

**PREVALENCE OF MALNUTRITION AND ASSOCIATED FACTORS AMONG
CHILDREN AGED 6-59 MONTHS IN KIZINDA SUBURB
BUSHENYI-ISHAKA MUNICIPALITY**

BY

**OMAR SALAT BUUL
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DECLARATION

I Omar Salad Bull declares that this research report is original, and it has never been presented to any institution of higher learning in partial fulfillment for the award of any level.

Sign..... date.....

OMAR SALAT BU

APPROVAL OF SUBMISSION

This research report was submitted with approval of the supervisor.

Sign.....date.....

MR. FASEUN YUSUF

BSc. MSc.

Supervisor

DEDICATION

My mother Hawa, my wife Sarah and my children who all missed me during the course of the study.

ACKNOWLEDGEMENT

My sincerely appreciation goes to my Supervisor Mr. Yussuf whose guidance helped me complete this research project. My fellow students and other lecturers for their support and company.

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LIST OF ABBREVIATIONS

HIV	HUMAN IMMUNODEFICIENCY VIRUS
SDG	SUSTAINABLE DEVELOPMENT GOALS
UDHS	UGANDA DEMOGRAPHIC HEALTH SURVEY
WHO	WORLD HEALTH ORGANIZATION

OPERATIONAL DEFINITION OF TERMS

Anthropometry: Measurement of the variation of physical dimensions and the gross composition of the human body at different age levels and degrees of nutrition by weight-for-age, height-for-age and weight-for-height.

Complementary food: Foods which are required by the child, after six months of age, in addition to sustained breastfeeding.

Diarrhea: Diarrhea is defined for a child having three or more loose or watery stools per day.

Family size: refers total number of people living in a house during the study period.

Fever: A child with elevated body temperature than usual.

Income: It is periodical monthly earning from one's business, lands, work, investment etc.

Malnourished: A child was labeled as malnourished if any of the nutritional assessment indices weight for height, weight for age, or height for age is abnormal.

Measles: A child with more than three signs of the following is considered having measles: fever, and skin rash, runny nose or red eyes, and/or mouth infection, or chest infection.

Stunting: A child was defined as stunted if the height for age index was found to be below -2 SD of the median of the standard curve. Severe stunting was diagnosed if it was below -3 SD.

Wasting: A child was defined as wasted if the weight for height index was found to be below -2 SD of the median of the standard curve. Severe wasting was diagnosed if it was below -3 SD.

Underweight: Measurements that fall below 2 standard deviations under the normal weight for age.

ABSTRACT

Background: Globally, approximately 151 million children under 5 suffer from stunting and in 2017, nearly 51 million children under 5 were wasted. In Uganda, child malnutrition is one of the most serious public health problems and among the highest in the world with about 28.9% stunted and 3.6 % wasted in 2015. Therefore, the purpose of this study was to identify prevalence of malnutrition and determine the associated factors for malnutrition among children under the age of 5 years among children in Kizinda suburb, Bushenyi-Ishaka municipality.

Methods: A community base cross-sectional descriptive study was conducted. Data collection was done using a pretested questionnaire and the Emergency Nutrition Assessment software version 2015 was used to generate z-scores and the Weight for Height Z-scores (WHZ) were generated using WHO 2005 Growth Standards. The data was then exported to IBM SPSS version 25 for analysis.

Results: Malnutrition was found to be at 31.9% (n=135) and factors associated with malnutrition were, sex of the child where, female children were 4 times likely to be malnourished than boys ($P=0.002$; $OR=3.620$; $95\%CI=1.560-8.385$). Birth weight was statistically associated with malnutrition ($P<0.001$; $X^2=18.19$) and a child with small birth weight had a 4 times risk of being malnourished ($OR=3.620$; $95\%CI=1.561-8.385$). results further showed that children who had no history of illness had reduced risk of being malnourished have ($OR=0.276$; $95\%CI=0.119-0.641$). Both caretaker's education level and occupation were statistically significant at ($P<0.001$, $X^2=20.09$) and ($P<0.001$, $X^2=17.94$) respectively.

Conclusion and recommendations: This study found out that prevalence of malnutrition was high (31.9%). Among the factors that were investigated, sex of the child, birth weight, history of infectious disease, caretaker's education and occupation were all significantly associated with malnutrition. A strong nutrition specific and sensitive intervention should be implemented in the study area with a special focus on supporting housewives, promoting education on child feeding and nutrition.

CHAPTER ONE

INTRODUCTION

1.1 Background

Child malnutrition remains a major public health problem in developing countries and major contributor to global disease burden (Nordqvist, 2017). Malnutrition's impact on child survival and future national economic productivity cannot be over-emphasized (Bourke, Berkley, & Prendergast, 2016). Worldwide, approximately 50.5 million (7.5%) children under the age of five years were wasted while 150.8 million (22.2%) were stunted in 2017 (Unicef, WHO, & World Bank Group, 2018).

