

**DETERMINANTS OF MALNUTRITION AMONG
UNDER-FIVE CHILDREN IN NAKASEKE AND
NAKASONGOLA DISTRICTS, UGANDA**

By

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DECLARATION

I, HABAASA Gilbert, declare that this dissertation has never been presented to any institution of higher learning here or abroad for an academic award and the work contained in it is original unless otherwise stated.

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Signature

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APPROVAL

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DEDICATION

To My dear Parents Mr. Polycalp Bahigiriwa and Mrs. Alice Kyomugisha.

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ABSTRACT

Malnutrition is one of the major causes of mortality and morbidity among under-five children in Sub Saharan Africa. To understand the determinants of malnutrition among under-five children, a study was conducted in Nakaseke and Nakasongola districts of Uganda to understand the determinants in these districts.

The source of data was household demographic and socio-economic characteristics which included anthropometric data on underfive children in Nakaseke and Nakasongola districts. The data was obtained from Africa Innovations Institute that conducted a study on the adaptation to the impact of climatic variability on food and health security in the two districts. Anthropometric data included height, weight and age of the children. Data analysis was done in Epi Info programme-Nutrition module and Stata statistical softwares. Multivariate analysis was done by fitting a binary logistic regression model to establish the underlying determinants of malnutrition among under-five children.

It was found out that Children aged 39-59 months were less likely to be underweight than those aged less than twelve months. Findings also revealed that stunting was more prevalent among children of peasant farmers than the pastoralists. There was however no significant relationship between child wasting and selected child characteristics.

In conclusion, it is worthy to note that the study is essential in pointing out the particular age-groups among underfive children as well as the occupations that contribute to malnutrition in the districts of Nakaseke and Nakasongola. Based on the findings, the study recommends exclusive breast feeding and proper complementary feeding especially among those aged less than three years. Special arrangement could also be put in place to have children of mothers engaged in cultivation brought regularly for breastfeeding.

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LIST OF ACRONYMS/ ABBREVIATIONS

AfrII:	Africa Innovations Institute
BCG:	Bacille Calmette-Guerin
BMI:	Body Mass Index
CDP:	Child Days Plus
DHS:	Demographic and Health Surveys
EPI:	Expanded Programme on Immunization
FAO:	Food and Agricultural Organization
MAAIF:	Ministry of Agriculture, Animal Industry and Fisheries
MoH:	Ministry of Health
NPA:	National Planning Authority
TASO:	The AIDS Support Organization
UBOS:	Uganda Bureau of Statistics
UNICEF:	United Nations Children’s Fund
WHO:	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The World Health Organization (2013) estimates that there are 178 million children that are malnourished across the globe, and at any given moment, 20 million are suffering from the most severe form of malnutrition. Malnutrition contributes to between 3.5 and 5 million annual deaths among under-five children. UNICEF estimates that there are nearly 195 million children suffering from malnutrition across the globe. In 1997, the World Health Organization had observed that 60% of the deaths occurring among all the under-five children in developing countries were attributed to malnutrition (Murray and Lopez., 1997). Most of the damage caused by malnutrition occurs in children before they reach their second birthday, in the time when the quality of a child's diet has a profound impact on his or her physical and mental development.

It has been estimated by the global burden of disease study that under-five malnutrition alone has caused approximately half (15.9%) of the global loss of Disability Adjusted Life Years (DALYs) that is the sum of years of life lost from premature mortality years lived with disability adjusted for severity (Faruque *et al.*, 2008). This consequently affects the intelligence level of children, their behaviour and school performance. The impaired mental development is taken as the most serious long-term handicap associated with under-five malnutrition.

Malnutrition among under-five children is one of the most important public health problems in developing countries especially Sub-Saharan Africa (Gulati, 2010) and about 35% of under-five deaths in the world are associated with malnutrition. An estimated 230 million

under-five children are believed to be chronically malnourished in developing countries. Similarly, about 54% of under-five deaths are believed to be associated with malnutrition in developing countries. 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 and South Asia (Kimokoti and Hamer, 2008).

In Uganda, malnutrition remains a serious health and welfare problem affecting the under-five children to whom it contributes significantly to mortality and morbidity. According to Uganda Demographic and Health Survey of 2006, nearly four in ten Ugandan children under-five years of age (38 percent) are stunted (short for their age), six percent are wasted (thin for their height), and sixteen percent are underweight (UBOS & Macro International Inc, 2007). Indeed the story may not be different for the districts of Nakaseke and Nakasongola in Uganda.

Malnutrition in Uganda starts at infancy and rises steeply, peaking at about two years when about 50% of toddlers are stunted and from the UDHS findings, Northern (40%) and South Western Uganda (50%) regions are more affected than other regions (UBOS & Macro International Inc, 2007). Malnutrition among children is an outcome of many interrelated factors including environment, economics, education, and culture and food security. Among these, the ones that have immediate and direct effects on malnutrition are feeding practices and infections. Therefore the nutrition levels of children can indicate the socio economic development of a community.

The Uganda food and nutrition policy focuses on nutrition and childhood development as one of the goals with an aim of improving child health especially among those under-five years. This policy is being formulated to address nutrition priority problems with assistance from international and local agencies like UNICEF, Save the Children, Plan International and TASO. The 2004/2005 Uganda food and nutrition policy reform focuses on policies and guidelines on anaemia, breastfeeding, HIV/AIDS and a number of other nutrition related disorders prevalent in the country (MoH and MAAIF, 2005).

The Ugandan government has put in place tremendous efforts in reducing the prevalence of malnutrition in the country through effective nutrition programs which act directly on feeding practices. However, the yield would be more significant if the government acted through factors that affect under-five child malnutrition. In addition, addressing the plight of women by strategically targeting their economic, education, and health status can improve nutrition at household level since women are the principle providers and care givers of children at this level.

1.2 Problem Statement

Effective nutrition is one of the most important health determinants among citizens of any country including Uganda. However, malnutrition remains a big threat to almost all regions in Uganda particularly in the cattle corridor districts of Nakaseke and Nakasongola.

Some children under-five years in Uganda have shown signs of growth failure, irritability, swelling of body parts, thin gray-blond hair, diarrhoea, as well as poor hygienic conditions according to Ministry of Health (MoH and MAAIF, 2005). These children do not gain corresponding body weight which leads to premature deaths later in life because vital organs are never fully developed during childhood. Malnourished children have lowered resistance

to infection and therefore more likely to die from ailments like diarrhoea and acute respiratory infections (Nguyen and Kam., 2008).

Data from the previous five Uganda Demographic and Health Surveys (2011, 2006, 2001, 1995, 1989) show that the nutrition indicators have not improved much over the past 15 years and some indicators have even shown a worsening trend (UBOS and ICF International Inc., 2012). For example the UDHS 2006 reported that 16% of children under-five in Uganda are underweight, 38% are stunted and 6.1% are wasted (UBOS & Macro International Inc, 2007).

An operation framework for nutrition in terms of child survival strategies was developed by the Government of Uganda in 2009. Additionally, the Government also launched the Uganda Vision 2040 and National Development Plan (2010-2015) that focuses also on nutritional wellbeing of children. The government has other several initiatives aiming at reducing under-five malnutrition especially the food and nutrition policy 2003 as well as the implementation of the global Millennium Development Goals (GoU, 2013; GoU, 2010).

Given the fact that a lot of studies on the determinants of malnutrition among under-five children have been conducted in the developing countries, there is need to examine if the same factors are responsible for malnutrition among children under-five years in the districts of Nakaseke and Nakasongola hence forming the research gap.

