MATERNAL NUTRITION KNOWELDGE, INFANT FEEDING PRACTICES AND YOUNG CHILD NUTRITION: A CASE OF BOSASO DISTRICT, SOMALIA

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN APPLIED HUMAN NUTRITION
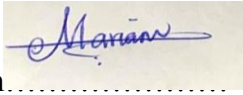
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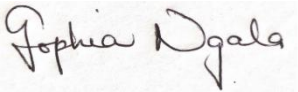
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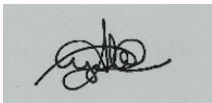Department of Food Science, Nutrition and Technology, University of Nairobi

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DEDICATION

This dissertation is dedicated to my parents Mr. Bashir Ismail Abdurrahman and Mrs. Farhia Yassin for providing the best and secure–foundation for my life. I also dedicate it to my husband Yassin Ali Shire for being understanding and supportive financially, socially and emotionally. Finally I dedicate my son Khalid Yassin for giving me the hope and strength. May the almighty Allah award them mercy and grace.

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LIST OF ABBREVIATIONS AND ACRONYMS

IYCF   :   Infant and Young Child Feeding Practices

IYCN   :   Infant and Young Child Nutrition

IDPs   :   Internally displaced persons

KAP   :   Knowledge, Attitude and Practice

MIYCN   :   Maternal Infant and Young Child Nutrition

GAM   :   Global Acute Malnutrition

MCH   :   Maternal and Child Health center

MICS   :   Multi Indicators Cluster Surveys

MOH   :   Ministry of Health

MUAC   :   Mid Upper Arm Circumference

UNICEF   :   United Nations Children's Fund

UNFPA   :   United Nations Population Fund

UN   :   United Nations

FSNAU   :   Food Security and Nutrition Analysis Unit

WHO   :   World Health Organization

USAID   :   United States Agency for International Development

ENA   :   Emergency Nutrition Assessment software

SPSS   :   Statistical Package for Social Scientists

OPERATIONAL DEFINITIONS

Nutrition knowledge: is refers to knowledge of concepts and processes related to nutrition and health including knowledge of diet and health, diet and disease, foods representing major sources of nutrients, and dietary guidelines and recommendations.

Child care Practices: For this study refers to the practices of the mother/caregivers in the household which translate to food and nutritional security and health care resources into a child's growth and development.

Caregiver: is refer the person who provides care for the children and responsible for the feeding and other basic needs of children.

Complementary food: is defined as the process starting when breast milk alone is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids are needed, along with breast milk, the child is usually 6months and above.

Exclusive Breastfeeding: Refers giving the infants breast milk only without addition any liquid for the first six months of life

Nutrition status: is the physiological state of an individual, which results from the relationship between nutrient intake and requirements and from the body's ability to digest, absorb and use these nutrients.

Anthropometry: involves the systematic measurement of the physical properties of the human body, primarily dimensional descriptors of body size and shape.

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ABSTRACT

Maternal Knowledge, attitude and practice of infant and young child feeding are key factors for optimal nutritional status, health and development of the children. Inadequate knowledge of appropriate foods and feeding practices is often a determining factor of malnutrition. The main objective of this study was to determine maternal nutrition knowledge, infant feeding practices and nutritional status of the children aged 0-24 months in Bosaso, Somalia.

A cross sectional study was carried out among 348 mothers with children aged 0-24 months living in Bosaso District, Somalia. Data was collected using both quantitative and qualitative methods. A structured household questionnaire was used to collect quantitative data from mothers of infants and young children aged 0-24 months. Data on demographic characteristics of the household, Hygiene and sanitation, Feeding practices and maternal nutrition knowledge. Food frequency and dietary diversity questionnaires were used to obtain data on food patterns, anthropometric techniques were used to determine the nutrition status of the study children. Focus group discussion was used to collect qualitative data on: maternal nutrition knowledge, attitudes, and child feeding practices.

Descriptive statistics was used to analyse. Normal test proportions were determined for socio-demographic and socio economic variables. Chi square was used for comparison and association of prevalence stunting, underweight and wasting between different groups, correlations were used for analysis the relationships between maternal knowledge and other variables. Mean score and knowledge z-score was computed and used to group the respondents into three knowledge groups of low, moderate, and high knowledge score.

The study results obtained showed the study population had poor socio-economic status and the families were living in low wealth level .Mother's nutrition knowledge on child feeding practices were moderate at 48.6%, about 40.5% had poor knowledge and 11% were highly knowledgeable. About 42.5% mothers had knowledge of exclusive breastfeeding while 31.6% on breastfeeding initiation, 31% had knowledge of frequency of breastfeeding and 42.5% of the mothers were exclusively breastfeeding.There was a significant difference between maternal nutrition knowledge, maternal health education (p=0.000),income(p=0.001),occupation(p=0.001)and breastfeeding practices (p=0.001) underweight (p=0.007) and wasting (p=0.001).There was no significant different between knowledge and mothers/care givers marital status (p= 0.606). There was no significant different between maternal nutritional knowledge, stunting (p=0.152) and MUAC (p=.0.143).

For all the three nutritional indicators, there was a positive correlation between maternal nutrition knowledge and stunting (r=0.084) wasting (r=0.140), the strongest being underweight (r=0.167).The mothers/care givers had moderate maternal nutrition knowledge on child feeding practices. Most mothers and care givers were aware of the recommended breastfeeding practices but the actual practice of the recommendation of infant and young child feeding practices was poor. The level of maternal nutrition knowledge affected young child nutrition and adoption of breastfeeding practices. There is need for counseling among mothers and care givers on the recommended child feeding practices in order to reduce the level of malnourished children in the community.

CHAPTER ONE
INTRODUCTION

1.1 Background

Global malnutrition is a major community health problem causing about half of children's deaths with in the first month of life (WHO, 2016) .Sub-Saharan Africa has one of the highest levels of child malnutrition globally besides and the number of stunted children has risen in every region of Africa (UNICEF, 2019).In Somalia, malnutrition rates remain among the highest in the world and the childhood malnutrition is the predominant health problem (Martin, et. al., 2020).

A recent Somali data showed that 28% of children under-five are stunted, 12% wasted and 23% are underweight (SHDS, 2020).A nationwide anthropometric survey showed that 23.2% of children under five years of age were stunted while regions of Central South Somalia had the highest stunting prevalence at 31.6% and Puntland (where the current study was) had the stunting prevalence at 10.7 % (UN, 2011). In Bosaso district situated in Puntland state of Somalia, the prevalence of acute malnourished children under five years of age is 68.8% (Abdirizak, et. al, 2018).In 2016 a study on infant and young children nutrition (IYCN) showed that early initiation of breastfeeding and exclusive breastfeeding levels are 84% and 39% in Puntland. Mother who e continued breastfeeding up to one year (12 to 15 months) were 52 % while only 22 % continue breastfeeding up to two years (20 to 23 months).Nearly half of mothers stop breastfeeding before one year.

Feeding practices play a great role for development of the child. Poor mother's nutrition education knowledge on young child feeding practices has negative effect on the children life style which may directly affect the children physically and mentally(FAO, 2008).Infant and young child feeding practices directly affect the nutritional status of children under two years of age and, ultimately, Improving infant and young child feeding practices in children under two years of age is therefore critical to improved nutrition, health and development of the children(WHO & UNICEF, 2008).The nutrition education set to mothers should strengthening the importance and the benefit of breast milk in the first six months of life and enhance proper and convenient balancing foods at six months with increased feeding and change in food in terms of nutrition value , utilization and diversity as the child ages (WHO, 2001).

Malnutrition and child survival rates are interlinked in Somalia. Malnutrition can result from sub-optimal breastfeeding practices, poor complementary practices and lack of knowledge on feeding practices can be effect negatively of on the growing of the child. Inadequate knowledge of right foods and feeding practices is one of the factors causing of malnutrition. It has been established that most mothers who have nutrition education, their children are healthier than mothers who have no nutrition education (Akeredolu et. al, 2014).

Therefore, lack of knowledge is one of the malnutrition indicators and there is limited information related with Knowledge, Attitude and Practices done in the district the need to assess the knowledge of the mothers on breastfeeding and complementary feeding practices and the nutritional status of children under two years of age in Bosaso has become significant, this is what encourages the researcher to carry out this kind of research at Bosaso district, Somalia.

1.2 Statement of the Problem

Bosaso is considered as a regional center of better education in Somalia and the Government and the Non-Government Organization (NGOs) have nutrition interventions and child survival programmes in place to curb child malnutrition. Despite there being relative peace in Bosaso and modest improvements in health education, the malnutrition levels remain high and the children in Bosaso have problems of malnutrition. Maybe the situation is influenced by the mothers' lack of knowledge on children nutritional needs and the type of child care practices carried out. Hence the need to carry out this study. The number of researches carried out in Somalia about maternal nutritional knowledge on infant feeding practices is limited and there are no baseline surveys related to KAP on infant and young child feeding practices in Bosaso district, Somalia. Hence, the objective of this study was to determine the maternal nutrition knowledge, infant and young child feeding practices and the children's nutrition status of children in Bosaso district, Somalia.

1.3 Justification of the study

The data generated from this study will lead to understanding that mothers/care givers need good nutrition understanding, among mothers with multi-recommended child feeding practices. This can then be obtained with the aid of mothers and other community who attend clinics regularly. The resultant effect will be to substantially minimize infant mortality and morbidity, enhanced maternal nutrition and health knowledge play a fundamental function in

the prevention of malnutrition of each mother and children. The information will be used by the Government and the Local agencies to introduce measures on how to curb sub-optimal breastfeeding practices, poor quality complementary foods, some of the traditional practices. The NGOs will know what to focus on Maternal Infant and Young Child Nutrition and Behavior change information for Mothers. Special meeting could be organized to explain to the community how some cultural belief among the guardians and mothers affect and contribute to poor nutritional status in under-fives years of age and to be informed the community on how to feed their children to be well nourished. This study will help contribute to information that could be used to help promoting maternal nutritional knowledge through encouraging mothers to access nutrition education, attend clinics and to introduce right and appropriate feeding practices. The study will help improved health and nutrition status of the children less than two years of age. The result of this study will be used as evidence to inform policy makers on what information to include in advising mothers on how to feed the children. The nutritionist will be trained to counsel the mothers on MIYCN and the researchers will help their researches to improve the gab of the study.

1.4 Broad objective

To determine maternal nutrition knowledge, infant feeding practices and nutritional status of children aged 0-24 months in Bosaso, Somalia.

1.4.1 Specific Objectives

1. To determine socio-demographic characteristics of household with children aged (0-24 months) in Bosaso, Somalia.
2. To assess the nutrition status of children aged 0-24months at Bosaso, Somalia.
3. To determine the child feeding practices by mothers in Bosaso, Somalia.
4. To determine nutrition knowledge and attitudes of mothers in Bosaso, Somalia

1.4.2 Research questions

1. What is the association between socio-demographic characteristics and maternal knowledge on child feeding practices in Bosaso?
2. Is there an association between nutrition status of the children and mothers nutrition knowledge in Bosaso?
3. Does the child feeding practices have an association with mother's nutrition knowledge attitude and practices in Bosaso?

CHAPTER TWO
LITERATURE REVIEW

2.0 Overview of Malnutrition

Malnutrition refers to deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients (Saunders, et al. 2011). The term malnutrition addresses 3 broad groups of conditions: under nutrition, which includes wasting (low weight-for-height), stunting (low height-for-age) and underweight (low weight-for-age);micronutrient-related malnutrition, which includes micronutrient deficiencies (a lack of important vitamins and minerals) or micronutrient excess; and overweight, obesity and diet-related no communicable diseases (such as heart disease, stroke, diabetes and some cancers).Malnutrition types are: over nutrition and under nutrition. Over nutrition is the excessive intake of energy and vitamins beyond ranges vital for growth, development, and metabolic functioning. Under nutrition, regularly used interchangeably with malnutrition, results specifically from insufficient intake of dietary electricity however may also be caused through infections that restriction absorption of key nutrients (Saunders, e al. 2011).