Although estimates suggested a declining trend in the global prevalence of stunting and wasting among children less than five years, Africa among other United Nation regions registered the lowest percentage decrease in prevalence of stunting (12.2%) from 1990 (42.5%) to 2017 (30.3%) (Unicef et al., 2018). In most sub-Saharan African countries, the level of wasting among children under-five years of age remained below emergency threshold level but at poor nutritional threshold levels (6.4%) for East Africa (Watkins, Bundy, Jamison, Fink, & Georgiadis, 2017). Subramanian and colleagues showed that approximately 45% of all deaths in children under five years were associated with malnutrition (Subramanian, Mejía-Guevara, & Krishna, 2016). This further underpins the impact of malnutrition on child survival.

The 2016 Ugandan Demographic and Health Survey (UDHS) showed a wasting and stunting prevalence of 3.6% and 28.9% respectively among children under five years of age (UDHS, 2017). Rural children were more disproportionately affected than their urban counterparts. In addition, the economic costs associated with childhood malnutrition in Uganda are of serious concern to policy makers, public health professionals and public health researchers. A growing annual economic loss of 1.8 trillion Ugandan shillings, an equivalent of 5.6% of the country's Gross Domestic Product (GDP) was reported (Government Of Uganda, 2015). This economic hemorrhage, malnutrition related premature childhood deaths (Bourke et al., 2016) and its sequel in a life-course perspective (Richter et al., 2017) are very important negative signals for Uganda's development. To reduce the burden of wasting and stunting among children under five years, globally applicable evidence-based nutrition specific and sensitive interventions were recommended (Vaivada, Gaffey, Das, & Bhutta, 2017), however the success of these interventions depends on several factors among which include identification of local and country

specific malnutrition risk factors, the benchmark for nutrition policy and interventions development, advocacy for resource envelop and political commitment (Thow et al., 2018).

Risk factors for wasting and stunting are overt across the globe. In the Lancet series of maternal and child nutrition, two systematic reviews by Black et al delineated the potential risk factors for wasting and stunting among children under five years of age at both global and regional level (Black et al., 2013), in middle and low-income countries (Bhutta et al., 2013), let alone the comprehensive UNICEF framework of determinants of malnutrition (Groot et al., 2015). Risk factors for stunting range from socio-economic to individual level factors such as inadequate dietary intake and infections. Low socio-economic status is an important distal risk factor for stunting. In particular limited maternal opportunity to earn and limited health knowledge resulting from lack of or limited formal education as opposed to paternal education, aggravates other correlates of stunting such as poor child-care practices related to nutrition, health and access to existing nutrition and health interventions (Dramowski, Whitelaw, & Cotton, 2016). Maternal short stature and low maternal body mass index ($<18.5\text{kg/m}^2$) have synergistic effect on pregnancy outcomes with the earlier leading to increased probability of operative delivery and the later intrauterine growth restriction thought to be the beginning point of linear growth faltering and a precursor for neonatal conditions (Nordqvist, 2017). The immediate risk factors for stunting in developing countries as alluded to earlier on are; inadequate dietary intake and frequent infections such as diarrheal diseases, measles, malaria, pneumonia and meningitis which interact in a process known as the malnutrition-infection cycle. Risk factors for wasting are synonymous with those for stunting though a slight difference exists (Habaasa, 2015).

Understanding persisting risk factors for wasting and stunting is essential to inform nutrition interventions and policy development at local and national level. This study therefore, investigated the prevalence and risk factors for malnutrition among children under five years of age in Kizinda suburb, Bushenyi Ishaka municipality.

1.2 Problem statement

Globally, approximately 151 million children under 5 suffer from stunting and in 2017, nearly 51 million children under 5 were wasted and 16 million were severely wasted (Unicef et al., 2018).

In Uganda, child malnutrition is one of the most serious public health problems and among the highest in the world (WHO, 2015). Nationally about 28.9% stunted and 3.6 % children were wasted in 2015 (UDHS, 2017). Moreover, Children suffering from stunting may never attain their full possible height and their brains may never develop to their full cognitive potential. More so, Children suffering from wasting have weakened immunity, are susceptible to long term developmental delays, and face an increased risk of death, particularly when wasting is severe. In addition, malnourished children that survive do suffer from frequent illness, which adversely affects their nutritional status and keeps them in a vicious cycle of recurring sickness, poor growth and diminished learning ability (World Health Organization, 2018).

In Bushenyi Ishaka municipality, prevalence of child malnutrition was not known as no study had been done before and results from elsewhere could not be assumed to be the same. Thus, this study assessed the prevalence of malnutrition and associated factors among children aged 6-59 months in Kizinda.

1.3 Objectives of the study

1.3.1 General Objective

To assess prevalence of malnutrition and associated factors among children aged 6-59 months in Kizinda suburb, Bushenyi Ishaka municipality.

1.3.2 Specific Objectives

- i. To determine prevalence of malnutrition among children aged 6-59 months in Kizinda suburb, Bushenyi Ishaka municipality.
- ii. To identify associated factors of malnutrition among children aged 6-59 months in Kizinda suburb, Bushenyi Ishaka municipality.

