especially underweight among children below five years is more prevalent (MoH Burkina Faso, 2019). In Africa, an estimated 13.4 million children under-five years of age, or 8.5%, were wasted in 2017 and these children are at substantial increased risk of SAM and death. In Africa, the estimated prevalence under-five overweight increased from 4% in 1990 to 7% in 2017.

Objectives: To determine the proportion of underweight children less than five years in Munuki primary health care center, Munuki Payam south Sudan, to establish caregivers demographic factors associated underweight in children less than five years in Munuki primary health care center, Munuki Payam south Sudan, to determine household food security factors associated with underweight in children less than five years in Munuki primary health care center, Munuki Payam south Sudan.

Results: Most of the respondents 56.9% were mothers to the children, 96.8% of the respondents were caretakers of the children by the interview period. Majority of the children 70.1% had their child's immunization cards or birth certificates or baptism card used to determine the date of birth, one third, 46.6% of the children were aged 6-11 months. Regarding gender of the child, 61.6% were male, 46.3% of the children were second born, 66.4% of the children had birth interval of at least two years from the older siblings. On birth weight, 59.5% of the children had birth weight of at-least 2.5 kg.

Conclusion and recommendation : The prevalence of underweight among children below five years was high at 65.9%. Younger age, being male, having at-least 2 years birth interval were negatively associated with underweight among children below five years. Low level of maternal education were negatively associated with underweight among children below five years

Having no readily available food, having no access to food throughout the years and not eating all type of food were associated with increased chance of underweight among children below five years in this study. Strengthen routine expanded program of vaccination at community level.

CHAPTER ONE: INTRODUCTION

1.0 Introduction

Malnutrition in children presents in three categories: stunting, wasting, and underweight (Demissie et al, 2018). Children whose weight-for-age indicator is greater than two or three standard deviations beneath the international standard for international reference population (ages 6-59 months) are considered moderately or severely underweight (WHO, 2017), and those children whose height/length-for-age indicator above two or three standard deviations less than the median for the international reference population (ages 6-59 months) are considered moderately or severely stunted (UNICEF, 2018)

Today, globally malnutrition affects most of the developing countries, South Sudan being a vulnerable developing country undergoing conflicts. In 2010 Global nutrition report in South Sudan indicated 49.4% were underweight. Chapter one presents the overall background regarding the burden of underweight among children below five years. This is captured from global, developed countries, Africa, sub-Saharan Africa and South Sudan.

1.1 Background of the Study

Globally, approximately 200 deaths per 100,000 in children below five years are due to under nutrition (GBD, 2018). In South East Asia, under nutrition is a leading public health problem particularly in Pakistan, Bangladesh, and India (Akhtar *et al*, 2018). Moreso, 428 deaths per 100,000 in children below five years in Pakistan were due to under nutrition (GBD, 2018). In developing countries like Burkina Faso, malnutrition especially underweight among children below five years is more prevalent (MoH Burkina Faso, 2019). In Africa, an estimated 13.4 million children under-five years of age, or 8.5%, were wasted in 2017 and these children are at substantial increased risk of SAM and death. In Africa, the estimated prevalence under-five overweight increased from 4% in 1990 to 7% in 2017. This trend is expected to continue. High prevalence levels of stunting among children under-five years of age in Africa (36% or 56 million in 2017), these children have elevated risk of mortality, cognitive deficits and increased risk of adult obesity and non-communicable diseases (WHO, World Bank, 2019).

Malnutrition among under-five children is one of the most important public health problems in developing countries especially Sub-Saharan Africa (Gulati, 2019). An estimated 230 million under-five children are believed to be chronically malnourished in Africa. Similarly, about 54%

of under-five deaths are believed to be associated with malnutrition in Africa. In Sub-Saharan Africa, 41% of under-five children are malnourished and deaths from malnutrition are increasing on daily basis in the region. Malnutrition continues to be a significant public health problem throughout the low income countries, particularly in Sub-Saharan Africa (Kimokoti and Hamer, 2018).

Consequently, approximately, 95159 and 50 million children below five years suffer fromunderweight and stunting (UNICEF, 2016). Similarly, in Nigeria, about 11 million children under five years were stunted and about 1.7 million were severely malnourished (UNICEF, 2015). Meanwhile, the burden of malnutrition among children less than five years in Uganda is more prevalent in rural areas unlike urban areas (UBOS, 2019).

For Eastern Africa, drought periods in Kenya and Uganda, and acute poverty in Tanzania are increasing the already high prevalence of malnutrition in children throughout East Africa. (World Bank, 2016). The World Bank report, based on year-old data, estimates that 22 per cent of Kenyans under the age of five are malnourished, along with 23 per cent of under-five aged Ugandans and nearly one-third of Tanzanian children under five are malnourished. This indicates that rates of childhood malnutrition in Kenya, Tanzania and Uganda are worsening (World Bank, 2016).

In South Sudan, malnutrition is a major development concern, affecting all regions of the country and most segments of the population. The current levels of malnutrition hinder South Sudan's human, social, and economic development. It is at the start of life in particular that we must work together to ensure that all Sudanese are properly nourished. (South Sudan Nutrition Action Plan 2011 – 2016).

A recent survey warned that more than one third of South Sudan’s population 4.8 million people were facing severe food shortages. Malnutrition rates in 7 of the country’s 10 states had reached the emergency threshold, meaning that more than 15 per cent of the population was malnourished, while in Northern Bar el Ghazal the malnutrition rate was 33 percent (UNICEF, 2015).

South Sudan is among the developing countries with the largest population of stunted under five children, there was an increase of nearly 50 percent over 2016 and more than 150 percent increase compared to 2014 (SSHHS, 2015). According to UNICEF, (2014), nutrition indicators

for children under-fives and their mothers have not improved much over the past 15 years, with some indicators showing a worsening trend.

South Sudan's, maternal and child malnutrition rates are among the worst public health challenges (UNICEF, 2016). Among children aged 6-59 months: 31% are stunted, 28% underweight, and 23% acutely malnourished giving an estimated prevalence of two types of malnutrition at 13% and 9% moderately and severely respectively placing South Sudan at global acute malnutrition (GAM) of 22 percent above 15 percent emergency threshold (GoSS/MOH, 2016) this is double the global GAM rate at (10.2%) emergency level, classifying South Sudan into malnutrition emergency (UNICEF, WHO, 2016).

An estimated six million people (50 per cent of the population) are expected to be severely food insecure in June – July 2017, with an over 1.1 million children suspected to develop malnutrition ascribing to additional disruption of the flow of imported goods, conflict continuation of limiting domestic food production, staple food prices rise due to the devaluation of the South Sudanese Pound (SSP), high transportation costs, besides conflict- associated to disruptions of trade (UNICEF South Sudan, 2017)

The greater Upper Nile region has experienced extensive decrease in food production leading to significant food and nutrition insecurity (IPC, 2015). Upper Nile region is the worst affected with IPC categorizing Boma state as in crisis with GAM rate of 13.6 % (IPC, 2017) even though the SPHERE Standard internationally placed Boma state below WHO emergency threshold of 15% connecting to the current political instability in addition to food insecurity, the county can find itself in a malnutrition emergency even with this alarming statistics experts consider it in its lowest point, expecting an extraordinary explosive upsurge that would potentially push Boma state into malnutrition emergency should not any intervention implemented (SCI-SMoH Survey, 2017). In 2017 Save the Children (SCI) and State Ministry of Health (SMoH) conducted SMART survey found the GAM of 16.4% above 15% emergency threshold positioned Boma state in malnutrition emergency (SCI, SMoH, 2017)

In South Sudan, malnutrition has become a major public health problem with about 200,000 children less than five years at risk of any form of malnutrition (WFP, 2014). Consequently, South Sudan ranks 15th highest in the world due to mortality rates associated with malnutrition

among children below five years (UNICEF, 2019). To worsen, on in every seven Sudanese children die before the fifth birthday attributed to the burden of malnutrition (WHO, 2015). Also, UNICEF's (2015) report indicates that the burden of moderate acute malnutrition increased over 40% from 123, 3832 to 675, 4003 and beyond 900,000 children below, five years was severely malnourished with the highest-burden in Jonglei, Upper Nile, and Unity state. Besides, Care International report (2015) showed that 30% of the children in Terkeka County were underweight.

Up to date, there is limited information about the burden of malnutrition especially underweight in children less than five years in Munuki primary health care center, Munuki Payam (district) south Sudan. However, based on the burden of malnutrition among children less than five years in South Sudan, this warranted an analytical cross-sectional study to investigate factors associated with underweight in children under five years in Munuki primary health care center.

1.2 Statement to the Research Problem

A cross-sectional study done at Munuki primary health care centre in Juba city by Yatta *et al*,(2018) indicated that 56% of the children below five years had chronic malnutrition with 24% underweight and 20% severe malnutrition. Despite this fact, there is insufficient information about the prevalence of underweight and its associated burden in children less than five years in Munuki's primary health care center.

Malnutrition has a significant association with several consequences on the children if not corrected before the child reaches 23 months (Kar *et al*, 2018). These include weakening the immune system, compromising cognitive development and the physical health of the children (Yatta *et al*, 2018).

The south Sudanese government and its partners and done sensitization of the mothers, and the community and provision of food. Science has proven beyond doubt the consequences of malnutrition on children more specifically underweight, if not attended to, can be irreversible and cause intergenerational transmission of poverty, mortality, impairment of cognition leading to poor education performance, impaired immune system and lower economic productivity (The Mother & child health and education trust, 2016).

Yet, 23,965 cases of severe and 61503 moderate cases of malnutrition were registered in South Sudan (UNICEF, 2019). Thus; this study sought to assess factors associated with underweight

among children less than five years in Munuki primary health care center, Munuki Payam, South Sudan.

1.3 Research objectives

1.3.1 General objective

To investigate factors associated with underweight among children less than five years in Munuki primary health care center, Munuki Payam south Sudan.

1.3.2 Specific objectives

1. To determine the proportion of underweight children less than five years in Munuki primary health care center, Munuki Payam south Sudan.
2. To establish caregivers demographic factors associated underweight in children less than five years in Munuki primary health care center, Munuki Payam south Sudan.
3. To determine household food security factors associated with underweight in children less than five years in Munuki primary health care center, Munuki Payam south Sudan.