2.1 Prevalence of Malnutrition in Children in Somalia

The study data from Somali Demographic and Health Survey have shown a 28% of children under-five are stunted (short for their age) ; the WHO cutoff for classify levels of stunting among children under five years of age considered (20-29) as Medium ;12% are wasted (thin for their height) which is too high according to WHO cutoff (10-14) considered as high , 23% are underweight (thin for their age) is too high comparing to WHO cutoff of underweight (20-29) which classified as high .The national general stunting prevalence in Somalia is 10% in central Somalia; 8% in the northeast of Somalia where the study area located and 3.6% in the northwest, the nationwide underweight prevalence in Somalia is 13.8% which is considered as Medium (10-19.9%),10.2% in the Northeast; 6.9 % in the Northwest. The general underweight prevalence in the country were13.6% which is an average indicator or combination of wasting and stunting prevalence (FSNAU, 2016).A study among Bosaso IDPs, assessed the prevalence of malnutrition and risk factors associated with malnutrition shows that the prevalence of malnutrition in Bosaso was 68.8% which is critical ,the study also observed that Lack of maternal education, Lack of exclusively breastfeeding and Pre-lacteal feeding were the factors that are linked with malnutrition(Abdirizak et al., 2018).

2.1.1 Causes of Child Malnutrition

Many aspects can cause malnutrition factors include poor diet or extreme infections, mainly in poor populations. Insufficient diet and illness, in order, are strongly related to the common regular of alive, the environmental conditions, and population is ability for afford their fundamental wants such as food, housing and health. Malnutrition is therefore a health result as properly as a hazard aspect for disorder and aggravated malnutrition and it can expand the chance each of morbidity and mortality. Although it is not often directly cause of death excepting in situations such as famine (Blössner *et al.*, 2005).

Globally acute malnutrition for children below five reflected serious if they go above 15%, in which fact emergency actions have to be provoked. The GAM prevalence in Somalia is a lot exceeding this serious level and factors such cultural and social are contribute to malnutrition Wrong information from family, cultural beliefs neighbors, and from friends as well as 'local legends' may lead to nutrition practices that are unsuccessful to afford optimal benefits to mothers and children (UNICEF, 2016).MICS, 2011 done in Somalia published significant sub-optimal IYCN practices, which had been influenced by means of a lack of information and poor cultural beliefs and practices. Lack of maternal information and poor cultural beliefs and practices in Somalia have been previously identified as important causes of malnutrition in young children (Kogi-Makau, 2007).

2.2 Maternal Nutrition Knowledge

The Nutrition education informed mothers about the benefits and importance of breastfeeding and encouraged mothers to continuing breastfeeding up to the child's age of two years (Kuchenbecker *et al.*, 2017).According to FAO Nutrition education for young girls and women, especially mothers, needs to be improved; local diets need to be optimized and linked with food security interventions; intensive education in complementary feeding is necessary(FAO, 2008).The vast mostly the mothers breastfeed their children for minimum some duration of time but less babies are solely breastfed till to the age of six months. Children under six months of age are often fed through tea or sugar water in mixture with breast milk; baby's formula or any other.

 Only a few Somali children are right suckled with the WHO/UNICEF optional recipe of breast milk and complementary strong foods at the age of one (UNICEF, 2016).Only 25% of women have at least primary level education , 32% of women are literate Educational attainment in Somalia is low—only 24 percent of the Somali population aged 25 and above

have completed at least primary school **(UNFPA, 2014).** Similarly to recent study data from Somalia Health Demographic Survey 2020, educational attainment was low—75 percent of all women had never attended school. Eighty-four percent of ever- married women had no education compared to 55 percent of never-married women.

2.3 Infant Feeding Practices

Poor infant feeding practices joined with infectious diseases are the main causes of malnutrition during the first two years of life. Accurate breast feeding and access to adequate amounts of suitable foods are vital for optimal infant nutrition. The common barriers to exclusive breastfeeding in Puntland is that mothers and other family members often believe that breastfeeding mothers are unable to produce enough milk to exclusively breastfeed their babies up to 6 months of age. They also believe that the baby needs some other drinks in addition to breast milk such as, water and animal milk. However, In Puntland, it's not been easy to ensure optimal infant and young child feeding practices and this, due to: strong beliefs and cultural practices and poor infant and young child feeding practices and so infant and young child feeding practices in Puntland are far too much below the recommended optimum standards which put the children at high risk for under nutrition, proper growth and eventually if not resolved(UNICEF, 2012).

The practice of not initiating breastfeeding within one hour of birth is widespread as reported in KAP study due to inappropriate beliefs and lack of knowledge and experience. There is belief of older women that breastfeeding within an hour of birth is not good and due to the influence they have on younger mothers the end result is delayed initiation of suckling. There is belief that water with sugar should comprise the first feed for a newborn and is given for other reasons such as stopping a baby from crying; the belief being that should such a baby die, The reasons for further delay in breastfeeding 2-3 days as opposed to one hour include, the fear that they mothers will feel tired after breastfeeding. inappropriate complementary feeding, food availability, lack of knowledge on balanced diets and health and lack safe water for domestic use, including drinking were cited as key factors that influence the quality of children's diet between the age of four and 59 months. wrong beliefs such as that the breast has no/inadequate milk is the main barrier of right infant feeding practices (Kogi-Makau, 2007).

2.4 Breast Feeding

Breast feeding is a fundamental human essential it is vital to baby and maternal health. Breast feeding is particularly designed for the requirement of a human infant it consists of the whole nutrient that a baby want in the first six months (Linkages, 2004).The best meals of newborns and children are exclusively breastfeeding for the first six months From 6 months of age a child want for carbohydrates and vitamins begin to exceed what is supplied by way of breast milk with persisted breastfeeding up to 2years of age or beyond as WHO recommends.

WHO/UNICEF Strategy for IYCF states that: Infants need to be initiated to breastfeeding inside the half of to 1 hour immediately after birth, They be solely breastfed up to 6 months of age minimum, They should acquire safe, nutritionally enough and age suitable complementary meals whilst persevering with to breastfeed up to 2 years and beyond to meet their evolving dietary needs. Mothers also benefit from breastfeeding: it protect mother's health, reduce the risk of different kind of cancer such the breast cancer, and allows women to better space their pregnancies. Childhood is the stage in a humans life related with boom and improvement and so sufficient diet is crucial for growth, health, and improvement of kids.

2.4.1 Exclusive Breast Feeding

Exclusively breastfed infants have only 12% of the risk of death than to those who were not breastfed— highlighting the strong protective effect of exclusive breastfeeding. On average, infants younger than six months who are not breastfed more than three times more expected to die than those who received any breast milk(WHO, 2017). Exclusive breastfeeding in the first months of life is associated intensely with improved infant survival and reduced risk of illness, primarily from diarrheal disease to achieve optimal growth, improvement and health.

In Somalia 34% of the children under 6 months are exclusively breastfed; many infants under six months are also fed other liquids in addition to breast milk, such as water at 15 %, other milk at 13 % and non-milk liquids at 5% differing to the recommendation that children under the age of six months be exclusively breastfed.15 % of infants began complementary foods before six months of age. 41% of children were introduced to complementary foods at 6-8 month (Haisma et al, 2003).

2.4.2 Complementary Breastfeeding

Children need nutritious foods in addition to breast milk from the age of six months, WHO mentions that children should start getting complementary foods at that age. Available and affordable foods that enrich the baby's diet with additional calories and micronutrients should be accessible – soft or crushed – in small amounts, numerous times a day. These complementary foods must regularly increase in amount and frequency as the baby grows.

Breastfeeding on call should continue until the age of two years. To improve understanding of whether complementary foods are introduced at the appropriate time, it is also important to know if foods are introduced too early or too late. To obtain a full picture of the timeliness of complementary feeding, additional information is requested on the percentage of babies who are not breastfed, of those who are exclusively breastfed, or who – in addition to being breastfed – are receiving plain water only, or supplements (other foods or liquids) at various ages. Feeds should also be adequate, safe and properly fed(WHO, 2012)**.**

2.5 Food Consumption Patterns

The nutrition value on consuming different type of foods and the number of the food frequency intake is improving the nutrition status of the children. The consumption of micronutrient rich foods such as fruits, vegetables, eggs and even offal especially among the children less than 2 years in Somalia is very low(FSNAU,2009).According to result from a study on Bosaso district, Somalia; Urban Household indicate 20% % of the population had a poor consumption profile and they had low and poor wealthy while the other households had an acceptable food consumption profile they are from the middle group (USAID, 2009).

2.6 Policy of Ministry of Health on Maternal and Child Survival Programs

The Somalia Ministry of Health (MOH) partners with UNICEF to provide health for the population. UNICEF plays a central role in the provision of primary health care in Somalia and the main supplies to the providers of health services in Somalia. Partners are the three zones of Somalia government; the Puntland Ministry of Social Affairs in the North East Zone, Somaliland Ministry of Health and Labour in the North West Zone, and international and national non-governmental organizations (NGOs) in the South and Central Zone.

The programme is a support the Government and other implementing partners to enhance equitable access to, and utilization of, quality, high impact mother and child nutrition interventions that will result in the reduction of acute malnutrition and contribute to lowering child mortality and morbidity. The nutrition programme, which is in line with National Development Plans (NDP) and UNICEF Strategic Plan is strategically designed to address the underlying causes of acute and chronic malnutrition and contribute to the reduction of child and maternal mortality and morbidity, all the while contributing to the achievement of the Sustainable Development Goals (SDGs), World Health Assembly resolutions and Global Nutrition Targets for 2025.The UNICEF Somalia Health Strategy Programme (2018-2020) will focus on foundational programming (health system strengthening).

The government is increasingly taking a leadership role in coordinating health promotion by Health Systems Strengthening; In order to ensure that women and children have access to quality government-led public and community services, considerable work is required to strengthen government health systems.it will seek to address the zonal, regional and district disparity reduction and equity gaps which are the greatest threats to reducing child and maternal mortality and morbidity. The key issues for children and women remain vaccine preventable diseases besides the major five common childhood illnesses – diarrhea, pneumonia, malaria, malnutrition and new-born conditions. Since the coverage and quality of health care services in Somalia continue to fail women and children.

Theory of Change ;The proposed outcome of the (2018-2020) health programmes is expected to create an enabling environment and address bottlenecks that would effectively strengthen health system which would in turn lead to the reduction of preventable new-born, child and maternal deaths and significantly reduced morbidity. During 2018-2020, the health sector has a unique responsibility, because it has the greatest reach to children and their families during critical time periods that affect child development. The Strategy proposes different implementation options based upon resource availability, Preventing and Reducing Malnutrition among Women & Children ; the nutrition programme is specifically targeted to children under five years and the Malnutrition rates in the North East where the study area located and the North West have increased over the past few years.

The main objective of UNICEF's nutrition programme in Somalia is "to increase child caring and feeding practices with a view to addressing the underlying causes of malnutrition." UNICEF's strategies to accomplish this objective are to: Contribute to the zonal/regional nutrition strategy development for local administration; Strengthen growth monitoring and nutritional surveillance and ensure linkage with planning implementation of interventions to reduce malnutrition; Promote positive feeding habits and hygiene practices, focusing on promotion of breastfeeding and good weaning practices; Ensure stronger linkages with other sectoral programmes, notably health and water and sanitation programmes; Provide Vitamin A capsules to at least 60 percent% of the children aged 6 months to 5 years living in settled areas (>250 inhabitants). Demand for services; there is generally a low level of awareness on issues related to maternal and child mortality across Somalia Gender dynamics and other social norms are influencing factors which act as a barrier to access for women and children. According to UNICEF By 2020, 80% Service providers can provide quality care for children and maternal services; and 95% care givers have increased knowledge and skills to improve health seeking behaviors and home care (UNICEF, 2018).

