

**HOUSEHOLD WEALTH INDEX, NUTRITIONAL STATUS AND
DIETARY PRACTICES OF CHILDREN AGED 6-59 MONTHS IN
MOGADISHU, SOMALIA**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF
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HUMAN NUTRITION OF THE UNIVERSITY OF NAIROBI,
DEPARTMENT OF FOOD SCIENCE, NUTRITION AND
TECHNOLOGY**

2019

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DEDICATION

This dissertation is dedicated to my wonderful parents; Sheik. Ibrahim and Mrs. Habibo, whose endless love, care, support and encouragement made me get to this stage. Thank you for giving me a chance to prove and improve myself through all my walks of life. I love you.

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LIST OF ACRONYMNS

ANC	Antenatal Care
ANOVA	Analysis of Variance
CI	Confidence Interval
EPI	Expanded program of Immunization
FSNAU	Food Security and Nutrition Analysis Unit
GAM	Global Acute Malnutrition
IBM	International Business Machines
IPF	Inactivated polio Vaccine
KII	Key Informant Interview
MCH	Mother and Child Health
MUAC	Mid-Upper Arm Circumference
ODK	Open Data Kit
OR	Odds Ratio
PPS	Probability Proportional to Size
SSA	sub-Saharan Africa
SPSS	Statistical Package for Social Scientists
TBA	Traditional Birth Attendance
UNICEF	United Nations Children’s Fund
WASH	Water, Hygiene and Sanitation
WHO	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Asset – Resources owned by a household that have future economic value. For example equipment's, land, buildings, vehicles.

Demography – Statistical study of human population.

Household – This refers to those people who live in the same house and eat from the same pot.

Principal component analysis –A statistical procedure that uses an orthogonal transformation to convert a set of observations of possible correlated variables into a set of values of linear uncorrelated variables called principle component.

Wealth index – A composite index composed of key asset ownership variables; it is used as a proxy indicator of household level of wealth.

ABSTRACT

Somalia has been recorded to have one of the highest and inconsistently updated child under-nutrition levels. Nutrition interventions have been put in place but few evaluation studies are done as the region is war prone. Persistent conflict and harsh environmental conditions make it a necessity that the most vulnerable population be protected to reduce the high malnutrition levels. The current study determined wealth index, nutritional status and dietary practices amongst children aged between 6months to 59 months in study households at Mogadishu, Somalia. This study aimed to determine the relationship with wealth index of households and also to investigate important aspects linked to undernutrition in the area. The study employed both qualitative and quantitative methods of data collection under a cross-sectional study design. A sample size of 405 of households with kids of ages between 6 months and 59 months were randomly selected and mothers or caregivers were the respondents.

Out of the 405 children who that were studied, 51 % of them were from low wealth index households. Majority of these households (60.1 %) had 5-6 persons living in the household therein. ANC attendance of the caregivers of these children was in the study area averaged at 64.0 %. The wealth index of the households of these children was significantly ($p<0.05$) connected with the rate of ANC attendance.

Less optimal breastfeeding practices including use of prelacteal feeds (54%), nipple-feeding (63.7%) and bottle feeding (87.7%). Complementary feeding was initiated at the ages of 1-6(79.0%) and 6-12 months (21.0%). A higher proportion of caregivers from the low wealth index households used prelacteal foods (62%) of their children and breastfed in public (89%) as compared to the high wealth index households which had prelacteal foods of 46% and breastfeeding in public of 77%.

About 90% of the children consumed more than 4 out 7 food groups pointing to a largely diverse diet and was not statistically different for high and low wealth index groups. Dairy

products, potatoes and tomatoes were the mostly consumed with about half of the children (50 %) consuming these foods daily.

Water hygiene and sanitation (WASH) practices of the mother/ caregivers showed that sanitation and hygiene facilities including clean treated water, toilet and garbage pits were available to 95.0 %, 99.8 % and 86.0 %, respectively. Availability of garbage pit and water usage were significantly ($p<0.05$) linked to the wealth index of the households of these children.

Upper respiratory infection and fever were the most prevalent illnesses occurring in 46.2 % and 22.7 % of the women. Preventive health services such as supplementation with vitamin A (90%), immunization (73%) and usage of mosquito net (81%) were administered to the children. There were incidences of wasting (11.0%), underweight (16.0%) and stunting (18.0%) among the children. The predictor response independent variables of wasting in kids of ages between 6 months to 59 months in the area of study was underweight, age of initiation of complimentary feeding, method of feeding, wealth index and income level ($p<0.05$, $R^2=0.20$). The predictor response independent variables of stunting in kids of ages between 6 months to 59 months in the area of study was underweight and age of initiation of complimentary feeding ($p<0.05$, $R^2=0.35$).

In conclusion, Mogadishu has low rates of malnutrition but those with less than -1 z scores were high. In addition, there are few caregivers who practice sub-optimal child feeding and breastfeeding practices. However, there is need to concentrate interventions to lessen the number of children who are vulnerable to undernutrition in Mogadishu and also conduct similar studies especially in the other regions of Somalia.

CHAPTER ONE: INTRODUCTION

1.1 Background information

Good dietary status is achieved by a complex interaction between the type of food consumed and the total body healthiness and day to day health care practices (Yalew, 2014). Suitable and appropriate feeding is paramount to good nutritional status; conversely, malnutrition result when there is nutritionally inadequate diet (Abeshu, 2016). Under nutrition remains a significant health burden among children living in developing countries (Black *et al.*, 2013). Understanding the rate and forms of enduring growth weakens like stunting besides the cumulative beginning of obesity in kids and teenagers is essential for planning in any country and implementation of civic health policy (Yalew, 2014).

The World Health Organization (WHO) approximates that about 45 % of childhood deaths in 2015 were majorly due to under nutrition (WHO, 2011). The 2015 global prevalence of malnutrition defined by underweight, stunting and wasting in kids under the age of 5 years were 23 %, 15.1 % and 7.8 %, respectively (WHO, 2016). In Africa, approximately 39.9% of kids in the same age group are affected by long-lasting malnutrition (WHO, 2016). Africa together with Asia and the Pacific accounts for 750 million (89 %) of the world's hungry people (WHO, 2011; WHO, 2016). In the last decade, the aggregate malnutrition rate in sub-Saharan Africa (SSA) has been approximated at 30 % (WHO, 2016; Jones, 2017). Though malnourishment occurrence has reduced considerably in most of the third world countries in the last decade, it has been practically fixed for Sub-Saharan Africa (SSA) (WHO, 2011). The static trend in the proportion of kids facing malnutrition, however, does not mirror the swiftly increasing figures of malnourished kids in SSA marked by exponential population growth rate (WHO, 2016). In Somalia, high incidence of stunting (29.2 %), underweight (23%) and wasting (15 %) in children under 5 years were reported by UNICEF (2016). Here, the population are intensely malnourished, with 1.9 % of the population being rigorously

malnourished with 13 out of 36 being acutely malnourished; which exceeds the UN call for emergency action that is Critical occurrence or when the Global Acute Malnutrition (GAM) \geq 15 % (FSNAU, 2016). Mothers and children in Somalia face nutritional disorders which prevent them from reaching their optimum growth and development levels (UNICEF, 2016). Dietary intake is largely influenced by individual, social, economic, cultural and environmental aspects (Drewnowski and Kawachi, 2015; de Moraes Sato *et al.*, 2015). Unhealthy nutritional outlines are not restricted to persons with a low socio-economic status, but are mostly evident in low income people than in wealthy population levels (Pecheyet *al.*, 2013). Generally, foods of lower-quality diets and low nutritional value cost little per calorie and are regularly consumed by the humble background populations especially in Africa (Konttinen *et al.*, 2013; Darmon and Drewnowski, 2015). Expenditure on food accounts for a greater portion of a low-income family's budget with price limitations dictating the choices of food towards less healthy foods; economic constraints therefore contribute to the high incidence of unhealthy food consumption amongst low socio-economic status individuals (Darmon and Drewnowski, 2015)

1.2 Statement of the Problem

For close to three decades, Somalia has been characterized by anthropogenic calamity mainly driven by insecurity and armed conflict. The situation is compounded by drought (World Bank, 2015; FSNAU, 2016) leading to more than half of the Somali population in need of emergency support or livelihood sustenance (FSNAU, 2016). The lack of human development and insecurity leading to constant man-made problems in Somalia, have impacted heavily food choices, availability and the overall nutritional status. Additionally, due to the Somalia conflict, about 30 % of the people can afford to access quality clean water and better hygiene facilities (FSNAU, 2016), which serve as essential components of nutritional and health well-being. Mothers and children in Somalia face nutritional disorders that prevent them from

reach their optimum growth and development levels (UNICEF, 2016), however, there is general lack of supporting statistics on the wealth status, food availability, dietary diversity and children nutritional pattern. This study also emphasizes the importance of wealth index as a tool for planning.

1.3 Justification of the study

To address the dietary consumption and nutritional situation of the population living in Somalia, concerted efforts must be taken to evaluate and highlight the actual nutritional status position and associated factors in order to rigorously contribute in informing policy changes where necessary. Interventions with less input of scientific evidence tends to be costly and less effective (Garza *et al.*, 2019). This study provides evidence for action considering that the area is still reeling with the effects of war, a major contributor to compromised child nutrition (Kinyoki *et al.*, 2017). Under-five children are required to match high level nutritional status since it's crucial for ideal growth and development in their early life (Preschulek *et al.*, 1999). Considering that the area has had nutritional interventions in order to address childhood undernutrition, assessment of the outcomes of these interventions would help guide the next course of action. However, the conflict in Somalia has made evaluation studies quite difficult, thus they are rarely done (Guha-Sapir and Ratnayake, 2009; Kinyoki *et al.*, 2017). The current study provides insights into the current situation in the urban area of Mogadishu in this conflict-ridden area.

1.4 Aim of the study

The goal of this study is to add towards improving dietary practices as well as nutrient consumption and improve nutritive level among kids aged between 6 months to 59 months Mogadishu, Somalia

1.5 Purpose of the Study

To determine the nutritive and dietary patterns among kids of ages between 6 months to 59 months in the general population of Mogadishu Somalia in order to assess the contribution of dietary intake on the nutritional outcome

1.6 Objectives

1.6.1 Overall Objectives

To determine the connection between wealth index, nutritive and dietary practices of kids aged between 6 months to 59 months in the general population of Mogadishu Somalia

1.6.2 Specific objectives

1. To determine socio-demographic of households with kids aged between 6 months to 59 months in Mogadishu, Somalia.
2. To determine the dietary practices of households with kids aged between 6 months to 59 months in Mogadishu, Somalia.
3. To determine the sanitation and hygiene practices of households with kids aged between 6 months to 59 months in Mogadishu, Somalia.
4. To determine the nutritional status and morbidity patterns of kids aged between 6 months to 59 months in Mogadishu, Somalia.
5. To assess the relationship between wealth index and diet status of kids in Mogadishu

1.7 Research questions

2. What is the socio-demographic status of homes with kids aged between 6 months to 59 months in Mogadishu Somalia?
3. How does breastfeeding and child feeding practice affect dietetic status of kids aged between 6months to 59 months?
4. What is the level of sanitation and hygiene practices households with kids aged between 6 months to 59 months in Mogadishu Somalia?

5. What is the nutritional status and co-morbidity patterns of selected households with kids aged between 6 months to 59 months in Mogadishu Somalia?
6. What is the connection of dietary practices, and nutritive status of kids aged between 6 months to 59 months and wealth index of households?

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter highlights relevant literature on wealth index, dietary and nutritional status, globally, regionally and in Somalia. The section further identifies the existing gaps of dietary and nutritional status with a special focus among kids of ages between 6 months and 59 months in Mogadishu Somalia.

2.2 Importance of nutrition

There is a strong relationship between nutrition, learning (Pertz & Putnam, 1982) and health (Dev, et al., 2017), and while genes (Ghoshet *al.*, 2017) and the environment (Gascon et al., 2017) are two factors that contribute towards a child's development, nutrition is also extremely crucial towards the development of a child because whatever a child eats during the first few months/ years after birth determines their academic performance and health in their later years, as well as their performance in the labor market (Neelsen & Stratmann, 2011). Nutrition affects learning directly by influencing the development of the central nervous system (CNS), and indirectly, the body has an innate capacity to learn, which is also determined by one's dietary intake (Pertz & Putnam, 1982).

When a pregnant woman is undernourished, the fetus experiences stunted growth which can lead to poor development of the brain that leads up to irreversible chronic illnesses. Negative psychological and physical outcomes, both in current and future are the outcomes of poor nutrition (Melanson, 2008). Undernourishment during early life adversely affects brain development in the neocortex (Hoffmann *et al.*, 2004) and hippocampal regions (Huang, et al., 2003). Undernourishment causes the number of neurons and synapses to reduce (Morgane *et al.*, 2002), as well as arborization of dendrites and myelination, leading to a decrease in the size of the brain (Tonkisset *al.*, 1993). It is therefore crucial to advocate for the promotion of healthy energy balance behaviors during early childhood, without which

excess weight in early childhood leads to obesity in later life(Dev, et al., 2017). However, from empirical evidence, children who live in richer households are the ones who have better health (Reis, 2012).