1.4 Research questions

1. What proportion of children less than five years in Munuki's primary health care center is underweight?
2. What are the caregivers demographic factors associated with underweight in children less than five years in Munuki primary health care center, Munuki Payam South Sudan?
3. What household food security factors are associated with underweight in children less than five years in Munuki primary health care center, Munuki Payam South Sudan?

1.5 Justification of the Study

The prevalence and risk factors associated with children less than five years in Munuki primary healthcare center is poorly documented. There is a huge number of people displaced within South Sudan but limited exists about the nutrition status of children below five years. Therefore, this study focused on establishing the prevalence and risk factors associated with underweight among children less than five years. However, this will be very important to develop policies and programs to address the problem of malnutrition in all its forms.

1.6 Significance of the study

The information that will be provided by the present study is useful in nutritional surveillance targeting programmes focusing more on populations at risk particularly the children below five years in the country. The study shall further avail information that could be used in policy planning and implementation particularly in vulnerable groups in the bid to SDG 2. In addition, this study shall also make important contribution to future research by contributing to the existing literature particularly on nutrition among children below five years.

By providing empirical evidence, the results of this study contribute to the growing of the body of knowledge about the factors influencing malnutrition in under-five children. They could also influence the formulation of appropriate policies aimed at addressing those factors. Relevant interventions could then be designed with the view to reduce the incidence of malnutrition in under-five children, and the results could provide lessons to other countries with similar structure.

The study may raise awareness and political interest in addressing malnutrition in study settings and focus attention on and advocate for greater resources to be committed to addressing this serious problem.

1.7 Conceptual Framework

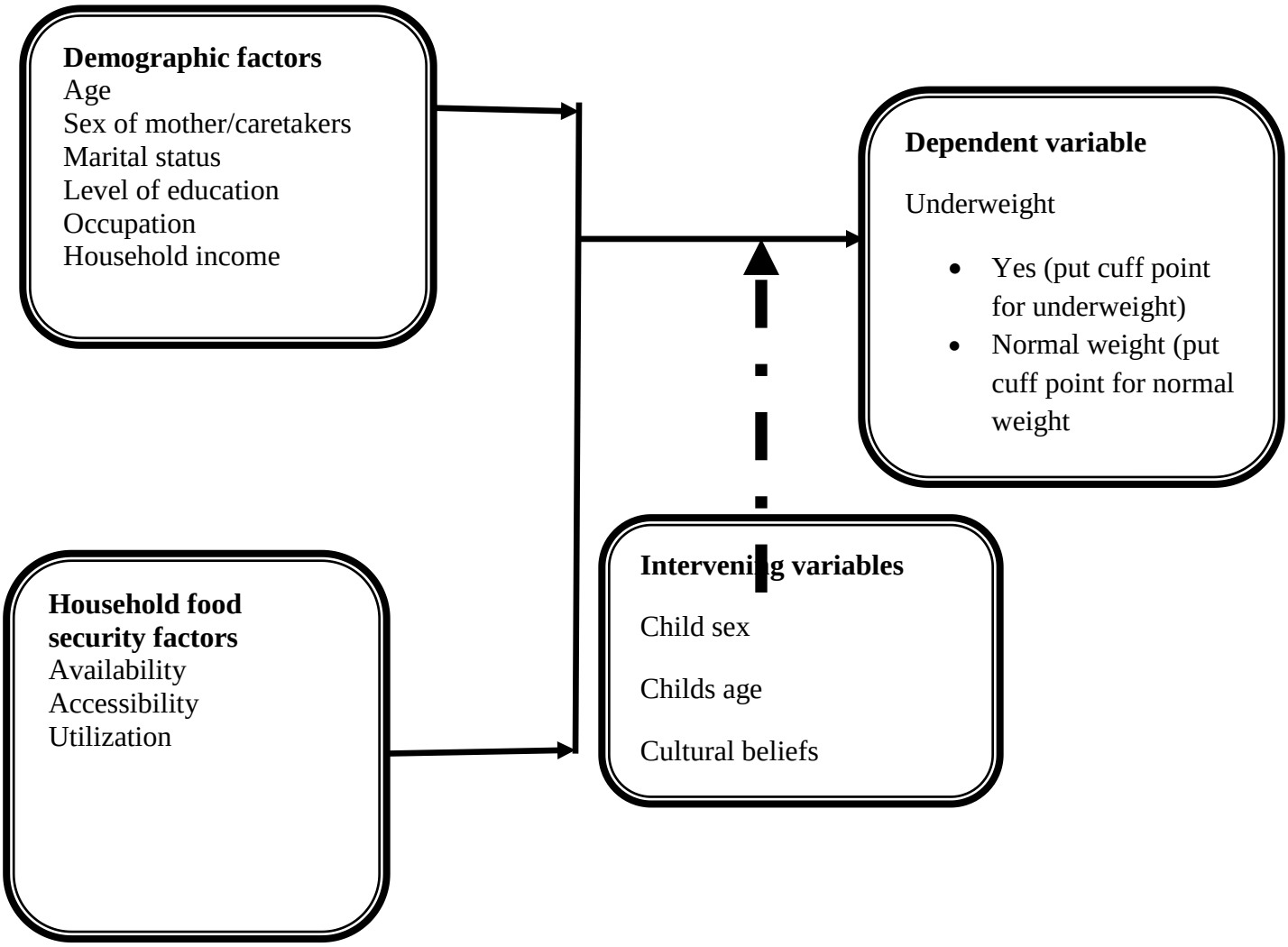


Figure 1: Conceptual Framework

Narrative of the conceptual framework

The conceptual framework illustrate the relationship between independent variables and the dependent variables. The dependent variable suggests that underweight could be influence by the household factors and maternal socio-demographic factors. The socio-demographic factors include; age, sex of mother/caretakers, marital status, and level of education, occupation and household income while the household food security factors are availability, accessibility and utilization

CHAPTER TWO LITERATURE REVIEW

2.0 Introduction

This chapter presents a thorough synthesis of reviewed literature on factors associated with underweight among children less than five years in Munuki primary health care center, Munuki Payam south Sudan. It gives an in-depth analysis of demographic and household food security factors and their interaction with underweight among children less than five years. This chapter consists of literature collected from text books, previous related research from electronic data base, internet, and journals.

2.1 Prevalence of underweight among children below five years

In Bangladesh, a cross section conducted in 2019 to 2013 indicates that approximately 31.67% of the children were underweight while 8.81% were severely underweight (Chowdhury et al, 2018). In Nepal, a report from ministry of health and Nepal demographic and health survey (2011) indicates that the prevalence of underweight among children less five years was 29% similar to 29% in Mali and contrary 13% in Nigeria (MoH Malawi 2013& MoH Nigeria,2019). However, in Uganda, a result of secondary data indicated that the prevalence of wasting among children less than five years of age was only 5% (Mawa & Lawoko, 2018). Meanwhile, another result obtained from secondary data in Pakistan revealed that the prevalence of underweight among children less than two years was 27.9% (Jawad Tariq et al, 2018). In Ethiopia, a finding from a community-based cross section using multi-stage sampling indicates that the prevalence of underweight among children 6 to 59 months was 48.7% (Sisay Shine and Wondwosen Asegidew, 2016). However, in India, results from a community based descriptive cross-sectional study revealed that 38.15% of t children less than five years were underweight (Purohit L et al, 2017).

2.2 Demographic characteristics of caregivers associated with underweight among children below five years

Marital status; In Southern Ethiopia, a result from a case-control study showed that children whose mothers were either single or widowed and divorced had increased odds of being underweight by three times compared to their counterparts (Feleke Gebremeskel & Hawariat, 2017). In Bangladesh, the prevalence of underweight was found higher in children whose

mothers were aged less than 19 years compared to those whose parents were 19 years and beyond (Nahar B et al, 2010).

With reference to the age of the mother, finding obtained from a cross-sectional study conducted in Rwanda indicated that there are higher odds of children being underweight if their mother is above 35 years unlike those who were age 17 to 24 years (Mukabutera *et al*, 2016). In Bangladesh, underweight reduces with the level of education of the care or mothers of the children. It was revealed in a cross-sectional study that children whose mothers had incomplete secondary and completed secondary education had 0.8 and 0.7 less odds of being underweight compared to those whose mothers were uneducated [(OR=0.84;95%CI:0.75-0.94)] and [(OR=0.77;95%CI:0.64-0.93)] (Chowdhury et al, 2018). In Malawi, the prevalence of underweight was found more in children whose mother attained the low and medium level of education compared to those whose mother has attained a higher level of education (Ntenda, & Chuang,2017). Finally, in Ethiopia, for any unit increase in maternal education (diploma and higher), the odds of their children getting underweight reduces by 81% more than those whose level of education is below diploma level ((Deneken Tosheno et al, 2017). In Malawi, results from a cross-sectional study indicate that children in communities with a low and medium income had higher chances of being undernourished compared to their counterpart (Ntenda, & Chuang, 2017). Similarly, in Pakistan, a cross-sectional conducted revealed a significant association between household wealth and underweight, thus, more (43.8%) cases of underweight were reported in the poorest household compared to 28.8% in the wealthiest household (Khan et al, 2016).

Studies have identified that children born from mothers that have a young maternal age (≤19 years) are malnourished. This has been associated with an increased risk of premature birth and fetal growth restriction, infant mortality, and child under-nutrition (Fall *et al.*, 2015). Another study suggests that these mothers are likely to have limited accessibility to financial and any other resources that can help them to meet the nutritional requirements of their children (Semali *et al.*, 2015). Study has revealed that young and inexperienced mothers are likely to breastfeed their children for a shorter duration (Fall *et al.*, 2015; Wambach, 2000) and for that matter they are behaviorally incapable and immature in attending to their infants' needs. Given the fact that

they are still growing, their bodies nutritional demands compete with those of the fetuses (Montgomery and Kristen, 2003).