1.4 Research questions

- i. What is the prevalence of malnutrition among children aged 6-59 months in Kizinda suburb Bushenyi Ishaka municipality?
- ii. Which factors are associated factors of malnutrition among children aged 6-59 months in Kizinda suburb, Bushenyi Ishaka municipality?

1.5 Justification of the study

Malnutrition is one of the main health problems facing children in under five age group in developing countries. The prevalence of malnutrition imposes significant costs on the Ugandan

economy as well as society. The high mortality due to malnutrition leads to the loss of the economic potential of the child. It affects children in many ways, predisposing them to different infectious diseases, psychosocial maldevelopment, and cognitive deficiencies.

The prevalence of malnutrition in Uganda is relatively well documented, but not specific to the regions, localities and residence so far. It also varies among regions, localities and residence and limited data is available in study area. Therefore, this study was designed to assess the prevalence of malnutrition and associated factors among children aged 6-59 months in Kizinda, Bushenyi Ishaka municipality. Results from the study can be used as a reference in priority setting and designing effective nutritional programs by the municipality and Bushenyi district authorities.

CHAPTER TWO: LITERATURE REVIEW

2.1 Overview of malnutrition

Three major types of undernutrition are explicit; stunting, wasting and underweight. Stunting is a chronic form of undernutrition which reflects prolonged period of insufficient nutrient intake and assimilation. It's also an indicator of overall societal socio-economic conditions (Arsenault et al., 2011). Wasting on the other hand is an acute form of undernutrition, an indicator of body tissue and fat mass deficit resulting from insufficient nutrient intake within a short-period of time. It's often used as an educated guess of the general population health (Cunningham et al., 2015). A child is considered to be either stunted or wasted if his/her length/height-for-age and weight-for-height z-scores is < -2 standard deviation of the WHO Child Growth Standards median respectively (Lancet, 2014). Lastly underweight, a third sub-division of undernutrition is a composite measure that includes both wasting and stunting. It accounts for 95% of the variance in weight-for-height index (Marshall, 2016), however has less discriminatory power for undernutrition and less utilized for that purpose (UNICEF, 2018).

2.2 Prevalence of malnutrition

Malnutrition rates remain alarming: stunting is declining too slowly while wasting still impacts the lives of far too many young children (World Health Organization, 2018). Worldwide, over 10 million children under the age of 5 years die every year from preventable and treatable illnesses despite effective health interventions. At least half of these deaths are caused by malnutrition (Saunders, Smith, & Stroud, 2015). Malnourished children have lowered resistance to infection; therefore, they are more likely to die from common childhood ailments such as diarrheal diseases and respiratory infections. In addition, malnourished children that survive are likely to suffer from frequent illness, which adversely affects their nutritional status and locks them into a vicious cycle of recurring sickness, faltering growth and diminished learning ability.

In developing countries, malnutrition is a major health problem. The burden of malnutrition is much higher in South Asia compared to that in Africa and other parts of the world. The recent WHO update on malnutrition indicate that 50.5 million globally are wasted and half of these live in South Asia (Unicef et al., 2018). Chronic malnutrition has been a persistent problem for young children in Sub-Saharan Africa. A high percentage of these children fail to reach the normal WHO standard height for their age; that is, they are "stunted". In contrast, the percentage of

children stunted in Southeast Asia dropped from 52 percent to 42 percent between 1990 and 2017.

A study conducted on influence of socio-economic factors on nutritional status of children in a rural community of Ibadan state, Nigeria revealed that the prevalence rates of underweight, wasting and stunting were 23.1%, 9 % and 26.7% respectively (Owoaje, Onifade, & Desmennu, 2014). A cross-sectional study conducted in Sekela district in western Ethiopia, the prevalence of underweight, stunting and wasting were 27%, 37% and 11%, respectively (Mulu & Mengistie, 2017). The prevalence of children under five years with acute malnutrition in Southern Sudan is one of the highest in the world approximately one out of every five children (22%) suffers from moderate to severe acute malnutrition (wasting). The prevalence of acute malnutrition among this age population in Southern Sudan is almost twice as high as in other parts of Sudan and also study conducted in a decertified area of Sudan - Alrawakeeb valley revealed that the prevalence of malnutrition among these children is very high (27.5% were severely malnourished and 35% suffered from either mild or moderate malnutrition (Musa, Musa, Ali, & Musa, 2014).

According to research conducted in pre-school children in a rural area of western Kenya revealed that, the prevalence of stunting, underweight and wasting were 30%, 20%, and 4%, respectively (Shinsugi et al., 2015). Similarly, study done in urban Haryana community revealed that, the prevalence of stunting, Underweight and wasting were 37.2%, 14.6%, and 4.5%, respectively. Moreover, severe stunting, severe underweight and severe wasting were seen in 14.8%, 2.9%, and 0.5% of the Children respectively (Yadav et al., 2016).

2.3 Factors associated with malnutrition

The causes of malnutrition are numerous and multifaceted. These causes intertwine with each other and are hierarchically related. The most immediate determinants are poor diet and disease which are themselves caused by a set of underlying factors; household food security, maternal/ child caring practices and access to health services and healthy environment. These underlying factors themselves are influenced by the basic socio-economic and political conditions (Kramer & Allen, 2015).