2.3 Malnutrition

2.3.1 Global

Early childhood malnutrition is a key aspect for the failure to thrive, and some of the adverse consequences associated with include; retarded growth, lower education, a negative influence on neurologic development, and dysfunctional marriages (Wanget al., 2016). Worldwide, the number of children aged 54 months and below who suffer from being overweight is almost reaching the number of children of similar age who suffer from wasting; apart from Africa and Oceania, the number of children suffering from stunted growth is declining; and the total of overweight children has been most rapidly increasing in Asia (IFPRI, 2016)

2.3.2 Africa

The situation of food insecurity has improved worldwide, but in Africa, the situation has only become worse. There have been several occasions of food insecurity which have caused the loss of lives and livelihoods in the past decade alone. Food insecurity leads to lack of proper nutrition which eventually leads to death. It is estimated that about one in every three deaths is related to a lack of proper nutrition whose effects are more pronounced in countries that are still developing especially in Sub-Saharan Africa. Children with malnutrition do not have a properly developed brain, and this in turn causes them not to function at their optimal mental capacities. Their inability to function optimally mentally in later life will make them unable to fend for themselves economically, and this leads to a malicious cycle of poverty and malnutrition (Bain et al., 2013).

In Africa, the least progress has been made towards realizing the reduction of hunger by 50 %, as indicated in MDGs(1). Chronic hunger is felt by close to one third of the African

population. For the most part, East and West Africa regions have experienced the worst food crises in the recent past. Acute food insecurity affects eleven countries and 23 million people in these regions alone, and these people are likely to suffer from malnutrition. This situation is brought about and worsened by the high population growth rate in these regions, endemic poverty, climate changes and political conflicts (Jones, 2017).

In the African continent, there is a worrisome food security outlook. With the current demographic conditions remaining constant, it is likely that the African population will increase to about two billion by the year 2050. Most of this population growth takes place around the sub-Saharan Africa region, which currently has a population growth rate of between 1.6-2.4 % (Committee on Population, 2016).

2.3.3 Somalia

Since 1991, there has been no nationally recognized central government in Somalia. The country is regarded as one of the most unsafe countries worldwide. It is one of the countries which suffer the greatest burden of acute malnutrition due to its complex emergencies which include internal conflict and drought. The long period of political instability and insecurity affects all facets of human life and development so that this country is classified as the fifth poorest country worldwide, having also a high rate of maternal and childhood mortality (UNHCR, 2012). On the food security index, it is ranked the lowest. In addition, it is estimated that Somalia has the highest rate of acute malnutrition when it is compared to the rest of the world. Statistics obtained from 2011 showed that 37 % of the Somali population or approximately 3 people in this country were experiencing food crisis (Kinyokiet *al.*, 2015).

As of the year 2011, one in every four children in Somalia was acutely undernourished. The severe crisis of access to food was mainly affecting poor farmers with no cereal stocks as there had previously been a crop failure, and food prices had sky-rocketed (FSNAU, 2011).

2.4 Measures of nutritional status

Pointers of poor nutritional status are used as early signal for children at risk (WHO, 2003). Anthropometric measurement, biochemistry and clinical assessments are the most commonly used measures of malnutrition. Generally, the anthropometric (weight and height) measurements of children below the age of 5 years are compared with those of the other children of the same age in a well-fed reference population (WHO, 1983; WHO, 2003). The anthropometric measurements are commonly stated as the percentage of the median or standard deviations from the mean (Z score) (WHO, 2003).

The weight-for-height index has also been used as an indicator nutritional status. This indicator normally measures the fatness or thinness of an individual. The method is profound to sudden changes in vigor balance. Interpretation for height-for-weight index with more than two deviations below the mean refers to wasting indicating excessive weight loss. Severe weight loss has been shown to occur as a result of acute starvation and/or severe disease (WHO, 2003). Generally, population pervasiveness of wasting is estimated at 5 % and below even in underprivileged countries as long as there is no serious food shortage. Overweight or obese in children refers to a weight-for-height index with more than two deviations above the mean (WHO, 2003).

The WHO further defines height-for-age as the growth and development index of the skeleton (WHO, 2003). Index of low value could be signaling prolonged exposure to long-lasting malnutrition and inadequate nutrition. In children low height-for-age value could be an indication of lack of essential nutrients, unhygienic conditions, diarrhea, repeated infections and insufficient health care (WHO, 2003). Using the height-for-age index; stunting is therefore defined as a condition that occurs when there are standard deviations greater than two below the mean of the reference population of WHO/CDC. Unlike wasting, stunting is

quite common all over the European Region, especially in groups of low-income (UNICEF/WHO. 2001; WHO, 2003).

Biochemical indicators are suitable for determining nutritional status, where some biochemical parameters providing early warning of a specific nutrient shortage (WHO, 2003). The cost and invasiveness of biochemical tests hinder their routine application. Haemoglobin is one exemption since modest and relatively economical field measurement approaches have been established (UNICEF/WHO. 2001). However, improved hemoglobin cut-off points have been used to define minor and sensible anemia with inter-countries comparisons not possible except if the raw data are available or similar cut-off points have been utilized (UNICEF/WHO. 2001).

2.5 Causes of under nutrition

Under nutrition is directly related to inadequate dietary intake and infectious diseases and is influenced by three broad factors: food, health and care (**Figure 2.1**). Optimal nutritional status results when children and families have access to foods that are conducive to a healthy diet and meet dietary needs (e.g. sufficient, safe and nutritious); appropriate maternal and child care practices; adequate health services; and a healthy environment, including safe water, sanitation and good hygiene practices. The interaction between under-nutrition and infection (particularly diarrheal diseases) creates a potentially vicious cycle of worsening illness and deteriorating nutritional status. The resources available in a society (human, financial, physical) and how they are used (social, economic, political and cultural) constitute the basic causes of undernutrition (UNICEF, 2013).

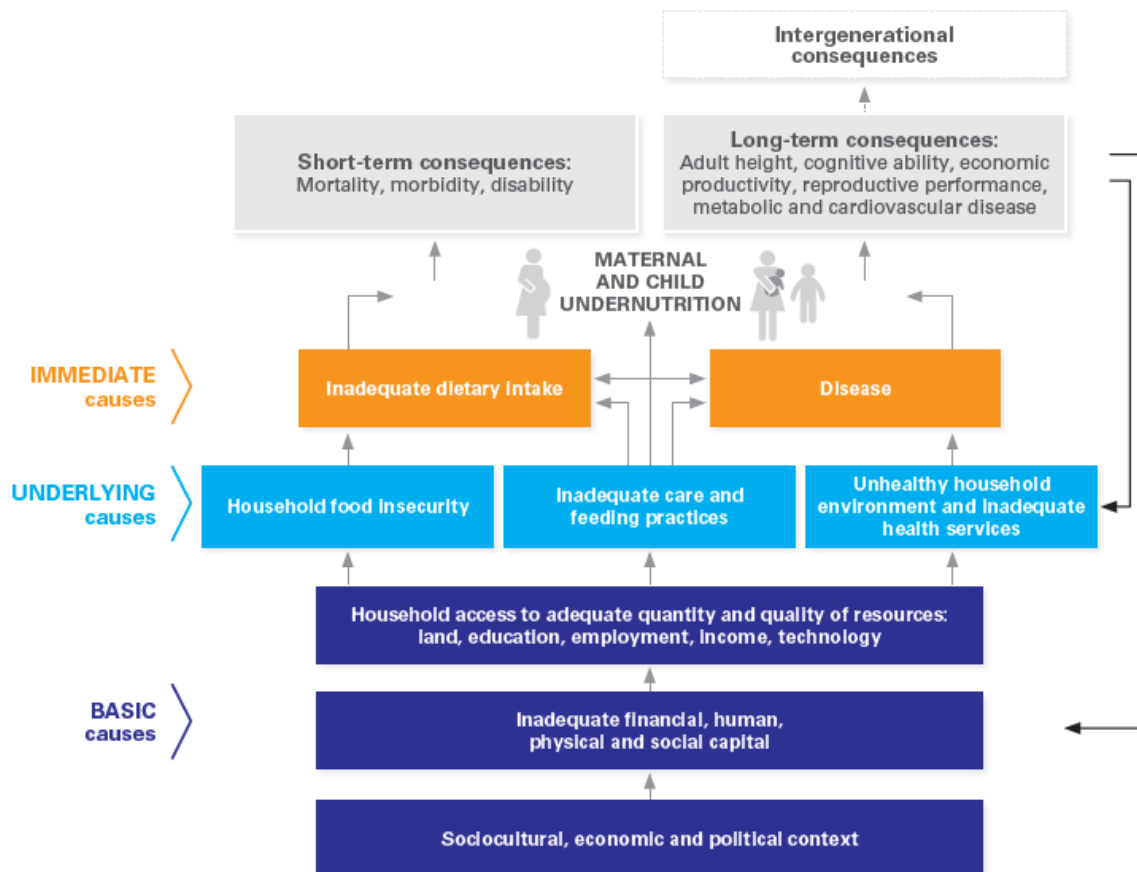


Table 3-1: Conceptual framework of the causes of child under-nutrition.

The black arrows express that the distresses of under-nutrition can go back to the original and fundamental causes of under-nutrition, spreading the series of under-nutrition, deficiency and inequalities.

2.6 Wealth Index in Somalia.

According to Somalia Human Development Report 2012, overall unemployment among people aged 15 to 64 is estimated at 54 percent in Somalia, up from 47 percent in 2002. The unemployment rate for youth aged 14 to 29 is 67 percent one of the highest rates in the world. Females experienced higher unemployment at 74 percent than males at 61 percent. The Human Development Index (HDI) value is 0.285 ranking Somalia among the lowest in the world, at 165 out of the 170 countries in the 2010 Global Human Development Report. In

2008, humanitarian assistance for Somalia per average per person was estimated at US\$ 80.10, which is four times the per capita aid for development (UNDP, 2012).

2.7 Gap in knowledge

The children in Somalia continue to undergo multiple nutritional deficiencies denying the chance to flourish and attain their maximum developmental potential. There are high intensities of severe malnutrition, stunting and underweight coupled with a high incidence of micronutrient shortages, balanced feeding and suboptimal breastfeeding practices. Several studies have focused on the general malnutrition and under nutrition as a communal health problem in Somalia. Nevertheless, there is inadequate information on causative associated factors to wasting, underweight, and co morbidities. Therefore, the causative factors play a critical role in development of any intervention aimed at reducing malnutrition or any related condition. At the same time, there is scarcity of evidence regarding the factors associated with nutritional status on children with ages between 6 months to 59 months in the general population of Mogadishu, Somalia.

CHAPTER THREE: RESEARCH METHODOLOGY

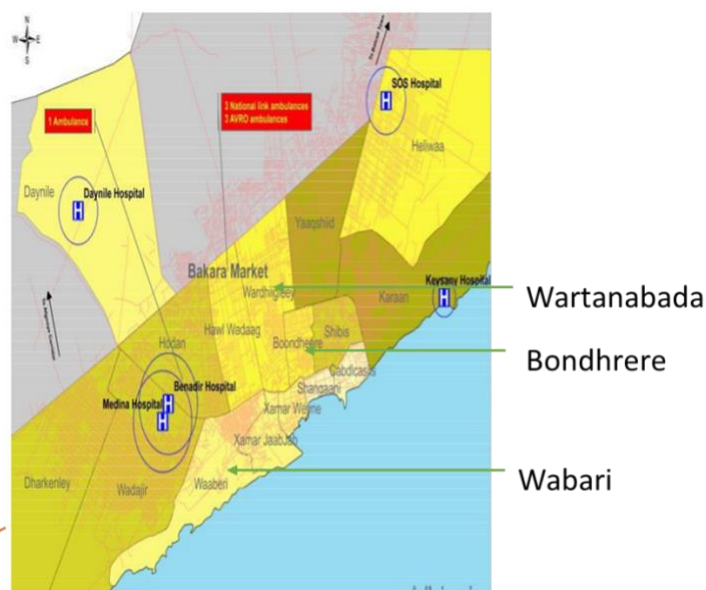
3.1 Study Site

The study was carried out in Mogadishu, Somalia (Figure 3-1). Mogadishu is recognized in the vicinity as Xamar (English: Hamar), it is the largest city in Somalia and the nation's capital; situated in the coastal Banadir region on the Indian Ocean of the Horn of Africa.

The city has helped as a significant port for centuries. Conferring to Demographia World Urban Areas (2017), Mogadishu occupies about 91 square km with an estimated population of about 2,425,000 people. Mogadishu is situated near the equator; hence it is considered as a hot and semi-arid weather with a mean temperature between 27-30 ° C and an average annual rainfall of about 429.2 millimeters. The public health care system in Mogadishu has collapsed because of the fighting that was in Mogadishu for two decades. A small number of public health care facilities have been re-established by international non-governmental organizations, to give free health care to patients in the city especially to the internally displaced people (IDPs). Therefore, the majority of the community seeks medical care from the private health sector.

Mogadishu administrative unites is divided into 17 constituencies specifically: Abdelaziz, Bond here, Daynile, Dharkenley, Hamar-Jajab, Hamar-Weyne, Heliwa, Hodan, Howl-Wadag, Karan, Shangani, Shibis, Waberi, Kahda, Wadajir, Wardhigley, and Yaqshid.

