FACTORS ASSOCIATED WITH HIGH MALNUTRITION RATES IN CHILDREN UNDER FIVE YEARS IN KARAMOJA REGION

BY

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AUGUST 2018
DECLARATION

I AINE BARBRA do declare that this is my original report complied and documented by my own efforts and it has not been duplicated from one presented by any other person or institute.

Signature.....................................

AINE BARBRA

15/U/45

Date.................................
This dissertation has been submitted to the school of statistics and planning for examination under my approval.

SUPERVISOR

SIGNATURE

..............................................................

DR MBONYE MARTIN.

DATE

8/7/2018
DEDICATION
I dedicate this report to my fellow students at Makerere University and any other institutions all over the country. I hope what it presents aids them with the knowledge they can base on for their research papers. I also dedicate it to my family and friends.
ACKNOWLEDGEMENT
This research would not have been possible without the guidance of several people who contributed and extended their valuable time and assistance in different ways. First of all I appreciate my supervisor DR Mbonye Martin for the professional mentorship, my parents MR and MRS Mugabe Frank for the love, care and financial assistance. I would like to take this opportunity to pass on my deep appreciation to my fellow students for their roles played in the competition of this great work.
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ABSTRACT
The study based on data from the UDHS 2016 and it considered respondents from Karamoja region Uganda. The study also based on children under-five years. The majority of the respondents were from rural areas (86.9%), had no education (70.1%) and belonged to the poorest households (81.8%). The highest proportion of respondents belonged to the catholic faith (75.8%), there children were below 1 year (33.2%) and were male (54.1%).

At bivariate analysis results showed that there was no significant relationship between malnutrition and other background factors. This was as a result of p-value<0.05.

At multivariate analysis, associated was found to exist between malnutrition and level of education, religion and age of the child at 95% confidence interval were by categories had odds ratios greater than 1.

Results from the analysis show that there was no influence of social demographic factors on malnutrition among children under five years in Karamoja region. Therefore the study urges more research about malnutrition to be done on the national level to bring about the relationship between malnutrition and background factors.

Basing on the findings of the study, the researcher recommends that the region of Karamoja adopts exclusive breast feeding programs in order to encourage mother breast feed their babies to eliminate cases of underweight and stunning growth among the children under-five years in Karamoja.
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<td>UDHS</td>
<td>UGANDA DEMOGRAPHIC AND HEALTH SURVEY</td>
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<td>SD</td>
<td>STANDARD DEVIATION</td>
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<td>UBOS</td>
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CHAPTER ONE

INTRODUCTION
The chapter gives information about the research problem, hypothesis, statement and background of the problem, objectives, significance and the scope of the study.

It focuses on the factors associated with the high malnutrition rates in children aged 5 years and below in Karamoja region.

1.1 BACKGROUND OF THE STUDY
Malnutrition is globally the cause of high morbidity and mortality rates especially in children aged 1-59 months. However, the rates are high in developing countries and in Uganda Karamoja has one of the highest malnutrition cases. This is according to the 2016 UDHS. It highlights the regions to have the highest percentage of underweight children as a result of malnutrition which is 26%.

Evaluation of malnutrition is based on the general comparison of basically three indices.

i. Height for age
ii. Weight for height
iii. Weight for age

They are furthermore exposed as standard deviation units from the reference group median. Therefore children who find themselves falling below minus two standard deviation (-2sp) from the median are regarded as moderately malnourished. Those that fall below minus three standard deviation (-3sd) from the reference population median are considered severely malnourished.

According to the above mentioned anthropometric indices, height for age is a measure of linear growth.

A child below -2SD is considered short for his or her age or stunned.

Weight for height describes current nutritional status. A child below -2SD from the reference median for weight for height its considered too thin for his or her height or wasted a condition that reflects acute or recent nutrition deficits.

Karamoja sub region has the highest number of wasted children.
Weight for age is a composite index for weight for height and height for age and thus do not distinguish between acute malnutrition (wasting) and chronic malnutrition (stunting). Children can be underweight for their age because they are stunted, wasted or both. Weight for age is an overall indicator of population nutritional health. The proportion of children underweight decreases with increasing levels of the mother’s education, increasing wealth quartiles.

Karamoja sub-region is in the northern part of Uganda. It consists of districts like Gulu, Kotido and Kaboong. Dr. Emmanuel Owing a nutritionist working with doctors in Africa explains that the number of underfed children in the region is still high due to the region being hard hit by famine.

Overall food insecurity classification shows that 14 percent the population in Karamoja is food insecure due to increased weather variations leading to poor harvests.

Nonetheless, malnutrition varies remain high due to poor household food security situation that has a cascading effect on infant and young child feeding practices, including the ability of mothers/care givers to provide meals of an adequate diversity and at acceptable frequency.

Poor water sanitation and hygiene situation with high levels of utilization of unsafe water sources, limited treatment of water before use and absence of sanitary facilities in majority of households.