1.3 Main objective

The major objective of the study was to assess the determinants of malnutrition among under-five children in Nakaseke and Nakasongola districts of Uganda.

1.4 Specific objectives

The study addresses the following specific objectives;

- i. To ascertain the relationship between child factors and malnutrition of children under-five years.
- ii. To ascertain the relationship between maternal factors and malnutrition among children under-five years.

1.5 Hypotheses

The hypotheses to assess the determinants of malnutrition among under-five children are presented below;

- i. There is no relationship between sex of a child and malnutrition among under-five children
- ii. There is no association between age of the child and malnutrition among under-five children
- iii. Birth Order of child and malnutrition among underfive children are independent
- iv. There is no relationship between child birth interval and malnutrition among underfive children
- v. There is no relationship between mothers' age at birth and malnutrition among under-five children
- vi. Maternal education level and malnutrition among under-five children are independent
- vii. There is no association between maternal occupation malnutrition among under-five children

viii. There is no relationship between marital status of the mother and malnutrition among under-five children.

1.6 Scope of the study

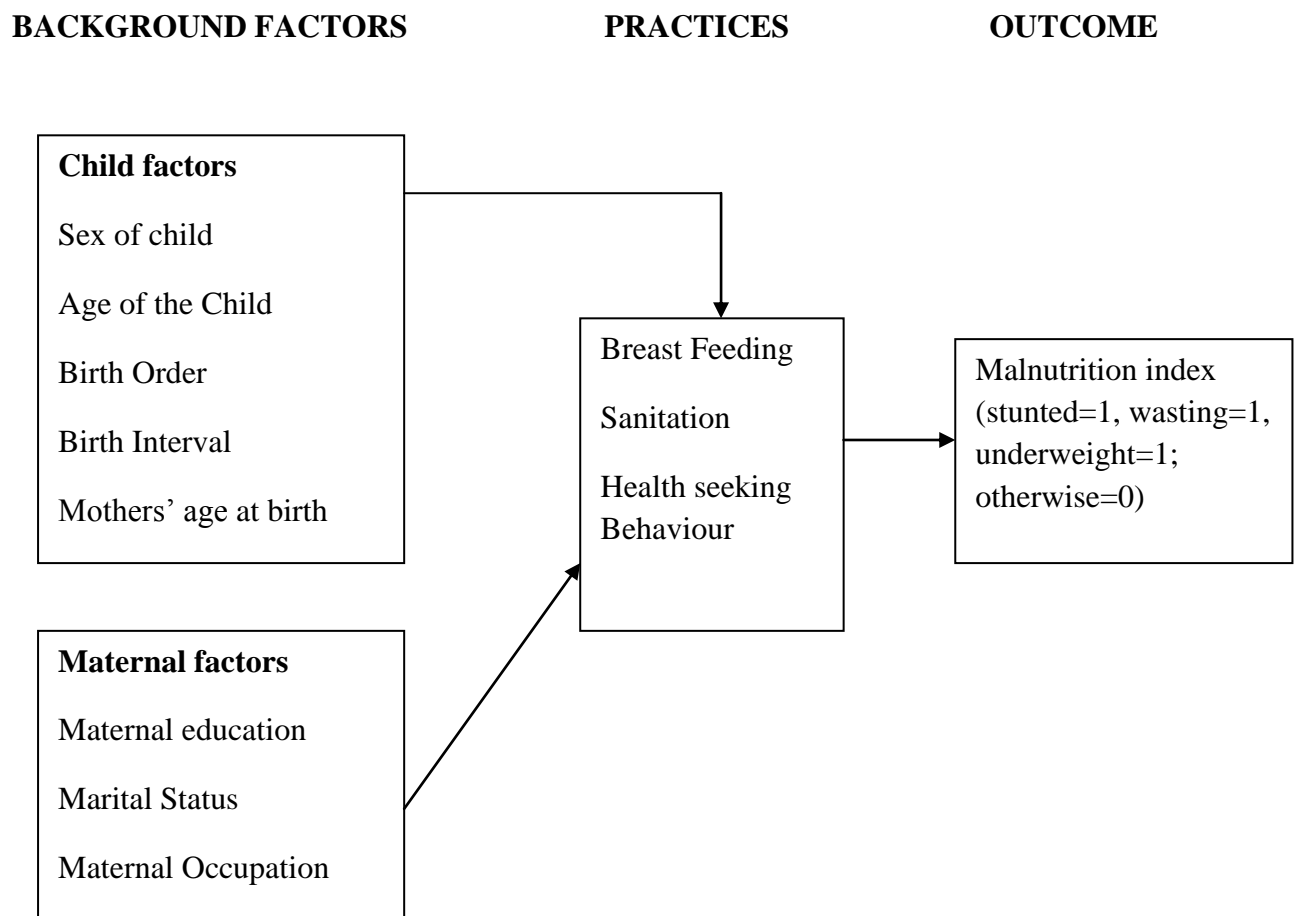
The study considered children below five years living in the cattle corridor of Nakaseke and Nakasongola districts in Central Uganda. This is because children under-five years are normally the most at risk of malnutrition within households and communities in Uganda.

1.7 Conceptual frame work

Figure 1.1 shows the conceptual framework on the determinants of malnutrition among under-five children in Uganda taking a case study of Nakaseke and Nakasongola districts.

In developing countries and particularly in Sub-Saharan Africa, under-five child malnutrition is normally determined by a large number of factors to the extent that it sometimes becomes difficult to predict the risk factors (Victoria *et al.*, 1997). Such factors act through a number of interrelated proximate determinants to bring about underfive malnutrition that is stunting, underweight and wasting. The demographic (child factors) and socio-economic factors (maternal factors) such as age of child, birth order, mothers age at birth, mothers education level, marital status as well as maternal occupation work through proximate variables like the duration of breast feeding, sanitation and mothers health seeking behaviours to determine underfive malnutrition.

Figure 1.1: Conceptual Framework showing the determinants of malnutrition among under-five Children



1.8 Significance of the study

The study provides information that could be used for nutritional surveillance and targeting programmes that would focus more on populations at risk particularly the under-five children. The study also makes important contribution to future research by contributing to the existing literature particularly on nutrition among under-five children. The study further avails information that could be used in policy planning and implementation particularly in vulnerable groups.

1.9 Structure of the dissertation

This dissertation is divided into five chapters which include; the introduction, literature review, research methodology, presentation of findings, summary of findings, conclusion and recommendations. Chapter one provides the background to the study, problem statement, study objectives, hypotheses, scope of the study, conceptual framework and significance of the study. Chapter two presents reviewed literature on the determinants of malnutrition among under-five children. Chapter three presents the methodology used in the study including measurements of anthropometric measures and limitations. Chapter four presents study results and interpretations. Chapter five is the last chapter and it presents summary of results, conclusion, study recommendations and areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section presents a synthesis of the reviewed literature on the determinants of malnutrition among under-five children in different settings particularly in developing countries.

2.2 Malnutrition among under-five Children

Research findings indicate that poor nutrition during childhood is one of the most important conditions that impede the physical and the mental development of children which ultimately propagates the vicious cycle of intergenerational malnutrition. Consequently, the effects of under-five malnutrition are permanent and cross into the adulthood stage of the child (Jesmin *et al.*, 2011).

According to the trends on under-five children's nutritional status, there was a downward trend in the proportion of children stunted and underweight over the past two Uganda Demographic and Health Surveys of 2011 and 2006 but the proportion of children who are wasted has remained unchanged. There was a decline in the proportion of under-five stunted children in Uganda from 38% to 33% which is an indicator of improvement in under-five nutrition over the past five years. A similar pattern is observed among the under-five children who were underweight due to a drop in the proportion from sixteen percent in 2006 to fourteen percent in 2011 (UBOS and ICF International Inc., 2012).