The work was conducted in the selected household of three districts of Mogadishu, namely; “Bondhera, Wabari and Warta-Nabada (Wardhigley)” located in Mogadishu, Somalia



Map of Mogadishu showing study sites

Table 4-1: Map of Mogadishu, Somalia

3.2 Study design

The study employed both qualitative and quantitative or data collection in cross sectional study design to answer the study objectives.

3.2.1 Study population

The study population encompassed all children in Mogadishu, Somalia, and the sampling frame was children among the age 6-59 months.

3.2.2 Inclusion criteria

1. Parents/guardians and children aged between 6months to 59 months residing in one of the three regions Bondhere, Wabari, and Warta-Nabada in Mogadishu districts
2. Parents/guardians consenting (Appendix 1) to participate as well as giving assent for their child to undergo nutritional indicator measurements

3.2.3 Sample Size determination

The following formula by Fisher (1993) was used in sample size determination for the target population.

$$n = \frac{z^2 P(1 - P)}{d^2}$$

Where:

Z= level of significant

P= prevalence assumed to be 50 %

d= level of accuracy

n= $\frac{1.96 \times 1.96 \times 0.5 \times 0.5}{0.05}$

0.05

= 384

With addition of 5 % attrition

n=384/0.95=405

3.2.4 Sampling procedure

The study background, aims, and procedures that were commenced during the study period were explained to the respondents in simple terms to fulfill the ethical requirement. The sampling units used in this research were Mogadishu Somalia region, districts, sub-locations, villages, and homes as the lowest sampling units. Purposive selection of the major urban area in Somalia, Mogadishu, was done followed by random sampling of three Somalia districts. The sampling frame consisted of three major districts of Mogadishu Somalia namely: Bondhere, Wabari, and Warta-Nabada. Sample allocation to three district clusters was done by chance relative to size (PPS), hence targeting households from each of the three districts were Wabari 125 households, Bondhera 150 households and Warta-Nabada 131 households.

3.3 Recruitment and training of research personnel

Research assistant with nutritional and medical background were recruited and trained on how to interact with the study respondent, interview techniques, and entry of information into the mobile-based information gathering tool using Open data kit (ODK). Practical skills were enhanced during the study pretesting phase of the questionnaire (Appendix 2). The information obtained during the pretest was not part of the actual study. The questionnaire was translated orally into Somali language where necessary, by the research assistants.

Pre-test was done in a Hamar – Jajab and Hodan district in Mogadishu among 15 parents/guardians and child aged 6-59-month pair from each of the two districts. The KII guide was also pre-tested on one officer who was not recruited for the study.

3.4 Data collection procedure, tools and Variables

A structured questionnaire was designed to capture data on: socio-demographic characteristics, anthropometric measurements, dietary practice, and nutritional status of children of ages between 6 up to 59 months. In this study the independent variables included dietary practice, demographic characteristics and wealth index of households. On the other hand, the variables of consideration in this study were the nutritional status of children that comprised of stunting, underweight, and wasting.

3.4.1 Demographic and Socio-economic characteristics

The following socio-demographic characteristics were determined using the structured questionnaire including marital status, gender of child, age of the mother, the average household size, the level of education of the parents, parent's occupation, family structures, Relationship to the household head and source of the family. The socio-economic status was based on home possession of assets, from which a wealth index of either high or low was computed.

3.4.2 Feeding practices and dietary diversity of children

A semi-structured questionnaire (Appendix 2) was administered by trained interviewers to the caregivers to collect information on various feeding practices like complementary feeding, food frequency and Individual dietary diversity score questionnaire (Appendix page 82). The child dietary variety questionnaire was centered on the 16 groups of foods IDDS questionnaire and then regrouped to the seven food groups as per WHO guidelines as follows; (1) cereals, roots and tubers; (2) legumes and nuts; (3) milk and its derivatives; (4) meat products (meat, poultry, offal, and fish); (5) eggs; (6) vitamin A-rich fruits and vegetables (leafy green vegetables, yellow fruits and vegetables); and (7) other fruits and vegetables. The regrouping was computed in excel by adding the multiple columns that fitted the new food groups.

Food frequency questionnaire (appendix, page 81) was used to assess the usual food intake. A list of foods was provided alongside their frequency of consumption.

3.4.2.1 Nutritional status of children

The weight and height of children were measured twice for each index child and the average was computed, to reduce measurement error.

3.4.2.2 Measurement of weight

Weight of the children was measured using an electronic scale. The children were weighed with minimum clothing; they were assisted by the enumerators on how to stand on the scale, upright and facing forward with minimum movements, for the ones who were below two years the scale was zeroed with the mother, who then held the child for weighing.

3.4.2.3 Measurement of height/length

The height/ length was measured using the height panel of the United Nations children funds (UNICEF). To assess the height or recumbent length, the caregivers assisted the child in

removing excessive clothing and shoes. Height measurement was done to nearest centimeters. Length to the nearest centimeters was measured for children below two years.

3.5 Key informant interviews

Key informant interviews were done to ratify and explain any incomplete or new questions designated in the designed questionnaires (Appendix 3). Key informant interviews have been shown to deliver a valuable foundation for a wider understanding of background information relevant to the concerns being explored (Bernard, 1994). Randomly 3 (1 person per the three districts) influential and well-informed members of the Mogadishu were branded and sporadically questioned at their residential place and at time best suitable and private for them. The key informants were chosen because of their role and position in the region, either formal or informal leadership roles in the community and their capability and readiness to reflect on our answers. The Key informants encompassed National Nutrition Manager and nutritionists.

3.6 Ethical considerations

Permission for data collection was sought from the Ministry of Health and Human Services of the Somali Federal Republic (Appendix 4). Oral approval was sought from the Ministry of Education and Cultural in Somalia and local authorities in the three districts. Informed consent was sought from each respondent on voluntary basis. Respondents were assured that their contribution was voluntary and that they were free to withdraw from the study at any time.

3.7 Data Management and Analysis

3.7.1 Data quality assurance

The research assistants were adequately trained principal and practical skills rendered during pre-testing, enabling them to fill the questionnaire appropriately without errors. The completed questionnaires were crossed checked to ensure completeness of the data,

consistence of the answers, and eligibility of the measurements obtained. The outliers and wrong entries were removed through data cleaning process before the full data analysis.

3.7.2 Data analysis

The data was directly entered, cleaned and analyzed using IBM, Statistical Package for Social Scientists (SPSS) version 20.0. Principal component analysis was used to determine wealth index, which was grouped as either low or high wealth index. This was done through factor analysis of assets owned by study households through dimension reduction from 9 factors to two components. Descriptive statistics including mean, standard deviations, frequencies, and inter-quartile ranges were used to describe respondent's socio-demographic characteristics, knowledge on feeding practices, and morbidity experiences. At the same time inferential statistic were obtained using different tests. Pearson's Chi-square t-test and regression were used to test for association and strength of the association between the independent variables and dependent variables. The difference between the mean of the study participants were tested using ANOVA. The confidence interval (CI), was set at 95 % and a P-value of <0.05.

In bivariate analyses, odds ratios (OR) and 95 % confidence intervals (CI) for the association between nutritional outcomes and socio-demographic, household cultural and economic status and dietary intake were calculated using Poisson regression. In multivariate analyses, a manual backward elimination approach was used to reach the most parsimonious model including factors that were associated with nutritional outcome among children aged 6-59 months from Mogadishu at the significance level of $P \leq 0.05$.

The data from KII were subjected to a thematic content analysis. This approach entailed the categorization of recurrent data collected under thematic areas (Green and Thorogood, 2010). Once the notes were organized the next important step involved extraction of themes in summary (Phillips and Dudley, 2005). The analysis was done manually using Microsoft Word (La Pelle, 2004).

CHAPTER FOUR: RESULTS

4.1 Socio-demographic characteristics and wealth index

4.1.1 Socio-demographic characteristics of households

The socio-economic and demographic characteristics are summarized in **Table 4.1**. The largest proportions of respondents (96.1%) were female. Majority of the households (60.1%) had more than five to six people living together in the same household. Salaried employees comprised the largest proportion (62.0%) of the respondents whereas the rest were either in casual labour or self-employed. About half (50.0%) of the respondents lived in rental residence whereas 30% lived in their own houses. Charcoal was the most widely used fuel by 62.1% of the households. The mean household size is 4.51 ± 1.54 (range 2-13). The mean number of adults in a household was 2.63 ± 1.15 (range 1-11), while average number of kids aged under 5 years in a home was 1.88 ± 0.89 (range 1-6).

Table 5-1: Socio-demographic characteristics of the households

Socio-demographic characteristics	Frequency (%)
Gender of respondents	
Male	3.9
Female	96.1
Household size (persons)	
2-4	29.3
5-6	60.1
7-8	9.8
9-13	0.8
Proportion of children in the Household based on age group	
1-2	69.0
3-4	29.0
5-6	2.0
Source of income	
Salaried job	62.0
Casual waged labour	12.0
Small own business/petty trade	9.0
Shop Owner	9.0
Others (Specify)	7.0
Income(dollar)	
Less than 50	4.0
51 - 90	4.0
91 - 150	34.0
151 – 200	27.0
201 - 250	13.0
251 – 300	12.0
More than 300 million	5.0
Type of home	
Pay rent	50.0
Self- Owned	30.0
Hosted by parent or relative for free	19.0
Others (Specify)	1.0
Fuel for cooking	
Charcoal	62.0
Gas	27.0
Electricity	6.0
Kerosene	3.0
Firewood	3.0

4.1.2 Ownership of household assets and wealth index

Television, radio and cell phones were the assets that had higher proportion of ownership (Table 4.2). Household wealth index was computed using principal component analysis based on 9 household assets listed in Table 4.2. After Principle component analysis, 51.0% of households were ranked as low wealth index and 49% high wealth index.

Table 5-2: Assets owned by the mother/ caregivers of children aged 6-59 months

	Ownership	high wealth index		low wealth index	
		n=199	%	n=209	%
Television	no	14	7	70	33
	yes	185	93	139	67
Radio	no	15	8	10	5
	yes	184	92	199	95
Cellphone	no	10	5	12	6
	yes	189	95	197	94
DVD player	no	80	40	209	100
	yes	119	60	0	0
Land	no	122	61	176	84
	yes	77	39	33	16
Bicycle	no	162	81	209	100
	yes	37	19	0	0
Car	no	78	39	209	100
	yes	121	61	0	0
Motorcycle	no	159	80	209	100
	yes	40	20	0	0

4.1.3 Household wealth index and demographic features of study population

The wealth index of the households was not significantly ($p>0.05$) linked to their level of income, source of income, type of home, type of fuel, and age of the kid. However, the number of kids in a family and the district of residence were significantly ($p<0.05$) associated with wealth index (Figure 4-1 and 4-2). Higher proportion of those with lower wealth index tended to have fewer number of children as compared to those with higher wealth index (Figure 4.1). Wartanabada district had a higher proportion of those with a higher wealth index (66%) as compared to Bondhere (44%) and Wabari (37%) Districts (Figure 4-2).

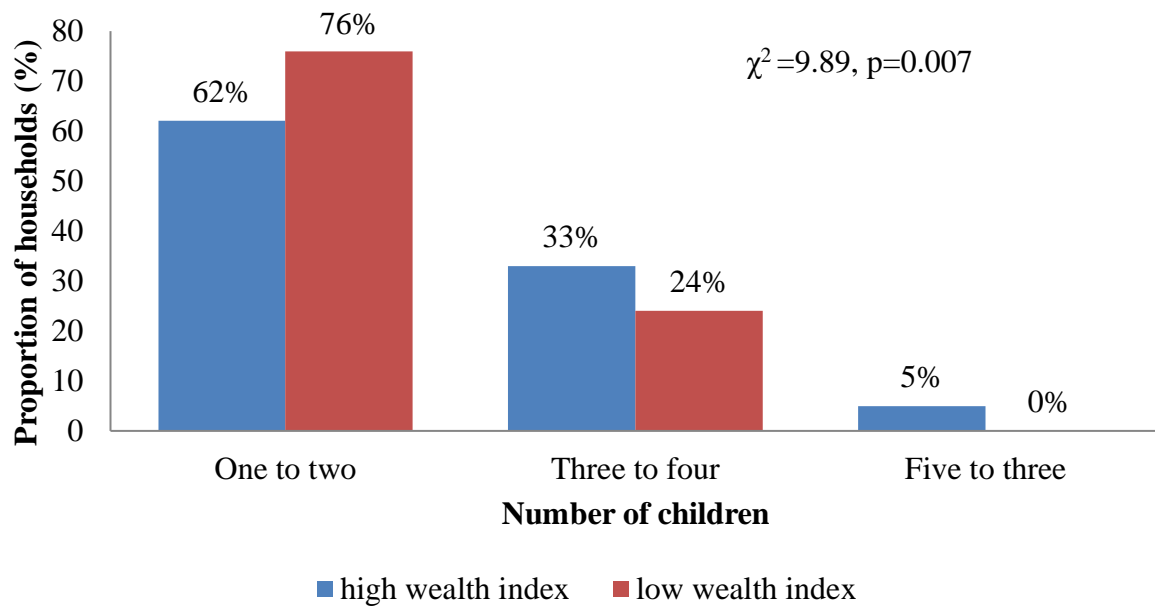


Figure 5-1: Wealth index and number of children in the study area.