Study conducted on malnutrition among under five children in Bangladesh revealed that household Female gender, economic status, mother's education, father's education, mother's antenatal visit (s), mother's age at birth and mother's BMI are the most significant factor /determinant s of child's malnutrition (Rahman, Howlader, Masud, & Rahman, 2016).

As study on influence of socio-economic factors on nutritional status of children in rural areas of Madhya Pradesh State, India, Children of mothers who were not educated beyond secondary school level had one and a half to two times the prevalence rate of stunting. On the other hand, children of mothers with post-secondary education were apparently more often affected by wasting than those with less educated mothers but there was no consistent trend in the pattern of wasting or stunting with respect to paternal educational level. Low maternal income and overcrowding were associated with higher prevalence of wasting. However no association was found between the source of drinking water or social class and malnutrition (Meshram et al., 2015).

Study conducted on prevalence and determinants of malnutrition among Under-five Children in rural communities in Imo State, Nigeria, malnutrition were significant associated gender and age of child, education and body mass index of mother, calorie intake of the households, access to clean water and presence of toilet in the households (Duru et al., 2015). The same study in Enugu state, Nigeria found that poor socioeconomic status was a risk factor for both stunting and underweight, Children reared in the jointly family were found less like to be stunted than those in nuclear family. Also ethnic group and age of mothers at pregnancy seems to have significance association with stunting but maternal education not associated (Nzeagwu & Aleke, 2016). Among the socio-economic variables included in the study in rural Ethiopia, family income was significantly associated with malnutrition (Endris, Asefa, & Dube, 2017).

In Uganda at present the most serious nutritional problems are mainly due to low intake of foods in general. The problem is more severe among children aged 1-3 years (Habaasa, 2015). Legason and colleague found in their study in North Western Uganda that malnutrition in children was influenced by low birth weight and was prominent in age group of 6-17 months (Legason & Dricile, 2018). The main cause of low birth weight especially in developing countries is intra-uterine growth retardation (Mccall, Alderdice, Halliday, Vohra, & Johnston, 2018). It is presumed that babies who suffer from intra-uterine growth retardation will be born malnourished. Studies have shown that about half of the cases of intra-uterine growth retardation in developing countries are due to maternal malnutrition at conception, and low weight gain during pregnancy (Negrato & Gomes, 2013). Other reported causes of intra-uterine growth retardation include iron deficiency and anemia (Quigley, Embleton, & McGuire, 2018). Studies have also shown that babies born to teenage mothers (age<20 years) are more likely to suffer from intra-uterine growth retardation and hence low birth weights (Groer, Gregory, Louis-

Jacques, Thibeu, & Walker, 2015). A possible explanation is that the nutritional demand in a young mother is double as she struggles to complete her own growth.

Factors that are contributing to malnutrition may differ among regions, communities and over time. Identifying the underlying causes of malnutrition in a particular locality is important to solve the nutritional problems. Thus, this study intended to identify the prevalence and risk factors of malnutrition in Kizinda suburb of Bushenyi Ishaka municipality.

CHAPTER THREE

METHODOLOGY

3.1 Study design

This was a community based cross sectional study which was descriptive in nature.

3.2 Study setting

The study was conducted in Kizinda suburb, Ishaka division, Bushenyi Ishaka municipality. In 2014 national census, the municipality had a population of 41,217 people of which 4,969 (12.1%) were children below 5 years old. The municipality borders entirely with Igara East and Igara west counties. Kizinda was chosen because it is the most populated part of the town. It is approximately 61.2 km and 327.6 km from Mbarara and Kampala to Ishaka town respectively.

3.3 Study population

The study population included children aged 6-59 months in the randomly households in Kizinda suburb.

3.3.1 Sample size determination

The sample size was calculated using Kish and Leslie formula (Rutterford, Copas, & Eldridge, 2015) which states that.

$$n = \frac{z^2 p(1-p)}{d^2} \text{ for a population } \geq 10,000$$

Where:

n = the desired sample size

P = 9.7% estimated number of children with malnutrition in Ankole region (UDHS, 2017).

$Z^2 = (1.96)$ Standard normal value at 95% confidence level

d = Margin of error between the sample and the population = 5%

$$\text{Therefore } n = \frac{1.96^2 \times 0.097 (1-0.097)}{0.05^2} = 135.$$

Therefore, the respondents will be 135.

3.3.2 Sampling procedure

The number of households was obtained from the respective chairperson. Sampling interval (K) was calculated and the first household in each village was identified using a random number from k number of households. Then, systematic random sampling technique was used to select

study participants from selected households for measurements. For households which had more than one eligible child, lottery method was used to select one child for the study. Mothers or care givers were interviewed on socio-demographic, economic, child health related characteristics and environmental conditions with a pre-tested structured questionnaire. Child morbidity status was asked in the previous 6 months as diagnosed by a health professional.

3.3.3 Inclusion criteria

Only care takers with children aged 6 – 59 months that gave informed consent was interviewed.