It is important to note that child malnutrition is associated with inappropriate feeding practices that occur mostly in the first two years of life. There is a global and national

understanding on the association between child malnutrition and inappropriate feeding practises as observed in the nutrition policies of Uganda and India (MoH and MAAIF, 2005). Similarly, the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) developed a global strategy for infant and child feeding that was adopted by the 55th World Health Assembly in 2001(Arun and Jon., 2004). These findings generate a synthesis of the determinants of malnutrition among under-five children in Nakaseke and Nakasongola districts.

A well-nourished child is one whose weight and height measurements compare very well with the standard normal distribution of heights and weights of healthy children with same age and sex categories. Nutritional status is primarily measured by a child's growth in height and weight and is directly influenced by food intake and the occurrence of infections. Chronic malnutrition in form of stunting, wasting and underweight are assessed at the population level through the Demographic and Health Surveys (ICF Macro, 2010). This is in line with how anthropometric data was collected within households in Nakaseke and Nakasongola districts.

The Uganda National plan and Action for Nutrition of 1996 indicates that there is high prevalence of malnutrition in Uganda among under-five children for example 38% of under-five children were stunted, 26% were under weight while 55% were wasted. Of the children who were stunted, 40% were severely stunted that is height for a child of a given age was below the mean deviation of the standard error of the reference population (Statistics department Uganda and Macro International Inc., 1996). The above findings are contrary to UDHS 2006 where nearly four in ten Ugandan children under-five years of age (38%) are stunted, six percent are wasted and 16 percent are underweight. This indicates a significant

decline in malnutrition among under-five children. The above findings may not differ much in the districts of Nakaseke and Nakasongola.

2.3 Child related factors of underfive malnutrition

There are a number of demographic variables that researchers have found significant in influencing under-five malnutrition however the study focused on few of them that included sex of child, age of child, birth order, birth interval and mother's age at birth.

2.3.1 Sex of child

From the reviewed literature, there seems to be a consensus that malnutrition among under-five children is greater among boys than girls. The cause of this discrepancy is not well established in the literature but it is believed that boys are more influenced by environmental stress than the girls (Henry et al., 2007; Nguyen and Kam., 2008; Sarmistha, 1999).

According to a study done in Kwara state Nigeria, Babatunde (2011) reported that there was 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. Another study done in Botswana revealed that stunting, wasting and underweight were also significantly more prevalent among boys than girls (Salah and Nnyepi., 2006).

A study by Olwedo *et al.*,(2008) on the factors associated with malnutrition in internally displaced persons' camps of Northern Uganda indicated that a male child was nearly two times more likely to suffer from acute malnutrition compared to a female child (Adjusted odds Ratio of 1.56 at 95% C.I 1.15-2.13 with p-value=0.004**). This situation could be due

to the fact that boys are rare at home given the fact that they tend to be active running around in the neighbourhood 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 above findings are contrary to the study findings in Nakaseke and Nakasongola districts which found out that there was no significant relationship between sex of a child and under-five malnutrition.

2.3.2 Age of child

Recent studies have found out that younger children are less likely to be malnourished than the older children. In the growth life cycle of children, weaning and less breast milk make them more vulnerable to under-five malnutrition. However, after weaning, the children begin to get adequate nutrition when they get used to complementary feeding (Shrimpton *et al.*, 2001).

It is important to note that specific ages, children's nutritional status is sensitive to feeding, weaning practices, care, and exposure to infection. A cumulative indicator of growth retardation (height-for-age) in children is positively associated with age. A study done in Ethiopia has also shown an increase in malnutrition with increase in age of the child (Yimer, 2000). The findings are similar in Nakaseke and Nakasongola districts where children aged 37-48 months were five times more likely to be underweight than their counterparts aged less than 12 months.

A study conducted by Nguyen and Kam 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 (Nguyen and Kam., 2008). The 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.

According to (UBOS and Macro International Inc, 2007), malnutrition increases with the age of the child through the first three years of life before declining in the fourth and fifth year. The increase is especially rapid during the first two years of life, as evidenced in the rise from 13 percent among children aged 6-8 months to 45 percent among children aged 18-23 months. It is expected that parents give less attention to older children when they give birth to a new child who needs much attention and care. Similar findings have been reported in different countries for instance in Kwara state of Nigeria (Babatunde, 2011), in Kenya (Kabubo-Mariara *et al.*, 2006) and rural India (Sarmistha, 1999). The findings are plausible considering that many of the younger children are still being breastfed and chronic malnutrition sets in only after weaning (Babatunde and Qaim, 2010).

2.3.3 Birth Order

Research findings indicate that malnutrition is rare among under-five children of birth order 2-3 and that higher birth order (5+) is positively associated with child malnutrition (Sommerfelt *et al.*, 1994; Jeyaseelan, 1997). In a study carried out among 6939 children under five years in Bangladesh, the prevalence of stunting increased with birth order hence most of the children who were of birth order more than two had greater chances of stunting and wasting (Rayhan and Hayat., 2006).

Worthy to note is that few studies according to the literature search have been conducted on the subject of child birth order and malnutrition among under five children. During the study

in Nakaseke and Nakasongola districts of Uganda, it was found quite easy to get actual information concerning birth order because the respondents found it easy to recall after all, they could easily tell by looking at their children.

2.3.4 Birth Interval

In another study conducted in Bangladesh, children within the first birth interval were 1.66 times more likely to be stunted and children whose preceding birth interval was less than two years were 1.32 times significantly more likely to be stunted as compared to children of a preceding birth interval 24 months or above. Similar results were observed for underweight children (Nure., Nuruzzaman and Goni, 2011). The study indicated that preceding birth intervals and child stunting were statistically significant ($p < 0.05$). 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.

According to UBOS and Macro International Inc (2007), 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. Child birth intervals were statistically insignificant in the study conducted in Nakaseke and Nakasongola districts.

2.3.5 Mothers age at birth

Mothers age at birth has been associated with malnutrition among under-five year old children for example it was found out in Bangladesh that children whose mothers were less than 20 years at the time of birth were 1.22 times more likely to be stunted, wasted and underweight compared to children whose mothers were 20 years and above at birth (Nure., Nuruzzaman and Goni, 2011).

Bachou (2000) in the Ugandan settings identified some common risk factors for protein energy malnutrition, that is severely malnourished infants mostly from young mothers had low weight at birth with less access to breast feeding that is essential for the infants protein intake. Thirty four percent (34%) of children received supplementary food by three months and some mothers stopped breast feeding earlier.

A number of studies have reported that mothers age at birth is one of the most important determinants of malnutrition among under-five children. It has been suggested that the risk is greater in younger mothers particularly those below 24 years because they are not ready to take care of the child including providing all the necessary attention required for the baby. Similarly, under-five malnutrition is higher also among children whose mothers give birth when they are older especially after 35 years. This is attributed to the fact that giving birth at an older age is associated with a higher likelihood of giving birth to babies with a low birth weight (Shrimpton *et al.*, 2001; Jeyaseelan, 1997). However, it is important to note that children of the younger mothers are traditionally cared for by their grandmothers in Turkey and this was associated with low levels of malnutrition among children of younger mothers less than 24 years (Ergin *et al.*, 2007).

2.4 Maternal factors of malnutrition among under-five children

A lot has been written about the socio-economic determinants of malnutrition among children under-five children by several researchers in both developed and developing countries. The study focussed on maternal education, marital status and maternal occupation. Some other variables like place of residence and region were not applicable since the study was conducted in rural areas of Nakaseke and Nakasongola districts both found in Central Uganda.