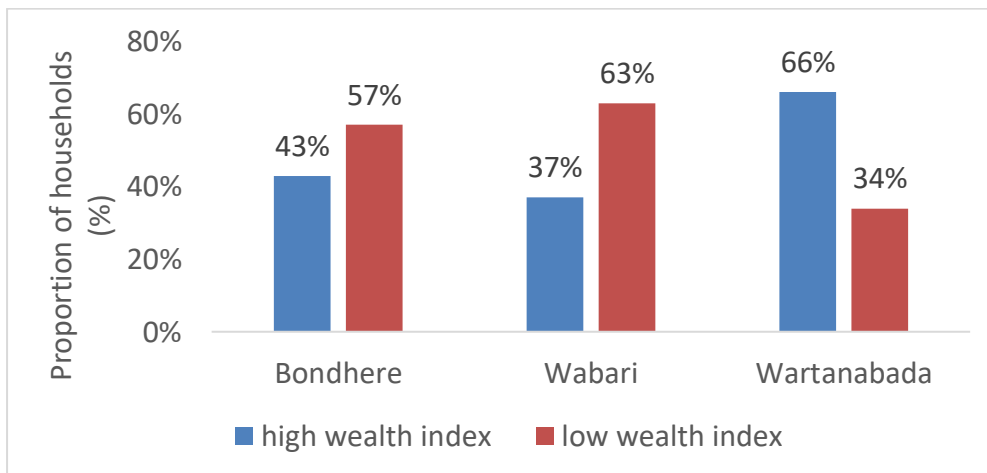


Figure 5-2: Districts of residence and wealth index of households.

4.1.4 Household demographic characteristics, mothers/caregivers place of delivery and prevalence of ANC visits

4.1.4.1 Household demographic features

Table 4.3 summarizes the socio-demographic features of the households with children wealth index. Over a third (69.6%) of the children were aged between 7-22 months. Majority (56.1%) of these children were of the male gender.

Table 5-3: Socio-demographic factors of the household with children aged under five years

Variable	Proportion of the children (%)
Age (in Months)	
7-21	69.6
22-37	25.7
38-52	4.7
Gender	
Female	43.9
Male	56.1

4.1.4.2 Place of birth of children and the Antenatal Clinic (ANC) visits by their caregivers

A third (68.0%) of the study children were born in hospital whereas the rest (34%) were born outside a hospital facility (**Table 4.4**). The ANC attendance was 94.1%.

Table 5-4: Place of birth of children and the ANC visits by their caregivers

Place of delivery	Proportion of the children (%)
Place of birth	
Hospital	68.0
TBA home	13.0
Mid-wife home	13.0
At home	6.0
ANC attendance	
Yes	94.1
No	5.9

4.4.1.3 Association of Antenatal Clinic attendance and wealth index of household

A larger proportion of women from the high wealth index (49%) compared to 23% of the low wealth index households attended ANC more than 3 visits, which was statistically significant (p-value <0.05) (**Figure 4-3**).

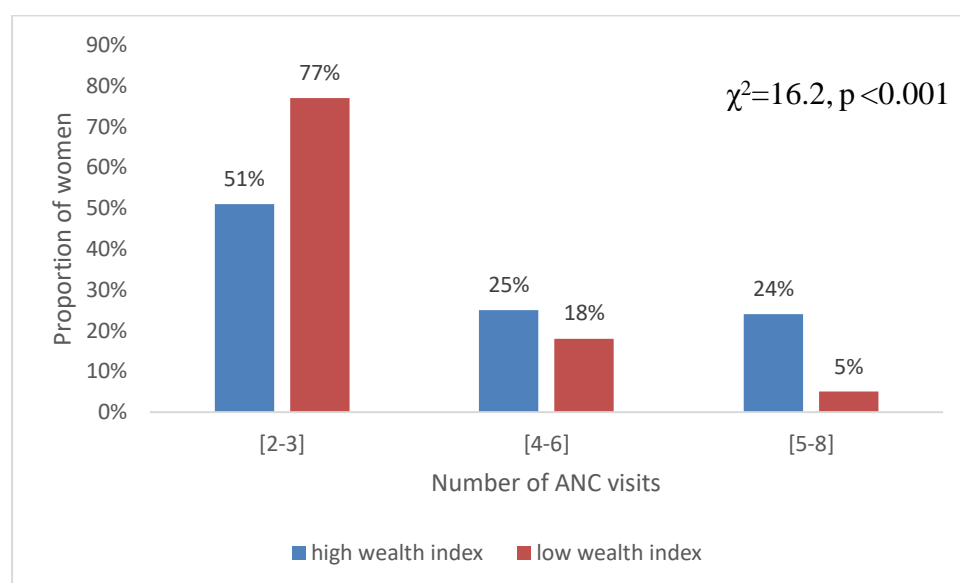


Figure 5-3: Association between wealth index and frequency of attendance of antenatal clinic.

4.2 Breastfeeding, child feeding practices and source of health support among women and relationship with wealth index

4.2.1 Breastfeeding practices

Table 4.5 summarizes the breastfeeding practices and history of the children. Seven in every ten (70.0%) of the children were breastfed immediately after birth. Over half (54.0%) of these children were on prelacteal feeds. Three quarters (75.0%) of the children were still breastfeeding at the time of the survey. Less than two in every ten (16.9%) of the women admitted that they would not freely breastfeed in public. The major reason cited by these women is shyness to breastfeed in public. Nipple (63.7%) and bottle-feeding (87.7%) were the two major modes used in feeding the child.

Table 5-5: Breastfeeding and child feeding practices among mother/the caregivers

Breastfeeding practices	Proportion of the women (%)
Onset of breastfeeding	
Immediately after birth	70.0
Within the first 30 minutes	18.0
Few hours after birth	10.0
Cannot remember	2.0
Intake of prelacteal feeds	
Yes	54.0
No	46.0
Currently breastfeeding	
Yes	75.0
No	25.0
Breastfeeding in public	
Yes	83.1
No	16.9
Reason for not breastfeeding in public	
Shy	86.0
Culture	12.0
Lack of time to feed in public	2.0
Mode of breastfeeding	
Nipple and bottle	63.7
Container and spoon	87.7
Child was fed on colostrum	95.0
Received support during breastfeeding	96.0

4.2.2 Child feeding practices

The child feeding practices among the children is as summarized in **Table 4.6**. About a fifth (21.0%) of the respondents began complementary after six months. About 42% of the children were fed only twice a day or less Hand washing before child feeding was a common practice among the mother/caregiver (99%). About nine in every ten (88.0%) of the children were fed on food sourced from within the household. Slightly over a quarter (26.0%) of the children had food avoidance behavior.

Table 5-6: Child feeding practices of children aged 6-59 months in Mogadishu

Breastfeeding practices	Proportion of the women (%)
Age of onset of complementary feeding (months)	
1-6	79.0
7-12	21.0
Number of feeding in a day	
Three times	58.0
Twice	17.0
Five times	12.0
Four times	11.0
Once	3.0
Source of food fed to the child	
Cooked in the household	88.0
Buying	12.0
Feeding centers	1.0
Washes hands before feeding the child	
Yes	99.0
No	1.0
Avoids food	
No	74.0
Yes	26.0

4.2.3 Food avoidances for children

The most avoided foods are the meat including liver (48.0%), kidney (18.0%) and beef (10.0%) as presented in **Table 4.7**.

Table 5-7: Foods avoided for child feeding

Foods avoided	Proportion (%)
Heart	48.0
Kidney	18.0
Beef	10.0
Liver	8.0
Honey	7.0
Coffee	3.0
Fish	2.0
Maize	1.0
Sweets	1.0
Egg	1.0

4.2.4 Dietary diversity score of study children

Ninety percent (90%) of the study children ate between 4-7 food groups in their meals (Figure 4-4).

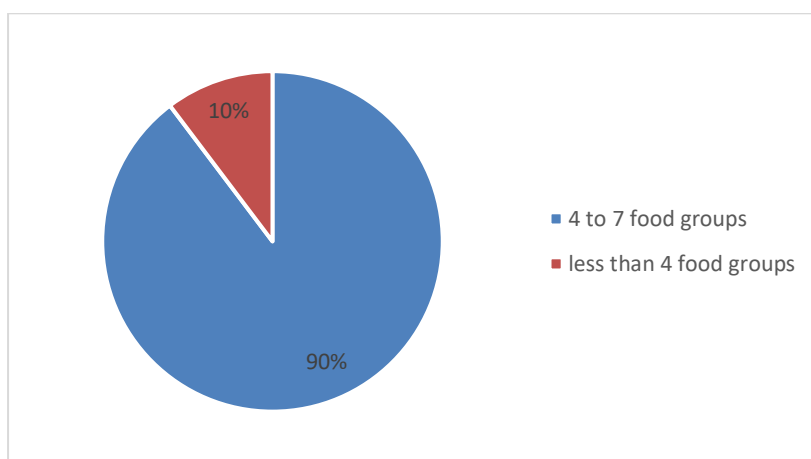


Figure 5-4: Dietary diversity scores of children

4.2.5 Food consumption rate of study children

The food consumption frequency is as summarized in **Table 4.8**. Dairy products, potatoes and tomatoes are the most regularly consumed foods as they are consumed daily by over half of the respondents. Cassava, ugali and the pulses are the least consumed products as more than three in every ten of the respondents consume them after a long time.

Table 5-8: Distribution of food by frequency of under five-year-old children Intake

Food item	Daily	3-6 times per week	Once or twice per week	Once per month	After a long time
Rice	7.0	57.0	32.0	3.0	0.0
Sorghum	18.0	40.0	34.0	7.0	1.0
Maize	31.0	44.0	21.0	4.0	1.0
Ugali	0.0	30.0	17.0	22.0	30.0
Pasta	8.0	64.0	24.0	3.0	1.0
Potatoes	62.0	22.0	12.0	3.0	1.0
Cassava	4.0	8.0	13.0	12.0	64.0
Pumpkin	41.0	44.0	11.0	3.0	1.0
Carrot	9.0	41.0	40.0	9.0	1.0
Spinach	1.0	35.0	53.0	9.0	2.0
Salad	4.0	46.0	43.0	5.0	3.0
Tomatoes	74.0	14.0	8.0	3.0	1.0
Mango	8.0	36.0	44.0	10.0	3.0
Spondias	4.0	32.0	50.0	8.0	6.0
Papaya	2.0	28.0	43.0	18.0	9.0
Cantaloupe	9.0	32.0	55.0	5.0	0.0
Liver	3.0	45.0	46.0	6.0	0.0
Kidney	4.0	51.0	38.0	4.0	3.0

Food item	Daily	3-6 times per week	Once or twice per week	Once per month	After a long time
Heart	6.0	40.0	40.0	3.0	11.0
Beef	15.0	38.0	31.0	7.0	9.0
Goat	19.0	37.0	35.0	6.0	3.0
Chicken	2.0	24.0	53.0	10.0	10.0
Egg	4.0	36.0	53.0	4.0	3.0
Fish	2.0	29.0	53.0	9.0	7.0
Peas	3.0	10.0	30.0	18.0	39.0
Lentils	4.0	4.0	44.0	12.0	36.0
Ghee	1.0	18.0	60.0	18.0	3.0
Yoghurt	14.0	47.0	25.0	10.0	4.0
Milk powder	86.0	7.0	5.0	1.0	1.0
Cow milk	11.0	19.0	45.0	22.0	3.0
Camel milk	3.0	4.0	21.0	21.0	50.0
Goat milk	4.0	9.0	20.0	35.0	32.0
Sheep milk	50.0	0.0	0.0	0.0	50.0
Butter	0.0	29.0	55.0	13.0	3.0
Honey	2.0	21.0	48.0	20.0	10.0
Chocolate	6.0	37.0	51.0	4.0	2.0
Cake	5.0	48.0	39.0	6.0	1.0
Tea with milk	66.0	20.0	11.0	2.0	0.0
Tea without milk	48.0	26.0	22.0	3.0	1.0
Coffee	7.0	14.0	43.0	14.0	21.0

4.2.6 Association between breast feeding, child feeding practices and the wealth index of the household

The wealth index of the women significantly ($p < 0.05$) influenced their use of prelacteal feeds, willingness to breastfeed in public, use of nipple/teat in feeding and feeding of the child with colostrum (Table 4.9). A higher proportion of the women from the low wealth index used prelacteal feeds and breastfed in public as compared to those from the high wealth index. On the other hand, a higher proportion of women from the high wealth index used nipples in feeding as compared to those from the low wealth index.

Table 5-9: Breastfeeding practices and the wealth index of the study household

Child breastfeeding practices	Wealth index		χ^2	P-value
	High	Low		
Use of prelacteal feeds			9.8	0.002
No	54	38		
Yes	46	62		
Has the child ever been breastfed				
No	38	65	6.2	0.012
Yes	62	35		
Currently breastfeeding				
No	20	29	3.6	0.057
Yes	80	71		
When breastfeeding was stopped				
2 to 6	8	3	3.5	0.173
7 to 12	23	12		
13 to 24	69	85		
Can breastfeed in public				
No	23	11	6.9	0.008
Yes	77	89		
Uses nipple/teat in feeding				
No	28	56	10.4	0.001
Yes	72	44		
Knowledge of when breastfeeding should be initiated				
No	6	5	0.01	0.908
Yes	94	95		
Breastfed colostrum				
No	2	3	4.4	0.036
Yes	98	97		

4.2.7 Child feeding practices and the wealth index of the households

The wealth index of the household of the child was significantly associated with child feeding practices as indicated in **Table 4.10**. A higher percentage of the children from the lower wealth index households were introduced late into complementary foods and took food from within the households than those from the high wealth index households ($p < 0.05$). The children from high wealth index households took meals more than three times a day as compared to those from low wealth index households ($p < 0.05$).