3.3.4 Exclusion criteria

Children who were seriously sick,

Care takers who failed to consent,

Children with deformity like kyphosis

3.4 Definition of variables

3.4.1 Dependent variable

Malnutrition indicated by:

Stunting: A child was defined as stunted if the height for age index was found to be below -2 SD of the median of the standard curve (WHO, 2018).

Wasting: A child was defined as wasted if the weight for height index was found to be below -2 SD of the median of the standard curve (WHO, 2018).

3.4.2 Independent variables

Socio-economic and demographic variables, maternal and child characteristics, environmental and health conditions, and child caring practice

3.5 Data collection tools and procedures

A questionnaire was used to collect information about sociodemographic factors, morbidity, and vitamin A supplementation in under-5s.

Data was captured in Microsoft excel 365 version and then anthropometric data extracted into Emergency Nutrition Assessment (ENA) software version 2015. Anthropometric measurements included weight and height. Body weight was measured to the nearest 0.1 Kg. It was measured with light clothing and no shoes. Calibration of the weighing scale was done before weighing

each participant by setting it to zero. The weighing scale was also checked against a standard weight for its accuracy on daily basis. Height of the participants was measured using ‘Seca’ vertical height measuring scale with the subject standing upright in the middle of the board. For infants who were unable to stand, a height board was used. The occiput, shoulder, buttocks, and heels touched the measuring board (Action Contre la Faim International, 2012) and height was recorded to the nearest 0.5 cm.

3.7 Data management

The data was reviewed, checked for plausibility and feedback given to the teams to proceed with data collection the following day. All survey equipment, for example weighing scales and height boards were calibrated or checked by the supervisors before they were handed over to the teams to be used for measurements. In any event of equipment becoming faulty during the field data collection, it was replaced by good one.

3.8 Data analysis and presentation

The Emergency Nutrition Assessment software version 2015 was used to generate z-scores and the Weight for Height Z-scores (WHZ) were generated using WHO 2005 Growth Standards. The WHO cut off points for mild/moderate malnutrition- weight-for- height z-scores less than -2 SD and/or with bilateral edema, severe acute malnutrition (SAM)-weight-for-height z-scores less than -3 SD and/or with bilateral edema were used. Z-scores obtained from ENA were then incorporated into the Microsoft excel data. The data was then exported to IBM SPSS version 25. Categorical variables were analyzed using the Chi-square test.

3.9 Ethical consideration

Ethical approval was obtained from Kampala international university western campus Faculty of clinical medicine in form of introduction letter after approval of the proposal. A written consent sought from the mothers/caretakers before they participate in the study. Permission to collect data was granted by the town clerk.

3.10 Study limitations

Some of the limitations of the current study include; technical errors in determining anthropometric measurements which could have led to misclassification of children’s nutritional status, self-reported indicators such as child morbidity may be subject to recall bias, and the period in which the survey was conducted may have greatly influenced our nutritional results.

CHAPTER FOUR

RESULTS

4.1 Characteristics of study participants

Table 1 below shows that more than half (60%) of children were females, 68.9% had adequate feeding and 59.3% of the care takers were peasants.

Table 1: Characteristics of study participants

Characteristics of Participants		Frequency	Percent
Sex of child	Female	81	60.0
	Male	54	40.0
Age of the child	6-11	46	34.1
	12-23	30	22.2
	24-35	12	8.9
	36-47	34	25.2
	48-59	13	9.6
Birth weight	Small	26	19.3
	Normal	66	48.9
	Large	43	31.9
Vitamin A supplement	Not up to date	39	28.9
	Up to date	96	71.1
Infectious disease	No	54	40.0
	Yes	81	60.0
Adequacy of feeding	Adequate	93	68.9
	inadequate	42	31.1
Care taker	Not the mother	14	10.4
	Mother	121	89.6
Care taker's education level	No formal education	81	60.0
	Primary	38	28.1
	Secondary	12	8.9
	Tertiary	4	3.0
Employment level	peasant	80	59.3
	Employed	14	10.4
	Self employed	41	30.4

4.2 Prevalence of malnutrition

Figure 1 below shows that 31.9% of the children had malnutrition compared to 68.1% who did not have malnutrition.