1.2 STATEMENT OF THE PROBLEM
Malnutrition is the cellular imbalance between the supply of nutrients, energy and the body’s demand for them to ensure growth maintenance and specific functions.

It occurs when an individual lacks nutrients because they do not consume enough food. Poor diet may lead to a lack of vitamin, minerals and other essential substances. Too little protein can lead to kwashiorkor lack of vitamin c.

When it happens during childhood, it leads to not only long term health problems but also to educational challenges and limited work opportunities in future.

Malnourished children often have smaller babies when they grow up. It can also slow recovery from wounds and illness, continues to complicate diseases such as measles, pneumonia, malaria and diarrhea. It makes the body more susceptible to diseases.
In more severe cases, breathing becomes difficult; hair becomes dry and sparse falling out easily. The cheeks appear hollow and eyes sunken as fat disappears from the face. Eventually, there may be respiratory and heart failure.

It is for this reason, therefore the most emphasis and attention be focused in reducing malnutrition cases in Karamoja and other parts of Uganda.

1.3 RESEARCH OBJECTIVES

1.3.1 Main Objectives
The purpose of this research is to examine factors associated with the high malnutrition cases in children aged five years and below in Karamoja sub-region.

1.3.2 Specific Objectives
   i. To find out the relationship between malnutrition among children under five years and the wealth quintile of their parents.
   ii. To establish the relationship between malnutrition among children under five years and education status of their mothers.
   iii. To find out the relationship between malnutrition among children under five years and the religious beliefs of their mothers.
   iv. To find out the relationship between malnutrition among children under five years and place of residence.

1.4 HYPOTHESIS
Children under five years of mothers that have not acquired an education are more likely to get malnourished than those born to educated mothers.

Children below five years of age of poor mothers (mothers with the lowest wealth index) are more likely to be malnourished than those of mothers with the highest wealth index.

Religion of mother has a zero impact on malnutrition of children less than five years.

Children below five years of age of mothers living in rural areas are more likely to be malnourished than those of mothers living in urban areas.
1.5 JUSTIFICATION OF THE STUDY
The study will add more information about factors contributing to high malnutrition levels in Karamoja region which will help policy makers in making better policies concerning malnutrition and the child feeding practices.

The study will provide more information that will be used in implementing new programs that will focus on overcoming/reducing malnutrition among under five years.

The study will also add on the existing literature especially about nutritional practices among children less than five years and also the study will help in filling the missing gaps about the nutritional practices.

The policy makers will be in a better position to make relevant policies related to the nutritional and child feeding practices.

The study will enlighten the service providers like health workers about the challenges faced by mothers while adopting the recommended child feeding practices which will help to improve on their services.

1.6 SCOPE OF STUDY

1.6.1 Content Scope
The content scope will cover maternal factors like wealth quintile, education of the mother and their relationship with the malnutrition ease in children less than 5 years of age.

1.6.2 Geographical scope
This research will cover the Karamoja sub region in the northern part of Uganda, this region is neighboring districts like Amuratur, Amuru, Apak, Gulu, Kitgum, Adjumani, Padar, Lag among others.

1.6.3 Time scope
The research will take one month that is the month of June 2018, this will include collecting information and analyzing such information.
1.7 CONCEPTUAL FRAMEWORK
This study represents a conceptual framework explaining how different variables both background and intermediate influence the dependent variables, malnutrition. Background factors can either work through intermediate factors to influence the dependent variables or some of them can directly influence the dependent variables without passing through intermediate variables.

A mother’s education level affects a child’s nutrition through her choices and health seeking skills related to nutrition, hygiene, preventive care and disease treatment. A mother’s responsibility to care for himself during pregnancy and her child through the most vulnerable stages of its life significantly affects under five child malnutrition.

While ample evidence shows that urban children have better nutritional status than their rural counterparts, recent research suggests that urban malnutrition is on the rise. The environment, choice and opportunities of urbanites differ greatly from those of rural dwellers from employment conditions to Social and family networks to access the health care and other services. Women in high wealth quintile are more likely to have capability of affording a balanced diet and highly nutritious foods for the young children as compared to women in the low wealth quintile. Therefore wealth status increases the rates of affordability of better nutrition practices and foods.

The religious affiliation of a child’s family provides information on the likely dietary restrictions encountered by a child in his or her early growing years, on the child’s exposure to fasting in the womb during the Muslim holy month of Ramadan and on possible differences in women’s autonomy and control over household resources arising from differences in some preference across religions.

**Figure 1.1 CONCEPTUAL FRAMEWORK**

Background variables | Intermediate variables | Dependent variables
--- | --- | ---
• Wealth quintile | • Knowledge about the dangers of bad nutrition practices | Malnutrition
• Religion | • Number of the living children
• Residence | • Accessibility
• Education | • Affordability
• Age of mother | • Availability

**LITERATURE REVIEW**
2.0 INTRODUCTION
This chapter presents malnutrition rates among children aged five years and below, the relationship between place of residence and malnutrition of children under five, relationship between wealth quintile of malnutrition between children under five.