2.7 Gap of Knowledge

The many studies focus on improving or alleviating malnutrition in under-fives by introducing intervention programmes that deal with child survival. Another area that has been emphasized is the training of medical practitioners and nutritionists. However, the nutrition status of the under-fives continues to be poor. It appears that the mothers and caregivers may not be embracing the maternal nutrition education offered at the medical centers. Nutrition education of mothers/caregivers maybe unstructured, only done when there is an opportunity, with no policy on what they should be educated on. The objective of this study is to determine maternal nutrition knowledge, infant feeding practices and nutritional status of the children aged 0-24 months in Bosaso, Somalia.

CHAPTER THREE

STUDY DESIGN AND METHODOLOGY

3.1 Study area

The study was carried out in Bosaso District in Somalia. Bosaso is a city in the northeastern part of Somalia. Located on the southern coast of the Gulf of Aden, (FSNAU, 2017). (latitude: 11° 17' 0.42" N and longitude: 49° 10' 31.26" E). It is situated at an elevation of 12 metres above sea level. The municipality serves as the region's commercial capital. It is the third largest city in the country after Mogadishu and Hargeisa.it is a major seaport within the autonomous Puntland state of Somalia. Bosaso has a several economy established on education, government, banking and health care. The district has many education centers'schools and universities make it a regional center of learning and better education with major courses like medicine, engineering, law and commercial enterprise and entrepreneurship.The total population of Bosaso estimated is about 74,287(Somalia Population Review, 2020).Bosaso is divided into two main sections by the main road that runs south from the port. These sections are called Baalade and Biyokulule, and each is divided into eight sub-sections. Remittances flow into Bosaso in large quantities from the diaspora abroad. The primary sources of income for most of the district are sales of livestock and livestock products. Livestock is the major source of household wealth and supply end products that include milk, meat skins and transport. Almost all food and non-food items are imported, including basic foods such as rice, wheat flour, sugar, oil, milk powder (Bettencourt, et. al. 2015).The prevalence of the acute malnutrition of Bosaso IDPS estimated in 2016 was 68.8% (Abdirizak et al., 2018) .

3.1.1 Climate

Bosaso has a hot climate and desert climate during the year and virtually no rainfall. It has average daily mean temperature year-round is 30 °C, (average annual high of 35 °C and low of 25 °C). The months of December to February the temperature is cool (average temperature high 30°C and low 20.6°C .Bosaso experiences rains in the moths of April, May and September. June to August months the temperature exceed 40 °C. (Burcharth, 1991)

Figure3.1: Map showing location of Bosaso District

Source: https://www.google.com

3.1.2 Study design

The study was a cross sectional survey that was designed to collect quantitative and qualitative data using a structured questionnaire. The data was collected from mothers who were respondents of whom each represented a household with children 0-24 months old to determine maternal nutritional knowledge, infants feeding practices and nutritional status of the children in Bosaso District, Somalia.

3.2 Research Methods

3.2.1 Study population

The study population was the mothers of young children aged 0-24 months representing households in Bosaso District.

3.2.2 Sampling

3.2.2.1 Sample size determination:

In Bosaso District the general prevalence of malnutrition of children under five, estimated in a previous study was 68.8% (Abdirizak et al., 2018). This prevalence was used to calculate sample size using Fischer et al (1991) formula as follows:

N=z²pq/d²

Where **N**= the desired sample size

z= the standard normal deviation which is 1.96 at 95% confidence interval.

p= estimated prevalence of overall malnutrition in Bosaso = 68.8%.

q=1-p the proportion of mothers with adequate nutrition knowledge.

d= the degree of accuracy desired set at 5%

Therefore

$\mathbf{N}= (1.96)^{2} (0.688) (0.312) / 0.05^{2} = \mathbf{330}$

Including **5%** attrition = **347**

3.2.2.2 Sample procedure

Multistage sampling was used to determine the study sample from the population .The study was carried out in Bosaso district, Somalia. Bosaso district located in Puntland state of Somalia. Puntland selected (purposively) because it's relatively better placed to receive health, nutrition services and food security interventions than regions of Central South Somalia. Bosaso District was conveniently sampled due to the malnutrition prevalence which is very high (Abdirizak *et al.*, 2018).Simple sample random used to select one of the two sections (Biyokulule) of Bosaso district, then 4 sections were selected from the 8 sub-sections (Netco, Soweto, Ridwan, Rahiis) using simple sample random method. The households with mothers - children pair 0-24 months were selected using simple random sampling. Where households had two eligible children like twins, simple sample random selection was done for one by the mother picking a piece of paper which has been written children's two names,

folded and placed in a basket and then picking one. The same applied about polygamous to select the mother's for the study attributes but all of the children were selected for weaning. (Figure3.2)

3.2.2.3 Sampling Frame

The sampling frame consists of 348 households with 344 children aged 0-24 months at Bosaso District.
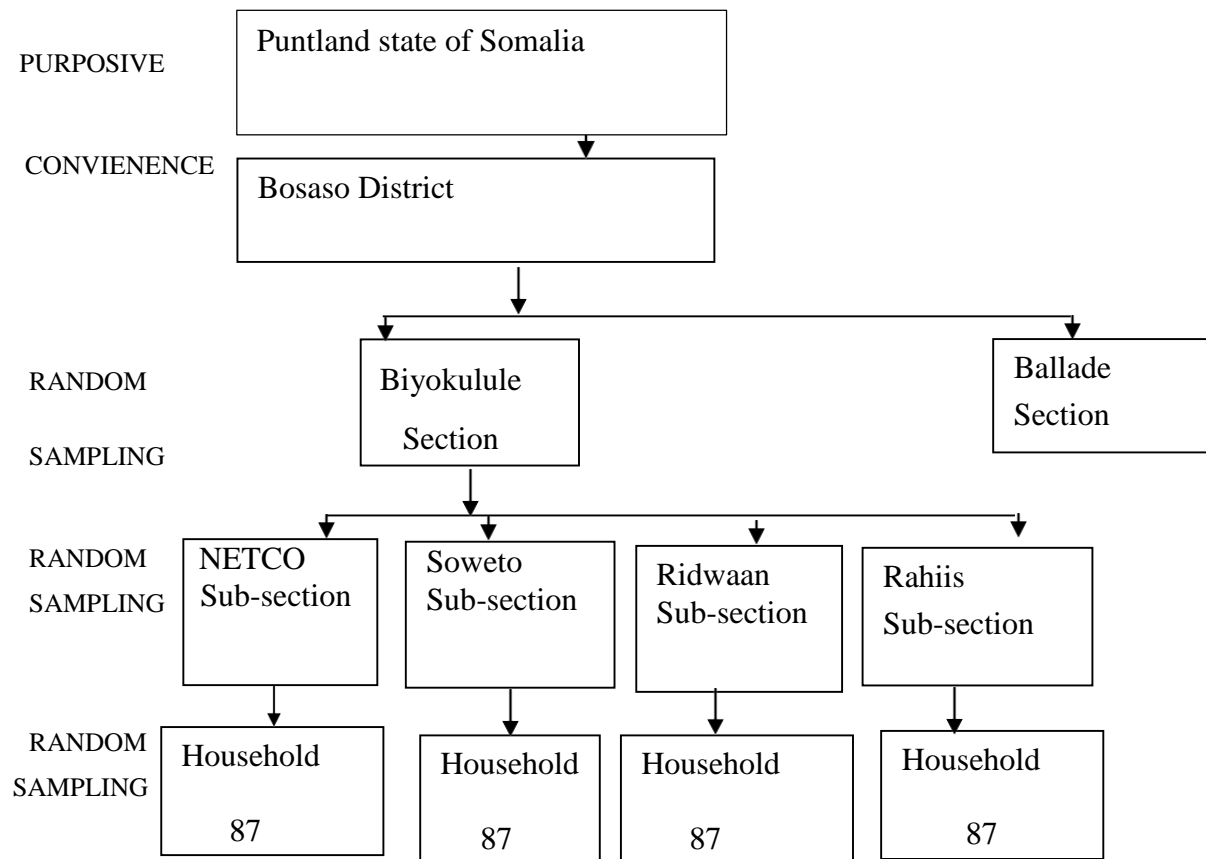
Figure3.2: Sampling procedure of study households in Bosaso, Somalia.

3.2.2.4 Inclusion and exclusion criteria

Inclusion

Children who had no underlying health conditions and aged 0-24 months.

Exclusion

Children who are deformed or very ill were not recruited into the study.

3.2.3 Research techniques

Data collection techniques included administration of structured questionnaire, and anthropometric measurements. The structured questionnaire was used to collect data and it was divided into two parts; Quantitative and Qualitative. The first part was quantitative data covered questions regarding variables: socio- demographic and socioeconomic characteristics of the households, sanitation and hygiene, feeding practices, maternal nutrition knowledge, dietary consumption patterns such as (food frequency and dietary diversity) and the anthropometric measurements such as weight and height/length.

The second part qualitative data covered questions on maternal nutritional knowledge, attitude and child care practices. Structured household questionnaire was used to collect data on maternal marital status, educational levels and age, occupation, source of income, size of the household, sex and the age of the child to determine socio-demographic characteristics of household. Food patterns data was collected using Seven days food frequency and dietary diversity questionnaire to determine the child feeding practices by mothers. Index child information was collected using anthropometric technique (weight, length) to determine the nutrition status of the study children. Qualitative data covered questions on maternal nutritional knowledge, attitude and child feeding practices using face to face interview from mothers with children under two years of age who accept to be part of the focus group discussion. The interview was conducted by the enumerators.

The information collected was nutrition knowledge and attitudes on infant and young child feeding practices. Anthropometric measurement instruments included pediatric scale and height board. The precision for weights was 0.1kg and 0.1cm for lengths. The weights and lengths of infants were measured as described by (Gibson, 2005).The weight of each infant was taken with minimum clothing and recorded to the nearest 0.1kg. For the 27 measurement of length a measuring board with an accuracy of 0.1cm was used to take the lengths of the infants. The infant was made to lie down on the measuring board which was laid on a flat surface. The head was positioned firmly against the fixed head board, with the eyes looking vertically. The knees were extended by applying some pressure, and the feet were flexed at right angles to the lower legs. The upright sliding foot piece was moved to obtain firm contact with the heels and the length was read to the nearest 0.1 cm. For both weights and length measurements, two readings were taken and the average of the two readings computed. Anthropometric measurements were taken for all infants under two years of age and their corresponding deviation scores (z-scores) were calculated .the children were categorized into classes of nutritional status.

Stunting results from extended period of inadequate food intake, poor dietary quality, increased morbidity or a combination of these factors, it indicates deficit in length and takes some time to develop (Gibson, 2005).Young infant are unlikely to be stunted. Therefore, assessment of nutritional status of infants 0-6 months was based on weight- for-age (underweight) only, while that of older infants was based on weight-for-age (underweight), weight-for-height (wasting), and height-for-age (stunting).MUAC- Mid-upper arm circumference was taken for 6-36 months using the left arm. The arm was bent at the elbow to make a right angle.

 The tape was placed at zero which is indicated by the two arrows, on the tip of the shoulder and the tape was pulled to the tip of the elbow. The midpoint of the arm was marked with a pen. The arm was then straightened, the tape placed around the marked area and the reading taken twice to get an average (Gibson, 2005). Information on child's age was determined from the birth card for those who born in hospitals, if found and the others who born in houses with verbal information on date of birth from the mother and the age was in months for age determination.

The infant feeding practices dealt with were Exclusive breastfeeding and complementary feeding practices. Breastfeeding included exclusive breastfeeding, breastfeeding initiation, and frequency of breastfeeding and expression of breast milk by mothers while the complementary feeding practices included the time of initiation of complementary foods, frequency of feeding, complementary foods given by the mothers and bottle feeding. Knowledge of the mothers on the infant feeding practices was assessed based on the WHO recommendations on infant feeding. For the example, if the mother gave the recommended period for exclusive breastfeeding, she had the correct knowledge. Any other answer given was viewed as incorrect knowledge. Knowledge was assessed for the following practices; exclusive breastfeeding, time of initiating breastfeeding, frequency of breastfeeding, time of initiation of complementary feeding and frequency of complementary feeding.