Rikimaru et al. (2008) determined the risk factors for developing severe malnutrition, underweight and low birth weight among children under-five years in the Princess Marie Louise Hospital in Accra, Ghana and found that severely malnourished children were more likely to have mothers of young age. Teller and Yimar, (2010), discovered that, the age of the mother is important when she is pregnant, as young and older mothers are at high risk of having babies that are already malnourished

Mothers' age at birth has been associated with malnutrition among under-five year old children. A study in Bangladesh found that children whose mothers were less than 20 years at the time of birth were 1.22 times more likely to be malnourished (stunted, wasted and underweight) compared to children whose mothers were 20 years and above at birth (Nure., et al., 2011).

Maternal literacy is one of the factors affecting nutritional status of under-five children. According to Asindi et al. (2010), children often need primary care for the first 6 years of life from the mothers/caregivers, and the quality of care given by the mothers/caregivers depends largely on the mothers' knowledge of basic health care practices and nutrition. It has also been reported that literate mothers are more likely to delay child bearing at a later age thereby lowering infant mortality (Chen, 1986). Sufiyan et al. (2012), found that children of uneducated mothers are at risk of stunting. In another study, Ali et al. (2005) found out that stunting was 40.8% higher among children of illiterate mothers, underweight (57.9%) highest among children of mothers who had attained at least primary education and wasting (33.3%) was common among children of mothers who had tertiary education. Glewwe (1999) highlighted that education can affect the child's health through direct transfer of health information from one generation to another; through the ability to promptly detect illness and treatment administered and through educated mothers who tend to be receptive to orthodox medication than uneducated mothers. The above links have been established because educated women are more likely to marry men with higher income, live in better neighbourhood, get higher paid jobs which directly or indirectly influence child survival and health (Desai and Alva, 2018).

In developing countries, women have been recognized for playing dual roles as primary caregivers to their children and generators of household income. Glick and Sahn (2001) argued that the more women participate in the labour workforce, the less attention they pay to household

responsibilities especially as it relates to the welfare of children, thereby placing younger children at risk of malnutrition. Abbir et al. (2006) stated that children's nutrition and health status can be negatively affected by their mothers' occupation outside child rearing. This is so because time constraints may prevent working-class mothers from providing the need care to their children. Several studies have indicated that young maternal age is associated with high prevalence of malnutrition, while children of older women are less likely to suffer from malnutrition (Nyaruhucha et al.,2006). A study carried out in Tanzania reported that children of older mothers are less likely to be malnourished than those of young mothers (Nyaruhucha et al., 2006).

Studies have demonstrated that marital status of the women is associated with household headship and other socio-economic attributes of the women that in-turn affect the nutritional status of their children. In terms of malnutrition, children of single mothers are said to be better nourished followed by children of widows, the married and the divorced or separated respectively (Ntoimo and Odimegwu, 2014). The levels of malnutrition among children of separated or divorced mothers were very high whilst those with married, widowed and single mothers registered high levels of malnutrition.

A study found that being a married mother was positively associated with good nutritional status among children under five years in the Volta region of Ghana (Appoh et al., 2015). Contrary to the above, a study in Tanzania revealed that mothers who are married were more likely to have undernourished children unlike those that who were unmarried (Nyaruhucha et al., 2016).

It was also noted that through education, parents may acquire high paying jobs which may in turn translate into better access to quality feeding practices. Additionally, maternal education may promote better child and healthcare awareness, improved health seeking behaviors, reduced fertility rates and better medical care accessibility (García Cruz et al., 2017). In a study conducted in Bangladesh, children of mothers with no education and primary education shown that children whose mother had no education or had primary education were more times significantly stunted and underweight than children whose mothers had secondary or higher level (Nure, et al., 2011).

Turyashemererwa, Kikafunda and Agabe (2009) in their study of children under 5 years of age in a peri-urban environment in Kabarole District in western Uganda revealed that education level of the mother/caretaker was significantly correlated with child stunting

A study in Vietnam revealed that children from mothers who were laborers or farmers and housewives had a greater prevalence of stunting, underweight and wasting than those from mothers who worked in office (Nguyen, 2009).

Households with women that are employed of doing some kind of business are able to earn some income with a subsequent benefit to the overall household nutritional status and 6-59 months children in particular. On the contrary, woman employment may also have counterproductive effects on child nutritional status since it may reduce the mother's time for childcare (Lahiru *et al.*, 2017). Some other studies have identified that children of unemployed mothers are more well-nourished and less malnourished for that matter (Fotso *et al.*, 2012; Yeleswarapu and Nallapu, 2012). Employed or working fathers have been identified with providing resources to care for health care and even buying nutritious foods for their children hence reducing malnutrition (Lahiru *et al.*, 2017).

Nghean, Hien and Hoa (2009) conducted a cross-sectional descriptive survey using a structured questionnaire and measurements of weight and height of children aged 6-36 months. The research found that mother's occupation was significantly correlated with child malnutrition. The economic status of a household has for long been a pointer of accessibility to adequate food supplies, utilization of health services and general improvement in the quality of life. These together with many others are major enhancers of child health and nutrition (Adeela and Seur, 2015). Many demographic and health surveys that have been conducted especially in developing countries have showed that 6-59 months children from low economical homes suffer a high risk of malnutrition (Richards, 2015).

In general, it has been observed that higher living standards of the household implies lower the proportion of stunted children (Das and Sahoo, 2011). A household with more income commands better access to adequate nutritious food supplies at all times (García Cruz et al., 2017).

2.3 Household food security factors associated with underweight among children below five years

Food insecurity usually results from the inability of individuals to purchase enough food and not because of lack of food itself. Etim (2016) reported that poor road networks, scarcity of food in markets and poor family income levels are factors that promote food insecurity among the disadvantaged populations. Countries sometimes depend on the importation of food especially when there is food scarcity in their own countries (Etim, 2016). Etim (2016) reports that many people especially the poorer populations are affected by fluctuations in food prices. In situations when the price of food is low, farmers may produce less food products which may not be proportionate to the demand by consumers, and as such may result in food scarcity in markets (Etim, 2016).

Certain factors such as location of the house, family income level and household size can significantly influence household food security. Food security is the sufficient availability, nutritionally adequate and safety of food consumed in a way that is socially acceptable (Oquntin, 2010). On the other hand, food insecurity occurs when the ability to acquire safe, nutritionally adequate food is limited or uncertain (Oquntin, 2010). It has been observed that, in most developing countries, the dietary practice in populations experiencing food insecurity tends to meet their energy requirements but do not provide sufficient nutrients to optimize health and prevent infection. Hence, it can be inferred that over-nutrition and under-nutrition are strongly associated withfood insecurity (Babatunde et al., 2007; Awoyemi et al.,2012). Factors such as poor academic performance, physical and mental ill-health, psycho-social problemand anaemia related to iron deficiency are consequences of food insecurity in children (Food andAgricultural Organization, 2008; Akinyele, 2009).

Studies have associated big families ewith 6-59 months stunting since are shared among everybody which may render them insufficient (Asfaw *et al.*, 2015). Kavosi *et al.* discovered that malnutrition among children below 5 years was significantly affected by the number of people in the family (Kavosi *et al.*, 2014). Bigger families are likely to have a high socio-economic burden for the consumption of food and thus predisposing 6-59 months children to malnutrition (Lahiru *et al.*, 2017).

Nghean, Hien and Hoa (2009) conducted a cross-sectional descriptive survey using a structured questionnaire and measurements of weight and height of children aged 6-36 months. The research found that was household size was significantly correlated with child malnutrition.
Studies have revealed that women with more than two 6-59 months children are more likely to have malnourished children. This is due to the fact that the mother's attention tends to be focused on the younger child neglecting the weaned older child (Lahiru *et al.*, 2017). Therefore, if the older child is neglected, it suffer difficulty in access to maternal stimulation to optimize his neurological development (Ajao et al., 2010).

According to Chaudhury (2009), children nutritional status can be affected by increase in family size due to decrease in per capita income. That means that increase in the number of children in a household decreases the food allocated to each child which consequently affects children nutritional status. Increase in household size also facilitates fertility decision between couples. In such situations, large family size may adversely affect the nutritional status of children and household members thereby promoting poor dietary practices especially in poorer households (Chaudhury, 2009).

A household income level is clearly determined by the rate of expenditure on food. Expenditure on food is likely to increase where there is improvement of household income thereby increasing the rate of caloric and protein intake among children and members of the household (Reutlinger and Selowsky, 1976). On the other hand, poor household income can lead to less expenditure on food and low nutrient/dietary intake. Chaudhury (2009) pointed out that a synergistic relationship exists between dietary adequacy, dietary intake and per capita expenditure.
Nghean, Hien and Hoa (2009) conducted a cross-sectional descriptive survey using a structured questionnaire and measurements of weight and height of children aged 6-36 months. The research found that number of children in family was significantly correlated with child malnutrition.

Education is one of the greatest assets that equip women with relevant knowledge regarding child care that is an important determinant of child's growth and development (Gunda, 2007).

Women with some level of education are by and large quite more informed than those with zero education on how to harness the available and scarce resources for the enhancement of the household nutritional status with much emphasis on 6-59 months children. A number of studies have associated maternal education with the ability to provide protection against under-nutrition among children since women are much more informed about the appropriate nutrition of the child (Abuya *et al.*, 2012; Adekanmbi *et al.*, 2013; Marriott *et al.*, 2012).
Education is likely to enable women to make independent decisions that are in-turn more acceptable to other household members, as well as enabling them to have better command and accessibility to household resources that have a strong bearing onto the nutritional status of children (Das and Sahoo, 2011).

In Nepal, 69% of households were classified as food insecure (had insufficient access to adequate food). As a result, the prevalence rates of stunting, underweight, and wasting among children were 41%, 24%, and 9%, respectively and the prevalence of anemia was 58% (Osei et al, 2010).