Table 5-10: Child feeding practices and the wealth index of the households

Child feeding practices	Wealth Index		χ^2	p-value
	High (%)	Low (%)		
Age of starting complementary feeding			5.6	0.017
1 to 6 months	84	74		
7 to 12 months	16	26		
Number of child feedings per day			14.2	0.007
Once	5	1		
Twice	14	20		
Three times	53	62		
Four times	14	9		
Five times	15	9		
Source of child food			14.1	0.003
Purchased from market	17	7		
Food Prepared in the household	82	93		
Feeding centers	2	0		

4.2.8 Source of health support to breastfeeding mothers

The greatest majority (96.0%) of the women received support during lactation. Nurses were the main source of support (27%) (**Figure 4-5**). The mother-in-law and friends/relatives were also a important sources of support to these women, 22.0% and 20%, respectively.

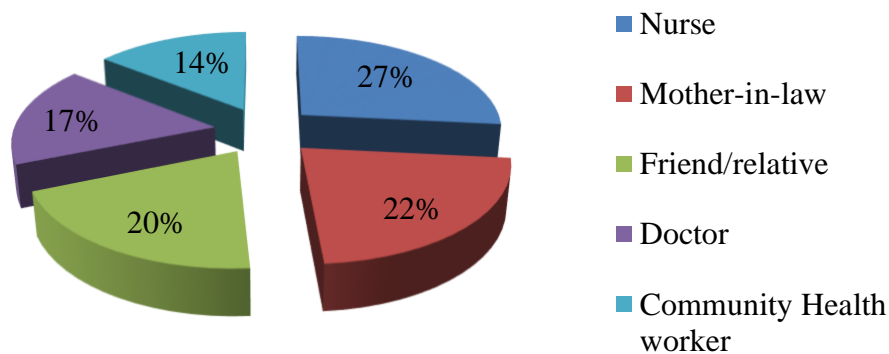


Figure 5-5: Source of support to breastfeeding mothers

4.2.9 Pica practice by caregivers

Pica was not common among the women both in and without pregnancy (Figure 4-6), but was higher during pregnancy.

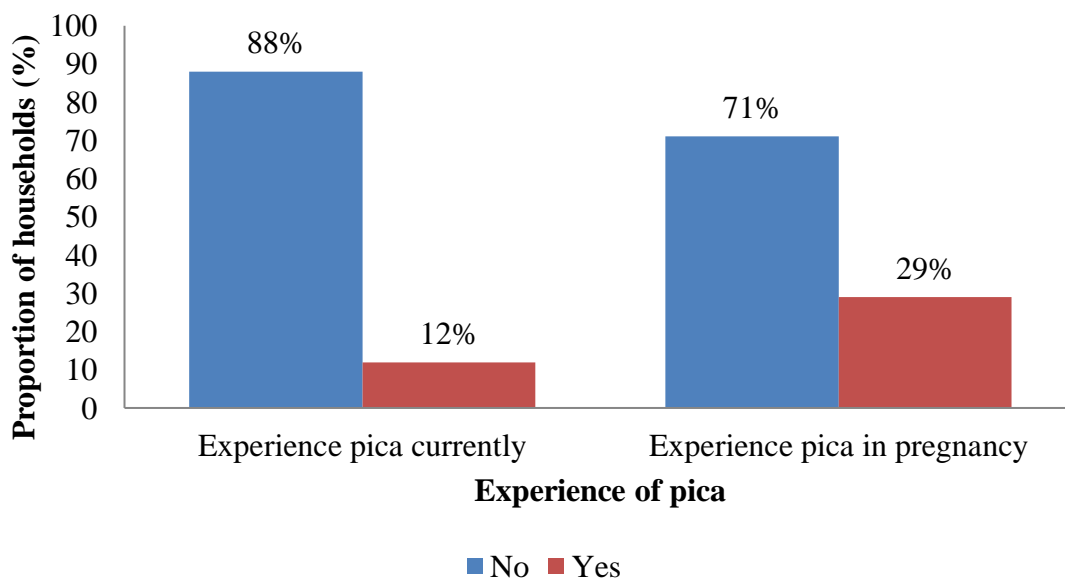


Figure 5-6: Experience of pica in breastfeeding mothers

4.3 Household hygiene and sanitation practices and wealth index of the respondents

4.3.1 Water, sanitation and hygiene practices

Water, sanitation and hygiene (WASH) practices among the households are as summarized in **Table 4.11**. Almost all the households (99%) relied on tap as the major source of water. Water treatment was a widespread practice among the households as it was done by 95.0% of the households. Of these households that treated water, eight in every ten (82.0%) used chlorination with the rest (18%) using traditional technique⁴ of boiling water. Almost all (>95%) the households had access to adequate water and stored water for later use. The average daily water use of the households was 21.32±9.03 (Range 2-200) liters.

Table 5-11: Hygiene and sanitation practices among the households

Water and sanitation	Proportion of households (%) n=404
Source of water	
Tap water	99.0
Borehole	0.5
Rain water	0.5
Treats water before use	
Yes	95.0
No	5.0
Water treatment techniques	
Water guard/Chlorine	82.0
Boiling	18.0
Storage of water	
Yes	98.0
No	2.0
Adequate water is available	
Yes	0.97
No	0.03
Daily water use (in liters)	
0-15	79.0
16-30	6.0
30-45	2.0
46-200	13.0
Has a toilet	
Yes	99.8
No	0.2
Type of toilet	
Ventilated improved pit latrine	71.0
Flush toilet	24.8
Traditional Pit latrines	4.0
Bucket	0.2
Has a garbage bit	
Yes	86.0
No	14.0

4.3.2 Household food preservation methods

The food preservation techniques in the households were drying and refrigeration by 78 and 20% of the households (**Table 4.12**).

Table 5-12: Household hygiene practices

Hygiene practices	Proportion of households (%)
Food preservation methods used	
Drying	78
Refrigeration	20
other (Specify)	2

4.3.3 Relationship between Water sanitation and hygiene and wealth index

The wealth index of the homes significantly influenced the water usage. A higher proportion of the low wealth index houses used lesser quantity of water than the high wealth index households as shown in **Figure 4-7**. Additionally, almost all (99.8%) of the households had access to toilets. Ventilated and flush toilets were the most common toilets in about 71.0 and 24.8% of the households respectively. About nine in every ten (86.0%) of the households had a garbage pit for waste disposal. Wealth index of the household significantly associated with the availability of garbage pit (**Figure 4-8**). Of the houses that had a garbage pit, the highest proportion was from the high wealth index households.

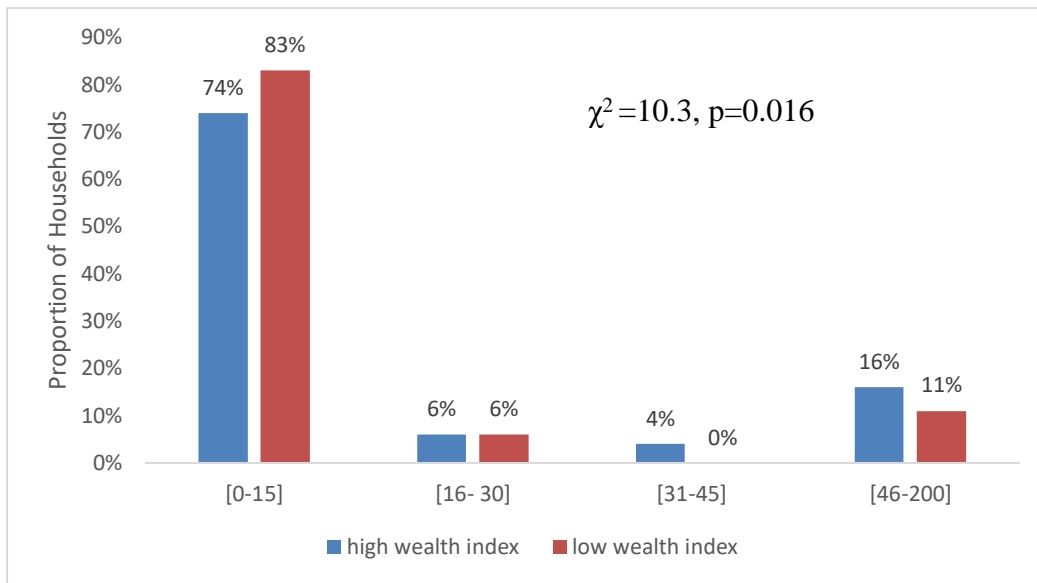


Figure 5-7: Wealth index and water usage in the households.

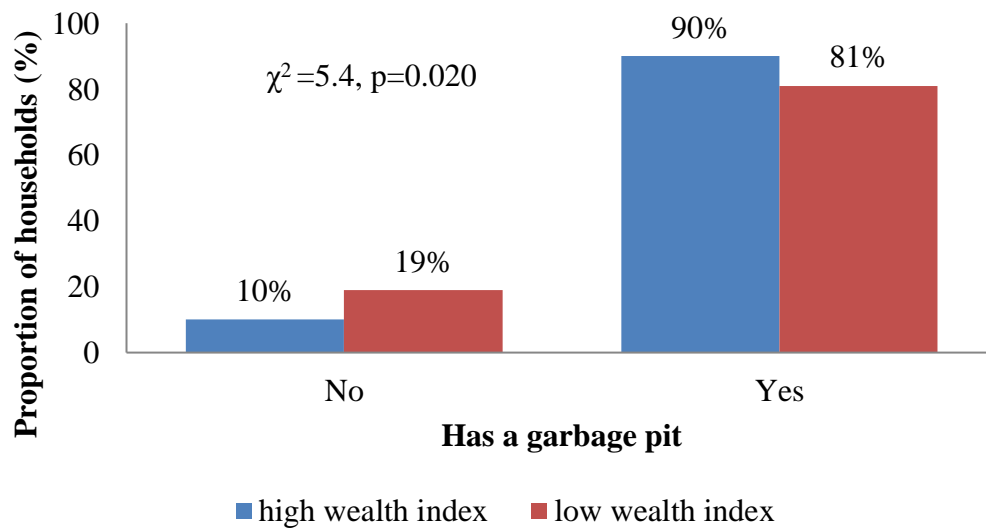


Figure 5-8: Availability of garbage pit in a household and their wealth index.

4.4 Health status of study children

4.4.1 Prevalence of childhood illnesses among study children

Majority (98.8%) of the children passed stool at the rate of 1-3 times in a day. Almost three quarters (72.0%) of children had experienced different illnesses in the 14 days preceding the study (**Table 4.13**). The most common illnesses were respiratory infection and fever in about 46.2% and 22.7% of the children.

Table 5-13: Health status of the study children

Health status	Proportion of the children (%)
Number of times the child passed stool in a day	
1 to 2 times	73.1
3 to 4 times	26.2
Above 4 times	0.4
Child currently ill	
Yes	72.3
No	27.7
Type of illness among the children	
ARI/cough (Upper respiratory infection)	46.2
Fever with chills like malaria	22.7
Skin Infection	18.5
Watery diarrhea (3or more watery stool/ day)	12.6
Pitting edema	2.0

4.4.2 Health care seeking behavior for medical care in cases of child illness

In cases of sicknesses, 96% of the guardians of the sick children consulted a medical practitioner. Of these, two thirds (66.0%) consulted at the health facility (**Figure 4-9**).

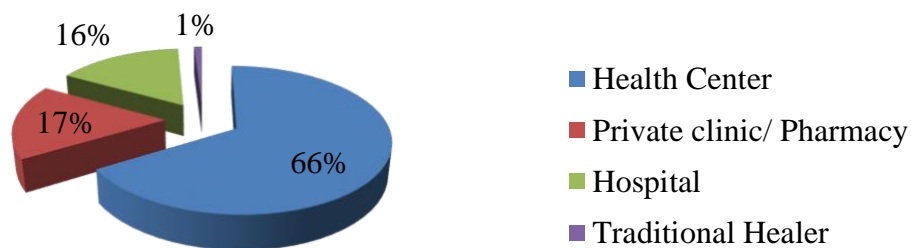


Figure 5-9: Proportion of guardians that seek medical attention at various facilities in cases of child illness

4.4.3 Wealth index and occurrence of sickness in the child

The wealth index of the households of these children was not significantly ($p > 0.05$) linked to the health status of the children (**Figure 4-10**). Child sicknesses were more common in the low wealth index households than the high wealth index households.