Figure 1: Prevalence of malnutrition

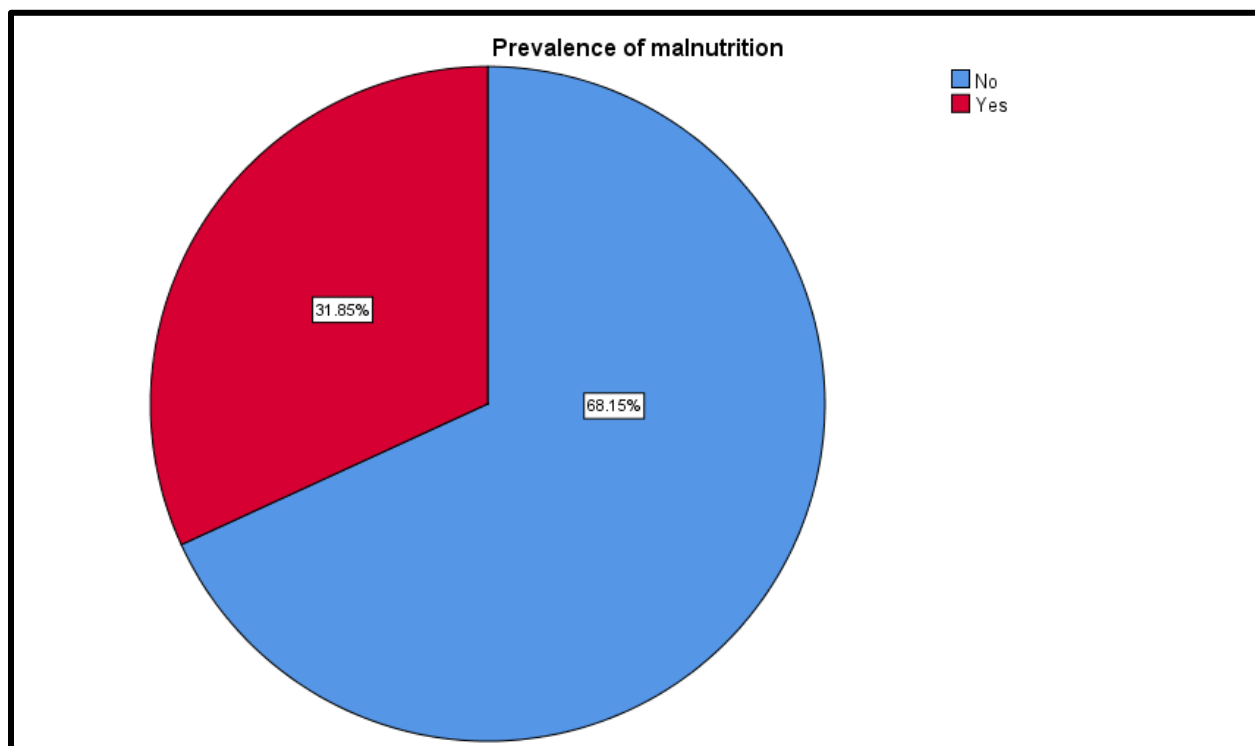


Table 2: Distribution of malnutrition

Nutritional indicator	Nutritional status	Frequency (%)
Weight for Height (WH)	Not wasted ($>-2SD$)	110 (81.5%)
	Wasted ($<-2SD$)	25 (18.5%)
Height for age (HA)	Not stunted ($>-2SD$)	117 (86.7%)
	Stunted ($<-2SD$)	18 (13.3%)

4.3 Association of respondents' characteristics and malnutrition

Among a number of factors studies, sex of the child ($P=0.002$), birth weight ($P=<0.001$), history of infectious disease ($P=0.002$), care takers' education level ($P=<0.001$), and caretakers' employment status ($P=<0.001$) were found statistically significant. Table 2.

Table 3: Association of respondents' characteristics and malnutrition

Characteristics of Participants		Malnutrition		Total	X ²	P value
		No	Yes			
Sex of child	Female	47	34	81	9.56	0.002*
	Male	45	9	54		
Age of the child	6-11	30	16	46	0.34	0.987
	12-23	21	9	30		
	24-35	8	4	12		
	36-47	24	10	34		
	48-59	9	4	13		
Birth weight	Small	10	18	26	18.19	<0.001*
	Normal	53	13	66		
	Large	29	12	43		
Vit A supplement	Not up to date	26	13	39	0.06	0.840
	Up to date	66	30	96		
Infectious disease	No	45	9	54	9.66	0.002*
	Yes	47	34	81		
Feeding adequacy	Adequate	68	25	93	3.41	0.075
	inadequate	24	18	42		
Care taker	Not the mother	10	4	14	0.08	1.000
	Mother	82	39	121		
Care taker's education level	No formal education	50	31	81	20.09	<0.001*
	Primary	35	3	38		
	Secondary	4	8	12		
	Tertiary	3	1	4		
Employment level	peasant	48	32	80	17.94	<0.001*
	Employed	6	8	14		
	Self employed	38	3	41		

*Statistical significance

4.4 Binary logistic regression of significant factors

Factors which were significant at chi square analysis were further analyzed by binary logistic regression and results were as shown in table 3 below. Female children were 4 times likely to be malnourished than males (OR=3.62; 95%CI=1.560-8.385). Similarly, child who had a small birth weight had a times risk of being malnourished (OR=4.35; 95%CI=1.561-12.121). children who had no history of infectious disease had reduced risk of being malnourished (OR=0.276; 95%CI=0.119-0.641).

Table 4: Binary logistic regression of significant factors

Variables		OR	95% CI	
			Lower	Upper
Sex of the child	Female	3.620	1.560	8.385
	Male	1		
Birth weight	Small	4.35	1.561	12.121
	Normal	0.59	0.240.	1.467
	Large	1		
History of infectious disease	No	0.276	0.119	0.641
	Yes	1		
Care takers' Employment	Peasant	8.44	2.401	29.700
	Employed	16.89	3.473	82.14
	Self employed	1		

CHAPTER FIVE:

DISCUSSION

5.1 Prevalence of malnutrition

Prevalence of malnutrition among children 6-59 months in this study was 31.9%. this prevalence is higher than the 28.9% that reported by the Uganda demographic and health survey of 2016 (UDHS, 2017). The reasons for this difference may include study settings and the period in which the surveys were conducted. The National Demographic Survey was conducted over a six-month period from June to December 2016 while this study was done over a period of one month of September.