2.4.1 Maternal Education

Mother's education level affects child's nutrition through her choices and health seeking skills related to nutrition, hygiene, preventive care and disease treatment. Mother's responsibility to care for herself during pregnancy and her child through the most vulnerable stages of its life significantly affects under-five child malnutrition. Several studies have found out that mothers education is associated with good nutrition practises and particularly under-five child nutrition (Babatunde and Qaim, 2010; Olwedo *et al.*, 2008; Webb and Block., 2004; Shrimpton *etal.*,2001). These studies have pointed out the fact most women with low education spend more time in gardens and feed their children on less nutritious foods. Women who spend more time in gardening get limited time to attend to their children and prepare for them nutritious meals unlike their educated counterparts who normally focus on good child nutrition practices even when they are absent from home most of the time. Education helps mothers gain additional knowledge about the adequate intake of food for their children in terms of correct quantity, quality and frequency. It also determines her income and this helps her access proper nutrition for the child as well as health services.

According to Sommerfelt *et al.*, (1994), there is a negative association between the mother's education and underfive child malnutrition. The higher the level of mothers' education, the lower the percentage of under-five children classified as undernourished. According to the study, malnutrition was most prevalent among children whose mothers attended primary school. It is however important to note that the decline in the levels of malnutrition with increasing maternal education is not always gradual. In some countries, malnutrition levels are fairly similar among children whose mothers attended primary or secondary school while elsewhere there is a greater similarity with children whose mothers attended primary school or had no formal schooling. Median levels of malnutrition across all countries range from 36

percent for children whose mothers had some primary education to 16 percent for children of mothers with secondary or higher education.

With increasing level of mother's education, the proportion of children who are malnourished goes down as found out in the Uganda Demographic and Healthy Survey of 2006 (UBOS and Macro International Inc., 2007). This result is consistent with the findings of Webb and Block (2004) that highlighted the importance of human capital investment in improving child nutrition status. This implies that educated mothers are better aware about the nutrition requirements of their children by providing improved health care (Babatunde, 2011).

In a similar study in Bangladesh, children of mothers with no education and primary education were 28% and 33% respectively more stunted than children of mothers with secondary or higher education. Wasted and underweight children also showed similar results. 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. However for wasting, children whose mothers had primary or secondary education had 0.87 times lower odds of wasting than those of mothers with higher education (Nure, Nuruzzaman and Goni, 2011).

According to Lisa (2000), education of a mother has several potentially positive effects on the quality of care of children and consequently malnutrition. More educated women are better able to process information, acquire skills and model positive caring behaviours. More educated women tend to be better able to use healthcare facilities to interact effectively with health care providers, to comply with treatment recommendations and to keep their living environment clean. Education also increases women's ability to earn income but this

increases the opportunity cost of their time which may mitigate against some important care giving behaviours for example breastfeeding.

More to note is that mother's education is associated with more efficient management of limited household resources, greater utilization of available health care services, better health promoting behaviours, lower fertility as well as child centred caring practises. All this consequently results into a reduction in malnutrition among under-five children (Nguyen and Kam, 2008). Indeed from the above study, children whose mothers had primary or no education were less likely to be stunted, underweight or even wasted perhaps because most of these mothers were unemployed and were able to stay home and care for their children.

2.4.2 Marital Status

On the study about mothers' marital status and under-five child nutrition, findings in Ethiopia reveal that child's malnutrition is significantly associated with marital status. It was found out that under-five child malnutrition is higher among unmarried rural and divorced/separated women compared to married ones (Teller, 2000). Similarly, being a married mother was positively associated with good nutritional status among children under five years in the Volta region of Ghana (Appoh and Krekling., 2005). Contrary to the above, a study in Tanzania revealed that mothers who are married were more likely to have undernourished children unlike those that were unmarried perhaps because of the cost of maintaining families hence sometimes these families fail to produce nutritious supplements to the under-five children (Nyaruhucha *et al.*, 2006).

It is however important to note that there is scanty literature linking mothers marital status and malnutrition among under-five children in developing countries. During the study done in Nakaseke and Nakasongola districts, marital status of the mother was also assessed in comparison to under-five malnutrition.

2.4.3 Maternal Occupation

Previous studies have found out that mother's occupation is one of the determinants of under-five malnutrition in most developing countries. A study in Vietnam revealed that children from mothers who were labourers or farmers and housewives had a greater prevalence of stunting, underweight and wasting than those from mothers who worked in office or were housewives (Nguyen and Kam, 2008). This is because working mothers rarely get time to take care of their children. They also leave their children at home with other siblings who may neglect feeding them following the right frequency and this sometimes worsens the problem of malnutrition. It is also common for mothers to fail to provide complementary feeds including protein foods since most of them cannot afford them (Olwedo *etal.*, 2008; Rukundo 1988). Such findings are true especially among peasant farmers in Nakaseke and Nakasongola districts who spend most of their time in gardens leaving the under-five children under the care of other siblings or housemaids who are sometimes too young or illiterate on proper under-five nutrition practises.

Mother's occupation is one of the indicators for access to adequate food supplies, use of health services, availability of improved water sources, and sanitation facilities which are prime determinants of child nutritional status (UNICEF, 1990). A study done on most of the DHS surveys conducted in developing countries (Loaiza, 1997) especially in the Southern

Nations, Nationalities and Peoples Region (SNNPR) of Ethiopia showed that under-five children from low economic status households were the most affected by malnutrition.

It is little wonder therefore that malnutrition was found to decrease with mother's occupation although the pattern is not uniform according to UBOS and Macro International Inc., 2007 study that conducted the Uganda Demographic and Healthy Survey in 2006. For working mothers, under-five child malnutrition could result from mothers' neglect or care by a less skilled sibling or housemaid despite the fact that a wealthy family can hire a skilled and attentive nursemaid (Popkin *et al.*, 1975).

According to a review of Demographic and Health Surveys in selected African countries, malnutrition is more prevalent among children whose mothers did not work for instance according to DHS 1986-89, 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. Wasting and underweight were also more common among the children of non-working mothers (Sommerfelt *et al.*, 1994). The above findings contradict study results where working mothers particularly crop cultivators had more chances of having malnourished children than their counterparts particularly pastoralists because they spent the bigger part of the day at home which helped them feed their children.

In a study done in Botswana on the effect of maternal occupation on under-five malnutrition, it was found out that underweight occurred to a lesser extent among children whose mothers worked in agriculture (7.5% in livestock and 28.6% for those working in crops) than among children (40.0%) whose mother were involved in informal business (Salah and

Nnyepi, 2006). Among mothers engaged in cultivation, a tendency of selling family food in a bid to get money has caused shortages and consequently increased cases of under-five child malnutrition (Zaramba, 1988). The study findings in the districts of Nakaseke and Nakasongola revealed that child malnutrition was higher among children born by mothers who were involved in cultivation as their occupation.

2.5 Summary of the literature review

Whereas the literature reviewed indicates that malnutrition among children below five years is determined by several factors, a need to find out if similar factors are responsible for malnutrition in the districts of Nakaseke and Nakasongola is quite important. This is part of the research gap that this study seeks to examine.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the methodology used in the study. This has been divided into study population, data source, variable specification, anthropometric analysis, data analysis and study limitations on the determinants of malnutrition among under-five children in Nakaseke and Nakasongola districts.

3.2 Study Population

The study population consisted of children below five years in Nakaseke and Nakasongola districts. The two districts were considered because they were covered by the project “Adaptation to the impact of climatic variability on food and health security in the cattle corridor of Uganda” funded by International Development Research Centre, Canada.