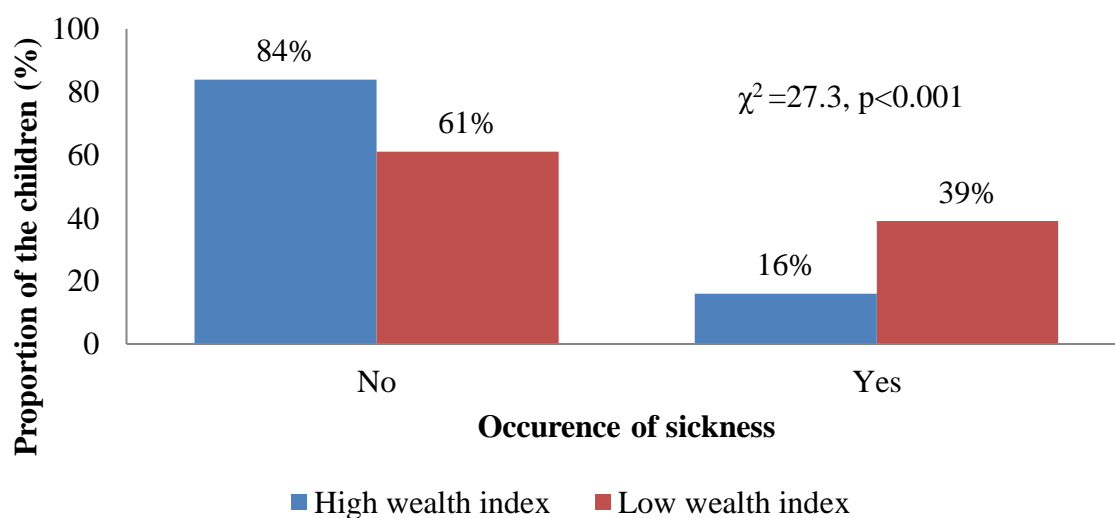


Figure 5-10: Wealth index and morbidity of sickness in the child immunization, vitamin supplementation, deworming and use of mosquito nets among the study children

Majority (<70%) of the children had acquired full immunization, vitamin A supplementation and mosquito nets (**Figure 4-11**). Deworming was the least acquired health service with 54% of the children being dewormed.

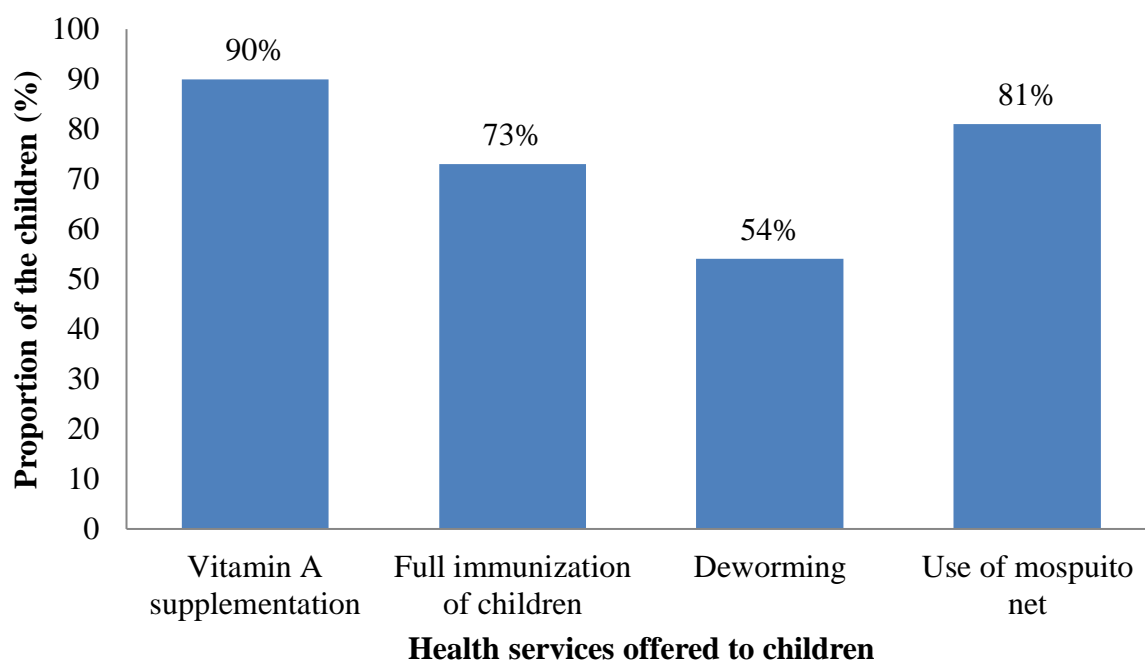


Figure 5-11: Preventive health services offered to children

4.5 Nutritional status of the children studied

4.5.1 Nutritional status of study children

The occurrence of wasting (11%), underweight (16%) and stunting (17%) among the under-five year old children (**Figure 4-12**). But those at risk of malnutrition (z-scores between -1 and -2) was quite high.

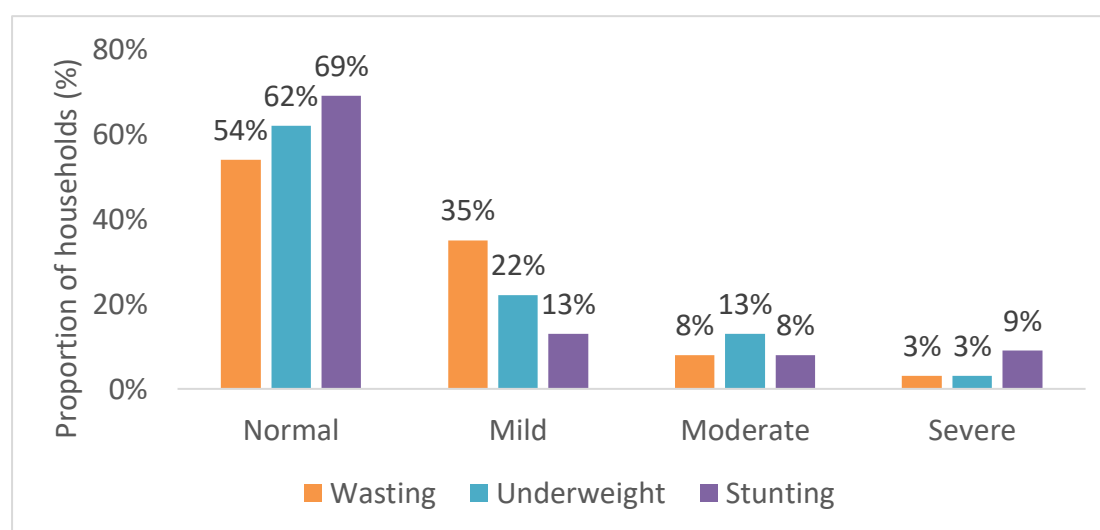


Figure 5-12: Undernutrition among undernourished children aged under five years

4.5.2 Wealth index and nutritional status of the children under study

Wasting in children below five year old was significantly associated with the wealth index of the household. More than twice the proportion of children from the low wealth index households were malnourished as compared to the high wealth index households (**Table 4.14**).

Table 5-14: Nutritional status of the children and the wealth index of their households

Nutritional status of the child		Wealth index		χ^2	P-value
		High	Low		
Wasting	Absent	94.0	84.0	7.7	0.005
	Present	6.0	16.0		
Stunting	Absent	82.0	83.0	0.0	0.988
	Present	18.0	17.0		
Underweight	Absent	86.0	82.0	0.7	0.386
	Present	14.0	18.0		

4.5.3 Association between the residence of the child and the nutritional status

More than double incidences of stunting were noted in Bondhere District as compared to either Wabari or Wartanabada districts (**Table 4.15**). Stunting was significantly associated with residence ($p < 0.05$).

Table 5-15: Distribution of children’s nutritional status to the district of residence

Nutritional status of the child		District of residence of the child			χ^2	P-value
		Bondhere	Wabari	Wartanabada		
		(%)	(%)	(%)		
Stunting	Absent	74	87	87	10.2	0.006
	Present	26	13	13		
Underweight	Absent	79	85	89	5.6	0.061
	Present	21	15	11		
Wasting	Absent	88	87	91	1.5	0.271
	Present	12	13	9		

4.5.4 Wasting

The predictor response independent variables of wasting in children of ages between 6months to 59 months in the study area was underweight, age of initiation of complimentary feeding, method of feeding, income level and wealth index as shown in **Table 4.16** at $p < 0.05$. The logit model was:

$y = 1.4a - 1.3b + 1.8c + 1.1d + 1.3e - 3.6$, where y is the response variable wasting in children; a , b , c , d and e are the predictor variables low wealth index, underweight in children, use of container in feeding, income level between USD 90-150 and income level between USD 151-200, respectively. Use of container and spoon feeding (OR=0.28), children aged above 24 months (OR=0.23) were protective factors against wasting while low wealth index (OR=1.4) and being underweight (OR=5.84) were risk factors.

Table 5-16: Response of wasting in children aged under five years

Respondent studied Parameters		Beta coefficients	Odds ratio	P-value
Method of feeding	Container and spoon	-1.3	0.28	0.026
Pica without pregnancy	Yes	0.8	2.22	0.151
Pica in pregnancy	Yes	0.5	1.67	0.225
Underweight	Yes	1.8	5.84	0.000
Age of child (Months)	24.0-58.0	-1.5	0.23	0.017
Age of initiation of complementary feeding (months)	6.0-12.0	-0.6	0.52	0.171
Income level	USD 90 - 150	1.1	3.05	0.045
	USD 151 - 200	1.3	3.49	0.013
Source of fuel	Firewood	1.5	4.66	0.078
	Gas	0.7	1.99	0.218
	Kerosene	1.6	4.75	0.101
Gender of the child	Male	0.4	1.56	0.225
Wealth index	low wealth index	1.4	4.04	0.003
Intercept		-3.6	-	0.000

$R^2=0.20$, $p<0.001$

4.5.5 Stunting and associated factors

The predictor response independent variables of stunting in kids aged between 6 months and 59 months in the area of study was underweight and age of initiation of complimentary feeding (**Table 4.17**) at $p<0.05$. The logit model was:

$y = 3.2a - 1.9b - 1.7$, where y is the response variable stunting in children; a and b are the predictor variables underweight and age of initiation of complementary feeding, respectively. The important factors were wasting, underweight, and child age of 7-12 months.

Table 5-17: Logit model for response of stunting in children aged under five years

Household characteristics		Beta coefficients	Odds ratio	P-value
Pica without pregnancy	Yes	1.0	2.84	0.083
Pica in pregnancy	Yes	-0.4	0.66	0.381
Underweight	Yes	3.2	25.79	0.000
Wasting	Yes	-1.7	0.18	0.012
Age of child (Months)	7.0-12.0	-1.9	0.15	0.000
Age of initiation of complementary feeding (Months)	6.0-12.0	-0.5	0.63	0.307
Source of fuel	Firewood	-1.1	0.32	0.364
Gender of the child	Male	0.6	1.89	0.079
Intercept		-1.7	0.19	0.000

4.6 Findings from key informant interviews

4.6.1 Availability of sessions to educate mothers on good nutrition

Nutrition education sessions for mothers are available in Somalia. “We conduct educative sessions which we showcase the community the importance of good nutrition, at community level we have structures which work as a promotive service by raising the awareness on nutrition”, the National Nutrition Manager. “At community level we have community

nutrition volunteers, mother to mother support groups and female health workers. All these cadres are focused mainly on working in nutrition promotion”, National Nutrition Manager.

4.6.2 Hindrances to proper feeding of children

The main hinderance pointed out was ignorance by the mothers and cultural beliefs. Thereby, mothers need to be educated on the importance of nutrition including breastfeeding for the infants. The strategy used to spread the message is through media (TV and radios). Some cultural beliefs lead to some communities to avoid some foods due taboos.

4.6.3 Current status of Somali Government and other stakeholders in improving the nutritional status of young children

At the time of this study the government is not contributing to nutrition projects due to their focus in other priorities like security. However, donors are playing key role since the nutrition projects are donor dependent and with minimal government contribution. Consequently, the government creates an enabling environment and developing SOPs and strategies to guide the interventions.

CHAPTER FIVE: DISCUSSION

5.1 Socio-demographic factors

The results showed that the mothers/caregivers of the children with ages 6 months 59 months were majorly of the female gender. The household size of this study agreed with another study done in Somalia by UNFPA/PESS (2014) that estimated the average household sizes at 5.9 persons. This also agrees with studies by UNPD (2017) that posits that Africa is dominated by large households of five persons. Mogadishu being a City and the Capital of Somalia, the respondents are largely salaried employees and heavily rely on rental apartments for residence.

Charcoal which is the quite affordable is the most utilized fuel source signifying low economic standard is rampant. The most owned assets among the respondents were mobile phones considering that the area of the study was an urban area. Additionally, the study population majorly lived in rented apartments. The living conditions in Somalia have most of the time been recorded as deplorable therefore the region attracts some of the greatest humanitarian assistance due to conflicts coupled with the effects of the environment that leave the people quite impoverished (UNICEF, 2017b). The country has a high child and maternal morbidity and has also been ranked among the top impoverished countries globally (UNDP, 2012; Kinyoki *et al.*, 2015).