Compared to similar studies, the prevalence of malnutrition reported here is lower than the 52% reported in South Asia (Unicef, WHO, & World Bank Group, 2018) but consistent with a previous finding among under 5s in Western Ethiopia (Mulu & Mengistie, 2017) and Southeastern Kenya (Shinsugi et al., 2015). The similarity may be due to the same methods used to assess nutritional status.

5.2 Risk factors of malnutrition

The prevalence of malnutrition was higher (79%) in the female children and females were 4 times likely to be malnourished than boys ($P=0.002$; $OR=3.620$; $95\%CI=1.560-8.385$). The higher prevalence of malnutrition among girls may be related to the higher growth rate in girls resulting in greater need for nutrients not supplied by diet (Kramer & Allen, 2015). This contradicts the results of the study by Rahman and colleagues in Bangladesh who reported that boys were more malnourished than girls (Rahman, Howlader, Masud, & Rahman, 2016).

In this study, birth weight was statistically associated with malnutrition ($P<0.001$; $X^2=18.19$). having a small birth weight had a 4 times risk of being malnourished ($OR=3.620$; $95\%CI=1.561-8.385$). This implies that there is an early exposure to nutritional stress and therefore the need for nutritional intervention right from the time of child conception. The observed association between birth weight and malnutrition in children is consistent with findings of several other studies (Habaasa, 2015, Legason & Dricile, 2018). The main cause of low birth weight especially in developing countries is intra-uterine growth retardation (Endris, Asefa, & Dube, 2017). It is presumed that babies who suffer from intra-uterine growth retardation will be born malnourished.

In this study, more than half of the children (60%) were reportedly ill in the preceding two-weeks of the study and this was statistically significant ($P=0.002$). Children who had no history of illness had reduced risk of being malnourished have ($OR=0.276$; $95\%CI=0.119-0.641$). Malnutrition can impair the immune system hence leading to increased susceptibility to infectious diseases (Mccall, Alderdice, Halliday, Vohra, & Johnston, 2018). On the other hand, helminthic infections, malaria and diarrhea have direct impact on malnutrition. For instance, hookworm infections lead to loss of blood and nutrients as a result of the blood sucking activities of the worms (Quigley, Embleton, & McGuire, 2018). Illnesses can also lead to malnutrition by suppressing appetite of an individual for food hence malnutrition (Quigley et al., 2018).

CHAPTER SIX:

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study found out that prevalence of malnutrition was high (31.9%). Among the factors that were investigated, sex of the child, birth weight, history of infectious disease, caretaker's education and occupation were all significantly associated with malnutrition.

6.2 Recommendations

In light of the findings of this study, the following recommendations are offered:

- Another study covering the whole district is recommended to give a district nutrition status in Bushenyi.
- A strong nutrition specific and sensitive intervention should be implemented in the study area with a special focus on supporting housewives, promoting education on child feeding and nutrition

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APPENDIX I: CONSENT FORM

I fully understand the explanation given by the researcher to me on the area of his investigation. I also understand that the aim of her research is to investigate the prevalence and factors influencing malnutrition among children under five years of age in Kizinda, Bushenyi Ishaka municipality. The findings from this study could contribute to the development of policies targeting the prevention of malnutrition in under five children.

I am fully aware that the information I will provide will remain confidential and that my personal details will not be made known. If I agree to respond to the questions contained in the questionnaire, I should do it as fully and objectively as I can by ticking the appropriate box. I am free to withdraw from this study at any time if I so wish.

I therefore:

- a) Agree to take part in the study Signature.....Date:.....
- b) Disagree to take part in the study Signature.....Date:.....

APPENDIX II: QUESTIONNAIRE

PREVALENCE OF CHILDHOOD MALNUTRITION AND ASSOCIATED FACTORS AMONG CHILDREN AGED 6-59 MONTHS IN KIZINDA SUBURB, BUSHENYI- ISHAKA MUNICIPALITY

I. CHILD INFORMATION

1. Age (in months)

2. Sex

- Male = 1
- Female = 2

3. Birth weight.....

- Low birth weight (< 2500 grams) = 1
- Normal birth weight (>or = 2500 grams) = 2

4. Weight and height measurements.....

5. Was the child exclusively breastfed during the first 6 months after birth?.....

Yes (ever breastfed) = 1 No (never breastfed) = 2

6. How many times does the child breastfeed, Milk formula feed, eat solid, semi solid or soft food other than water per 24 hours?.....

Adequate = 1 (at least 8 times for infants 0-6 months old; at least 5 times for infants and children 7-59 months old)

inadequate = 2 (<8times for infants 0-6 months old; < 5 times for infants and children 7-59 months old)

7. Did the child have one of the following conditions (cough, diarrhoea, vomiting, fever, ear problems or disability) 2 weeks prior to the time of the diagnosis of underweight for the case or the corresponding date for the control?.....