3.3 Data Source

Secondary data was obtained from Africa Innovations Institute (AfrII), an organization that implemented the project. Empirical data on 104 children was collected in households within the two districts of Nakaseke and Nakasongola.

3.4 Study Variable Specification

This section presents the specifications of the variables that were measured during the study.

i. Child malnutrition

The measure of child malnutrition in this study is a dummy variable with a value of 1 if the child malnutrition index is present and a value of 0 if otherwise as presented below.

1=Is the child stunted? 0=No, 1=Yes

2=Is the child wasted? 0=No, 1=Yes

3=Is the child under weight? 0=No, 1=Yes

ii. Sex of child

Sex of child was a binary variable with a value of 1 if the child was male and a value of 0 if the child was female.

iii. Age of child

Age of the child was recorded in complete months for all children who had not exceeded five years of age. The data was categorized during analysis as; ≤ 12 months, 13-36 months, and 37-59 months.

iv. Birth order

Birth order of the child was categorized into; 1-2, 3-4 and 5⁺ order.

v. Birth interval

Child birth interval was categorized in years as; ≤ 2 , 3-4 and 5-6.

vi. Maternal age at birth

Age of mother at birth was categorized in years as; < 20 , 20-29, 30-39 and 40-49.

vii. Maternal level of education

Maternal level of education was categorized as; no formal education, primary and secondary+ education.

viii. Marital status

Marital status of the mother was categorized as; never married/separated and married/cohabiting.

ix. Maternal occupation

Maternal occupation was categorized as; peasant farmers, civil servants/business, pastoralists, and handcrafts.

3.5 Anthropometric analysis

Anthropometry is a technique that uses human body measurements to draw conclusion about the nutritional status of individuals and population. This technique was used to assess the malnutrition status of under-five children (Gibson, 2005). Child variables that included age, sex, height and weight were entered in Epi Info7 software-nutrition module to generate measurement indices of height-for-age, weight-for-age and weight-for-height. The indices

generated were compared with standard reference values for WHO Child Growth Standards and CDC 2000 to obtain the Z-scores. This was done automatically by Epi Info programme. For this study, three indices of malnutrition that included stunting, underweight and wasting were determined among all the under-five sampled children. Stunting refers to a low height-for-age which is a measure of chronic or long-term malnutrition in children. It is a good indicator of cumulative growth retardation. Children whose height-for-age Z-score was below minus 2 standard deviation from the median of the reference population were classified as stunted. Underweight denotes a low weight-for-age and it is a measure of combination of chronic and acute malnutrition. Children having weight-for-age Z-score less than minus 2 standard deviation from the median of the reference population were regarded as underweight. Wasting represents a low weight-for-height and it is a measure of acute malnutrition, an indicator of short-term fluctuation in nutritional status. Similarly, all the children under-five years whose weight for height Z-scores were less than minus 2 standard deviation were regarded as wasted.

3.6 Data analysis

Demographic and socio-economic data for all children under-five years were entered in Epi Data software and then exported to stata programme. Anthropometry data of child's age, sex, height and weight were entered in Epi Info7 nutrition module to generate the nutrition indicators of stunting, wasting and underweight which were entered in STATA programme and then merged with the demographic and socio-economic data for analysis. Descriptive statistics on background characteristics of under-five children were generated and presented in frequency distribution tables. Bivariate analysis was performed with cross tabulations and

Pearson Chi Square (χ^2) to establish the relationship between the independent variables and under-five malnutrition. The Pearson Chi Square (χ^2) test was derived as follows.

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \dots\dots\dots 3.1$$

Where;

O is the observed frequency while E is the expected frequency.

r is the row while c is the column.

A binary logistic regression model was fitted to ascertain the determinants of malnutrition among children underfive years at multivariate analysis. Three indices of malnutrition that is stunting, wasting and underweight were taken as dependent variable taking a value of 1 for a malnourished child and 0 for otherwise. The model estimated the probability of falling into either of the dichotomous values of the dependent variables given the effect of the explanatory variables.

The logistic regression model is displayed below;

$$\text{Logit (Malnutrition)} = \log \left(\frac{p}{1-p} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon \dots\dots\dots 3.2$$

Where; β_0 is a constant.

β_{1-8} are unknown coefficients.

p is the probability of having a malnourished child.

x_i are the explanatory variables; x_1 is sex of child, x_2 is age of child, x_3 is birth order, x_4 is birth interval, x_5 is mother's age at birth, x_6 maternal level of education, x_7 is marital status and x_8 is maternal occupation.

3.7 Limitations of the study

The dataset used for the study missed out some variables of interest on child malnutrition that included duration of breast feeding and Body Mass Index of the mother. The sample size of 104 respondents was relatively small hence it could have had an effect on the outcomes of the study. The analyses was limited to the available information on variables given the nature of the dataset.

CHAPTER FOUR

MALNUTRITION AMONG CHILDREN UNDER FIVE YEARS

4.1 Introduction

The findings of the study are presented as background characteristics, bivariate analysis and multivariate analysis results.

4.2 Background characteristics of children and caretakers

The background characteristics are divided into child and maternal factors as presented below.

4.2.1 Underfive Child factors

Underfive child demographic factors in Nakaseke and Nakasongola districts are presented in Table 4.1.

Table 4.1: Underfive Child factors

Child factors (n=104)	Frequency	Percentage (%)
Sex of Child		
Male	51	49
Female	53	51
Age of the child(months)		
≤ 12	3	2.9
13-36	44	42.3
37-59	57	54.8
Birth Order		
1-2	52	50
3-4	26	25
5+	26	25
Birth Interval(years)		
≤ 2	46	44.2
3-4	43	41.3
5-6	15	14.5
Age of mother at birth (years)		
<20	16	15.4
20-29	34	32.7
30-39	42	40.4
40-49	12	11.5

More than half of the under-five children in the study were females (51%) and majority were aged 37-59 months (54.8%) and followed by those aged 13-36 months (42.3%) respectively. Half of the children (50%) were of birth order 1-2 with a few in the birth order of 3-4 (25%) and 5+ order (25%) respectively. Most of the children were of birth intervals equal or less than two years (44.2%). There was also quite a large number of children born in the birth interval of 3-4 years (41.3%). The delivery of majority of children within a birth interval of two years implies that child feeding brings about weaning off breast milk early to give room for the mother to take care of a possible new pregnancy. Basing on the above results, it is not

by surprise that malnutrition of children under-five years has persisted in Nakaseke and Nakasongola districts since short breast feeding intervals subjects the child to early weaning.

On the age of the mother at birth, majority of the children had their mothers aged 30-39 years (44.4%) while quite a significant proportion was also from children whose mothers at birth were aged 20-29 years (32.7%). Few of the children were from mothers aged less than 20 years (15.4%) and 40-49 years (11.5%) at birth respectively.

4.2.2 Maternal factors of malnutrition among under-five children

The maternal factors of malnutrition among children underfive years in Table 4.2.

Table 4.2: Maternal factors of malnutrition among under-five children

Maternal factors(n=104)	Frequency	Percentage (%)
Education level		
No education	16	15.4
Primary	76	73.1
Secondary+	12	11.5
Marital status of the mother		
Never Married/Separated	35	33.7
Married/Cohabiting	69	66.3
Maternal Occupation		
Peasant farmer	52	50.0
Pastoralist	14	13.4
Business/ civil servant	32	30.8
Handcrafts	6	5.8

The percentage distribution of under-five children according to the education level of the mother indicates that majority of the mothers had received primary level education (73.1%) and quite a few had never been to school (15.4%). Findings further reveal that only 11.5% of the children had mothers with secondary education and above. The level of education could impact on child care as many of the mothers may lack the basic skills and knowledge to look after their children by offering nutritious feeding. Many of such mothers still believe in the

traditional way of feeding and would ignore the recommended child feeding and health practices that encourages exclusive breast feeding for up to at least six months as well as provision of nutrition supplements and balanced diet.