2.1 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 deny menial development of children which ultimately contributes to the vicious cycle of intergeneration malnutrition consequently the effects of under-five malnutrition are permanent and across 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 2016 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 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 the appropriate feeding practices that occur mostly in the first two years of life. There is a global and national understanding on the association between child nutrition and inappropriate feeding practices 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 synthesis of the determinates 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 inform 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.

From the reviewed literature, there seems to be a consensus that malnutrition among under-five children is greater among boys and 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 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 (Saleh 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 acute malnutrition compared to a female child (Adjusted odds Ratio of 1.56 at 95% C. L 1.15-2.13 with p-value = 0.004**). This situation could be due to the fact that their mother’s got since they 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.
2.2 RELATIONSHIP BETWEEN MOTHERS EDUCATION TO MALNUTRITION OF CHILDREN UNDER FIVE YEARS

Mother’s education level affects child’s nutrition through her choices and health seeking skills 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 mother’s education is associated with good nutrition practices and particularly under-five child nutrition (Babatunde and Qaim 2010; Olwedo et al 2008; Webb and Block, 2004; Shrimpton et al 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 Sommerfel et al,(1994), there is a negative association between the mother’s education level and under-five child malnutrition. The higher the level of mother’s education, the lower the percentage of under-five children classified as undernourished. According to the study, malnutrition was most prevalent among children whose mothers attend 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 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 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 Uganda Demographic and Health Survey of 2006(UBOS and Macro International Inc… 2007). This result is consistent with the findings of Webb and Block.
(2004) which 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 lines 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 behaviors. 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 can income but this increases the opportunity cost of their lime which may mitigate against some important care giving behaviors 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 behaviors, lower fertility as well as child centred caring practices. 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 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.

2.3 RELATIONSHIP BETWEEN WEALTH QUINTILE TO MALNUTRITION OF CHILDREN UNDER FIVE YEARS
Household wealth status is important determinant of chronic childhood malnutrition, and that there is significant neighborhood variation in childhood malnutrition even after controlling for effects of both individual and community level characteristics.
2.4 RELATIONSHIP BETWEEN PLACE OF RESIDENCE TO MALNUTRITION OF CHILDREN UNDER FIVE YEARS WHETHER URBAN OR RURAL AREAS

While ample evidence documents that urban children generally have better nutritional status than their rural counterparts, recent research suggests that urban malnutrition is on the rise. The environment, choices, and opportunities of urbanities differ greatly from those of rural dwellers from employment conditions to social and family networks to access to health care and other services. Given these differences, understanding the relative importance of various determinants of child malnutrition in urban and rural areas and especially whether they differ is key to designing context-relevant, effective program and policy responses for stemming malnutrition. This study uses Demographic and Health Survey data from 36 developing countries to address the question of why child malnutrition rates are lower in urban areas. The purpose is to answer the broader question of why child malnutrition rates are lower in urban areas. The socioeconomic determinants examined are women’s education, women’s status, access to safe water and sanitation, and household economic status. The analysis finds little evidence of differences in the nature of the socioeconomic determinants or in the strength of their associations with child nutrition status across urban and rural areas. As expected, however it documents marked differences in the levels of these determinants in favour of urban areas. Large gaps in nutritional status, especially maternal prenatal and birthing care, quality of complementary feeding, and immunization of children. The conclusion is that better nutritional status of urban children is probably due to the cumulative effect of a series of more favorable socioeconomic conditions, which, in turn, seems to lead to better caring practices for children and their mothers. Given that the nature of the determinants of child nutritional status is largely the same across urban and rural areas, the same program and policy framework can be used to stem malnutrition in both effort) to alleviate the most critical socioeconomic constraints specific to different environments should continue to prioritized (LISA, 2004)

2.5 RELATIONSHIP BETWEEN RELIGION AND MALNUTRITION OF CHILDREN UNDER FIVE YEARS

Religion plays an important role in these countries. The religious affiliation of a child’s family provides information on the likely dietary restrictions I encountered by a child in his or her early growing years, on the child’s exposure to fasting in the womb during the Muslim holy month of Ramadan, and on possible differences in women’s autonomy and control over household resources arising from differences in some preference across religions (Jayachandran and Paande 2014,
Coffey et al. 2013). All of these are factors that may contribute to the high rate of stunting and wasting among children in these countries since one is born into one’s religious identity and marriage is often restricted to one’s caste and faith in these regions, these three countries provide an especially pertinent context in which to analyze the causes of inequality in child health status by religious identity.