In sub-tropical and tropical regions, 95% of all malnourished individuals live in relatively stable climate. Thus, climate change is a significant factor to be considered when ensuring substantial availability of food (food security) (Climate Change, 2007). Latest report has shown that temperature increase in the sub-tropics and tropics are very likely (climate change) Climate Change, 2007). A United Nations study carried out in over 40 developing countries showed that climate change directly or indirectly influence the decline in agricultural production and may as a result increase the number of people suffering from hunger each year (Action against Hunger, 2012). Even a slight change in temperature can affect the weather conditions (Climate Change, 2007). Agricultural production and good nutrition are highly affected by the impact of these events. For instance, during the Central Asian drought, there was about 50% reduction in wheat production and80% loss of livestock products (Battisti, 2008). In Sub-saharan Africa, extreme weather conditions such as drought can diminish productivity of many crop species thereby exacerbating the impact of malnutrition (Battisti,2008).

Poor children often reside in urban slums or very rural areas where there is absolute lack of basic amenities such as water supply and other sanitation facilities which lead to contamination of water bodies which in turn, can cause diarrhea (Black et al., 2011). Diarrhea promotes wasting and prevents children from getting enough nutritious food. It is general knowledge that malnutrition is a condition that is associated with poverty since it comes with hunger and lack of food at the right quantity and quality. Malnutrition could also come as a result of loss of appetite, and this may be common among terminally ill people such as HIV/AIDS, cancer and failed organ patients, kwashiorkor people and elderly people (Etim, 2016). Etim (2016) has reported that, in Sub-saharan Africa, the proportion of people affected by extreme poverty has nearly doubled from 164 million in 1982 to 313 million as of 2002 in the last two decades. It is estimated that over 70% of Nigerians live below poverty line of $1 per day with Northern Nigeria being the worst.

In the face of conflicts and crisis within countries, food security and access to food are significantly compromised. Conflicts often lead to annihilation of farmlands and farm businesses, low food productivity and limited level of food distribution internally. As a result, people are often susceptible to starvation, illness and diseases than may arise from food insecurity. A recent survey carried out in Afghanistan revealed that water-related hardship was a major determinant of health and nutritional status of children under five years of age (Mashal et al., 2008).

2.4 Summary of literature review

Several researches have been carried out to investigate malnutrition-dependent factors in different parts of the world especially developing countries (Mashal et al., 2008; Black et al., 2011; Action Against Hunger, 2012; Etim et al., 2017). Some authors have associated child factors such as sex, age, diseases and child position in a household with malnutrition (Baranwal et al., 2010; Nyaruhucha et al., 2006). In Sub-saharan Africa association has been established between nutritional status of children and birth weight (Wamani et al., 2007; Hien and Kam, 2008). Some authors point to maternal literacy as having a significant impact on the nutrition of children (Sufiyan et al., 2012; National Population Commission, 2013). A good number of the researches have pointed to socio-economic/household factors which influence malnutrition. For

example, poverty (Olanrewaja, 2011; Etim, 2016; Etim et al., 2017), family size (Chaudhury et al., 2009), household income and expenditure (Reutlinger and Selowsky, 1976), household food security and insecurity (Food and Agricultural Organization, 2008; Akinyele, 2009; Oquntin, 2010; Awoyemi et al., 2012; functional education (Chaudhury, 1983), lack of access to food (Etim, 2016), socio-demographic factors (Etim, 2016), environmental factors (Climate Change, 2007) and wars and crisis in a country (Mashal et al., 2008), have all been recognized as malnutrition dependent factors. In conclusion, governments of developing countries and the global community should work together to remove these factors.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

Chapter three presents the methodology that was used to conduct the study. It includes study design, study population, sources of data, sample size determination, sampling procedure, data collection procedures, and tools. Also, study variables, quality control to minimize errors, bias, data management, analysis plan, ethical consideration, anticipated limitations, and plan for dissemination of study findings.

3.1 Study Design

The research used an analytical cross-sectional study design to investigate factors associated with underweight among children less than five years in Munuki's Primary Health Care Center. The data on exposure to risk factors and the outcome of interest (underweight) was collected at the same point in time. However, the unit of enrollment was mothers/caretakers of children less than five years.

3.2Study Population

The study was target children six to fifty-nine months of age and their mothers/caretakers attending health care services in Munuki primary health care centers.

Inclusion and exclusion criteria

All mothers/caretakers of children 6-59 months seeking health services in Munuki primary health care centers were allowed to participate in the study.

The study excluded mothers/caretakers of children 6-59 months with mental problems, not voluntary to respond and those who were very ill.

3.3Sources of Data

Primary data source

The primary data source was mothers/caretakers of the children six to fifty-nine months.The data was obtained using a researcher administered questionnaire and the key informant guide from key informants.

Secondary data source

A review of literature was done through review of peer reviewed journals, books and reports on the subject matter.

3.4Sample Size Determination

The sample required for this study was determined using Lesh and Kish formula. Since the a cross-sectional study done at Munuki primary health care centre in Juba city by Yatta *et al*,(2018) indicated that 56% of the children below five years had chronic malnutrition with 24% underweight and 20% severe malnutrition.. Thus, the margin of error is 5% at a 95% level of confidence and a 10% non-response rate.

Therefore, $N=Z^2pq/e^2$

$N=1.96*1.96*0.56*0.44/0.05*0.05=378$

Therefore, 378 mothers/caretakers were required to participate in this study.

3.5Sampling Procedure

For this study the researcher used systematic sampling methods and simple random sampling. Then systematic sampling method was used to select the participants at the health facility on each day. The sampling interval of individual participants was calculated based on the daily mothers/caretakers of children 6-59 month's caseload. In addition, 4^{th} interval was calculated by using the estimated number of mothers/caretakers of children 6-59 months who seek services at the health facility which was average of 133 mothers/caretakers of children 6-59 months per day totaling to 876. The first individuals were determined using simple random sampling method. The next individual was identified systematically by 4^{th} interval until the required sample size was obtained during the data collection of one four weeks

Purposive sampling technique was used to sample Key informants. The Key informants included the in-charge of the facility, the YCC department In-charge, and the two health workers handling maternal and children health at the facility.

3.6 Data collection technique

After seeking permission from the local leaders, the researcher was accompanied to the home of caretakers where she sought consent from them to participate in the study. On reaching the homes of the caretakers, the researcher introduced herself to them and explain the purpose of the

study. They were informed that the exercise is meant to carry out a study about the nutrition in children. When caretakers consent, they were then enrolled into the study as respondents and then be subjected to research questions.

Survey method

Data was collected through researcher administered questionnaires. This is where the researcher was administer questions to the respondents in relation to the study specific objectives and then record the information from them. Researcher administered questionnaires were used because; they enabled the researcher to establish rapport with potential participants and therefore gain their cooperation, help to keep the respondents focused on the study and also allowed the researcher to clarify ambiguous answers and where appropriate, sought follow-up information.

The researcher administering technique was used to obtained data from respondents who can and write by themselves while self-administering technique were used for respondents who can and write in either English or Arabic.

Key informant interview

Face-to-face-interaction procedures were used for conducting key informant interviews. The sampled key informants were given appointments and they chose the appropriate time and day for the interview. Each key informant was interviewed for 15-30 minutes and the responses were recorded and notes taken too.

3.6 Data Collection Tools

Researcher administered Questionnaire

A researcher administered questionnaire was used to gather data on factors associated with underweight in children six to 59 months in Munuki primary health care center. Anthropometry was used to capture data on nutrition indicators of the children.

A semi- structured questionnaire gathered quantitative data from participants of which it consisted of three parts.Part one gathered information regarding participants' socio-demographic factors (age, sex of mother/caretakers, marital status, and level of education, occupation and household income). Part two consisted of questions on information pertaining household food security factors (Availability, accessibility and utilization), while part three comprised of questions to collect data on underweight status.

Key informant guide

Key informants interview guide was used to collected qualitative data from the health workers on the subject matters with a series of open ended questions

3.7Study Variables

This section outlines variables as they are understood in the analysis and mainly they were the dependent and independent variables. The independent variables were regarded as potential risk factors associated with underweight.

3.7.1 Dependent variable

The dependent variable in this study underweight. The child was said to be underweight when the weight for age Z-score by sex and age is (<-2 z score), moderate underweight (<-2 z-score and >=-3 z-score) and severe underweight (<-3 z-score) (ENA, 2016).

3.7.2 Independent Variables

In this study, socio-demographic, and household food security factors wereconsidered as the independent variables. Child caretaker's socio-demographicvariables included: age, sex of mother/caretakers, marital status, and level of education, occupation and household income; availability, accessibility and utilization.While the household food security factors were availability, accessibility and utilization of food.

3.8Quality Control

To minimize errors and control bias, the data collection tools were Juba Payam to identify whether the questions can capture the required information on factors associated withunderweight. For validity, the data collection tools was translated into Arabic, the language of the study participants.

The quality control issues begin with careful selection and adequate training of the research team, which was appropriately conducted. Adequate training was offered to the research assistants on daily basis for two days consecutively. This training was cover the discussion and review of the research instruments.

In order to adhere to the principle of validity and reliability, a specific day was set for pre-testing the questionnaires and this was involve a total of 10 respondents. The purpose of conducting this pretest was to ensure the highest degree to which the questionnaire is clearly understood by the respondents. This helped in identifying areas which call for modification and certainly corrections was undertaken if need be before the actual data collection commences. Pretesting also familiarizes the research assistants to the data collection tools.

The tool was also be translated into Local language the commonly spoken local language in the study area.

3.10.2 Validity of the Study

A regular questionnaire containing both close ended (structured) and open ended (semi-structured) questions as guided by the specific objectives (refer to appendix II) was developed. Before beginning of study, the research tool was pretested in a pilot study proposed to be carried out. This helped the researcher to make necessary adjustments before the study is carried out. Redundant questions that may never add any value to the study was removed. The validity and reliability of the questionnaire was assessed using a Content Validity Index (CVI) given by the following formula;

$$\textbf{CVI} = \frac{\textbf{Number of questions declared valid}}{\textbf{Total number of questions in the questionnaire}}$$

A minimum of 0.75 of CVI was used to test validity (Creswell, 2012). The Content Validity Index is 0.85

3.9Data Management and Analysis Procedures

The researcher supervised during the data collection process as well as crosschecked each questionnaire to ensure the questions are fulfilled. After data collection, data entry was created in Epidata version 3.1 with categorical response questions put in checks to control errors during data entry. Then, the data was entered in Epidata version 3.1 and exported to statistical package for social sciences (SPSS) for analysis. The data analysis included univariate analysis where the frequency distribution of all the variables under study was presented with corresponding percentages. Secondly, the chi-square test was used to establish a level of association between independent and underweight at a 95% confidence interval. The level of significance is

determined using a probability of less than 0.05. Meanwhile, the multivariate analysis was used to determine variables that contribute to underweight and the results are presented using odds ratio at 95% confidence interval.