The distribution of under-five children according to the marital status of their mother indicates that majority of the children were born to mothers who were married/cohabiting (66.3%). Quite a big number of the under-five children were born to never married/separated mothers (33.7%). There was quite a high number of children born to single mothers which could have serious implications on under-five child malnutrition since the kind of care that the child receives from the single parent may be compromised compared to those with both parents who will always give their children undivided attention and care. Besides single mothers may not have advantage of receiving financial support from the father of the child especially in proper feeding.

The findings also indicate that majority of the under-five children had their mothers who were peasant farmers (50%) as their occupation. Children whose mothers were doing business or civil servants were also significantly many (30.8%) as well as the pastoralists (13.4%). followed by those whose mothers were doing business (17.3%). Most of the mothers who did business lived nearer to the trading centres in Nakaseke and Nakasongola districts. There were also a few children whose mothers did handcrafts as their occupation (5.8%).

4.2.3 Immunization status of the under-five children

Table 4.3 presents the full immunization status of under-five children who were involved in the study in Nakaseke and Nakasongola districts.

Table 4.3: Immunization status of under-five children in Nakaseke and Nakasongola Districts

Under-five Child Immunization status(n=104)	Frequency	Percentage (%)
Measles immunization status		
Immunized up to date according to EPI card	54	51.9
Has measles immunization scar	8	7.7
fully immunized according to the mother	34	32.7
Not immunized (> 9months)	6	5.8
Less than 9 months old (not immunized)	2	2
BCG Immunization Status		
Immunized up to date	34	32.7
Has BCG scar	48	46.2
Immunized according to the mother	18	17.3
Not immunized	4	3.9
Vitamin A administration		
Administered according to EPI card	57	54.8
Administered according to the mother	39	37.5
Not administered	8	7.6

The immunization status of the under-five children that were involved in the study reveals that majority of the children (51.9%) were immunized up to date according to the Expanded Programme on Immunization Card (EPI Card), and this was confirmed by at least 32.7% of the mothers whose children were fully immunized.

Similar results were obtained for the Bacille Calmette-Guerin (BCG) immunization where most of the children had BCG scars (46.2%) followed by 32.7% of the children that were immunized up to date. Non immunized children were few (only 3.9%) among the under-five children. BCG is a vaccine for tuberculosis (TB) disease recommended by the World Health Organization.

On vitamin A supplement administration, majority of the children received vitamin A supplement according to EPI card (54.8%) followed by those who were administered vitamin

A as reported by their mothers (37.5 %). Only 7.6 % of the children had not received vitamin A supplementation. The high immunization and Vitamin A supplementation levels among the children is in line with the Uganda Government’s policy through which mothers are regularly mobilized to take their children to health units for immunization. This programme is known as Child Days Plus (CDP).

4.3 Levels of malnutrition among underfive children

The levels of malnutrition among children underfive years in Nakaseke and Nakasongola districts in Central Uganda are presented in Table 4.4.

Table 4.4: Levels of malnutrition among underfive children in Nakaseke and Nakasongola districts

Malnutrition Index	Overall status (%)	Nakaseke (n=54)	Nakasongola (n=50)
Stunting	38.5	23(42.6%)	17(34.0%)
Wasting	16.5	12(22.2%)	5(10.2%)
Underweight	13.5	9(16.7)	5(10.0%)

Results indicate that stunting was the most common malnutrition problem (38.5%) among underfive children in Nakaseke and Nakasongola district. There was also quite a high prevalence of wasting and underweight among underfive children given the fact that the sample of children was not very big. The findings are slightly higher than the Uganda national figures of stunting at 33%, and wasting at five percent. There is an almost similar proportion of children underweight with the national prevalence of 14% according to Uganda Demographic and Health Survey (UBOS and ICF International Inc., 2012).

On the levels of malnutrition by district, results in Table 4.4 indicate that stunting was higher in Nakaseke district than in Nakasongola. Similarly, child wasting and underweight were highest in Nakaseke than in Nakasongola district.

4.4 Relationship between child and maternal factors with malnutrition among under-five children

Results on the relationship between child and maternal factors with malnutrition among under-five children are presented in Table 4.5.

Table 4.5: Bivariate associations between child and maternal factors with malnutrition among under-five children

Explanatory Variable	Total Children	Stunting		Wasting		Underweight		χ^2	p
		Stunted (%)		Wasted (%)		Underweight (%)			
Sex of the child			0.011	0.546		3.302	0.069	1.839	0.159
Male	39	15(38.5)			3(7.7)			2(5.1)	
Female	48	19(39.6)			11(22.9)			7(14.6)	
Age of child(months)			1.993	0.737		0.788	0.94	9.949	0.041**
≤12	76	32(42.1)			13(17.1)			9(11.8)	
13-36	16	4(25)			2(12.5)			0	
37-59	16	6(37.5)			2(12.5)			5(31.3)	
Birth Order			0.438	0.803		2.921	0.232	5.378	0.068
1-2	43	19(44.2)			3(6.9)			3(6.9)	
3-4	18	8(44.4)			4(22.2)			4(22.2)	
5+	17	6(35.3)			3(17.6)			0	
Birth Interval (years)			5.085	0.079		0.153	0.926	0.795	0.672
≤2	38	15(39.5)			6(15.7)			4(10.5)	
3-4	17	11(64.7)			2(11.8)			2(11.8)	
5-6	6	1(16.7)			1(16.7)			0	

Age of mother at birth (years)			3.135	0.371		1.351	0.717		1.503	0.681
< 20 Years	16	6(37.5)			2(12.5)			2(12.5)		
20-29 Years	41	15(36.6)			7(17.1)			3(7.3)		
30-39 Years	23	13(56.5)			3(13.0)			3(13.0)		
40-49 Years	7	2(28.6)			0			0		
Mother's education level			1.135	0.769		3.525	0.317		2.866	0.413
No education	11	3(27.3)			3(27.3)			2(18.2)		
Primary	57	25(43.9)			6(10.5)			4(7.0)		
Secondary+	11	5(45.6)			2(18.2)			0		
Marital Status			1.331	0.275		1.55	0.362		0.032	0.584
Never married/Separated	34	11(32.4)			3(8.8)			3(8.8)		
Married/Cohabiting	56	25(44.6)			11(19.6)			6(10.7)		
Mothers' occupation			11.03	0.05**		3.101	0.684		3.419	0.636
Peasant farmer	44	20(45.5)			6(13.6)			5(11.4)		
Pastoralist	11	1(9.1)			2(18.2)			0		
Business/civil servant	15	9(60)			3(20)			0		
Handcraft	6	2(27.3)			0			0		

** Statistically significant at 95% Confidence Interval

A comparison of stuntedness between males and females showed that slightly more females (39.6%) were stunted compared to 38.5% of the males. For wasting and underweight, females were equally more wasted and underweight respectively than their male counterparts. However there was no significant relationship between sex of child and malnutrition.

On the age of a child, there was a significant relationship between age of child and underweight ($p=0.041^{**}<0.05$). There were few children underweight from 13-59 months (only five) unlike those aged 12 months and below as shown in table 4.5. Also children aged 12 months and below were more stunted and wasted than those older from 13-59 months.