3.2.4 Recruitment and training of enumerators

Five research assistants; proficient and eloquent Somali and English languages with a good communication skill were recruited. The assistants were recruited on the basis of having experience in survey field work and had basic nutrition knowledge. The field assistants were undergraduate students with experience in research work/data collection. During the training phase, the assistants were briefed on the objectives of the study by the researcher and the

researcher's expectation from their work. Training was conducted by the researcher on: principles of ethics including confidentiality, right to privacy and right to decline to be interviewed or answer certain questions; way of collecting data; administration of the questionnaire; recording of the responses; research techniques; Interpersonal skills; how to introduce themselves to the respondents and were described to simple ideologies of field ethics, such as convincing the respondent of confidentiality. The methods used to train the field assistants included lecture to a questionnaire and demonstrations for anthropometric measurements.

The team leader reviewed and signed all forms to ensure that no pieces of data had been left out. The meetings were in every evening. The overall training session took three days. The data obtained from the pretest was analyzed to verify the validity of the questionnaire and adjustments that needed to be made were revised before the main data collection phase. This was helped in finding issues that was needed to address before the original data collection started and to assess the easiness of the language that was used in the questionnaires.

3.2.5 Ethical considerations

The permit to carry out the research was obtained from the Bosaso municipality, Ministry of Health office. The nature and purpose of the study was explained to the study participants, Informed consent was sought and signed forms were obtained (for person's innumerate persons, the chief or person in authority gave consent) before onset of data collection. They were assured of confidentiality. No respondent was forced to be part of the study and the names of respondents were not to be used else were except in the questionnaire. The respondents were notified that they are able to leave the study any period they wish. The researcher ensured that all materials used in the study are suitably, not harmful and applicably.

3.2.6 Data Management and Analysis

3.2.6.1 Quality control

The Enumerators were adequately trained to ensure they collect the data in the required way. The Questionnaire was pre-tested on 30 households from a section called Balade not included in the study. The questionnaires were reviewed daily to cross-check for correction, Re-calibration of scales were done on a daily basis to ensure data accuracy, checking equipment availability and pre-testing the tools before actually administering the tool to the target

population for obtained good quality data. The field assistants were adequately trained to ensure quality data collection and the scales were checked for accuracy and calibrated every day. Each day before leaving the field, each team leader reviewed and signed all forms to ensure that no pieces of data had been left out. Team leaders and survey supervisor recorded all important points in a notebook as soon as possible The data cleaned before analyzed to remove the outliers and ensure the data been analyzed is in the right state.

3.2.6.2 Data Analysis

The Statistical Package for Social Sciences (SPSS Inc. version 20) was used for analysis both descriptive and inference statistics. ENA software was used to compute nutritional status for children to compute z-scores Statistics used to compare where there existed any association or relationships were both parametric and non-parametric. Descriptive statistics (Mean, Mode, Median, proportions, Standard deviation, Skewness, and Standard error of the mean) were used to analyze data. Inference Statistics used was (Chi Square, T-test, Pearson Correlation, ANOVA, Binomial test, Fisher exact, Kruscall Walisand Mann Whitenay). Means, modes, medians, percentages and standard deviations were used to analyze data for socio demographic and socio economic variables. (x2) test computed at $p=0.05$ level of significance was used to determine the association of knowledge and the demographic characteristics. Chi square used to determine association between variables and for comparison of prevalence stunting, underweight and wasting between different groups. . Chi-square Correlation used to test the strength of the association. Analysis of variance (ANOVA) to compare more than two groups, Pearson's Correlation coefficient used to analysis the relationships between maternal knowledge and nutrition status data. Binomial test used to test the proportions of the boys and girls. Mean knowledge score, standard deviation, SEM was computed. The maximum knowledge score was 11 and minimum was 0. The data was further transformed to knowledge status i.e. Poor, moderate and highly knowledgeably using percentiles .e 25th 50th and $75^{th.}$.

CHAPTER FOUR

RESULTS

4.1 Socio demographic and Socio Economic Characteristics of the Households in Bosaso District, Somalia

A total of 348 households with children 0-24 months were sampled and had a mean household size of 9±3.8. The household size ranged from 2 of 21. The infants and young child age 0-24 months had a mean age of 12.3±6.7. The male's children were 39.4% and females 60.6%. Although there was a significant different between the gender of the children (p=0.000).The majority of the study children ages were between 6 to 12 months at 41.7% followed by 18 to 24 months followed by 12 to18 months at 17.1% and only 12.5% were less than 6 months. The proportions per age group by gender was not significant (p=0.870). (Table 1)

Table 1: Distribution of Age by Gender percentages of children aged (0-24) months at Bosaso district, Somalia

Age Group	Gender Male N=136	Female N=209	Total 345	p-value
(0- 6) Months	41.4	58.0	12.5	0.360
(6-12) Months	39.6	60.4	41.7	0.015
(12-18) Months	42.4	57.6	17.1	0.298
(18-24) Months	36.4	63.6	28.7	0.009
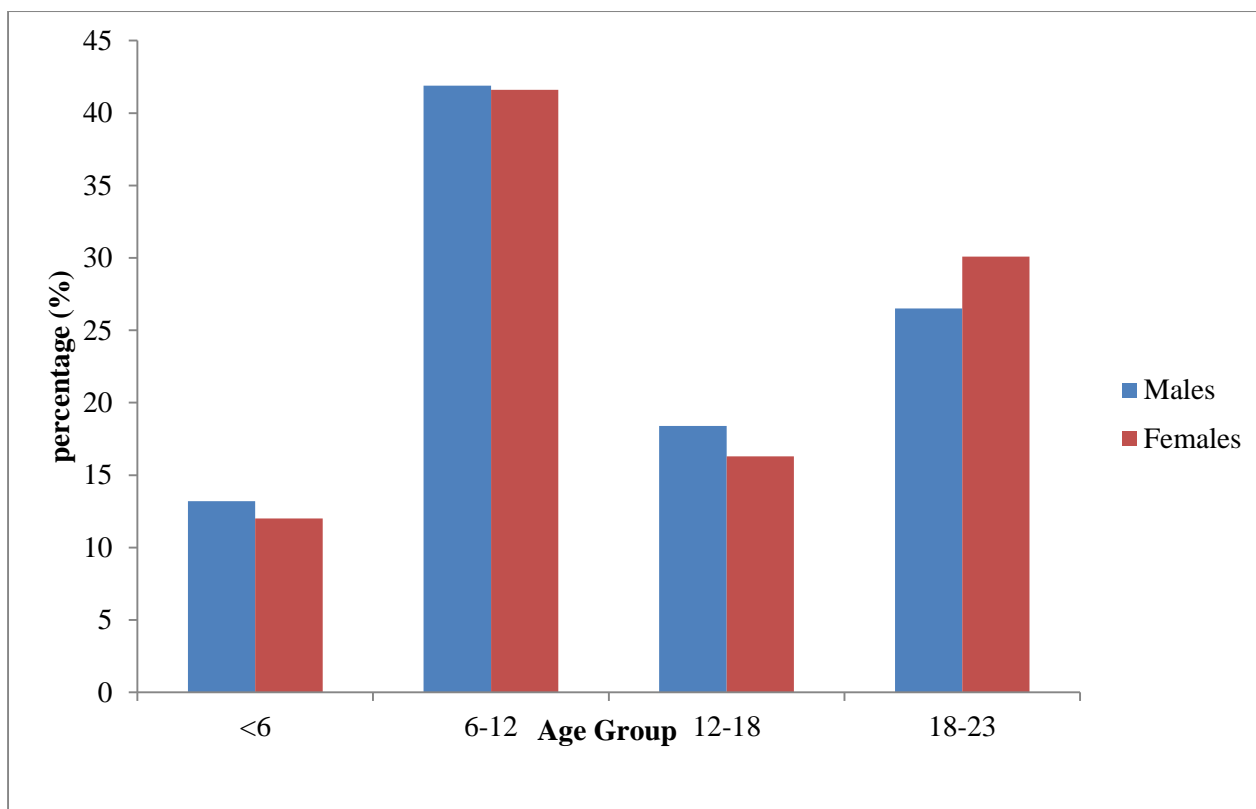
Figure4.1: Age Distribution by Gender of the study children at Bosaso, Somalia

The Majority of the study populations were married at 62.9% followed by divorced at 31.3% and the rest of the categories were less than 6% (separated, single and widowed). Majority of women were un-educated at 72.1% followed by less than 11 % (pre education, primary school), then 10.1% attained at secondary school education. Those who had either been to college, university or had adult education totaled 8%. Majority of the study women were salaried 39.4% followed by 34.2% who were housewives. The category of study respondents who ran businesses–self-employed or were on casual employment were 18%, while the un-employed were 8.6%.Majority of the households purchase 88.8% their food, followed by households receiving food from food Aid while s less than 5% households got food from other sources (own farm produce ,animal/animal products and purchase and own farm) . The majority of the household had income between were $150-$200USD followed by 19.8%, at $200-$250 USD then 17% of the households earned $100-$150 USD, 13.8% living on 50$-$100USD month and those who lived on 0-$50 USD or 250-$300 USD were 5.2% in each category. The households living on ≥ 300 USD were only 1.7%.Main source of cooking fuel was firewood in slightly over half of the households (51.5%) followed by charcoal in 43.4% of the household, while no household used electricity as a source of cooking fuel, However the majority of the households(8%)as the main source lighting. The main houses are permanent at (40.5%) following by temporary houses at (34.2%) and the others quarter of the houses (25.3%) were also observed in the area. Majority main source of water was the tap at (58.6%),

followed by dam/Pod (25%), borehole (14.4%) and only (2%) of the households obtained water from the river. No households got water from streams nor harvested rain water. (Table 2)

Table 2: Socio-demographic characteristics of the Households with children aged 0-24 months at Bosaso District, Somalia.

Socio- demographic	Percentage (%) N=348
Marital status	
Married	62.9
Divorced	31.3
Separated	5.2
Single	.3
Education level	
Un- Education	72.1
Pre-Education	5.2
Primary School	5.5
Secondary School	10.1
College	1.4
University	.6
Adult Education	5.2
Occupation	
Salaried Employed	39.4
Business	8.0
Self Employed	8.3
Casual Employed	1.4
Housewife	34.2
Un employed	8.6
Average monthly income in (USD)	
0-$50	5.2
50-$100	13.8
100-$150	17.0
150-$200	37.4
200-$250	19.8
250-$300	5.2
$300 and above	1.7
Fuel for cooking	
Gas	5.5
Charcoal	43.4
Firewood	51.1
Fuel for Lighting	
Gas	3.4
Electricity	82.5
Paraffin	2.9
Candle	10.9
Solar	0.3

Footnote: Temporary house is a rent house and the permanent is the owned one.

4.2 Nutrition Status of Children aged 0-24 months in Bosaso District, Somalia

A total of 348 children were assessed but 4 (1.1%) were flagged off (excluded) because they were extreme ±4 Z-scores hence eligible children totaled 344. Wasting (Acute Malnutrition) as an indicator, overall Global Acute Malnutrition (GAM) was 43.6% (47.8% being boys and 40.9% girls). Prevalence of Severely malnutrition children were 26.5% (36.8% being boys and 19.7% girls). Comparison of malnutrition between gender was significant statistically difference. (p=0.025).

Underweight as an indicator, overall Global under Weight was 37.4% (with 42.6 % being boys and 34.0 % girls). Severe prevalence of underweight was 19.7 % (25% being boys and 16.3% girls) boys are significantly severally high compared to girls. Comparison of underweight malnutrition between gender was not statistically difference (p=0.104). Stunting (Chronic Malnutrition) as an indicator, overall Global Stunting was 27.3% (36.0% being boys and 21.6 girls) and severe prevalence of stunting was 13.7% (14.7% being boys and 13.0% girls). Comparison of stunting between gender was significant statistically difference (p=0.003) proofing that boys are more stunted as compared to girls (Table 3).