The study population majorly comprised of children below two years who are still within the recommended ages for complementary feeding (WHO, 2009b). Children aged 6-23 months are usually put on complementary feeding in order to meet their increased nutrient requirements relative to children aged below six months (Olatona *et al.*, 2017). Attendance of ANC clinic was high among the women in the study area. A great proportion of the women also preferred delivery within a health facility. The national ANC and skilled birth attendance of Somalia still remains unknown (WHO, 2018b). Relative statistics of neighboring countries

that captured the skilled personnel birth attendance showed that Kenya, Uganda, Tanzania, Ethiopia, Eritrea and Djibouti posted proportions of 62%, 72%, 64%, 28%, 34% and 87% respectively. The study population posted delivery in health facility of less than 70%, a level that is lower only than the health statistics of Uganda and Djibouti. With increasing wealth index of the households, the frequency of attendance of ANC among the women also increased. This finding is similar to that by UNICEF (2017a) where it was reported that the more wealthy women utilized ANC more than the women from poor households. It has been argued that wealthy women have more resources and income to afford a variety of health services thus would have more maternal care including ANC services in pregnancy (Nuamah *et al.*, 2019).

5.2 Breastfeeding and child feeding practices

In as much as majority of the women did breastfeeding in the area, cases of nipple and bottle-feeding were also reported. The level of breastfeeding recorded in this study was lower than the findings by Omar *et al.* (2018) who reported that eight in every ten women were breastfeeding. Use of bottle-feeding was greater among the women from the high wealth index households. The women majorly shied off from breastfeeding in public. Additionally, the use of prelacteal feeds was majorly among the women from the low wealth index households. According to WHO (2009a), the 99% of sub-optimal breastfeeding practices including utilization of prelacteal feeds are in the developing countries. Limitation of prelacteal feeds such as boiled water has been recommended as a way of improving child feeding practices thus improving health (Victora *et al.*, 2016). WHO reports that the use of prelacteal feeds and other sub-optimal breastfeeding practices contribute up to 44% of newborn communicable deaths, 32% diarrheal demises and 17% of breathing contagion deaths (WHO, 2009a). Support for the breastfeeding women among the family was also very

little to these women. Support in breastfeeding is recommended for improvement of breastfeeding rates and practices (Rayfield, Oakley and Quigley, 2015).

The breastfeeding practices of the women were rather compromised as late initiation of breastfeeding and wider use of prelacteal feeds were reported. Recommendations for child care and feeding require that early initiation of breastfeeding and emphasis on breastfeeding rather than pre-lacteal feeds (WHO, 2009b; UNICEF and WHO, 2018). Breastfeeding for the children on complementary foods (6-24 months) should be on demand according to WHO recommendations (Legesse *et al.*, 2014). However factors such as attachment of the baby, baby response to contact and breast disorders are key defining the initiation and quality of breastfeeding among lactating mothers (Barbosaa *et al.*, 2017). Late initiation of breastfeeding has been associated with avoidance of colostrum thus has impact on the health of the child (Legesse *et al.*, 2015).

Cases of late and early introduction of balancing foods were noted among the respondents. Additionally, risk factors of malnutrition such as fewer meals and food avoidance among the children was also noted. Dietary habits have such as food intake and dietary diversity are recognized to influence the nutritive status of kids (Khan, 2017). Motbainor et al. (2015) also reported that meals taken in a day would predict the dietary status of kids aged under five years. WHO recommends that the meal intake of children with ages under five years to be between 2-4 meals with additional snacking (WHO, 2018a). Sub-optimal feeding practices such as less feeding affect the dietary status of the kid and may have irreversible effects at times.

5.3 Dietary practices and feeding habits of households

Avoidance of animal protein in pregnancy happened in almost 94% of the women. This as per the study by Montani and Omwega (2002) is largely due to food taboos and intentional behavior perceived to improve the health of the unborn child. The children consumed at least

five food groups pointing at diverse food intake among the children. The most consumed foods included tomatoes, potatoes and milk. Cereals such as rice, maize and sorghum were also consumed in significant portions in a week. Similar findings were reported by Masese (2016) who reported that the intake of cereals was as high as 99% among households in Somalia. Furthermore, she reported that the intake of vegetables, pulses, fruits and meats was either just at average or below the average. This study reported similar findings to this as cassava, pulses, meats and vegetables were the some of the least consumed foods among these children.

5.4 Water, hygiene and sanitation practices in households

WASH practices are known to impact on the health and development of children with far reaching effects that can determine the efficiency of nutrition in under-five year old children (Johnson *et al.*, 2015). The usage as per the study was averaged at 21.34 litres per household. Despite of this high usage, it has also been reported that the residents of Somalia are less satisfied with the water quality; only 15% were found to be satisfied with the quality of water that is supplied to them (Jama and Mourad, 2019). Moreover, access to quality water in the area has been hindered by drought and civil wars, leaving the people vulnerable (Jaffer and Hotez, 2016). The high level of storage of water is explained by the inadequacy that comes due to the civil wars and extreme weather conditions. The average water usage was about 21.34 litres per household. The households practiced water storage and treatment with chlorine and boiling. The water usage was also higher in the high wealth index households. This finding agrees with those of other multiple studies that found that the rich have an increased capacity to afford and access water (Yang *et al.*, 2013; WHO and UNICEF, 2014; United Nations, 2015; Tuyet-Hanh *et al.*, 2016)

The study found that most of the household had access to sanitation and hygiene facilities. Sanitation facilities such as toilets and garbage pits were also found to be common in most of

the households. The levels reported in this study were higher than those that were reported in the city of Abidjan in Cote d'Ivoire where less than half the households had access to sanitary facilities (Angoua *et al.*, 2018). SSA has been found to be one of the most ill equipped regions in terms of infrastructure to address hygiene and sanitation (Besada and Werner, 2015). This explains why poorer households had limited access to hygiene and sanitation facilities such as garbage pits as reported by this study. In their WASH evaluation study of SSA countries, Armah *et al.* (2018) reported that rich urban households were 220% more probable to access hygiene amenities as compared to the poor urban homes which they attributed to the increased capacity due to income among the rich to access sanitary facilities.

5.5 Morbidity pattern of the study children aged 6-59 months

The study reported that respiratory illnesses were quite frequent among the children. Globally, respiratory diseases such as pneumonia and asphyxia are listed as primary causes of child mortality (Van de Poel *et al.*, 2008). These illnesses were more common in the low wealth index households in comparison with the high wealth index households. The wealthier households have more access to medical and health services that help them address illnesses in their midst as compared to the poor households (Nuamah *et al.*, 2019).

The disease prevention practices including medical services and nutrient supplementation were widely used among the children. In as much as the prevailing conflicts in Somalia has hindered access to medical services in the area as reported by other studies (Kinyoki *et al.*, 2017), this study found that there was wider access to services such as vitamin A supplementation, immunization and distribution of mosquito nets. The national reports obtained from Somalia showed that vitamin A supplementation has a below average coverage of only 30% (Wirth *et al.*, 2017). The values obtained in this study are higher than the recorded national levels. The global estimates show that the coverage of vitamin A supplementation of the under-five year old children in sub-Saharan Africa stands at 73%

(UNICEF, 2007), higher than the national values but lower than the values obtained in this study. Currently, vitamin A supplementation in Somalia is done through the health facilities for the under five year olds and the post-partum women (FAO and WHO, 2016). The least accessed medical service was de-worming at just slightly over half of the children utilizing it. The WHO targets 75% coverage for de-worming globally (Kumapley, Kupka and Dalmiya, 2015). Vijayaraghavan *et al.* (2012) recommends the introduction of child health days as a cost-effective strategy of improving the utilization of health services such as de-worming, immunization and supplementation.

5.6 Nutritional status determinants for children with ages under under five years in households

The study reported that the rates of stunting, wasting and underweight in the area of study were 18%, 16% and 11% respectively. Higher levels of 21% and 31% for wasting and stunting respectively have been reported in another study by Kinyoki *et al.* (2017). UNICEF(2018) also reported that the level of malnutrition in Somalia is still high despite an annual reduction of 0.8% as noted between 2011 and 2015. The report also found that of those that were malnourished, at least 10% were severely malnourished. These results are similar to those stated in this study where at least one in every ten of the malnourished children was a severe case. Additionally, WHO health statistics in 2018 found that Somalia was among the countries that recorded higher rates of stunting and wasting globally (WHO, 2018b). This is because the country has been in a prolonged period of conflict that has resulted into diminished quantities of produced foods and less accessibility to food (UNICEF, 2018).

The predictor model for the risk factors of malnutrition in this study included underweight, age of initiation of complimentary feeding, method of feeding, income level and wealth indexes as the independent variables. In his study, Kinyoki *et al.* (2017)found that the

inclusion of conflict as an independent predictor variable perfects the predictor models for malnutrition. In another study, Kinyoki *et al.* (2015) reported that climate and infection among children aged 6-59 months as the key determinants of either stunting or wasting. Earlier outline and feeding of balancing foods (at the stage of 6 months to 12 months) in these children was found to lower the odds of being stunted. It has been shown that stunting occurs during the period of complementary feeding, at the age of 6-23 months of the baby (WHO, 2009b; Aguayo, 2017). In his study, Martinez *et al.* (2018) found that on time initiation of complementary feeds in children aged 6-24 months improved their dietary diversity by up to 22% thus improving the nutrient adequacy of these children. Other findings by Roosita *et al.* (2010) revealed that deficiency of the diet with protein, iron, zinc and calcium correlated with the incidences of stunting. On the other hand, this study found that economic status of the caregivers in terms of their income and wealth index, feeding using teat and the incidence of underweight were predictors of wasting in the children.

Tests of association showed that residence influenced stunting whereas the wealth index influenced wasting rates. Similar finding were also reported by Harding *et al.* (2018) in their studies across various South Asian countries: stunting differed by geographies and wasting was more prevalent in poor households. The association of poverty and under-nutrition has been explained by the vicious cycle of poverty as this limits the access of these households to food thus they are food and nutritionally insecure (Akombi *et al.*, 2017). The implication of this finding is that more preventive measures such as safety nets for the poor households need to be in place to prevent high incidence of child under-nutrition in these households.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The study was majorly focused on the female caregivers and the urban population of Mogadishu, Somalia. Contrary, to what is expected the conflict-laden area has high utilization of the ANC services and birth attendance by skilled health personnel.

Furthermore, the children consume a diverse diet, even though, there is less optimal breastfeeding practices and use of prelacteal feeding practice. To avert dangers posed by such practices, it would be necessary for proper nutrition interventions with a focus on child feeding and breastfeeding practices.

Finally, the incidences of malnutrition and diseases are minimal among the children living in Mogadishu. However, availability of clean water and sanitation facilities are lower among the poor households, which indicate greater vulnerability for these households. The important factors contributing to undernutrition especially wasting were low wealth index and child being underweight. Factors that reduced undernutrition were good child feeding practices with spoon and a container.

6.2 Recommendations

In as much as minimal incidences of malnutrition were reported, there is still need to improve nutrition outreach in order to address the less optimal practices of breastfeeding and child feeding, deworming and ensure 100% coverage in child immunization.

Additionally, this research was limited in the urban areas and therefore, evaluation of the situation of nutrition status and dietary diversity for children in the rural areas helps provide an overall picture of the whole country.

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APPENDICES

APPENDIX 1: CONSENT FORM.

You are being invited to take part in a research study. The purpose of the current study is to determine the dietary intake and nutritional status among children aged 6-59 months in the general population of Mogadishu Somalia in order to assess the contribution of dietary intake on the nutritional outcome

In this study you will be expected to provide truthful information provide truthful information regarding your household to the enumerator assigned to you. Once you consent to participate, you will be asked questions that will be captured in tablets/-mobile phones after which the enumerator leaves your homestead.

The data collected shall only be seen by members affiliated with the study and will not be linked to any identifying information such as name, address or other personal details that you will supply. The data collected shall be averaged over many participants and therefore your individual data shall not be identifiable. This study poses no known risks to you and you may decide to stop participating in the study at any time however we encourage you to remain in the study. You may demand that any data provided until that point be withdrawn/destroyed.

If you have any questions with regards to this information sheet, you should ask the enumerator before the study begins.

Researcher: Ismail Ibrahim Mohamed

Contacts:0615195388

DIETARY INTAKE AND NUTRITIONAL STATUS AMONG CHILDREN AGED 6-59 MONTHS IN MOGADISHU, SOMALIA.

Kindly tick where appropriate:

I confirm that I have read (or been read to) and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had the questions answered satisfactorily.

I understand that my participation is voluntary and that iam free to withdraw at anytime without at any time without giving any reason, without my legal rights being affected.

I understand that relevant sections of information and data collected during the study may be looked at by other members of this research team. I give permission for these individuals to have access to these records.

I agree to take part in the study without any demands and of my own free will.

Name of respondent: _____

Date: _____

Signature: _____ **or \Thumb print:**

**APPENDIX 2: QUESTIONNAIRE FOR MOTHERS AND CARE GIVERS
DIETARY PRACTICES AND NUTRITIONAL STATUS AMONG CHILDREN AGED
6-59 MONTHS IN MOGADISHU SOMALIA**

Personal identification

Name of interviewer.....