For birth order, stunting was more among children of birth order 1-4 than those of order 5 and above. Children of birth order 3-4 were more wasted than those of birth order 1-2 or 5+. Similarly, underweight was highest among children of birth order 3-4.

On the birth interval, stunting was highest among underfive children with birth interval of 3-4 years than those of ≤ 2 or even 5-6 years. For wasting, however, more children of birth interval ≤ 2 years were wasted. On underweight, only few cases of children with birth interval 4 years and below were underweight. There was however no significant relationship between birth interval and all the malnutrition indices that is stunting, wasting and underweight.

Results also indicate that there were more stunted children among mothers aged 30-39 years (56.5%) than those 20-29 years or even 40-49 years. There was however no significant relationship between age of mother at birth and stunting. However, there were more wasted children among mothers aged 20-29 years unlike other age groups. It is indicated that majority of underweight children were from mothers aged 40-49 years. There was no significant relationship between age of mother and malnutrition among underfive children.

On mother's level of education, most of the children had mother with primary and secondary+ education. Stunting was less among children of mothers with no formal education. There was no significant relationship between mother's education level and malnutrition.

On the marital status, majority of the stunted children were from mothers who were married or cohabiting (44.6%). Similarly, there were more wasted and underweight children among married or cohabiting couples. There was however no significant relationship between marital status and malnutrition.

There was a significant relationship between mothers occupation and malnutrition($p=0.05$). More stunted children were from peasant farmers as well as business/civil servants. In the same vein, wasting and underweight was common among peasant farmers and pastoralists.

4.5 Determinants of malnutrition among under-five children in Nakaseke and Nakasongola districts.

The binary logistic regression model was fitted to examine the determinants of under-five child malnutrition and the results are presented below.

Table 4.6: Determinants of malnutrition among underfive children in Nakaseke and Nakasongola districts

Variable	Stunting			Wasting			Underweight		
	OR	β	p	OR	β	p	OR	β	p
Sex of the child									
Male*									
Female	1.07	0.48	0.89	3.36	2.34	0.08	2.98	2.48	0.19
Age of child (months)									
$\leq 12^*$									
13-36	0.38	0.26	0.16	0.79	0.65	0.78	0.67	0.59	0.65
37-59	0.76	0.46	0.66	0.79	0.65	0.78	4.14	2.74	0.03**
Birth Order									
1-2*									
3-4	0.74	0.42	0.59	3.62	2.98	0.12	3.62	2.99	0.12
5+	0.69	0.42	0.55	2.92	2.56	0.22	4.40	5.78	0.26
Birth Interval (years)									
$\leq 2^*$									
3-4	2.33	1.44	0.17	0.71	0.63	0.70	1.14	1.05	0.88
5-6	1.86	2.18	0.59	0.72	0.66	0.72	1.04	0.84	0.96

Age of mother at birth (years)

< 20 Years*

20-29 Years	0.80	0.50	0.72	1.27	1.11	0.78	0.48	0.47	0.46
30-39 Years	1.45	0.99	0.58	0.90	0.88	0.92	0.89	0.88	0.91
40-49 Years	0.27	0.33	0.28	2.17	1.32	0.21	0.19	0.24	0.20

Mother's education level

No education*

Primary	3.09	2.59	0.18	0.29	0.23	0.12	0.31	0.29	0.22
Secondary+	4.00	4.24	0.19	0.78	0.83	0.81	0.40	0.39	0.36

Marital Status

Never married/Separated*

Married/Cohabiting	2.04	0.98	0.14	2.33	1.62	0.22	1.14	0.85	0.86
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Mothers' occupation

Peasant farmer*

Pastoralist	0.12	0.13	0.05**	2.53	2.39	0.33	2.11	2.61	0.55
Business/civil servant	2.71	1.82	0.14	1.58	1.24	0.56	1.15	1.39	0.91
Handcraft	1.23	1.74	0.92	0.24	0.27	0.21	1.15	1.38	0.90

*** Reference category****** Statistically significant at 95% Confidence Interval**

Results in table 4.6 indicate that children aged 37-59 months were less likely to be underweight (OR=0.76) than their counterparts who were aged 12 months and below (reference category) in Nakaseke and Nakasongola districts. In fact children aged 37-59 months and child underweight were statistically significant since the p-value ($p=0.03^{**}<0.05$) was less than the critical value of 0.05 at 95% confidence interval. The above findings agree with similar findings at national level that the proportion of underweight children is lowest among children 36-59 months old and highest among those 6-8 months old (UBOS and ICF International Inc., 2012). Similar findings have been observed by several scholars in Vietnam, India, Nigeria and Kenya (Nguyen and Kam., 2008; Sarmistha, 1999; Babatunde, 2011 and Kabubo-Mariara et al., 2006). The findings are however contrary to the study in Ethiopia that found out that underweight had a positive linear relationship with age of a child (Yimer, 2000).

Findings indicate that there is a significant relationship between woman's occupation and stunting among underfive children ($p=0.05$) in Nakaseke and Nakasongola districts. Children whose mothers were pastoralists (OR=0.12) were less likely to be stunted unlike their counterparts whose mothers were peasant farmers (reference category). Mothers engaged in pastoralism are believed to supplement the nutrition value of their children with cow milk and other milk products which consequently reduces the risk of stunting unlike the peasant farmers and business people. According to Salah and Nnyepi (2006), crop cultivators were more likely to have stunted children. Similarly, a study done in Vietnam found out that children from mothers who were crop cultivators had an increased risk of stunting because they rarely get time to care for their children hence end up leaving them under the care of elder siblings or inexperienced maids (Nguyen and Kam, 2008). In another study, it was

found out that some mothers especially peasant farmers in most cases fail to provide supplementary feeding to their children because they cannot afford (Olwedo et al., 2008).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusion and recommendations of the study in line with the objectives of the study.

5.2 Summary of findings

The study found out that malnutrition is one of the major challenges affecting under-five children in Nakaseke and Nakasongola district. The common form of malnutrition included stunting, wasting and under weight. Children aged 39-59 months were less likely to be underweight than those aged less than twelve months. Stunting was majorly common among children of peasant farmers than those from pastoralist mothers or even those doing business.

5.3 Conclusion

Results from the analysis confirm that age of a child and maternal occupation are one of the most significant determinants of malnutrition in Nakaseke and Nakasongola district. The study therefore underscores the age groups prone to malnutrition challenges as well as the particular occupations among women that could pose a risk of malnutrition to the underfive children. This then gives a focus to policymakers in the designing of strategies aimed at combating malnutrition among children below five years.

5.4 Recommendations

The study recommends exclusive breast feeding and proper supplementary feeding especially among children aged less than 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 the districts of Nakaseke and Nakasongola districts.

The study also recommends a special arrangement for mothers engaged in cultivation to have their children breastfed regularly by having their babies brought to 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.

There is need for a bigger study to be carried out in the districts of Nakaseke and Nakasongola covering more children to establish the determinants of underfive malnutrition. Perhaps another study may establish significant determinants like education of mother, sex of child, birth order, birth interval, age of mother and marital status. These factors were found significant in the literature review despite the fact that they were insignificant in this study.

5.5 Areas for further studies

There is need for a comprehensive study on the impact of climatic variability on the malnutrition of under-five children in Ugandan cattle corridor. This is an environmental aspect that was not particularly studied at length yet it is an important phenomenon that has not been widely studied by several scholars.

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APPENDICES

APPENDIX I: RESEARCH INSTRUMENT

MAKERERE UNIVERSITY

SCHOOL OF STATISTICS AND PLANNING

A Questionnaire on the determinants of malnutrition among under-five children in Nakaseke and Nakasongola districts of Uganda.