Table 3 : Prevalence of nutrition status of the study children 0-24 months of age at Bosaso district,Somalia

Nutrition Status	Total (%) n = 344	Boys (%) n = 136	Girls (%) n = 208	p-value
Prevalence of global acute malnutrition (<-2 z-score and/or oedema)	43.6 (38.5 - 48.9 95% C.I.) **	47.8 (39.6 - 56.1 95% C.I.) **	40.9 (34.4 - 47.7 95% C.I.) **	P=0.000
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	17.2 (13.5 - 21.5 95% C.I.) **	11.0 (6.8 - 17.4 95% C.I.) **	21.2 (16.2 - 27.2 95% C.I.) **	P=0.000
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	26.5 (22.1 - 31.4 95% C.I.) **	36.8 (29.1 - 45.1 95% C.I.) **	19.7 (14.9 - 25.6 95% C.I.) **	P=0.890
Prevalence of underweight (<-2 z-score)	37.4 (32.5 - 42.6 95% C.I.) **	42.6 (34.6 - 51.0 95% C.I.) **	34.0 (27.9 - 40.6 95% C.I.) **	P=0.104
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	17.7 (14.0 - 22.1 95% C.I.) **	17.6 (12.2 - 24.9 95% C.I.) **	17.7 (13.1 - 23.4 95% C.I.) **	P=0.096
Prevalence of severe underweight (<-3 z-score)	19.7 (15.9 - 24.2 95% C.I.) **	25.0 (18.5 - 32.9 95% C.I.) **	16.3 (11.9 - 21.9 95% C.I.) **	P=0.000
Prevalence of stunting (<-2 z-score)	27.3 (22.9 - 32.3 95% C.I.) **	36.0 (28.4 - 44.4 95% C.I.) **	21.6 (16.6 - 27.7 95% C.I.) **	P=0.003
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	13.7 (10.4 - 17.7 95% C.I.) **	21.3 (15.3 - 28.9 95% C.I.) **	8.7 (5.5 - 13.3 95% C.I.) **	P=0.077
Prevalence of severe stunting (<-3 z-score)	13.7 (10.4 - 17.7 95% C.I.) **	14.7 (9.7 - 21.6 95% C.I.) **	13.0 (9.1 - 18.2 95% C.I.) **	P=0.307

*** Values in brackets are lower and upper limit*

A total of 348 children were assessed but 4 (1.1%) were excluded from the analysis because the data was missing hence eligible children totaled 344. Wasting (Acute Malnutrition) as an indicator, overall acute malnutrition using MUAC was 35.2% .35.3% being boys and 35.1% were girls and severe prevalence of acute malnutrition was 18.3% .17.6% being boys and 18.8% were girls. Comparison of acute malnutrition prevalence between gender was not significant statistically difference (p=0.933) proofing that boys and girls are equally malnourished as far as using MUAC indicator is concerned (Table 4).

Table 4: Prevalence of acute malnutrition based on MUAC by sex of the study children at Bosaso district, Somalia.

NS	Total (%) n = 344	Boys (%) n = 136	Girls (%) n = 208	p-value
Prevalence of global malnutrition(<125mmand/or oedema)	35.2 (30.3 - 40.4 95% C.I.) **	35.3 (27.8 - 43.6 95% C.I.) **	35.1 (28.9 - 41.8 95% C.I.) **	0.933
Prevalence of moderate Malnutrition (< 125 mm and >= 115 mm, no oedema)	16.9 (13.3 - 21.2 95% C.I.)**	17.6 (12.2 - 24.9 95% C.I.)**	16.3 (11.9 - 22.0 95% C.I.) **	0.189
Prevalence of severe malnutrition(< 115 mm and/or oedema)	18.3 (14.6 - 22.7 95% C.I.)**	17.6 (12.2 - 24.9 95% C.I.) **	18.8 (14.0 - 24.6 95% C.I.) **	0.059

*** Values in brackets are lower and upper limit*

4.3 Child Feeding Practices by Mothers at Bosaso District, Somalia

More than half of the study participants were breastfeeding their children at the interview time at 54.3. The time of breastfeeding initiation varied but only than 31.2% of the respondents indicated having initiated breastfeeding immediately or within one hour after delivery. The mothers initiate of breastfeeding immediately after birth , 22.5% did it within 30 minutes, 9.1% within one hour, followed by 20.5% mothers did it at the same day, a fifth the following day (23.2%). and (24.8 %) initiated breastfeeding 2 or more days after giving birth. followed by (35.8%) breastfed in 3times a day, followed by (4%) breastfed on 4 times a day, followed by (3.6%) who breastfed 5 times a day a sixth (0.7%) breastfed in 6 times a day. 42.5% of the children were breastfeeding exclusively.

The respondents were still breastfeeding their infants at the time of interview. On exclusively breastfeeding of the infants for six months, 42.5% indicated willingness to do so by the time of interview. The remaining majority; at 90.3% had given additional liquids or semi-liquid foods to the infants before the age of one month. Mean duration of breastfeeding was found 12.1±4.6.Some of the children breastfed in public (43.1%) and the majority reasoning embarrassed at 77%. Only 31% of the mothers were breastfeeding on demand. Some were giving other foods in addition to breast milk (57.5%).The mean weaning age was found. 4.1±1.6,Mean breastfeeding frequency 4.6±1 times child a day. The majority respondent's bottle feed (79.3%) their children and only (20.7%) was cup feeding then children (Table 5).

Table 5: Breastfeeding Practices of respondents with children aged (0-24) months at Bosaso district, Somalia.

Breastfeeding Practices	Proportion of women (%) N=348
Child still breastfeeding	54.3
When initiated breastfeeding	
Within 30 minutes	22.5
Within 1 hour	9.1
With first day	20.5
Following day	23.2
After 2 days and more	24.8
Number of times child is breastfed	
On demand	31.0
1-2 times	24.8
3 times a day	35.8
4 times a day	4.0
5 times a day	3.6
6 times a day	0.7
Child exclusively breastfeeding	42.5
Mean duration of breastfeeding	12.1±4.6
Breastfeed in public	43.1
Shy	23
Embarrassed	77
Giving others foods in addition to breast milk	57.5
Mean weaning age	4.1±1.6
Mean times child is fed in a day	4.6±1
Feeding method liquids- Bottle	79.3
Feeding method liquids- cup-feeding	20.7

Out of 348 a total of 40 children in the study were below 6 months old hence should be exclusively breastfeeding. Out of the 40 children below 6 months 42.5% were exclusively breastfeeding. (Figure 4.2).The participated in focus group discussion session reported that they know that infants should be exclusively breastfed they mostly stated the breast milk alone is not adequate for the growth of the child in the first six months of the child's life, reasoning as there is belief that breast milk is strong and hot to the infant and the baby can't take it without water. Others mentioned the infants sleep better when initiate with water according to their practices.
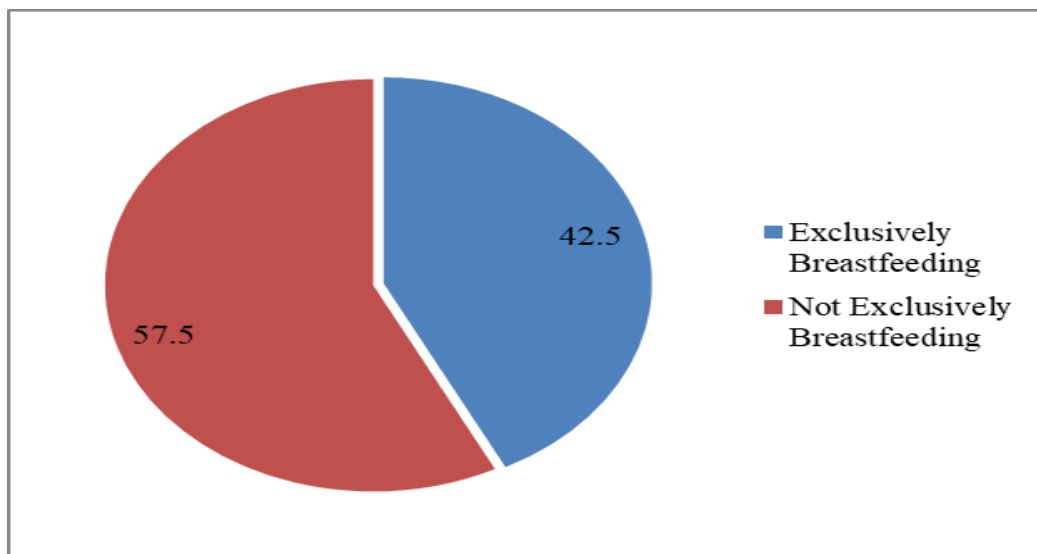
Figure 4.2: Exclusively Breastfeeding of the study women at Bosaso District, Somalia

The study established that 57.5% of the infants were getting additional liquids to breast milk. The majority of the mothers introduced complementary foods at age of less than 6 month.39% started at 5 months, followed by 7% started at 4 months of age, followed by 16% started at age of 3, followed by 15% started at age of 2 months and 2% started at one month. Those who started before the age of one month complementary foods introduced at this stage were, however, liquid in form. These included milk, water and glucose, water and sugar. Solid and semi-solid foods were introduced later in life, after 5 months. The solid foods included vegetables, fruits, porridge, mashed foods (consisting of bananas and potatoes). (Figure4.3)
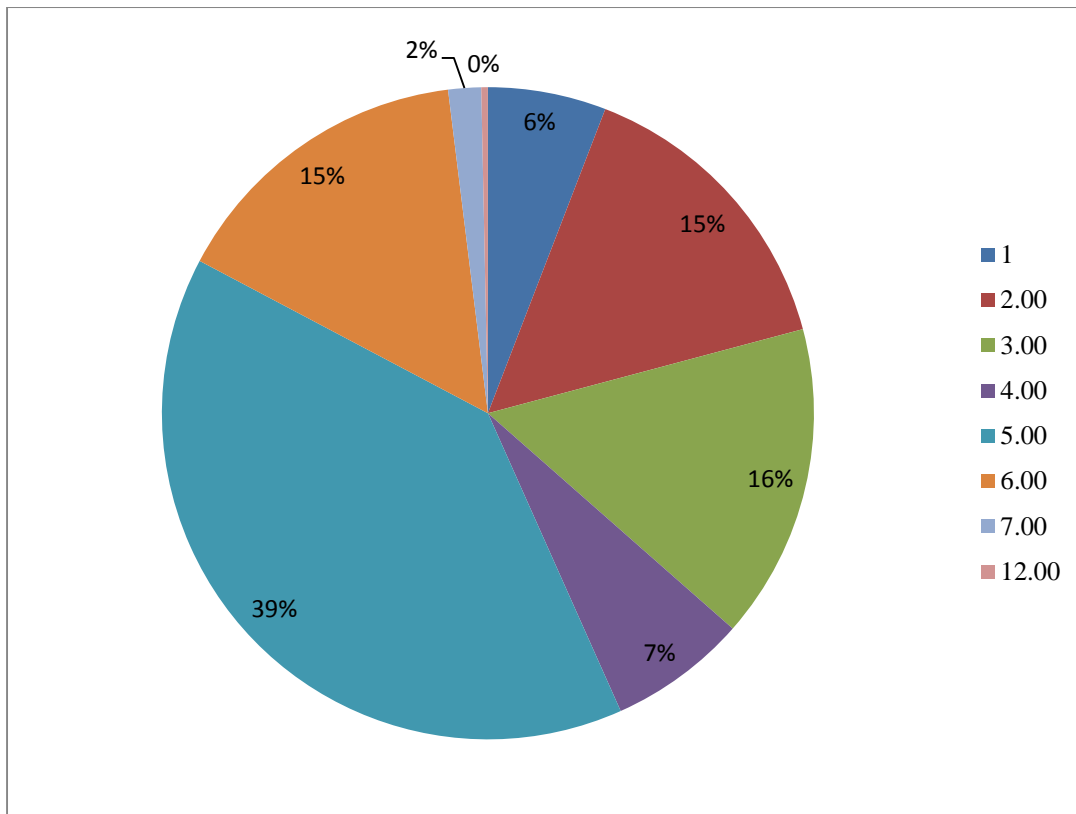
Figure 4.3: The initiation age of the children (0-24) of age at Bosaso district