3.10Ethical Consideration

Permission and approval to conduct the study was obtained from Clarke International University. In addition, administrative approvals were obtained from the Munuki primary healthcare center authority. Informed consent was obtained from respondents after explaining adequately the aim, procedures and anticipated benefits of the study. This was to ensure that this study is conducted in an ethical manner with respect and protection for participants. The Informed Consent Form (ICF) were signed as an evidence of the consent. The consent form was also specified that the participation was voluntary; therefore, participants were able to withdraw their participation at any point of time of the survey without any consequence. Additionally, the consent form included the aims, data collection procedures, data security and data management strategies, data reporting, and dissemination of the study results. All participants were made aware of their rights as a participant: (a) that they were free to withdraw from the study at any time and (b) that they were consenting to participate in the study by completing the questionnaires.

The respondents were assured that the information they pass on was kept as confidential information, and that it was used in such a way that it could not be traced back to a particular respondent. The respondents were also assured of maximum respect during the entire process of data collection. Lastly, a consent/assent form were availed to the respondents for signing after an elaborative explanation

3.11 Limitations

The factors that interfered with collection of data were political instability which may delay the access to the area of study.

There were also issues that have got to do generalizability which also affect the study for example small sample size.

3.12 Plans for Dissemination of Study Results

When the research is done a copy will be given to CIU institute of public health management, another copy will be given to the ministry of health, Munuki primary health care center and also to the lactating mothers.

CHAPTER FOUR: DATA ANALYSIS

4.0 Introduction

This chapter presents the results of the study according to the study objectives. Results are presented in text, tables, and figures. For most findings, tables have been used in the presentation of the gathered information. A total of 378 respondents were interviewed during the period of data collection yielding 100% response rate.Results on child demographics factors were included in the study as intervening variables.

4.1 Child demographic factors associated underweight in children less than five years in Munuki primary health care center

Table 1: Univariate analysis child demographic factors associated underweight in children less than five years in Munuki primary health care center

Variable	Frequency, n	Percentage, %
Relationship to the child		
Mother	215	56.9
father	126	33.3
Others	37	9.8
Care takers		
Yes	366	96.8
No	12	3.2
Child's immunization card or birth certificate or baptismal card to determine the birth date		
Yes	265	70.1
No	113	29.9
Age of the child (Months)		
6-11months	176	46.6
12-24 months	88	23.3
25-59 months	114	30.1
Sex of the child (Observe)		
Male	233	61.6
Female	145	38.4
Child's birth order		
1	68	18.0
2	175	46.3
3	100	26.5
≥4	35	9.2
Birth interval of the child		
< 2 years	127	33.6
≥ 2 years	251	66.4
Child's weight at birth		
< 2.5kg	153	40.5
≥ 2.5kg	225	59.5

Source: primary data

Most of the respondents 56.9% were mothers to the children, 96.8% of the respondents were caretakers of the children by the interview period. Majority of the children 70.1% had their child's immunization cards or birth certificates or baptism card used to determine the date of birth, one third, 46.6% of the children were aged 6-11 months. Regarding gender of the child, 61.6% were male, 46.3% of the children were second born, 66.4% of the children had birth interval of at least two years from the older siblings. On birth weight, 59.5% of the children had birth weight of at-least 2.5 kg.

4.2Child demographic factors associated underweight in children less than five years in Munuki primary health care center

Table 2: Bivariate analysis child demographic factors associated underweight in children less than five years in Munuki primary health care center

Variable	**Normal (%)**	**Underweight (%)**	χ^2	**P-value**
Relationship to the child			4.427	.219
Mother	74(57.4%)	141(56.6%)		
father	39(30.2%)	87(34.9%)		
Others	16(12.4%)	21(8.5%)		
Care takers			.092	.762
Yes	124(96.1%)	242(97.2%)		
No	5(3.9%)	7(2.8%)		
Child's immunization card or birth certificate or baptismal card to determine the birth date			3.944	.047*
Yes	95(73.6%)	170(68.3%)		
No	34(26.4%)	79(31.7%)		
Age of the child (Months)			6.157	.046*
6-11months	64(49.6%)	112(45.0%)		
12-24 months	30(23.3%)	58(23.3%)		
25-59 months	35(27.1%)	79(31.7%)		
Sex of the child (Observe)			4.471	.034*
Male	84(65.1%)	149(59.8%)		
Female	45(34.9%)	100(40.2%)		
Child's birth order			2.250	.522
1	25(19.4%)	43(17.3%)		
2	57(44.2%)	118(47.4%)		
3	32(24.8%)	68(27.3%)		
≥4	15(11.6%)	20(8.0%)		
Birth interval of the child			5.733	.017*
< 2 years	58(45.0%)	69(27.7%)		
≥ 2 years	71(55.0%)	180(72.3%)		
Child's weight at birth			.961	.327
< 2.5kg	53(41.1%)	100(40.2%)		
≥ 2.5kg	76(58.9%)	149(59.8%)		

Among the child demographic factors, availability of immunization card (χ^2=3.944, P=0.047), child's age (χ^2=6.157, P=0.046), child's sex (χ^2=4.471, P=0.034) and birth interval (χ^2=5.733, P=0.017), were significantly associated with nutritional status of the children

Table 3: Univariate analysis caregivers' demographic factors associated underweight in children less than five years in Munuki primary health care center

Variable	**Frequency, n**	**Percentage, %**
Maternal age at birth		
16-25 years	126	33.3
26-35 years	167	44.2
36-45 years	68	18.0
>45 yeas	17	4.5
Parental marital status		
Never lived together as couple	200	52.9
Married/living together	35	9.3
Separated/divorced	75	19.8
Widowed	68	18.0
Household size		
<5 members	71	18.8
5-10 members	107	28.3
>10 members	200	52.9
Number of under-five children		
<2 children under five years	107	28.3
2-5 children under five years	208	55.0
>5 children under five years	63	16.7
Maternal level of education		
No formal education	282	74.6
Primary school completed	85	22.5
A-Level completed	11	2.9
Paternal level of education		
No formal education	100	26.5
Primary school completed	67	17.7
O-level completed	156	41.3
A-Level completed	55	14.5
Maternal occupation		
Peasant farmer	122	32.3
Casual laborer	214	56.6
Others	42	11.1
Paternal occupation		
Peasant farmer	89	22.5
Casual laborer	137	36.2
Employed	35	9.3
Petty business	75	19.8
Others	42	11.1
Maternal average monthly income		
<2000	378	100
Paternal average monthly income		
<2000	353	93.4
2000-6000	25	6.6

Most of the respondents 44.2% said the maternal age at birth was 26-35 years. Majority of the respondents 52.9% of the respondents had parents that have never lived together as couple, the same number 52.9% had more than ten members in the households. More than half 55.0% of the respondents had 2-5 under-fives children in the household, 74.6% of the mothers had no formal education while 41.3% of the children's fathers had completed O-level. Regarding occupation, most of the respondents 56.6% of the mothers were casual laborers and so do 36.2% of the fathers, all the mothers of the children had an average monthly income of <2000 SSD and most 93.4% of the fathers of the children had monthly income of <2000USD.

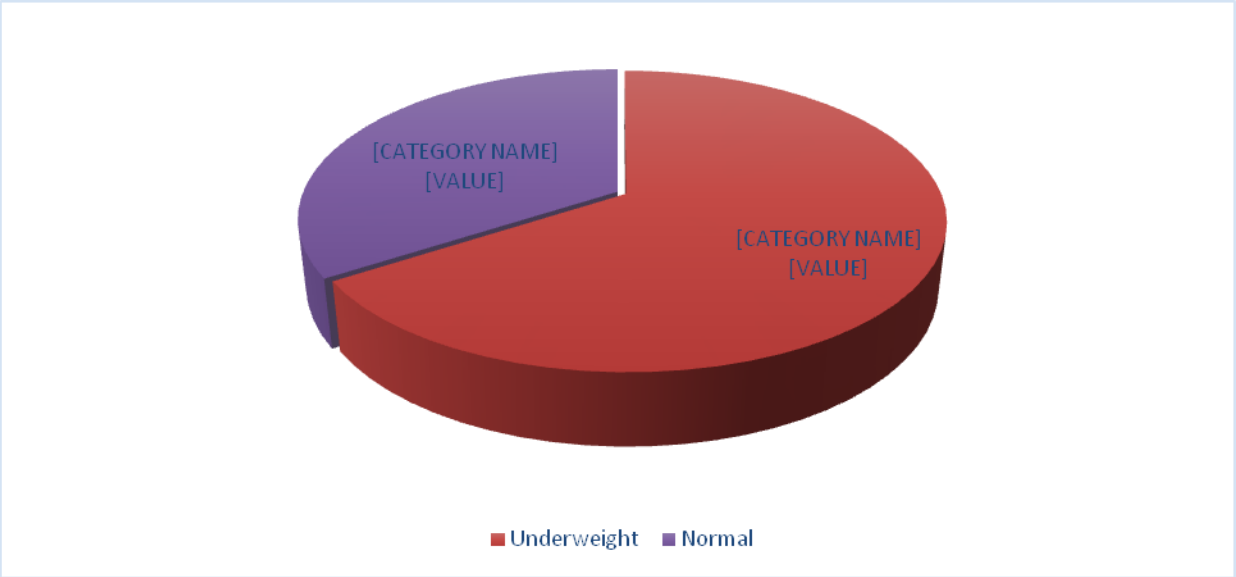
Table 4: Bivariate analysis caregivers' demographic factors associated underweight in children less than five years in Munuki primary health care center