Dear respondent,

This is an academic research intended to assess the determinants of malnutrition among under-five children in the districts of Nakaseke and Nakasongola districts of Uganda.

The purpose of this study and its findings is purely academic. I kindly request for your assistance by sparing some of your precious time to participate in this study.

The study will take about 30 minutes only. All information provided will be handled and treated with utmost confidentiality.

Thank you.

QUESTIONNAIRE NUMBER	<table border="1"><tr><td style="width: 50%;"></td><td style="width: 50%;"></td></tr></table>		

Date of the interview -----/--/----- time start-----

Participants' identification:

Name Village..... Ward.....

Name of the respondent.....

Relationship of the respondent to the child.....

Number of children below 5 years living in the household.....

Demographic Characteristics		
No	Questions	Response
1	Sex of the child	1= Male 2=Female
2	Date of birth of the child (DD/MM/YY <i>(if possible verify with the available documents)</i>)	_____/_____/_____
3	Birth order of the child (<i>refer to the biological mother of the child</i>)	_____
4	Birth interval between the child and older sibling(if any)_____ (years)	
5	Is the child's biological mother alive?	1=Yes 2=No, 3= I do not know
6	Is the child's biological father alive?	1=Yes 2=No, 3= I do not know
7	What is the marital status of the parents if both are alive?	1=Never lived together as couple, 1=Married, 3=Separated,

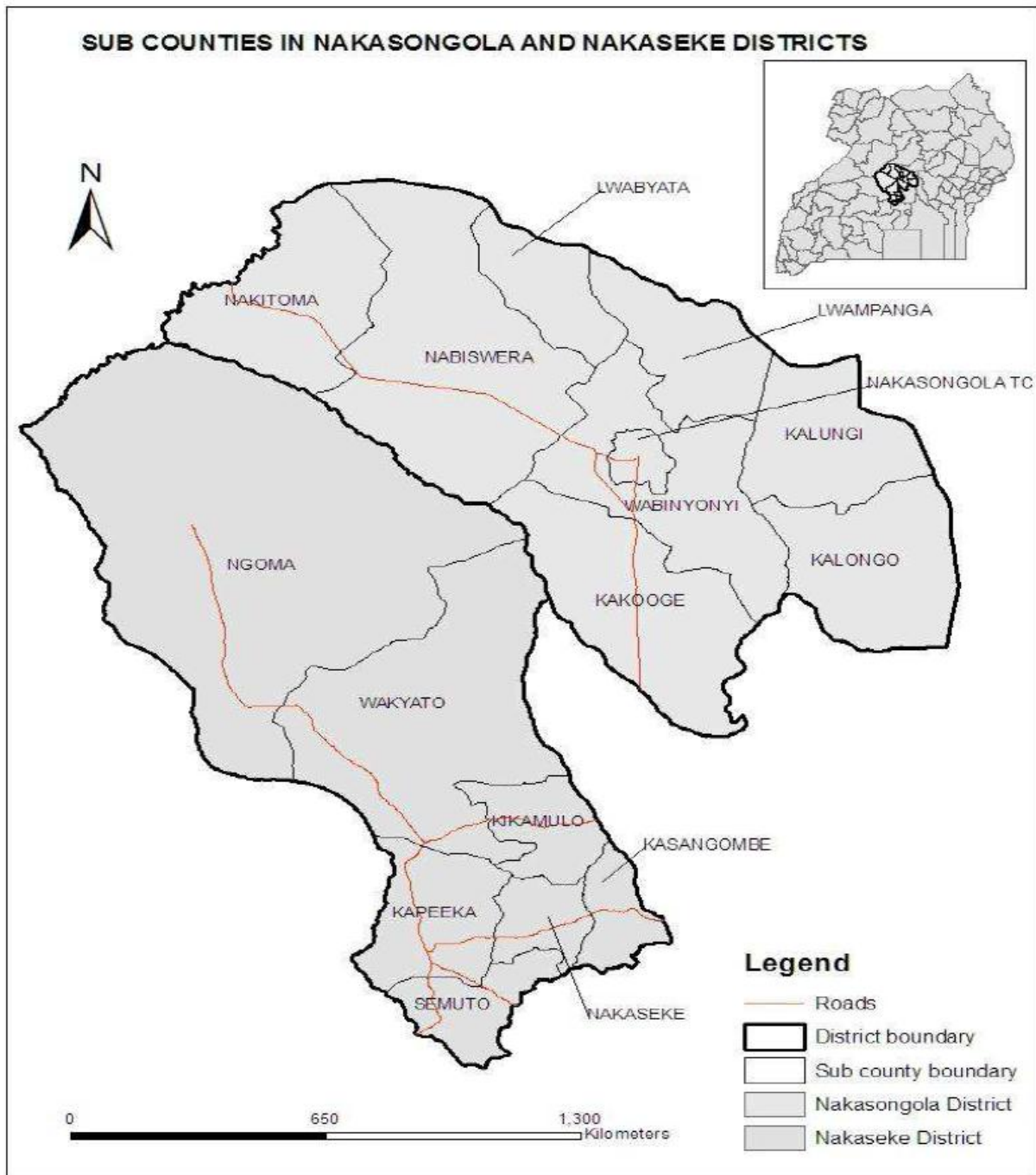
Demographic Characteristics		
No	Questions	Response
		4=cohabiting, 5=I do not know
8	How old was the child's biological mother at birth?	_____ (years)
9	What is the highest level of education for the child's mother?	1=Not gone to school at all 2=Primary education 3=Secondary 4=Tertiary/University
10	What is the occupation for the child's mother?	1= Peasant farmer 2= civil servant/NGO staff 3= Pastoralist 4= Business 5= Handcrafts 6= Others
11	What is the Measles immunization status of the child?	1=immunized up to date according to EPI card,

Demographic Characteristics		
No	Questions	Response
		<p>2= Has measles immunization scar,</p> <p>3 = fully immunized according to the mother,</p> <p>4 = Not immunized (≥ 9 months),</p> <p>5=Less than 9 months old (Not yet immunized),</p> <p>6 = I do not know</p>
12	What is the BCG Immunization status of the child?	<p>1= immunized up to date,</p> <p>2= Has BCG scar,</p> <p>3=immunized according to the mother,</p> <p>4 = Not immunized,</p> <p>5 = I do not know</p>
13	Vitamin A supplement administered to the child?	<p>1= administered according to EPI card</p> <p>2= administered according to the mother</p> <p>3= Not immunized</p> <p>4 = I do not know</p>

Demographic Characteristics		
No	Questions	Response
14	Did the child get very ill in the last 3 months that you thought he/she could die?	1=Yes 2=No 3=I do not know
15	Did the child get any of the following illnesses in the last 3 month's?	On &Off fever >1 week (1=Yes, 2=No) Measles (1=Yes, 2=No) Diarrhoea >1 week (1=Yes, 2=No) Persistent cough > 3 weeks (1=Yes, 2=No) Others (specify)_____
<i>CHILD ANTHROPOMETRY</i>		
16	What is the weight of the child? (Kgs)	_____ (Kg)
17	What is the height/length of the child? (CM)	_____ (CM)
18	What is the mid Upper arm circumference of the child? (CM)	_____ (CM)
	Time at the end of the interview	_____
Thank you		

APPENDIX II: A MAP SHOWING STUDY AREA

A map: Sub counties in Nakaseke and Nakasongola districts; Part of Uganda cattle corridor.



Source: Uganda Government, Districts by 2007.