Majority of respondents start weaning at very age (less than 6 months). Majority starting giving infant formula at 72.0% with mean age of 3.4±1.5), followed by water with sugar at 71.2%, with mean age of 1.5±1.5), followed by water alone (at 57.1% with mean age of 2.9±1.8),followed by water glucose at 8.9% with mean age of 1.9±1.8), followed by Goat at10% with mean age 5.9±1.7), followed by camel milk at13.4%with mean age of 8.0±2.1), followed by Cow milk at 5.5% with mean age of 5.8±2.2) followed by Tea at 33.1%with mean age of 7.3±1.5). The least given is oil at 1.4%.Followed by fruits 19.3%with mean age of 5.1±.5 followed by fruit juice at7.8%with mean age of 5.9±.6) followed by porridges at39.8%with mean age of 5.2±.5 (Table 6)

Table 6: Mean age and prevalence of foods initiation to the children aged 0-24 months by respondent at Bosaso district, in Somalia

Onset food introduced for the child	N	N=348 (%)	Mean (age-months)	Std. Deviation
Water alone	198	57.1	2.8586	1.82487
Water Glucose	31	8.9	1.8710	1.76526
Water with sugar	247	71.2	1.4939	54570
Goat Milk	38	10.1	5.8158	1.65799
Camel Goat	47	13.4	8.0426	2.12600
Cow Milk	19	5.5	5.7895	2.27496
Tea	115	33.1	7.3826	1.49609
Oil	5	1.4	5.8000	.83666
Fruits	67	19.3	5.1493	.46884
Fruit Juice	27	7.8	5.8148	.68146
Porridges	138	39.8	5.2826	.52651
Infant formula	250	72.0	3.3920	1.51244

4.4 Maternal Nutrition Knowledge and Attitudes of The Respondents with children aged 0-24 months in Bosaso District, Somalia

4.4.1 Maternal Nutrition Education

Only 11.2% of responded had received nutrition education on good child feeding practices. The main source of maternal nutrition education was from Maternal child health (MCH) 56.4% followed by 10.3% who had the information from relatives. Friends of the respondents gave maternal nutrition education to2.6% while those who had obtained such information from their school days were12.8%.Seminars/Workshops contributed to about 7.7% respondent's knowledge and Radio/mass media.10.3 %.(Table7).

Table 7: Source of the Nutrition knowledge of the respondents with children aged 0-24 months on infant feeding practices at Bosaso district, Somalia

Maternal education	Proportion of women (%) N=348
Received Nutrition Education	11.2
MCH Clinic	56.4
Relatives	10.3
Friends	2.6
School	12.8
Seminars/Workshops	7.7
Radio/Mass Media	10.3

4.4.2 Maternal Nutrition Knowledge and Practices on Breastfeeding Practices

A total of 348 respondents nutrition knowledge on feeding and child practices was assessed using a scale of 0 - 11. Mean nutrition knowledge score was found to be 4.2±2.7. Majority of the participants had moderate nutrition knowledge on child feeding practices at 48.6%, then 40.5% had poor knowledge and only 11% were highly knowledgeable on nutrition knowledge. (Figure 4.4)
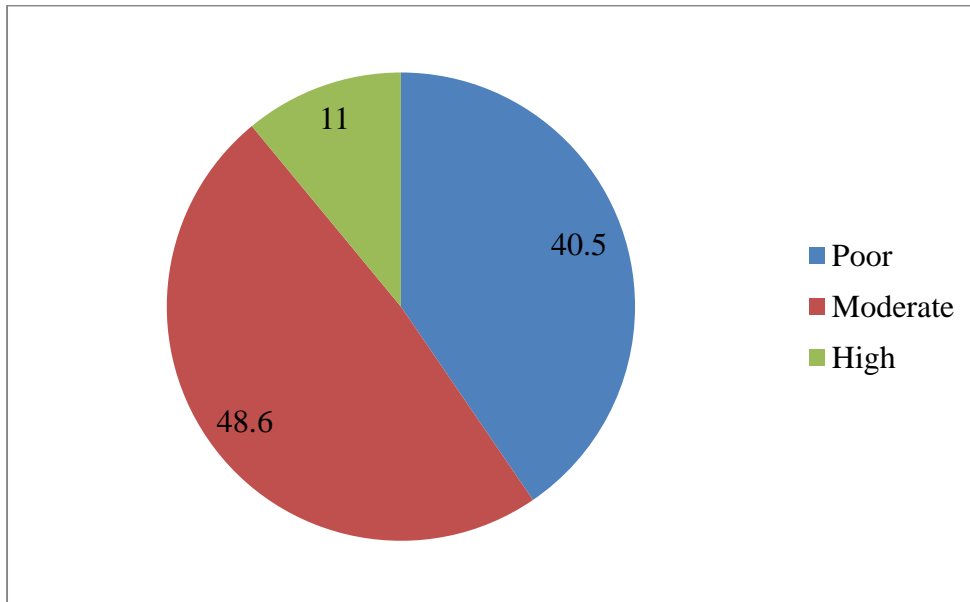
Footnote: The figures in the pie chart are in percentage (%)

Figure 4.4: Maternal nutrition knowledge of the participants at Bosaso district, Somali

Table 8 reports that proportionally majorities of mothers had least knowledgeable (43.1%) on when should breastfeeding be initiated after delivery, (29.6%) on upon what ages can the baby remain healthy on breast milk and only (18.4) on how often should a healthy baby breast feed in a day (Frequency of breastfeeding). The majority of the mothers had least knowledge (21.3%) on the danger of starting weaning before the recommend age. The majority of the mothers had traditional knowledge at (77.3%) on what should give to the infant 0-3 months followed by (69.5%) who had traditional knowledge on what should give to the infants 3-6 months followed by (63.5%) had traditional knowledge on what should give to the infant 6-12 months followed by (30.3%) had modern knowledge on what should give to the infants 3-6 months followed by (36.5%) had modern knowledge on what should give to the infants 6-12 months. The percentage score was found to 38.2± 20.9.Testing for normality of proportions using one sample test-Kolmogorov Smirnov test there was no significant difference (p=0.913) within the knowledge attributes.

Table 8: Proportion of Nutrition Knowledge of the mothers on Breastfeeding practices at Bosaso district, in Somalia

Knowledge Attributes	Knowledgeable Proportion (%) N=348
1. When should breastfeeding be initiated after delivery	43.1
2.Up on what age at which can a baby remain healthy on breast milk only	29.6
3.How often should a healthy baby breast feed in a day	18.4
4.What age should a baby be weaned	30.6
5.Would you express breast milk and leave to be given to the child by someone else	4.3
6.The danger on starting weaning before recommended age	21.3
7. what should give to the infant 0-3 months	
8. what should give to the infants 3-6 months	77.3
9. what should give to the infant 6-12 months	69.5
10. what should give to the infants 3-6 months	63.5
11. what should give to the infants 6-12 months	30.3
	36.5

4.4.3 Maternal Attitudes on Breastfeeding Practices

The summary of the mother's attitudes on infant and young child feeding practices from the focus group discussion. (Table 9)

Table 9: Mothers Attitudes and Practices on Child Feeding and reasons given by respondents for the negative attitudes and poor practices

Exclusive Breastfeeding	Reasons of not exclusively breastfeed : • breast milk alone is not adequate for the growth of the child in the first six months of the child's life, reasoning as: • breast milk is strong and hot to the infant and the baby can't take it without water • Others mentioned the infants sleep better when initiate with water according to their practices. • Inadequacy of breast milk • others cited there is effect of elder mothers in the community
Initiation of Breastfeeding	Delaying initiation of breast (colostrum) reported is allied with beliefs such as : • no milk is producing immediately from breast • Illness and the weakness of the when give deliver • It help mothers to relief and recover faster from the weakness • breast milk spoiled in the breast after three days of delivery the reason why not given colostrum to the infant
Complementary Feeding	Reasons of early weaning: • To get enough strength before teething • working outside as employee and doing duties for full times which can make difficult to spent time with their infants for frequent feeding
Duration of Breastfeeding	Reasons of No longer Breastfeed • majority cited Pregnancy condition it's not healthy to feed the child with breast milk at that condition it harms the baby due the sour taste which lead the baby refuse and so stop breastfeeding
Public Breastfeeding	Reasons of not breastfeeding in public • It's embraced to remove the cover from the breast on the public in front men unless there is only women in the place and • No availability of breastfeeding

4.4.4 Relationships between The maternal Nutrition Knowledge and The Socio Demographic Characteristics

There was a significant different between maternal nutrition knowledge and maternal education level (p=0.000) indicating that mothers or caregivers who had no formal education had significantly poor nutrition knowledge. However, there was no significant different between knowledge and marital status (P= 0.606). There was a significant different between maternal nutrition knowledge and monthly income (p=0.000). (Table 10)

Table 10: Comparison Between Maternal Nutrition Knowledge and Demographic characteristics

Maternal Marital Status	Poor (%)	Moderate (%)	High (%)	p-value
Married	25.1	30.1	7.8	P= 0.606
Single	0	0.6	0	*FisherExact=6.*
Separated	1.4	3.5	0.3	52
Divorced	13.6	14.7	2.9	
Widow	0.3	0.0	0.0	
Maternal Education Level	**Poor** (%)	**Moderate** (%)	**High** (%)	*P=0.000*
No Education	74.3	78.0	39.5	
Primary	5.7	4.2	10.5	*FisherExact=4*
Secondary	11.4	5.4	26.3	*1.509*
College	0.7	2.4	0	
University	0	0	5.3	
Adult Education	6.4	3.0	7.9	
Maternal Income	**Poor** (%)	**Moderate** (%)	**High** (%)	P=0.000
0-50$	4.3	6.5	5.6	
50-100$	17.9	13.1	2.6	
100-150$	12.1	20.8	18.4	
150-200$	45.7	31.0	34.2	
200-250$	15.7	22.6	21.1	
250-300$	2.1	6.0	13.2	
>$300	2.1	0.0	7.9	
Maternal Occupation	**Poor** (%)	**Moderate** (%)	**High** (%)	P=0.000
Regular employed	52.1	29.2	34.2	
Business	5.7	7.1	21.1	
Self employed	2.1	12.5	13.2	
Casual employed	2.1	1.2	0.0	
Housewife	29.3	39.9	28.9	
Un employed	8.6	10.1	2.6	

4.4.5 Associations between The maternal Nutrition Knowledge and The Children Nutrition Status

There is a significant and positive association between Under Weight (p=0.007), Wasting (p =0.001) and maternal knowledge indicating the more knowledgeable the better nutrition status. There is no significant different between stunting and maternal nutrition knowledge. (p =0.52). (Table 11)

Table 11: Maternal Nutrition knowledge and Nutrition Status comparisons of the mothers with children aged 0-24months at Bosaso district, Somalia.