We focus on children Iron, birth to five years of age. The health of children at these young ages is critically important as a wealth of recent evidence demonstrates dial negative health shocks in this period can have large, long-lasting effects extending well into adulthood (see, For example, Currie and Vogl 2013). While most of this literature has focused on children in the developed world, children in developing countries are likely to be even more vulnerable given the prevalence of insults to health(nutritional, environmental and toxic) and wide spread adherence to behavior that may have harmful effects on children’s health such as fasting during pregnancy. Negative health shocks to children in developing countries have only recently begun to receive attention in the economies literature (Almond and Mnzumder 2011, Brainerd and Menon 2014).

Our study uses a number of datasets to assess inequalities in child health by religion. Our main analysis uses several recent round of Demographic health surveys (DI-IS) for India, Bangladesh and Nepal to examine differences in child anthropometric measures by religion age and gender within each country. The DHS surveys provide a rich source of data on child, mother and father characteristics, including detailed fertility histories if women aged 15 to 49. The period we analyze is approximately 1999-2011 (depending on the country) a rime span in which all three countries experienced strong economic growth and declining poverty rates.

Our results indicate that Muslim infants (age less than 12 months) have a significant advantage in height for age and weight-for-age z-scores over low caste Hindu infants in India. In Bangladesh, Muslim male infants have better height-for-age as compared to Hindu male infants, and Muslim female infants have better weight-for-age than Hindu female infants. However, this advantage does not persist past infancy: looking at the one to five years age group. Hindu children in all three countries. Two additional datasets for South Asian children confirm these patterns ( Young Lives Survey and the 2004 Health survey for England) These datasets allow us to rule out mortality selection(weakest infants die and so the samples of older children have a larger proportion of strong children than should be the ease in samples dial are representative) as a cause of the reversal,
and further suggest that the early Muslim advantage is likely to be cultural and possibly linked to religious practices (hand-washing before prayers) rather than country-specific.

While a Muslim advantage in child survival in India is well known (Bhalotra et al. 2010), the pattern of Muslim advantage in infancy, its reversal after 12 months to a Muslim disadvantage and its consistency across these three countries has (to the best of our knowledge) not been previously documented. As we demonstrate, the reversal in Muslim health advantage is not explained by static differences in family background or living conditions between Muslim and Hindu children (such as mother’s education, mother’s height, age at marriage, access to sanitary facilities, or household assets), nor is it explained by differences in child characteristics such as birth order, breast feeding, prenatal care, or disease incidence. The Muslim advantage in height for male infants is especially surprising for India, in which the preferential treatment of boys (thought to be greater among Hindus) begins even in the womb (Bhanidwaj and Lakdawala 2012) and extends after-birth to lengthier breastfeeding and greater vitamin supplement (Jaynchandran and Kuziemko 2011, Barcellos et al. 2014). We test for possible explanations for reversal of the Muslim health advantage and find that for boys in India, the most likely explanation is observance of fasting during Ramadan by Muslim women, which appears to lend to a positive selection of male infants but still has long-lasting negative health effects on all surviving Muslim children. However this does not explain the patterns among girls, nor does it explain the reversal of health advantage for Muslim infants in Bangladesh. In this sense, the Muslim health advantage in infancy and its later reversal in these three countries remain a puzzle.

The widespread malnutrition of children in South Asia is persistent, troubling and poorly understood. Given that religion dictates many of the rituals of daily life for much of this population from dietary restrictions and fasting, to hand washing and daily prayer –our paper investigates differences in child health by religion to better understand the high rates of stunting and wasting among children in these countries. The detailed data and comparative research design we use allow us to count for many socio economic characteristics or children and families and to establish that remarkably similar patterns of child malnutrition by religious affiliation occurs across all the countries we study. The reversal in Muslim advantage in infancy to Hindu advantage among older children, even in Bangladesh, a Country with a Muslim majority, is a puzzle. In addition to positive
selection of Muslim (male) infants, it is also possible that differences in hygiene practices such as hand-washing before daily prayer among Muslims, explain the Muslim health advantage in infancy. We are not able to investigate this possibility, although hygiene differences would have to be more important for infants than for young children for this to explain the patterns we observe. A future line of research would explore other Muslim-Hindu differences in cultural practices, in infant and child care or in intra household allocation of resources to women and children which are unable to observe in our data but may explain the Muslim Hindu differences in child health outcomes we document.

For example, upper caste Hindu children will not consume any form of meal or eggs and will switch to consumption of rice away from breast milk relatively quickly son preference is believed to be stronger among Hindus and women’s autonomy, especially of the youngest daughters in law, is believed to be the weakest. The indicators are measured in terms of z-scores which capture how much a child’s weight/height deviates from that of an international reference group of healthy children of the same age who are raised in a healthy environment, as proposed by the World health Organization (WHO, 2006). In our analysis for Bangladesh, Hindus are not differentiated by caste status as we lack that data. Male fetuses are more susceptible to shocks and so the weaker ones die; this means that male infants who are born are relatively more ‘strong’ (positive selection)
CHAPTER THREE

METHODOLOGY OF THE STUDY

3.1 INTRODUCTION
This chapter presents the methodology that was used in this stud. It includes the study variables. This section further gives more information on the data sources, the study population, the sample size, data processing and analysis, ethical consideration and study limitations.