Variable	Normal (%)	Underweight (%)	χ^2	P-value
Maternal age at birth			6.077	.108
16-25 years	47(36.4%)	79(31.7%)		
26-35 years	50(38.8%)	117(47.0%)		
36-45 years	30(23.3%)	38(15.3%)		
>45 yeas	2(1.6%)	15(6.0%)		
Parental marital status			1.238	.744
Never lived together as couple	59(45.7%)	141(56.6%)		
Married/living together	12(9.3%)	23(9.3%)		
Separated/divorced	29(22.5%)	46(18.5%)		
Widowed	29(22.5%)	39(15.6%)		
Household size			2.946	.229
<5 members	23(17.8%)	48(19.3%)		
5-10 members	47(36.4%)	60(24.1%)		
>10 members	59(45.7%)	141(56.6%)		
Number of under-five children			1.162	.559
<2 children under five years	37(28.7%)	70(28.1%)		
2-5 children under five years	65(50.4%)	143(57.4%)		
>5 children under five years	27(20.9%)	36(14.5%)		
Maternal level of education			4.394	.011*
No formal education	98(76.0%)	184(73.9%)		
Primary school completed	30(23.3%)	55(22.1%)		
A-Level completed	1(.8%)	10(4.0%)		
Paternal level of education			7.894	.048*
No formal education	40(31.0%)	60(24.0%)		
Primary school completed	32(24.8%)	35(14.1%)		
O-level completed	44(34.1%)	112(45.0%)		
A-Level completed	13(10.1%)	42(16.9%)		
Maternal occupation			3.771	.152
Peasant farmer	54(41.9%)	68(27.3%)		
Casual laborer	60(46.5%)	154(61.8%)		
Others	15(11.6%)	27(10.9%)		
Paternal occupation			6.575	.160
Peasant farmer	43(33.3%)	46(18.5%)		
Casual laborer	32(24.8%)	105(42.2%)		
Employed	13(10.1%)	22(8.8%)		
Petty business	26(20.2%)	49(19.7%)		
Others	15(11.6%)	27(10.8%)		
Paternal average monthly income			1.268	.260
<2000	117(90.7%)	236(94.8%)		
2000-6000	12(9.3%)	13(5.2%)		

Among the maternal demographic factors maternal education (χ^2=4.394, P=0.011) and paternal level of education (χ^2=7.394, P=0.048) were significantly associated with nutritional status of the children.

4.4 Underweight status of the children

Figure 2: Showing the underweight status of the children



Among the children studies 65.9% were underweight while the 34.1% had normal weight according to age.

4.3 Household food security factors associated with underweight in children less than five years in Munuki primary health care center

Table 5: Univariate analysis of household food security factors associated with underweight in children less than five years in Munuki primary health care center

Variable	Frequency, n	Percentage, %
Food readily available in this household		
Yes	252	66.7
No	126	33.3
Household access food throughout the year		
Yes	262	69.3
No	116	30.7
Eat all type of food for the people in the household		
Yes	124	32.8
No	254	67.2
Ever breastfed		
Yes	255	67.5
No	99	26.2
Does not know	24	6.3
How long did it take for the child to breastfeed after birth?		
<1hour	155	41.0
1-3 hours	76	20.1
>3 hours	33	8.7
Does not know	114	30.2
Children given colostrums		
Yes	124	32.8
No	216	57.1
Does not know	38	10.1
Exclusively breastfed		
Yes	201	53.2
No	152	40.2
Does not know	25	6.6
Fluid given before six months		
Water (includes water with sugar)	3	.8
Infant formula	90	23.8
Other non-breast milk	194	51.3
medicines	20	5.3
Others, specify:	12	3.2
does not know	37	9.8
Did not give	22	5.8
Age at weaning		
<6months	47	12.4
6-24 months	110	29.1
Doesn't remember	153	40.5
Still breastfeeding	68	18.0
Does (child's name) eat foods that the family eats?		
Yes	241	63.8
No	31	8.2
N/A	106	28.0
Number of meals in a day		
One	12	3.2
Two	333	88.1
At-least three	33	8.7

Most of the children 66.7% had readily available food at the household, above two third of the respondents 69.3% had access to food throughout the years, and 69.3% of the respondents eat all type of food in their household. Sixty nine percent of the children have ever breastfed, 41.0%% of the children being initiated within an hour after birth, and 57.1% of the children were never given colostrums. On exclusive breastfeeding, 53.2% of the children were exclusively breastfed foe six months since they were never given anything other than breast milks. Majority 51.3% of the children who were not exclusively breastfed were given non-breast milk while 23.8% were given infant formula. Most of the respondents 40.5% did not remember when the baby stop breastfeeding, 63.8% of the children ate food that the family eat of those 88.1% had two meals a day

Table 6: Bivariate analysis of household food security factors associated with underweight in children less than five years in Munuki primary health care center

Variable	Normal (%)	Underweight (%)	χ^2	P-value
Food readily available in this household			8.018	**.005***
Yes	94(72.9%)	158(63.5%)		
No	35(27.1%)	91(36.5%)		
Household access food throughout the year			7.517	**.031***
Yes	80(62.0%)	182(73.1%)		
No	49(38.0)	67(26.9%)		
Eat all type of food for the people in the household			9.013	.008*
Yes	46(35.7%)	78(31.3%)		
No	83(64.3%)	171(68.7%)		
Ever breastfed			.927	.629
Yes	34(26.4%)	65(26.1%)		
No	87(67.4%)	168(67.5%)		
Does not know	8(6.2%)	16(6.4%)		
How long did it take for the child to breastfeed after birth?			7.566	.056
<1hour	42(32.6%)	54(21.7%)		
1-3 hours	23(17.8%)	53(21.3%)		
>3 hours	10(7.8%)	23(9.2%)		
Does not know	54(41.9%)	94(37.8%)		
Children given colostrums			2.858	.240
Yes	45(34.9%)	79(31.7%)		
No	65(50.4%)	151(60.6%)		
Does not know	65(50.4%)	19(7.6%)		
Exclusively breastfed			.280	.869
Yes	65(50.4%)	136(54.6%)		
No	55(42.6%)	97(39.0%)		
Does not know	9(7.0%)	16(6.4%)		
Fluid given before six months			14.705	.023*
Water (includes water with sugar)	3(2.3%)	0(0.0%)		
Infant formula	28(21.7%)	62(24.9%)		
Other non-breast milk	58(45.0%)	136(54.6%)		
medicines	9(7.0%)	11(4.4%)		
Others, specify:	7(5.4%)	5(2.0%)		
does not know	11(8.5%)	26(10.4%)		
Did not give	13(10.1%)	9(3.6%)		
Age at weaning			.484	.922
<6months	17(13.2%)	30(12.0%)		
6-24 months	44(34.1%)	66(26.5%)		
Doesn't remember	44(34.1%)	109(43.8%)		
Still breastfeeding	24(18.6%)	44(17.7%)		
Does (child's name) eat foods that the family eats?			.507	.476
Yes				
No	126(97.7%)	241(96.8%)		
N/A	3(2.3%)	8(3.2%)		
Number of meals in a day			4.112	.128
One	14(10.9%)	24(9.6%)		
Two	67(51.9%)	167(67.1%)		
At-least three	48(37.2%)	58(23.3%)		

Child immunization status, (χ^2=8.018, P=0.005), place of delivery (χ^2=7.517, P=0.00), serious childhood illnesses (χ^2=9.013, P=0.008) and giving of fluids to a child before six months (χ^2=14.705, P=0.023) were significantly associated with nutritional status of the children

Table 7:The multi-variate analysis of the factors associated with underweight in children less than five years in Munuki primary health care center

Variable	**AOR**	**(95% CI)**	***P*-value**
Age of the child (Months)			0.000
6-11months	2.85	1.11-4.67	
12-24 months	2.18	0.92-3.92	
25-59 months	1.00	Reference	
Child's gender			0.002
Male	2.62	1.19-5.59	
Female	1.0	0.53-20.74	
Birth interval			0.040
< 2 years	1.73	0.93-12.80	
≥ 2 years	1.0	Reference	
Mothers / caretaker's highest level of education			0.000
No formal education			
Primary school completed	6.53	4.00-6.92	
A-Level completed	2.75	0.02-17.23	
	1.0	Reference	
Food readily available in this household			0.000
Yes	1.97	0.14-3.94	
No	1.0	Reference	
Household access food throughout the year			0.036
Yes	2.35	1.38-4.31	
No	1.0	Reference	
Eat all type of food for the people in the household			0.003
Yes	2.03	1.30-3.18	
No	1.0	Reference	

Children aged 6-11 months were almost three times more likely not to be underweight than those who were 25-59 months. Children who were 6-24 months were 2.18 times more likely not to be underweight than those who were 25-59 month

Male children were more than double more likely not to be underweight compared to their female counterparts.

Children who had more than 2 years birth interval after the older sibling were 1.73 times more likely not to be underweight compared to those who had interval of less than two times.

Children whose mother had no formal education were 6.53 times more likely not to be underweight compared to those who had A-level education. While those who had primary education were 2.75 times were likely not to be underweight compared to those who had A-level education

Children whose caregivers reported having readily available food were almost two times more likely not to be underweight than those whose caregivers reported that food was not readily available.

Children whose household access food throughout the year were 2.35 times more likely not to be underweight compared to those whose household couldn't access food throughout the year

Children whose household eat all type of food were two times more likely not to be underweight compared to those whose households do not eat all type of food.

Health workers identified time allocation as a barrier to proper feeding and care. Respondents believed this was especially true for women working outside the home, as their work schedule interferes with breastfeeding:

> *"The working women can't breastfeed properly. They hire a maid servant for the children and they feed tinned milk."(Health worker)*

In addition to paid work, study participants highlighted household work as a major consumer of maternal time: "*sometimes mothers have too many household jobs so they can't take care of babies properly"* (*Health worker*).

Participants were able to be specific in identifying their knowledge needs with respect to infant feeding issues. For example, many expressed a strong desire to learn more about which foods are best for children at specific ages:

> *"Many mothers would like to know about the foods that will keep babies away from diseases so that they will be healthy, can grow up properly, and can study properly. There are many girls who know very little about child nutrition. They give complementary foods before 6 months but shouldn't. They need to know this information."* (Health workers)

Participants considered early marriage a barrier to optimal child feeding and care because they believed that teenage girls are not prepared physically or emotionally to care for young children.