Study women's score category	Under Weight (%)	Stunting (%)	Wasting (%)
Poor	39.5	47.8	38.7
Moderate	55.8	40.2	56.7
High	4.7	12.0	4.7
p-values	*0.007*	0.52	0.001

All the three nutritional indicators, the correlation is positive but quite weak, the strongest being underweight (r=0.167).Interestingly underweight (p=0.007) and wasting (p=0.001) are significant indicating the better nutrition status the more knowledgeable the mother is.There is significant difference between maternal nutrition knowledge and underweight and wasting using both z-scores and MUAC. The same illustrate that there is a positive correlation and significant difference of the same indicating the less mothers or caregivers are knowledgeable the more there children are malnourished. (Table 12)

Table 12: Comparison between Maternal Nutrition Knowledge and Children Nutrition Status

Nutritional Status	Poor (%)	Moderately (%)	Highly (%)	Total (%)	*p-value,X^2*
Under-Weight (z-scores <-2)	37	43.1	15.8	37.6	0.007, 9.89
Stunting (z-scores <-2)	32.1	22.3	28.9	27.0	0.152, 3.76
Wasting (z-scores <-2)	42.3	50.9	18.4	43.9	0.001, 13.47
Wasting (MUAC <12.5 cm)	41.3	52.1	6.6	35.4	0.143, 3.88

4.4.6 Relationships between the maternal Nutrition Knowledge and The Breastfeeding Practices

There is significant difference between maternal nutrition knowledge and breastfeeding practices (P=0.001) indicating that the poor the knowledge, poorer breastfeeding practices is. (Table13)

Table 13: Distribution of child feeding practices by maternal knowledge of mother/caregivers in Bosaso, Somalia

Breastfeeding practices	Poor (%)	Moderate (%)	High (%)	*p-value,X²*
Still Breast feeding	22.0	23.4	9.0	0.001, 13.94
Breast feeding in public	6.6	29.3	7.3	0.001, 38.01
When initiated Breastfeeding	**Poor (%)**	**Moderate (%)**	**High (%)**	p=0.001 Fisher
Within 30 minutes after delivery	3.7%	14.1%	4.7%	Exact=67.91
2 hours after delivery	1.7%	4.4%	3.0%	
With first day	3.4%	16.5%	0.7%	
Following day after delivery	10.8%	10.1%	2.0%	
More than 1 day after delivery	15.5%	7.4%	2.0%	
Exclusive breastfeeding	**Poor (%)**	**Moderate (%)**	**High (%)**	P=0.000
Yes(practiced)	8.5%	4.2%	42.9%	
No(Not Practiced	91.5%	95.8%	57.1%	

4.5 Food Consumption Patterns of the children aged 0-24 in Bosaso District, Somalia

Majority of children were consuming milk (98.5%) with mean intake of 3 times in a week closely followed by tea (95.1% with mean intake of 6 times in a week. This indicates that although majority consumes milk but less frequent compared to tea. The least consumed is chicken (2.7%) with a mean intake of almost zero per week (Table 14).

Table 14: Food Frequency of The Children aged (0-24) months at Bosaso district, Somalia

Food Eaten	Mean number of time-consuming in a week	Percentage Consuming in a week	Once in two weeks (%)	Once a month/ Rare (%)	Never Consumed (%)
Milk	3.37±2.16	98.5	0	0	1.5
Beef	1.65±1.22	86.7	5.8	5.5	2.0
Liver	0.87±1.02	54.6	22.7	17.2	5.5
Chicken	0.05±0.48	2.7	1.7	16.3	79.3
Fish	1.66±1.97	56.3	21.0	16.9	5.8
Fruits	0.56±1.45	17.2	30.3	41.7	10.8
Legumes, beans,Lentile	1.11±1.49	47.0	36.8	12.6	4.2
Green vegetables	1.11±1.67	42.0	38.8	16.6	2.6
Eggs	2.06±1.77	74.6	19.0	3.8	2.6
Porridge	1.62±1.81	59.5	21.3	3.5	15.7
Tea	5.92±1.87	95.1	2.3	0.9	1.7
Coffee	0.68±1.35	30.3	14.0	8.5	47.2
Pasta	3.03±1.80	88.6	4.4	1.5	5.5
Maize	2.05±1.91	69.1	19.0	6.4	5.5
Noodles	0.40±1.16	13.7	7.6	18.1	60.6
Rice	4.19±1.50	97.1	0.6	0.3	2.0
Bread	3.65±1.97	91.0	7.0	0	2.0

CHAPTER FIVE

DISCUSSION

5.1 Socio demographic characteristics of Study population household of children in Bosaso District, Somalia

The study population had a large household size. A recent study carried out in Somalia showed that the average household size was 8.5 persons being higher in the urban areas than the rural areas(UNFPA/PESS, 2013). Another study with results similar to mine found that Senegal had an averaging household size of 9.0 persons (UN, 2017) .A researcher found that Households with large family size, food insecurity and poor child care practices were more likely to have malnourished children(Ajao, K. O. et al, 2010). A study revealed that Somalia is one of the countries with a strong population growth in Africa (Gendreau, F. 2010).Large household sizes have implication on how children will be taken care of in the community especially feeding patterns.

The socio-economic status was low and the majority of the families were living in low wealth level. Another study which had similar findings established that in Somalia the half of the families (50.8%) were living on less than 200USD per month (Abdulkadir, M.,2018). in a Somali poverty profile reports, stated that Somali population is living in poverty, with poor households living on less than $1.90 a day which is the international poverty line of (Somali Poverty Profile, 2017).Living in low/power wealth profiles or status is a risk factor that might lead to poor child nutritional status.

The education level of the study mothers besides knowledge of nutrition education on good child feeding practices very low .The study found there is significant different between maternal nutrition knowledge, maternal education level and maternal income. This indicates that mothers or caregivers who had no formal education and low income had significantly poor nutrition knowledge. A study based on Mother's Knowledge on Nutritional Requirement of Infant and Young Child Feeding in Ethiopia, indicated that all mothers had a moderate and slight knowledge on infant and young child feeding. Knowledge increases in parallel with educational and income level(Berihu, G. *et al.*, 2014). Another study on Caregivers knowledge and attitudes on childhood diarrhea among refugee and host communities in gambella region, Ethiopia had the same result where the nutrition Knowledge of the caregivers was significantly associated with formal education (AOR, 1.3; 95% CI, 1.03–1.5(Mekonnen, G. K., 2018) .The mother's education level is important determinant of the mother's knowledge in childcare.

Majority of household's main source of food was purchase. A researcher observed that the Somalia community purchases food mainly because remittances enable them to purchase their access to credit also improves(Majid, N., 2017).Majority had higher purchasing power due to Somali culturally are support each other's on financially and household income specially Somali Diaspora those who live in abroad assist their families with cash and their properties such house for their family to live(UNICEF, 2016). Remittance plays a great role of the food security and the income of the household's.

5.2 Nutrition status of children aged 0-24 months at Bosaso district, Somalia

The prevalence of stunted, wasted and underweight was very high. A similar study carried out in Nigeria on prevalence and socio demographic determinants of malnutrition among under-five children in rural communities had high prevalence of underweight, wasting and stunting were 28.6%, 23.6% and 28.1% respectively (Duru et al., 2015).

The results of this study revealed that the prevalence of stunting among the children was high at Bosaso district. The national prevalence of under-five stunting children is 25.3%, which is equal to   the developing country average of 25%. Somalia's under-five wasting prevalence of 15% is also greater than the developing country average of 8.9% (Global nutrition report, 2020). The study prevalence of severe stunting was significantly higher among males compared to females. Another study carried out in Northeast Ethiopia on malnutrition and associated factors among under-five children had the prevalence of stunting of 27.9% in male children and 15.2% in females which was higher in male children compared to female (Gebre, 2019).The prevalence of underweight among the children was very high at Bosaso district. Another Study carried out in Dollo Ado district, Somali region on Ethiopia had the prevalence of 47.7% for underweight (Demissie, 2013).The prevalence of MUAC middle- upper arm circumstance in the study was low. A study carried out in Somalia on Predictors of the risk of malnutrition among children had low mid-upper arm circumference in children at 36 %.(Kinyoki, 2015)

The study GAM was very high .similar with Gu (June) 2018 season nutrition assessment among Internally Displaced Persons (IDPs) in the main settlements and two urban areas shows critical prevalence of acute malnutrition (Global Acute Malnutrition-GAM $\geq$ 15%) in 7 out of 15 population groups surveyed in June 2018: including Bosaso, IDPs indicated that The Gu 2018 assessment results for IDPs Serious GAM levels (10-14.9%) were recorded among Bosaso IDBS,Bosaso also reflect increase in GAM prevalence since Deyr 2017 although these changes are not statistically significant.(FSNAU,2018)

The study showed strong and positive relationship between maternal nutrition knowledge and underweight. A study assessed Factors affecting prevalence of malnutrition among children under three years of age in BOTSWANA had similar findings of strong relationship between the increase in the level of education of the mother and the decrease of underweight among children.

5.3 Child Feeding Practices by Mothers in Bosaso District, Somalia

More than half of the study children were breastfeeding. The proportion of the exclusive breastfeeding was very low in children less than 6 months and the majority start weaning age less than 6 months of age. A researcher in Somalia regional state of Ethiopia, Exclusive breastfeeding practices were very low among mothers employed in governmental and non-governmental organizations in the study area(Tadesse, 2019).This results agreed with another study established in Kenya showed that the exclusive breastfeeding was very low at (1.2%) with almost all infants receiving additional foods before the age of one month.(Mugo, 2008).Another study assessed Somali mothers' infant feeding practiced living in Oslo showed that exclusive breastfeeding was less common among the mothers, due to early introduction water, formula and early introduction of tastes of solids.(Lyngstad, 2014)

More than half of the mothers who participated in the study were using bottle feeding .The same showed in study conducted in Somalia with high prevalence of bottle feeding practices at 48.3 per cent of children aged 0-23 months were fed from a bottle .(Tadesse *et al.*, 2019).There is a huge need for the mothers to understand clearly the IYCF to promote good nutrition and IYCF practices.

The study found that there is significant difference of the dietary diversity within underweight and wasting. A study established in Tanzania on the influence of dietary diversity on the nutritional status of children showed that dietary diversity intake was significantly associated with a reduction of stunting, wasting and being underweight in children. (Khamis *et al.*, 2019) .More focus needs to be put on diversifying the diets through integration of different ingredients

5.4 Maternal Nutrition Knowledge in Bosaso District, Somalia

The study found that there was significant association between the nutritional status of the study and the maternal nutritional knowledge. A study with similar findings stated that child malnutrition might derive from gaps in the caregiver's knowledge, attitudes, and practices regarding hygiene and infant feeding (Sulaiman et al., 2019).

Another study assessed Mothers' Nutritional Knowledge, Infant Feeding Practices and Nutritional Status of Children 0-24 Months in Lagos State, Nigeria showed a statistically significant association (p<0.05) between mothers' nutritional knowledge and the children's nutritional status. (Kuchenbecker, 2017).The mothers or caregiver's nutrition knowledge is directly affecting the children's nutrition status.

5.5 Nutrition Knowledge, Attitudes and Practice Related to Children Feeding Practices in Bosaso District, Somalia

The study found that most mothers had moderate maternal nutrition knowledge and the nutrition status of the children was poor. A study in Somalia established that young mothers did not know about recommended nutritional practices therefore poor nutrition knowledge contributing the poor nutrition outcomes(UNICEF, 2012). A researcher in Somali country, observed that that almost three quarter of the participants had never got any information related to sanitation (Alasow et al, 2020). A similar study in Kenyan, based in the urban area found that Children and adolescents with mothers that have high nutrition knowledge have a significantly larger HAZ (p<0.01) than children and adolescents with mothers that have low nutrition knowledge (Debela, 2017). There is need to explore knowledge, attitudes and practice related to Infant Young Children Nutrition practices for all mothers and the wider community.

The study also find a strong cultural beliefs influence the mothers to in appropriate infants and young child feeding practices This result comparable with Knowledge, Attitudes and Practice study done in Eastern Ethiopia stated despite the high knowledge of the participants on infant and young child feeding, a large proportion of mothers/caregivers had negative attitude and poor practice on proper infants and young child feeding (Guled, 2016). It is important that Bosaso district mother's be educated nutrition issues as a means to improve the nutrition status of the children. There is need for behavior change strategies to improve feeding practices in the community for overcoming breastfeeding barriers in the community.