Yes = 1

No=2

8. How was the vitamin A supplementation at the time of the diagnosis of underweight for the case or for the corresponding date for the control?..... Up to date = 1 Not up to date = 2

☐☐

III. MOTHER OR CARETAKER INFORMATION

15. The respondent is

the.....

Mother = 1

Caretaker = 2

16. What is your education level?.....

None (never been at school) = 1 Secondary (at least 1 year) = 3

Primary (at least 1 year) = 2

Tertiary (at least 1 year) = 4

☐

17. About the current employment status of the head of your household, which is most appropriate?.....

Unemployed = 1 Sometimes gets temporary jobs = 2 Regular job = 3 Self-employed = 4

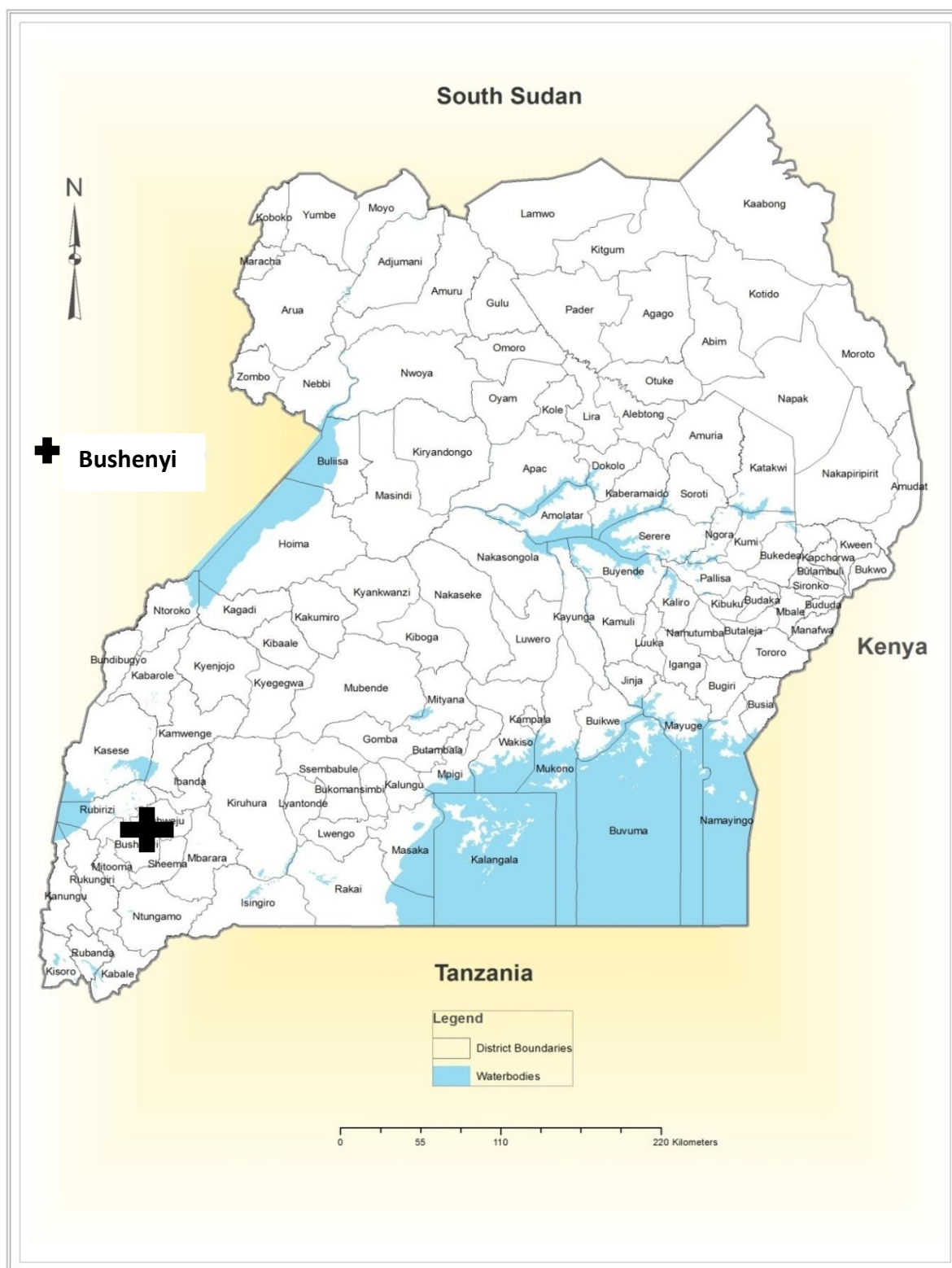
Refused employment = 5

☐

.....**Thank you**.....

☐

APPENDIX IV: MAP OF UGANDA SHOWING LOCATION OF BUSHENYI DISTRICT



APPENDIX V: MAP OF BUSHENYI SHOWING BUSHENYI-ISHAKA MUNICIPALITY