In this context, young women appear to be well aware of the potential psychosocial and economic burden and clinical risks of early marriage and childbearing:

> *"If a girl gets married at an early age she cannot take care of her husband, then when the baby comes, it causes harm to her body."*(Health workers)

CHAPTER FIVE: DISCUSSION OF RESULTS

5.0 Introduction

This chapter discusses the research findings in relation to the problem statement, literature review of studies conducted elsewhere with and in line with the specific study objectives. It also explains the obtained results from the study.

5.1 Proportion of underweight children less than five years in Munuki primary health care center

The study found that prevalence of underweight among children below five years was 65.9%. The result of this study is above that of World Bank profiles (2004) in South Sudan-Alrawakeeb valley which reported that prevalence of malnutrition among these children was (27.5%) and were severely and 35% suffered from either mild or moderate malnutrition. This could probably be because South Sudan is currently under armed conflict and usually conflict comes with a lot of issues including inadequate food availability, for both mothers and their children, inaccessible and unavailable health care of which this could result in malnutrition hence the high level of malnutrition. In addition Madut D, et al., (2009) in Bangladesh who revealed that high prevalence of stunting and underweight, were 42% and 40% respectively of under five children. This is however, contrary to SSHHS (2016) finding stated that nearly eight in every ten Sudanese children under-five years of age (38%) are stunted, six percent are wasted and 16 percent are underweight.

5.2 Child demographic factors associated underweight in children less than five years

In this study, age of the child was significantly associated with underweight; children aged 6-11 months were almost three times more likely not to be underweight than those who were 25-59 months. Children who were 6-24 months were 2.18 times more likely not to be underweight than those who were 25-59 month. This is in agreement with Girma and Genebo (2002), Ali *et al*. (2016) and Nguyen et al., (2010) who discovered that children of age group 36-47 months suffered the severest malnutrition at 61 percent, followed by children of age groups 48-59 months (60%) and 12-23 months (58%). In contrary to this study by Nguyen et al., (2010) in Vietnam found out that the risk of malnutrition increases with age of a child. Children in the

youngest age group 0-11 months had significantly lower risk of being stunted, underweight and wasted than children in the older age groups. This implies that that low risk to malnutrition may be due to the protective effect of breastfeeding since almost all children are breastfed throughout the first year of life. Higher rates of malnutrition after the 12 months are linked to inappropriate food supplementation during the weaning period.

Gender of the child was significantly associated with underweight in the study; male children were more than double more likely not to be underweight compared to their female counterparts. This is in agreement with Babatunde (2011); (Henry et al., (2009); Nguyen et al., (2010), (Mittal and Singh, 2007; Teshome *et al*., 2009)noted a significant relationship between sex of a child and malnutrition, male children were more likely to be malnourished than their female counterparts. This is probably due to increased attention paid to female children unlike the male children and it is believed that boys are more influenced by environmental stress than the girls. This situation could be due to the fact that boys are rarely at home given the fact that they tend to be active running around in the neighborhood as compared to female children who in most cases eat whatever small feeds that their mothers got since they are always with them at home.

The study found that child's birth interval was significantly associated with underweight;children who had more than 2 years birth interval after the older sibling were 1.73 times more likely not to be underweight compared to those who had interval of less than two times. This is probably because is the birth interval is too short the mothers will change the attention towards the new baby and little care will be given to the elder one which put the other child at risk of malnutrition. This is in line with SSHHS and Macro International Inc (2009) indicated that preceding birth intervals and child stunting were statistically significant. Preceding birth intervals of 18-35 months had a marginally positive significance on stunting whereas the interval of more than 48 months shows a negative relationship on stunting, malnutrition is highest if the birth interval is less than 24 months (41 percent) since it is an important indicator of the nutritional status of children. similarly, (Jyothi *et al*., (2003) also found that Arrival of a new and younger sibling diverts the attention of the mother from the relatively older children even when they are still in need of care by caretakers and Majority of the DHS surveys for developing countries have established that short birth interval children (less than 2 years) are more at risk of

malnutrition (Ikeda et al., 2013). This implies that others should adequate spaced their children for the better health of themselves and the child

5.3 Caregivers demographic factors associated underweight in children less than five years

Maternal education was found to be associated with usnderweight; children whose mother had no formal education were 6.53 times more likely not to be underweight compared to those who had A-level education. While those who had primary education were 2.75 times were likely not to be underweight compared to those who had A-level education. This is probably because of educated mothers are more likely to interpret issues such as those at health education and understand what malnutrition is, how is causes, its prevention and the perceived complications. This is consistent with with Nure, et al., (2011, Nguyen et al., (2009) and Lisa (2010) whose study findings stated that education of a mother has several potentially positive effects on the quality of care of children and consequently malnutrition. This disagrees with Sommerfelt et al., (2014) in selected African countries which stated that malnutrition is more prevalent among children whose mothers did not work for instance according to DHS 2006-09, Burundi had 48% of stunted growth among children from non - working mothers while Zimbabwe had 31.0% of her children stunted among non-working mothers while 27.5% were among working mothers. This could be because of the situation in which the difference study population were. This implies that government should resolves the difference with the rebels so as to allow community to go back to their normal lives when they can earn their own living.

The study found no association between mother's age at birth and current maternal age with underweight among children under-five at multivariate level. However, Teller and Yimar, (2010) discovered that the age of the mother is important when she is pregnant, as young and older mothers are at high risk of having babies that are already malnourished. Rikimaru et al. (2008) in Ghana also disagrees with findings of this study when they found that severely malnourished children were more likely to have mothers of young. This has been associated with an increased risk of premature birth and fetal growth restriction, infant mortality, and child under-nutrition (Fall *et al.*, 2015). Another study suggests that these mothers are likely to have limited accessibility to financial and any other resources that can help them to meet the nutritional requirements of their children (Semali *et al.*, 2015). Study has revealed that young and inexperienced mothers are likely to breastfeed their children for a shorter duration (Fall *et al.*,

2015; Wambach, 2000) and for that matter they are behaviorally incapable and immature in attending to their infants' needs. Given the fact that they are still growing, their bodies nutritional demands compete with those of the fetuses (Montgomery and Kristen, 2003). The difference in these studies could be because of the difference in study area, this study was carried out in war stricken region unlike in the other studies.

The study revealed that there was no significant association between marital status of the mother/caretakers and underweight. This is not in line with Teller, (2010) and Appoh et al., (2015) who stated that child's malnutrition is significantly associated with marital status. This could be due to cultural differences in the studies settings whereas in this study setting male are polygamous with a man having even seven wives this makes him unable to attend to all his wives and children, the other study setting there is limited number of polygamy. The implication is that children will not considered for appropriate nutritional foods since they will have to be oriented to cultural foods.

5.4 Household food security factors associated with underweight in children less than five years

In this study, availability of food in the household was significantly associated with underweight among children below five years; children whose caregivers reported having readily available food were almost two times more likely not to be underweight than those whose caregivers reported that food was not readily available. This is probably because those who deliver food for the households helps the child have variety of food for the children. This was inconsistent to Jackson et al., (2016) which stated that inadequate dietary intake and poor nutritional status go hand in hand. Zere et al., 2013; Duggan., (2015) also supported that abnormal mealtimes with a caretaker or parent or insufficient quantities of food is associated with malnutrition; this is either because the mother give little attention because a second child is born. This implies that all children have to be fully immunized before their first birth day to provide protection to them.

The study found that children who eat all type of food from the household were less prone to being underweight; children whose household eat all type of food were two times more likely not to be underweight compared to those whose households do not eat all type of food. This is in line with Golden (2015); Torin, (2016) who stated that balance diets play a major role in the etiology

of PEM because they result in increased needs and a high energy expenditure, lower appetite, nutrient losses due to vomiting, diarrhea, poor digestion, malabsorption and the utilization of nutrients and disruption of metabolic equilibrium. This is because it takes time for a malnourished child needs a balance diet to heal and pick up from the condition.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

This chapter gives the conclusion and recommendations of the study.

6.1 Conclusion

The prevalence of underweight among children below five years was high at 65.9%.

Child factors

Younger age, being male, having at-least 2 years birth interval were negatively associated with underweight among children below five years

Caregiver factors

Low level of maternal education were negatively associated with underweight among children below five years

Household factors

Having no readily available food, having no access to food throughout the years and not eating all type of food were associated with increased chance of underweight among children below five years in this study.

6.2 Recommendation

Based on the findings of the study, the following recommendations are made:

Mothers

Strengthen routine expanded program of vaccination at community level.

Uses of protected water source for drinking and prevent water pollution with inter sect oral collaborations.

Administration at Munic primary health facility

Care givers need to wash their hand with clean water and soap before preparing food, before feeding baby and after visiting of toilet or disposing of child feces.

More NGOs and government interventions should focus in Munuki primary health care center, Munuki Payam in particular through integrated and sustainable community nutrition programs with special focus on children to ensure that stunting levels are lowered.

There should be continuous nutrition surveillance and special attention given to under 5 children that are severely malnourished by the district health team.

There is need for a bigger study to be carried out in the districts of Munuki primary health care center covering more children to establish the factors associated with under-five malnutrition

Since colostrum breastfeeding has many advantages such as; rich in vitamin 'A', help to intestinal mature prevent to infection because it contains antibiotic in nature. Professional in the study should disseminate health information on importance of colostrum milk

Furthermore, emphasis should be put on effective management of fever and childhood illnesses in the area and provision of insecticide treated mosquito nets to mothers/caretakers with children under five years old.

The study also recommends a special arrangement for mothers engaged in cultivation to have their children breastfed regularly by having their babies brought to them in the gardens at regular intervals. The mothers could also visit their babies at home regularly from their gardens to ensure that proper nutrition is given to their children. This may contribute to a reduction in stunting especially among children of peasant farmers who were found to have increased levels of malnutrition than the rest of the children with mothers of other occupations.