3.2 DATA SOURCE
This study used data from the Uganda Demographic and Health Survey 2016 specifically the female dataset for more detailed information. The Uganda Bureau of statistics (UBOS) conducted the sixth Uganda Demographic Health Survey (UDHS) on June 15 through December 18, 2016. The main purpose of the UDHS is to provide the data needed to monitor and evaluate population health and nutritional programmes on a regular basis.

3.3 STUDY POPULATION
The study population comprised of mothers with children under the age of five in Karamoja region. The study subjects were selected from UDHS, 2016 database. This region is one of the regions in Uganda with very low levels of income mainly attributed to political instability. The main economic activity for women is subsistence farming followed by alcohol brewing and petty trade business. After the war, farming and trade business still came at the top of women’s economic activities followed by formal employment and brewing alcohol.

3.4 DATA VARIABLES
3.4.1 Dependent Variables
Malnutrition; this variable was based on the WHO standardized age and sex specific growth reference to calculate height-for-age Z scores, weight-for-age Z-scores and weight-for-height Z-scores. A child whose height-for-age is below the-2SD (<-2) from the mean and median were considered as stunted and children whose weight-for-age is below -2SD from the mean and median were considered to be underweight.

3.4.2 Independent Variables
Socio-economic and demographic variables: wealth quintile, education level, place of residence, religion, sex of the child and age of the child.
### 3.5 Data Analysis

In this analysis, the study used data from the Uganda demographic and Health survey (UDHS, 2011). The data was weighted to get a representative sample for each region enumerated.

Using univariate analysis level only one variable is studied, frequency table were used to summarize and understand data.

Bivariate analysis, at this level of analysis Pearson’s Chi-square was used to test whether there is any statistical association between the dependent and the independent variables. If the probability value (p-value) was found to be equal or less than the critical level of significance (0.05) then there is a statistical relationship between the dependent and the independent variables.

The formula of the Person’s chi-square statistics:

\[
X^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \left( \frac{O_{ij} - E_{ij}}{E_{ij}} \right)^2
\]

Where

- \(O_{ij}\) = the observed frequency in rows \(i\) and in columns \(j\) for cross tabulation
- \(E_{ij}\) = the expected frequency

The level of significance used is 5% for all statistical tests.

Multivariate analysis was performed to analyze in case of more than two variables, the effect of each factor of malnutrition. To assess the relationship between the dependent and independent variables, a logistic regression model was analyzed as follows:

A logistic regression model

\[
\log(\ldots) = a + b_1 x_1 + \cdots + e_l
\]

Such that

- \(a\) is a constant
- \(b\) is the coefficient of the independent variable
- \(X_1\) is the independent variables
E is the error term

3.6 STUDY LIMITATIONS
The approximation to the chi-squared distribution breaks down if expected frequency are low. It was normally acceptable as long as more than 20% of the events have expected frequencies below 5, in case of only 1 degree of freedom. Using approximation is not reliable if expected frequencies are below 10.

Cases where the expected value (E) is found to small (indicating a small underlying population probability, and/or a small number of observations) the normal approximation of the multinomial distribution can fail.

3.7 POSSIBLE SOLUTIONS
Yale’s correction for continuity may also be used. This is where a better approximation can be obtained by reducing the absolute value of each difference between observed and expected frequencies by 0.5 before squaring.

The researcher may have a use a C-test, a likelihood ratio based lest statistics.

3.8 Ethical Considerations
The researcher applied for access of the access of the UDHS 2016 dataset using the UDHS program website and permission was granted.
CHAPTER FOUR

FINDINGS OF THE STUDY

4.1 INTRODUCTION
This chapter presents the findings of the study. It involved the univariate, and bivariate analyses which include; the description of the respondents by their background characteristics and the relationship between the dependent and background characteristics of the women and children under study. These characteristics presented include education level of a mother, age of the child, and sex of the child, religion and wealth index.

4.2 BACKGROUND CHARACTERISTICS OF RESPONDENTS
The respondents of this study were 488 women of reproductive age (15-49 years) in Karamoja region Uganda.

4.2.1 Place of Residence
Majority of the women studied were from rural areas (86.9%) and while only 13.1 percent resided in urban areas.

4.2.2 Educational level
Results in table 4.1 shows that majority of the women that were interviewed had no education (70.1%) followed by those with primary education (25%), secondary education (4.1%) those with higher education were only 0.8 percent.

4.2.3 Wealth Index
Results from the study show that the highest proportion of the respondents belonged to the poorest households (81.8%) followed by women in poorer households (8.8%). The least were those from richer households (1%).