CHAPTER SIX
CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The study population had large household size, the mother's education level and socio-economic status was low and the families were living in low wealth level. The nutrition status of the children was very poor. The majority of the care gives were aware of the recommend breastfeeding practices but the actual practicing was quiet low. The nutrition knowledge level of the mothers on infant young and child Feeding practices was moderate. The level of maternal nutrition knowledge (poor/moderate/high) affected young child nutrition and adoption of breastfeeding practices. Improvements in child feeding, and better maternal education are needed to maintain the children's nutritional status

6.2 Recommendation

There is need to emphasize the education of the mothers/caregivers on infant and young child feeding practices to improve the children's exclusive breastfeeding and the nutritional status of the children in Bosaso, Somalia.

There is need for counseling mothers/care givers on the recommended child feeding practices in order to reduce the level of malnourished children in the community.

There should be intervention programs by the Government and NGO to monitor infant and young child feeding practices in Bosaso.

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APPENDICES

APPENDIX 1: CONSENT FORM

Hello? My name is _____ I am carrying out research on Maternal Nutrition Knowledge, Attitude, Infant Feeding Practices and Nutrition Status of Children Aged (0-24months) at Bosaso District in Somalia.

Your household has been randomly selected from among many others. The information you give us will be treated confidentially and your name will not reflect in the main report. It is voluntary to take part in the survey, but we urge you to participate whole heartedly. Should you have any questions we will gladly answer you.

Respondent agree to be interviewed

YES   NO

Signature of interviewee_____ Date _____

STUDY ON MATERNAL NUTRITION KNOWELDGE, INFANT FEEDING PRACTICES AND YOUNG CHILD NUTRITION: A CASE OF BOSASO DISTRICT, SOMALIA

SECTION A: DEMOGRAPHIC DATA

a) Number of household members_____No. below 15years old _____No. above 65years old

_____No. between 15 and 65years_____

b) Marital status of the mother_____(b) father _____

 1=Married 2= Single 3=Separated   4=Divorced   5=Widowed

c) Level of Education of (a) mother_(b) father _____

1=No education   2= Pre-school   3= Primary school 4= Secondary school

    5=College   6=university   7= Adult education

d) Occupation of (a) mother_____(b) father _____

1= Regular employee 2= Business   3=Self-employment   4=Casual labourer

5= Housewife   6 = Unemployed   7=Herden   8=others (specify) _____

2. SOC IO-ECONOMIC STATUS |circle appropriate response]

e). what is the household's average monthly income? (USD)

1= (0-$50)   2= ($50-100$)   3= ($100-$150)   4= ($150-200$) 5= ($200-250$)   6= ($250-$300) 7= ($300and above)

f). How is your household income distributed among the uses listed in the table below [using proportional piling method- use 100 seeds

Food (%)=1	Health care (%)=2	Others (%=3)

g). what is the main source of food for your family?

  l=Purchase 2=Own farm produce 3= Purchase and own farm produce 4=Food aid 5= others (specify)………………………….

h) What is your main fuel for cooking?

1=Paraffin 2= Gas   3=Charcoal   4=Firewood 5=Electricity   6=others (spec)

i) What is your main fuel/ energy for lighting?

1= Gas 2= Electricity **3=** Paraffin 4= Candle 5= Solar 6=other..................

j) What type of housing do you live in?

1= Permanent 2= Temporary 3= others

3. SANITATION AND HYGIENE [circle appropriate response]

k) Where do you obtain your water?

1= River 2= Tap 3= Borehole 4= stream 5=Harvest rain water 6= Dam/pod 7=others

l) Do you treat drinking water?   1= Yes 2 =No

m) If yes, how do you treat it?

   1 = Boil 2= Leave to decant 3 = use chemicals 4= others

n) How do you store your drinking water?

   1 = covered container 2 =Not covered.

o) Is the water in adequate supply?   1= Yes   2= No

p) Is there a hand washing facilities with soap near the toilet ?   1= Yes with soap2 =No 3 =Yes but no soap 4 = Yes but no soap and water 5 = other (specify)

q) What kind of toilet facility you're your households have? 1= TraditionalToilet2=Flush toilet 3=Bush/None4=other

INDEX CHILD INFORMATION

a) Name of child - .... b) Sex l=male 2= female

c) Child delivered at .... l=hospital 2= home d) Birth weight (kg)

   e) Date of birth -d/m/y

SECTION B: INFANT FEEDING PRACTICES

Breast feeding Practices [circle appropriate response]

1. a) Is the child still breastfeeding?

     1= Yes 2= No

  b) When did you initiate breast feeding?

 l=within30minutes after delivery   2= 1hr after delivery 3= within first day
4= the following day after delivery5=3days after6=others (specify)…………..

  c) How many times do you breastfeed? 1= on child's demand 2=1-2 times a day 3=
3 times a day   4= 4 times a day 5= 5 times a day 6= >6 times a day7=other

  d) Is the child breastfeeding exclusively? 1= Yes 2= No

  e) If yes. How long will you breastfeed exclusively? ….………months

  f) Do you breastfeed your child outside home/public places? 1= Yes 2=No

  g) If It not. Why don't you breastfeed? 1= shy 2= embarrassed 3= others (specify)

Complementary feeding practices

2 a) Are you giving the child anything else in addition to breast milk? 1= Yes 2=No

b) At what age did you start giving other foods/fluids to the baby? months

c) How many times do you feed your child/day 1 2 3 4 5 6 others specify

17. a) .Are there foods that infants are not traditionally allowed to eat? 1= Yes 2= No
b) If Yes, which are these foods? ....
c) Why are these foods prohibited in the community?...
18. g) Please tell me the foods/fluids you give to your child.

Type of dish	Age (months/days initiated)	Ingredients	Frequency/day
Water alone			
Water Glucose			
Water with sugar			
Goat Milk			
Camel Milk			
Cow's Milk			
Tea			
Oil			
Fruits			
Fruit Juice			
Porridges			
Infant formula			
other non-food substances			

19. What do you use for feeding liquids to the child?

1=Bottle-feeding 2= cup-feeding

SECTION C: MATERNAL NUTRITION KNOWLEDGE

[Circle appropriate response]

20. Have you ever received education on good child feeding practices? 1= Yes 2= No

21. If yes, where did you receive the education? 1= MCH clinic *2*= Relatives 3=friends

4=School 5= Seminar/workshops 6= Radio/Mass media 7=others

22. Did you receive the education before or after the birth of the index child?

1= Before 2= after

23. Were you aware of the traditional child feeding practices before you received the modem education on child feeding practices? 1= Yes 2= No

24. If yes, who gave you traditional education? l=Relative 2 - friends 3=observation

25. Please answer the following questions in the table below

Questions	Modern Knowledge	Indigenous Knowledge
When should breastfeeding be initiated after delivery?		
Up to what age (months) can the baby remain healthy on breast milk only?		
How often should a healthy baby breastfeed in a day?		
At what age should the baby be started other foods?		
If you had to be away from the child for several hours, would you express breast milk and leave to be given to the child by Someone else?	1.No 2.Yes	1.No 2.Yes
If No. in the above question, why not?		
What complementary foods were given to the infants in olden days? 0-3 months 3-6 months 6-12 months		
What complementary foods are currently given to the infants? 0-3 months 3-6 months 6-12 months		

26a).Do you know the dangers of starting the child on foods and fluids before the recommended age? l=Yes *2*= No

b) If Yes, please tell me some of the dangers?..

c) How did you know about this danger?..

27. a) Has anyone discussed with you how to prepare complementary foods? l=Yes *2*= No

b) If Yes. Who was it? 1= Nurse 2= Relative 3=friends 3= Seminar 4= others

c) Tell me three important things they discussed on preparation of complementary foods;

28. How many times/day should a healthy baby is feed?...

29. How can mothers be helped to follow the recommended infant feeding practices?...................................

SECTION D: NUTRITIONAL STATUS OF THE CHILDREN

30.	Anthropometric index for children		
		Age in month	
		Weight (kg)	
		Height(Cm)	
		MUAC cm	

SECTION E: FOOD FREQUENCY QUESTIONNAIRE FOR CHILDREN 0-24 MONTHS

33. How often do you give children the following foods?

FOOD EATEN	NUMBER OF TIMES EATEN							Once in two Weeks	Once a month/ Rare	Never Consumed
	No. Of days consumed in a week									
Milk	1	2	3	4	5	6	7			
Eggs										
Beef										
Liver										
Chicken										
Fish										
Fruits										
Legumes, beans, Lentils										
Green Vegetables										
Cereal porridge										
Fermented Porridge										
Tea										
Coffee										
Pasta										
Maize										
Noodles										
Rice										
Bread										

SECTIONF: Dietary Diversity questionnaire

No	Food group	Examples	Yes=1 No=2	Main sources 1=own production 2=purchase 3=gift 4=other (specify)
1.	Cereals	Bread, noodles and foods made from millet, sorghum maize rice, wheat +local foods Anjeero and porridge.		
2.	White tubers and roots	Carrots and sweat potatoes		
3.	DARK GREEN LEAFY VEGETABLES	Dark-green Leafy lettuce and Spinach		
4.	Oils and fats	Oil, fats or butter added to food or used for cooking		
5.	(Vitamin C) Fruits(citrus) Other fruits	Lemon, oranges etc.		
6.	Meat/organ meat	Beef,, lamb, goat , chicken		

7.	Eggs			
8.	Fish and other seafood	Fresh or dried fish or shellfish		
9.	Legumes, nuts and seeds	Beans, peas, lentils, nuts, seeds or foods made from These		
10.	Milk and milk products	Milk, cheese, yogurt or other milk products		
11.	SPICES, BEVERAGES CONDIMENTS	spices(black pepper, salt) condiments (soy sauce, hot sauce) coffee and tea		
12.	Sweets	sugar, honey ,sugary foods such as chocolates, sweets or candies		

Appendix 3: Focus group discussion Guide

Name of representative_____ Date_____

Name of recorder_____Place_____

No	Name of participant	Occupation	Marital status	Number of children under Two years	Nutrition knowledge
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

FOCUS GROUP DISCUSSION (FGD) QUESTIONS

1. Is nutrition essential for the growth of your child? 1=yes 2=No

2. What is a balanced diet?

   Breastfeeding

3. Do you think breast milk is important to the baby?

4. If no why?

5. What is the important of breastfeeding first three days /or given colostrum's to the infant?

6. Did you give the colostrum's to the baby?1=yes2=No

7. If No, Why and what do you feed the baby on during this period?

8. When did you initiate breastfeeding?

9. Do you breastfeed exclusively without given water or any liquid or solid apart from the breast milk?

10. If yes, for how long do you exclusively breastfeed without giving any other liquids or solid?

11. Do you still breastfeed the baby?

12. If No why have you stopped?

13. At what age do you introduce other feeds to infants apart from breast-milk?

14. What food did you first introduce your child?

15. What is the meaning of breastfeeding as you understand?

16. Did you start giving the child anything else in addition to breast milk before 6 month …………

17. If yes, Why?

18. What are the foods that infants are not traditionally allowed to eat in your community and Why? ………………………………………………………………………..

19. Do you breast feed in public?

20. If No ,Why

21. Which methods you are using in feeding the infants ?1=Bottle 2=cup

22. Why are you feeding the child with this method

23. If you had away from the child do you pump/express breast milk and leave it to be given the child?

24. If No, Why

Appendix 4: Research Approval

Puntland Government of Somalia
Ministry of Health

RESEARCH & ETHICS REVIEW COMMITTEE

ETHICAL APPROVAL

This is to certify that the proposal submitted by:

Principal investigator:
Dr. Ngala
Investigator :Marriam Bashir Ismail

Reference: No :
MOH//170/07/2019

Full project Title:

MATERNAL NUTRITION KNOWLEDGE ATTITUDE, INFANT FEEDING PRACTICES AND
NUTRITIONAL STATUS OF CHILDREN AGED (0-24) MONTHS AT BOSAASO DISTRICT IN
SOMALIA.

To be undertaken in

Somalia .

Starting Date : 1/6/2019   Finishing date : 1/8/2019

For the proposed period of research
Has been approved by the Research & ethics committee at the Ministry of Health
On the

Dr. Abdirizak Hassan Isse   Mr. Omer A. Ahmed

Director Policy& Planning   Secretary