MOH

The study recommends exclusive breast feeding and proper complementary feeding especially among children under three years. In line with UNICEF and WHO recommendations, there is need for exclusive breast feeding during the first six months of life and thereafter semi-solid complementary foods are introduced up to at least two years or more. This will consequently reduce on the underweight children who are mostly aged less than three years in Munuki primary health care center.

The government and NGOs should put in place food security means for improving the family's long-term situation while using food aid for short term and midterm interventions

The government through the health ministry and its partners should emphasize on immunization and vaccination children to prevent preventable illnesses, finding highlighted the importance of childhood vaccination, family planning, poverty alleviation and extensive nutrition education programmes as potential targets for intervention.

Areas for further research

More research should be conducted focusing on the other probable factors that could be associated with stunting such child health related factors, environmental and cultural factors and many others. Where nutrition interventions programs have been on-going, their level of effectiveness should be assessed to ensure efficient and more focused utilization of resources. More analytical studies such as cohorts and case control studies should be conducted to assess the temporal associations between risk factors and malnutrition.

Cultural and socio-economic factors: This would require prioritization of research into the effects of education, literacy and family dynamics on nutrition more importantly areas of study include strategies to educate and empower women to make dietary choices for themselves and their children.

The effects of other factors like conflicts, natural disasters, and forced migration on food availability and dietary patterns: This calls for the populations' potential and resilience into the adaptation to dietary changes, including the net effects of environment on nutrient uptake.

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APPENDIX I: INFORMED CONSENT TO PARTICIPATE IN RESEARCH

I am are asking you to take part in a research study called:

Factors associated with underweight among children less than five years in Munuki primary health care center, Munuki Payam south Sudan.

The person who is in charge of this research study is Munuki Payam south Sudan. The research will be conducted in Munuki Payam south Sudan.

Purpose of the study

The purpose of this study is to:

1. To determine the proportion of underweight children less than five years in Munuki primary health care center, Munuki Payam south Sudan.
2. To establish caregivers demographic factors associated underweight in children less than five years in Munuki primary health care center, Munuki Payam south Sudan.
3. To determine household food security factors associated with underweight in children less than five years in Munuki primary health care center, Munuki Payam south Sudan.

Study Procedures

You are being asked to participate in this study, as you are adult community members of Kiboga Parish who can help us to better understand self-medication practices. If you take part in this study, you will be asked to:

Take part in a one-time, one-on-one, semi-structured interview; The interview will take approximately one hour;

The interview will take place at a location most convenient to you as the participant;

The interview will be transcribed, in the form of field notes, to ensure accuracy in reporting your statements;

Benefits

There may be no direct benefits associated with your participation in the study, but the information you will provide will be useful in planning and organizing health awareness campaigns on self-medication especially among children under five years.

Risks or Discomfort

This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

Compensation

No research participants will be compensated

Privacy and Confidentiality

We will keep your study records private and confidential. Certain people may need to see your study records. By law, anyone who looks at your records must keep them completely confidential. The only people who will be allowed to see these records are:

The research team, including the Principal Investigator and those involved with the study**.**

I may publish what I have learnt from this study. If l do, l will not include your name. l will not publish anything that would let people know who you are.

Voluntary Participation / Withdrawal

You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. You are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study.

You can get the answers to your questions, concerns, or complaints

If you have any questions, concerns or complaints about this study, or experience an adverse event or unanticipated problem, contact the researcher on +211 925 635 753

If you have questions about your rights as a participant in this study, general questions, or have complaints, concerns or issues you want to discuss with someone outside the research, call the CIUREC Chairperson Dr. Samuel Kabwigu on (0312307400) & the executive secretary of UNCST on (0414 -705500) respectively.

Assessment of understanding

Please check which box best describes your assessment of understanding of the above informed consent document:

- □ I have read the above informed consent document and understand the information provided to me regarding participation in the study and benefits and risks. I give consent to take part in the study and will sign the following page.

- □ I have read the above informed consent document, but still have questions about the study; therefore I do not give yet give my full consent to take part in the study.

_____

Signature of Person Taking Part in Study

_____

Date

_____

Printed Name of Person Taking Part in Study

_____

Thumb print of Person Taking Part in Study

Note: Leave this space for the CIUREC stamp

_____ _____

Signature of Person Obtaining Informed Consent / Research Authorization Date

_____

Printed Name of Person Obtaining Informed Consent / Research Authorization

APPENDIX II: QUESTIONNAIRES

Instructions to the interviewer

Ensure that the respondent has understood clearly all the pertinent details of this study by answering all her questions before taking consent.

Section A: Socio-demographic factors

1. Identification		
1	Household code	_____
2	Date survey is applied	Date……..__ __ /__ __ __ __/_____ DD/MM/YYYY
3	Interviewer Name	_____
4	Child's Code	_____
5	Address (Village)	_____
2. Introduction		
1	Respondent Name?	_____
2	Index child name	_____
3	Relationship to the child	Mother..... 1 Father…..... 2 Others, specify:_____..... 7
4	Are you the one that takes care of this child?	Yes..... 1 No..... 2
NB: Conduct the survey in a household that has under-five children and all the children in the household will be considered under one caregiver		
3. Demographic characteristics		
I am going to ask you about your child		
1	Do you have the child's immunization card or birth certificate or baptismal card to determine the birth date?	Yes.....1 No.....2
2	What is your child's birth date?	Date.....__ __/ __ __ / __ __ day month year
3	Number of months completed	_____

4	Sex of the child (Observe)	Male..... 1 Female..... 2
5	What is the birth order of the child *(ask mother or immunization card)*	_____
6	What is the birth interval between the child and older sibling (*If any)*	_____*years*
7	Child's weight at birth (*Verify with the child health card)*	_____kilograms
8	How old was the child's biological mother at birth?	_____years
9	What is the marital status of the parents if both are alive?	Never lived together as couple……..1 Married/living together…....2 Separated/divorced……....3 Widowed…….....4 I don't know……9
10	How many are you in this household?	_____
11	How many of them are under 5 years old?	_____children under 5
12	How far did you go with school?	No formal education …...……0 Primary school completed…....l O-level completed…...……2 A-Level completed……..…3 Tertiary school completed…...4 University completed…...……5 Post graduate degree……...….6
13	How far did the child's father go in school?	No formal education …...…....0 Primary school completed...….l O-level completed…...……....2 A-Level completed……..……3 Tertiary school completed..….4 University completed……..…5 Post graduate degree……....6

14	What is the occupation for the child's mother?	Peasant farmer……1 Casual laborer……..2 Employed……3 Petty business……..4 Others……..5
15	What is the occupation for the child's father?	Peasant farmer……1 Casual laborer……..2 Employed……3 Petty business……..4 Others……..5
16	Like how much money does the mother earn in a month in SS pound?	<2000 2000-6000 >6000
17	Like how much money does the father earn in a month in SS pound?	<2000 2000-6000 >6000

Household food security		
	Does your household had readily available food stuff?	Yes.....1 No.....2 Does not know.....9
	Does the household access food throughout the year	Yes.....1 No.....2 Does not know.....9
	Does the household members eat all type of food for the people in the household	Yes.....1 No.....2 Does not know.....9

1	Has he/she ever breastfed?	Yes.....1 No.....2 Does not know.....9
2	How long did it take for the child to breastfeed after birth?	<1 hour...……..…..……..1 1-3 hours.....2 >3 hours.....3 Does not know.....9 N/A……...……0
3	Was the children given colostrums? Explain how it looks like(was the child put on the breast immediately)	Yes.....1 No.....2 Does not know.....9
4	Was the child given any other thing other than breast milk in the first three days?	Yes.....1 No.....2 Does not know.....9
5	If yes, what did you give him/her *(READ ALL OPTIONS)*	Tea.....1 Water (includes water with sugar)..2 Infant formula.....3 Other non-breast milk milks……4 medicines……5 Others, specify:.....7 does not know….....9 Did not give……..0
6	At what age did you stop breast feeding your child?	_____months ……...28 <1 month……...……...…00 Doesn't remember……..……99 Still breastfeeding……..…77
After weaning (25-59 months)		
7	Does (child's name) eat foods that the family eats?	Yes.....1 No.....2 N/A…….9

8	If yes, how many meals a day?	----------
4. **Anthropometry**		
INTERVIEWER: *After all questions are complete, measure the length/height of the index child and record it below.*		
	Measurement	**Result**
	Height	_____
	length	_____
1	Height/Length (cm)	_____
End of survey		
Thank you for your cooperation		

APPENDIX III: KEY INFROMANT GUIDE

Do most mother's breastfeed their babies? If not, how do they feed them?

Up to what age are babies breastfed?

At what point do mothers begin breastfeeding? Immediately after birth? At 2 days old?

Is breastfeeding actively encouraged by doctors, nurses, midwives?

What is the frequency of breastfeeding? on demand? Hourly schedules?

What is the baby fed if the mother goes out to work? Who feeds the baby?

Is there an "indigenous formula"? Made for babies? What is it? How is it used?

Are there beliefs about certain foods or local herbs that increase the milk output?

What are the common problems encountered before or during breastfeeding?

When do mothers feel that breast milk is insufficient and that other foods are to be given?

What are the common foods given?

APPENDIX IV: INTRODUCTORY AND CORRESPONDENCE LETTER

CLARKE INTERNATIONAL UNIVERSITY
LEAD · INNOVATE · TRANSFORM
IPHM School of Public Health and Management

(+256) 0312 307400
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17th Dec 2021

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Dear Sir/Madam,

RE: ASSISTANCE FOR RESEARCH

Greetings from Clarke International University (CIU) - Formerly International Health Sciences University (IHSU).

This is to introduce to you Ms. Ngonga Rebecca Reg.No.2018BPHFT-A15 who is a student of our University. As part of the requirements for the award of a Bachelor of Science in Public Health, the student is required to carry out field-based research for the submission of a Research Dissertation.

Ngonga would like to carry out research on issues related to: **Factors associated with underweight among children below 5 years at Munuki Primary Health Care Centre South Sudan.**

I therefore request you to render the student such assistance as may be necessary for the success of her research project.

I, and indeed the entire University Administration would like to thank you in advance for the assistance you will render to the student.
Sincerely yours,

Alege John Bosco
Senior Lecturer / Dean

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