4.2.4 Religion
Results from the study show that the highest proportion of the respondents in Karamoja were Catholics (75.8%) followed by protestant (12.3%), Pentecostal (7.4%) while those belonging to the SDA faith were the least accounting for 1 percent.
Table 4.1 Percentage distribution of the respondents by selected characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>64</td>
<td>13.1</td>
</tr>
<tr>
<td>Rural</td>
<td>424</td>
<td>86.9</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No education</td>
<td>342</td>
<td>70.1</td>
</tr>
<tr>
<td>Primary</td>
<td>122</td>
<td>25.0</td>
</tr>
<tr>
<td>Secondary</td>
<td>20</td>
<td>4.1</td>
</tr>
<tr>
<td>Higher</td>
<td>4</td>
<td>0.8</td>
</tr>
<tr>
<td>Wealth index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poorest</td>
<td>399</td>
<td>81.8</td>
</tr>
<tr>
<td>Poorer</td>
<td>43</td>
<td>8.8</td>
</tr>
<tr>
<td>Middle</td>
<td>23</td>
<td>4.7</td>
</tr>
<tr>
<td>Rich</td>
<td>18</td>
<td>3.7</td>
</tr>
<tr>
<td>Richer</td>
<td>5</td>
<td>1.0</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catholic</td>
<td>370</td>
<td>75.8</td>
</tr>
<tr>
<td>Protestant</td>
<td>60</td>
<td>12.3</td>
</tr>
<tr>
<td>Muslim</td>
<td>7</td>
<td>1.4</td>
</tr>
<tr>
<td>Pentecostal</td>
<td>36</td>
<td>7.4</td>
</tr>
<tr>
<td>SDA</td>
<td>5</td>
<td>1.0</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
<td>2.0</td>
</tr>
<tr>
<td>Age of the child</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>162</td>
<td>33.2</td>
</tr>
<tr>
<td>1</td>
<td>155</td>
<td>31.8</td>
</tr>
<tr>
<td>2</td>
<td>87</td>
<td>17.8</td>
</tr>
<tr>
<td>3</td>
<td>42</td>
<td>8.6</td>
</tr>
<tr>
<td>4</td>
<td>26</td>
<td>5.3</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>3.3</td>
</tr>
<tr>
<td>Sex of the child</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>264</td>
<td>54.1</td>
</tr>
<tr>
<td>Female</td>
<td>224</td>
<td>45.9</td>
</tr>
<tr>
<td>Total</td>
<td>488</td>
<td>100</td>
</tr>
</tbody>
</table>

4.2.5 Current age of the child
Results from table 4.1 show that the majority of the respondents children were below 1 year (33.2%) followed by those aged 1 (31.8%). The least were those aged 4 and 5, these accounted for 5.3 percent and 3.3 percent respectively.

4.2.6 Sex of the child
Results in table 4.1 show that majority of the children were males (54.1%) while the rest were females accounting for 45.9 percent.
4.3 THE BIVARIATE ANALYSIS OF THE DEMOGRAPHIC AND SOCIO-ECONOMIC FACTORS DETERMINING MALNUTRITION

This section examines the association between the dependent variable which is nutrition status and the independent variables which are education level of a mother, birth intervals current age of the child, sex of the child, and marital status of the mother. Cross tabulations were used to determine the association between the dependent and independent variables. Testing for the hypothesis under the study was also done through showing the level of significance association between the dependent and independent variables using the chi-square value and p values.

4.3.1 Current age of child and nutrition status

Results from table 4.2 show that there were more cases of stunted growth among children aged 2 years (10%) followed by those aged 1 year (4.8%), furthermore only children aged 1 year were reported underweight (16.7%). However results show that there is no significant relationship between age of the child and malnutrition this is because p-value >0.005.

4.3.2 Sex of the child and nutrition status

Results from table 4.2 show that there happens to be more cases of stunting growth among females (8%) than those among the males. The females also had more cases of underweight (7.7%) as compared to males. However results show that there is no significant relationship between sex of the child and malnutrition this is because the p-value >0.005.

4.3.3 Place of residence and nutrition status

Results from table 4.2 show that there were more cases of stunted growth among children living in rural areas (4.3%) as compared to those living in urban areas. However results show that there is no significant relationship between place of residence and malnutrition this is because p-value >0.005.
Table 4.2: Percentage distribution malnutrition by background factors