Date of interview...../...../2018

Respondent's name

Gender () 1= Male, 2= Female

Section A: Demographic and Socio-economic characteristics

1. Household profile

S/No	Name	Relation ship to HH head -codes-	Age (years)	Marital status -codes-	Religion -codes-	Level of Education	Main occupation -codes-
1							
2							
3							
4							
5							
6							
7							
8							
9							

RHHH	Marital status	Religion	Education	Occupation
1= HHH	1= married	1= Christian	1= In Primary	1= salaried
2=Spouse	2=Separated	2=Muslim	2=Primary drop-out	employee
3=son	3=Widowed	3=Traditions	3=Completed primary	2=farmer
4=Daughter	4=Single	4= Others (specify)	4=Secondary drop-out	3=Self employment
5= Grandson	5=Divorced		5=In secondary	4=Casual laborer
6=Grand daughter	6=not applicable <15 Years		6=Completed secondary	5=Student
7=Relative			7=Tertiary level	6=Unemployed
8=Parent			8=University	7=Others (specify)
9=Employee			9=Adult education	
			10= Other (specify)	

Section B. Socio-economic characteristics

2. What are your sources of income?

1. Salaried job
2. Shop Owner
3. Help from children
4. Casual waged labor
5. Small own business/petty trade
6. Others specify -----

3. How much Sh. So. Do you earn per month from all sources-----

4. Please describe the home where you live

1. Self- Owned
2. Hosted by parent or relative for free
3. Pay rent

5. What is the main type of cooking fuel?

1. Kerosene
2. Electricity

3. Firewood ()

4. Charcoal ()

5. Gas ()

6. Others Specify-----

6. Which of the following are owned by your family?

1. Television ()

2. Radio ()

3. Cellphone ()

4. DVD Player ()

5. Bicycle ()

6. Land ()

7. Plot ()

8. Car ()

9. Motorcycle ()

SECTION C

Index child information

7. Child's first name.....

8. Age in months.....

9. Gender of the child 1) male 2 Female

10. Where was the child born?

1= Hospital

2= At home

3= Others Specify_____

Child FEEDING information(6-59 Months)

Brest feeding practice

11. When was the (NAME) child first put on the breast?

- 1= immediately after birth ----- 2=within the first 30 minutes-----
 3= few hours after birth----- 4= One to two days after birth.
 5= cannot remember----- 6= others (specify) -----

12. What was the child given immediate after birth other than breast milk?

- 1=None 2=Water
 3=Honey 4=Dates
 5=caws milk 6=other.....

13. During the first three (3) days was the child given anything other than breast milk?

- 1=None 2=Water
 3=Honey 4=Dates
 5=caws milk 6=other.....

14. Is the child currently breast-feeding? 1=Yes 2=No

(If no jump to Q14, 15, 16); If yes go to Q17

15. Did the child ever breast feed earlier on? 1=yes 2=No

16. When did you stop breastfeeding? ----- (age in months)

17. Why did you stop breastfeeding?

- 0= Baby is not getting enough
 1= Cultural beliefs (Specify).....
 2= the baby has grown up

18. Do you breast feed your child outside home/public places? 1=Yes 2=No

19. If not why don't you breast feed in public? 1=Shyness 2=Ignorance

3=Custom 4=others _____(specify)

20. Yesterday, did the child drink anything from the bottle with nipple/teat 1) Yes 2) No

21. Yesterday, did the child drink anything from the container and spoon 1) Yes 2) No

22. In your opinion, should a baby be put on the breast immediately they are born?

- 1) Yes 2) No

23. Should a baby be given the very first milk (colostrum) from the breast at birth or soon after? 1) Yes 2) No

24. During the first 3 days after the child was borne did you receive any practical support or advice to help you to start breastfeeding? 1) Yes 2) No

25. If yes, who gave you the support.

- 1) Mother-in-law
- 2) Friend/relative
- 3) Community Health worker
- 4) Nurse
- 5) Doctor

26. Where was this child born 1) Home 2) Health Centre/Dispensary 3) Hospital 4) TBA home 5) Mid wife.

27. Did you attend antenatal care during the pregnancy of this child 1) Yes 2) No

How many times did you attend ANC _____Times

Complementary feeding

28. What age did you start giving other foods (complementary feeding?)

29. How many times is food served in a day?

1. Once
2. Twice
3. Three times
4. Others (specify)

30. Where do you get food for the child?

1. By cooked in the house hold
2. By buying
3. by feeding centers
4. from relatives
5. Others (Specify).....

31. How many people living in the house

32. Do you wash your hands before feeding the child? 1=Yes 2=NO

33. Are there some foods that should be fed to children because they are a taboo 1) yes 2)No

If yes, which foods. 1)_____2) _____3)_____

34. Are you currently taking any soils/stones 1) yes 2)No

35. During the pregnancy of this child were you taking any soil/stones 1) yes 2)No

Section E

Food frequency

36. Please indicate; how many times in the last 7days did_____ (ref child) eat each of the food in the list

Numbers	Food	Frequency 1-Daily, 2- 3-6 times per week, 3-Once or twice per week, 4-Once per month 5- After long time or never	Source of food 1. Own production, 2. Purchases 3, Gift 4, Food aid 5. Traded 6. Borrowed 7. Gathering, 9. others(explain)
1	Maize		
2	Rice		
3	Sorghum		
4	Ugali		
4	Flour		
5	Pasta		
6	Porridge		
	Fermented flours (porridge)		
	Unfermented flours (porridge)		
7	White potatoes		
8	White cassava		
9	Pumpkin		
10	Carrot		
11	Spinach		
12	Salad		
13	Tomatoes		
14	Onions		
15	Ripe Mango		
16	Spondias		
17	Ripe papaya		
18	Cantaloupe		
19	Liver		
20	Kidney		
21	Heart		
22	Beef		
23	Goat		
24	Chicken		
25	Egg		
26	Fresh or dried Fish		
27	Peas		
28	Lentils		
29	Ghee		
30	Yoghurt		
31	Milk powder		
32	Cow's milk		
33	Camel milk		
34	Butter		
35	Oils		
35	Fats		
36	Sugar		
37	Honey		

38	Chocolate		
39	Cake		
40	Tea with milk		
41	Tea without milk		
42	Coffee		

37. What flours are do you use to cook porridge for the child _____

38. DIETARY DIVERSITY QUESTIONNAIRE

How many meals 1 has the (NAME) index child had in the last 24 hours (from this time Yesterday to now).....

39. Please I would like to ask you about the foods and drinks (meals and snacks) that your child ate yesterday during the day and at night (24 hours), whether at home or outside the home. Please recall all foods and beverages that the child ate starting with the first food eaten in the morning.

Write down all food and drinks mentioned by the respondent. When the respondent has finished, probe for meals and snacks not mentioned.

Breakfast	Snack	Lunch	Snack	Super	Snack

When the respondent recall is complete, fill in the food groups based on the information recorded above. For any food groups not mentioned, ask the respondent if a food item from this group was consumed.

No	Food group	Examples	YES=1 NO=0
1	CEREALS	corn/maize, rice, wheat, sorghum, millet or any other grains or foods made from these (e.g. bread, noodles, porridge or other grain products) + insert local foods e.g. 'ugali, porridge, angera pastes or other locally available grains	
2	VITAMIN A RICH VEGETABLES AND TUBERS	pumpkin, carrots, squash, or sweet potatoes that are orange inside + other locally available vitamin-A rich vegetables (e.g. red sweet pepper)	
3	WHITE TUBERS AND ROOTS	white potatoes, white yams, white cassava, or other foods made from roots	
4	DARK GREEN LEAFY VEGETABLES	dark green/leafy vegetables, including wild ones + locally available vitamin-A rich leaves such as spinach and cassava.	
5	OTHER VEGETABLES	other vegetables (e.g. tomato, onion, eggplant), including wild vegetables	
6	VITAMIN A RICH FRUITS	ripe mangoes, cantaloupe, apricots (fresh or dried), ripe papaya, dried peaches + other locally available vitamin A-rich fruits	
7	OTHER FRUITS	other fruits, including wild fruits	
8	ORGAN MEAT (IRONRICH)	liver, kidney, heart or other organ meats or blood-based foods	
9	FLESH MEATS	beef, lamb, goat, rabbit, wild game, chicken, duck, or other birds	
10	EGGS	chicken, duck, a hen or any other egg	
11	FISH	fresh or dried fish or shellfish	
12	LEGUMES, NUTS AND SEEDS	beans, peas, lentils, nuts, seeds or foods made from these	
13	MILK AND MILK PRODUCTS	milk, cheese, yogurt or other milk products	
14	OILS AND FATS	oil, fats or butter added to food or used	
15	SWEETS	sugar, honey, sweetened soda or sugary foods such as chocolates, candies, cookies and cakes	
16	BEVERAGES	coffee, tea, OR local examples	

40. Did your child eat anything (meal or snack) OUTSIDE of the home yesterday? 1) yes 2) No

(A meal refers to the number of times the child is fed served and eaten at one time (includes all of the three commonly known foods and snacks: - breakfast, lunch and supper/dinner and snacks).

41. Total number of food groups consumed by the index child: -----

42. How do you store excess foods?

1=Drying

2=Refrigeration

3=other specify-----

Section F:

Sanitation and hygiene practices in households with children 6-59 months

43. Where do you get your drinking water?

1= Tap water

2=Borehole

3= Rain water

4= sea water

5= others (specify)

44. Do you treat water?

1= Yes

2= No

45. If yes, how do you treat?

1= Boiling

2= Water guard/Chlorine

46. How do you store your drinking water? 1=covered container 2=Not covered

47. Do you have water in adequate supply? 1=Yes 2=No

48. How much water do you think is adequate for your household----- (can use

Jerry cans to estimate liters/day)

49. Any pit latrine/toilet in the household?

1= yes

2=No

50. If YES, What type of toilet facility?

1=Bucket

2=Traditional Pit latrines

3=Ventilated improved pit latrine

4=Flush toilet

5=other (specify).....

51. When do you wash your hands?

1. =After defecation/visiting toilet?
2. =Before feeding the child
3. =Before eating
4. =Before preparing food
5. =When I think they are dirty
6. =When water is available
7. =Other (Specify).....

52. Do you have garbage pit?

1=yes

2=No

53. What do you do with the baby's leftover food?

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

54. How often does your baby pass stool?

.....
.....

Section f

Co-morbidity status of children 6-59 months

55. Has the child been dewormed in the last six months?

1. Yes
- 2.No

56. During the past 2 weeks, did the child suffer from any Illness/ injury?

1. Yes
2. No

57. If yes, how many days did the child suffer? _____

58. Can you describe the illness? (You can tick more than one)

1. Fiver with chills like malaria
2. ARI/cough (Upper respiratory infection)
3. Watery diarrhea (3or more watery stool/ day)
4. Bloody diarrhea (3 or more with blood stool.)
5. Skin Infection

6. Others Specify

59. Was any one consulted for that illness?

1. Yes
2. No

60. If No, what is the reason?

1. Lack of Money ()
2. No health facility nearby ()
3. Mild illness ()
4. Other Specify -----

61. If yes, where did you go for consultation?

1. Health Center
2. Traditional Healer
3. Private clinic/ Pharmacy
4. Hospital
5. Shop
6. Relatives/friends
7. Community health workers
8. Local healers.....

9. NGO
10. Other-----

62. Did (NAME) the child sleep under a mosquito net last night? 1=Yes 2= No

63. Has the child received vitamin A supplement in the past 6 months? 1=Yes 2=No

64. How many times did the child receive vitamin A capsules from the facility or outreach?
.....

65. If Vitamin A received how many times in the past one year did the child receive verified by Card?

66. Does the child have a vaccination card? 1= Yes. 2=No

[If the card is available, fill in the information as per table below]

Serial no	Name of child	Q56	Q57					Q58			Q59	Q60
		Has the child received BCG vaccination? Check for BCG scar 1 = scar 2=No scar	(Oral polio vaccine). 1=yes 2=no 3= do not recall					PENTAVALENT (diphtheria, tetanus, whooping cough, hepatitis B, homophiles)			Measles 1=Yes 2=No	Fully Immunized 1=Yes 2=No
			OPV 0	OPV 1	OPV 2	OPV 3	IPV (in active polio vaccine)	PENTA 1	PENTA 2	PENTA 3		

Nutritional status of children 6-59 months

Anthropometric measurements.

	ANTHROPOMETRIC ASSESSMENT METHOD	MEASUREMENT 1	MEASUREMENT 2	AVERAGE
61	Weight (Kg)			
62	Length (Centimeters)			
63	MUAC(Centimeters)			

APPENDIX 3: KEY IN FORMAT INTERVIEW

1. What is your general view of child nutrition and morbidity pattern?
2. What are food types are readily available to feed young children?
3. Is there farming done around here? How is it important as a source of food?
4. Do you have any data for the last 3 months on children regarding nutritional status?
5. What supplements do you have for malnourished children?
6. What qualifies a child to be put under food supplements?
7. Do you conduct sessions to educate mothers on good nutrition?
8. In your own view, what hinders caregivers from feeding their children with proper balanced meals?
9. What is the Somali Government doing to improve the nutritional status of young children?
10. How can other stakeholders assist in improving the nutritional status of young children?

APPENDIX 4 ETHICAL APPROVAL



Somali Federal Republic
Ministry of Health & Human Services

RESEARCH & ETHICS REVIEW COMMITTEE

ETHICAL APPROVAL

This is to certify that the proposal submitted by:

Investigators: Ismail Ibrahim Mohamed

Reference No:

MOH&HS/DGO/0829/May/2018

Title:

Dietary intake and nutritional status among children aged 6-59 months in Mogadishu Somalia.

To be undertaken in

Mogadishu, Somalia

For the proposed period of research

Has been approved by the Research & ethics committee at the Ministry of Health

On the 23rd day of May 2018

Chairman



Secretary

Ministry of health, Somalia

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