<table>
<thead>
<tr>
<th>Variables</th>
<th>Stunting</th>
<th>Underweighting</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>0.0</td>
<td>0.0</td>
<td>64</td>
</tr>
<tr>
<td>Rural</td>
<td>4.3</td>
<td>5.3</td>
<td>424</td>
</tr>
<tr>
<td>(X^2), p value</td>
<td>(X^2=0.397, p=0.529)</td>
<td>(X^2=0.220, p=0.639)</td>
<td></td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No education</td>
<td>5.9</td>
<td>8.3</td>
<td>342</td>
</tr>
<tr>
<td>Primary</td>
<td>0.0</td>
<td>0.0</td>
<td>122</td>
</tr>
<tr>
<td>Secondary</td>
<td>0.0</td>
<td>0.0</td>
<td>20</td>
</tr>
<tr>
<td>Higher</td>
<td>0.0</td>
<td>0.0</td>
<td>4</td>
</tr>
<tr>
<td>(X^2), p value</td>
<td>(X^2=1.342, p=0.770)</td>
<td>(X^2=0.958, p=0.619)</td>
<td></td>
</tr>
<tr>
<td>Wealth index</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poorest</td>
<td>0.0</td>
<td>5.6</td>
<td>399</td>
</tr>
<tr>
<td>Poorer</td>
<td>0.0</td>
<td>0.0</td>
<td>43</td>
</tr>
<tr>
<td>Middle</td>
<td>0.0</td>
<td>0.0</td>
<td>23</td>
</tr>
<tr>
<td>Rich</td>
<td>0.0</td>
<td>0.0</td>
<td>18</td>
</tr>
<tr>
<td>Richest</td>
<td>0.0</td>
<td>0.0</td>
<td>5</td>
</tr>
<tr>
<td>(X^2), p value</td>
<td>(X^2=N/A, p=N/A)</td>
<td>(X^2=290, p=0.962)</td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catholic</td>
<td>4.7</td>
<td>12.5</td>
<td>370</td>
</tr>
<tr>
<td>Protestant</td>
<td>0.0</td>
<td>0.0</td>
<td>60</td>
</tr>
<tr>
<td>Muslim</td>
<td>0.0</td>
<td>0.0</td>
<td>7</td>
</tr>
<tr>
<td>Pentecostal</td>
<td>0.0</td>
<td>0.0</td>
<td>36</td>
</tr>
<tr>
<td>SDA</td>
<td>0.0</td>
<td>0.0</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>0.0</td>
<td>0.0</td>
<td>10</td>
</tr>
<tr>
<td>(X^2), p value</td>
<td>(X^2=0.627, p=0.960)</td>
<td>(X^2=1.960, p=0.581)</td>
<td></td>
</tr>
<tr>
<td>Age of the child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>162</td>
</tr>
<tr>
<td>1</td>
<td>4.8</td>
<td>16.7</td>
<td>155</td>
</tr>
<tr>
<td>2</td>
<td>10.0</td>
<td>0.0</td>
<td>87</td>
</tr>
<tr>
<td>3</td>
<td>0.0</td>
<td>0.0</td>
<td>42</td>
</tr>
<tr>
<td>4</td>
<td>0.0</td>
<td>0.0</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>0.0</td>
<td>0.0</td>
<td>16</td>
</tr>
<tr>
<td>(X^2), p value</td>
<td>(X^2=0.212, p=0.697)</td>
<td>(X^2=2.962, p=0.398)</td>
<td></td>
</tr>
<tr>
<td>Sex of the child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.0</td>
<td>0.0</td>
<td>264</td>
</tr>
<tr>
<td>Female</td>
<td>8.0</td>
<td>7.7</td>
<td>224</td>
</tr>
<tr>
<td>(X^2), p value</td>
<td>(X^2=2.572, p=0.109)</td>
<td>(X^2=0.804, p=0.370)</td>
<td></td>
</tr>
</tbody>
</table>
4.3.4 Education level of the mother and nutrition status
Results from table 4.2 show that majority of the women with no education had many cases of children experiencing stunting growth (5.9%) compared to those with other education statuses. Women with no education also had the most case of underweight children (8.3%), this can be attributed to the fact that women who have gone to school know the benefits of providing good nutrition to their babies than those who have not been to school. However results show that there is no significant relationship between education of the mother and nutrition status this is because p-value >0.05.

4.3.5 Wealth Index
Table 4.2 shows that majority of the women who belonged to the poorest households had more cases of underweight among their children (5.6%) compared to those from other wealth index. However results show that there is no significant relationship between wealth index and malnutrition this is because p-value >0.005.

4.3.6 Religion
Results table 4.2 shows that Catholics had more cases of stunting growth among there under five children(4.7%) and underweight cases (12.5%) compared to those belonging to other religions. However results show that there is no significant relationship between religion and malnutrition this is because e p-value>0.005

4.4 MULTIVARIATE ANALYSIS
Results from table 4.3 show that there was no association between places of residence of the respondents with malnutrition at 95% confidence interval. This was because the OR was less than 1 thus no association.

Results further show that there is a high association between education of the respondents and malnutrition at 95- confidence interval where by women in Karamoja that had attained higher education had 4 times odd ratio of having a malnourished child compared to those that attained other education levels.
Table 4.3 Multivariate analysis

<table>
<thead>
<tr>
<th>Variables in the study</th>
<th>S.E</th>
<th>sig</th>
<th>Exp(B)</th>
<th>95.0% C.I for EXP(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Upper</td>
</tr>
<tr>
<td>Residence(Urban)* rural</td>
<td>1.136E4</td>
<td>0.999</td>
<td>1 0.000</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>Primary</td>
<td>8.451E3</td>
<td>0.998</td>
<td>2.502E8</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>Secondary</td>
<td>1.525E5</td>
<td>1.000</td>
<td>4.394E6</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>Religion (Catholics)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protestant</td>
<td>4.368E4</td>
<td>1.000</td>
<td>6.497E7</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>Muslim</td>
<td>4.078E4</td>
<td>1.000</td>
<td>0.265</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>Pentecostal</td>
<td>1.678E5</td>
<td>1.000</td>
<td>0.066</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>SDA and others</td>
<td>1.519E5</td>
<td>1.000</td>
<td>2.295E13</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>Wealth Index(poorest)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poorer</td>
<td>1.452E5</td>
<td>1.000</td>
<td>0.000</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>Middle</td>
<td>4.165E4</td>
<td>1.000</td>
<td>0.000</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>Richer</td>
<td>1.549E5</td>
<td>1.000</td>
<td>0.000</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>Sex of child (Male)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>6.896E3</td>
<td>.0998</td>
<td>0.000</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>Age of child (*)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>7.555E3</td>
<td>0.998</td>
<td>0.000</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>2</td>
<td>7.555E3</td>
<td>0.998</td>
<td>0.000</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>3</td>
<td>1.816E4</td>
<td>1.000</td>
<td>2.388</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>4</td>
<td>3.137E4</td>
<td>0.999</td>
<td>0.000</td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>Constant</td>
<td>4.245E4</td>
<td>0.999</td>
<td>1.190E25</td>
<td></td>
</tr>
</tbody>
</table>

Results further show that there is a high association between religion and malnutrition at 95%-confidence interval were by Protestants had 6 times chances of having malnourished children compared to those in other religion followed by SDA and other religion at OR 2.
Results further show that there is no association between wealth index and malnutrition at 95-confidence interval.

Results further show that there is a high association between education and malnutrition at 95 confidence interval was by women in Karamoja that had attained higher education had 4 times odd ratio of having a malnourished child compared to those that attained other education levels.
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION
This chapter gives a summary of the study findings, conclusions drawn from analysis and recommendations. The first section summaries the study design giving an over view on the analysis made from background characteristics influencing malnutrition. The second section represents conclusions made from key findings and the last section discuses recommendations.

5.2 SUMMARY OF FINDINGS
The study based on the data from the UDHS 2016 and it considered respondents from Karamoja region Uganda. The study also based on children under-five years. The majority of the respondents were from rural areas (86.9%), had no education (70.1%) and belonged to the poorest households (81.8%). The highest proportion of respondents belonged to the catholic faith (75.8%), there children were below 1 year (33.2%) and were male (54.1%).

At bivariate analysis results showed that there was no significant relationship between malnutrition and other background factors. This was as a result of p-value<0.05.

At multivariate analysis, association was found to exist between malnutrition and level of education, religion and age of the child at 95% confidence interval were by categories had odd ratios greater than 1.

5.3 CONCLUSION
Results from the analysis show that there was no influence of social demographic factors on malnutrition among children under-five years in Karamoja region. Therefore the study urges more research about malnutrition to be done on the national level to bring about the relationship between malnutrition and background factors.

5.4 RECOMMENDATIONS
Basing on the findings of the study, the researcher recommends that the region of Karamoja adopts exclusive breast feeding programs in order to encourage mother breast feed their babies to eliminate cases of underweight and stunting growth among the children under five years in Karamoja.
Women enlightenment is one of the most important measures that can be invested into reduce high cases of malnutrition in young children. This can be done through promoting the girl child education because education attainment increases knowledge and information about better ways to take care of young children and babies and affordability because of the added income advantage educated women have through various professions.

Occupation of women plays an important role in improving their social status thus increasing their decision making power particularly concerning important issues like when to feed to their babies, how often and on what and more so how many children to give birth to thus take care of extensively.

Religious leaders on the other hand should also be positive influence on reducing these cases this can be done by ruling out the pregnant women, expectant mothers and young children from certain religious practices that may affect them for example fasting for Muslims and Christians.

The government should also ensure that there are affordable medical services, professional advice and assistance to the expectant or pregnant mothers about better feeding and nutritional practices to reduce on the high malnutrition rates. The dangers of malnutrition to the children should also be highlighted to motivate the mothers to it seriously. This should be mostly in rural areas.
REFERENCES


Zaramba. N.M (1988), Malnutrition and its unnts in children under five years in west Nile, Kampala, Uganda MM