KNOWLEDGE AND PRACTICES ASSOCIATED WITH COMPLEMENTARY FEEDING AMONG YOUNG CHILDREN ATTENDING GAMBOOL HEALTH CENTRE, GAROWE DISTRICT, PUNTLAND STATE, SOMALIA

BY

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DECLARATION

This dissertation is my original work and has not been submitted for the award of a degree in any other University

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DEDICATION

This dissertation is dedicated to God, my mother Amina and father Mohamed, my aunts Shukri and Farhia who overpoweringly supported me both morally and financially during my study period.

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ABBREVIATIONS

ARIs	Acute Respiratory Infections.
DDQ	Dietary Diversity Questionnaire.
FFQ	Food Frequency Questionnaire.
FSAU	Food Security Analysis Unit.
FSNAU	Food Security and Nutrition Analysis Unit.
GNC	Global Nutrition Cluster.
ICDDR.B	International Centre for Diarrheal Disease Research, Bangladesh.
ICF	Inadequate Complementary Feeding.
MUAC	Mid-Upper Arm circumference
NGOs	Non-Governmental Organizations.
NCHS	National Center for Health Statistics
SAM	Severe Acute Malnutrition.
SES	Socioeconomic Status.
UNAIDS	United Nation Programme on AIDs.
UNICEF	United Nations International Children's Emergency Fund.
USAID	United States Agency for International Development.
WHO	World Health Organization.

OPERATIONAL TERMS AND DEFINITIONS

Complementary feeding: complementary feeding is the skill of feeding, during which foods or liquids are given along with sustained breast milk feeding to the children.

Exclusive breastfeeding: exclusive breastfeeding means exclusive feeding of the baby with breast milk only, for the first six months.

Dietary diversity: as the number of unique diets consumed by household members over a given period.

Underweight: underweight is defined as low weight for age at less than 2 standard deviation of the median value of the NCHS international reference.

Nutrient adequacy: is the comparison between nutrient requirements and the intake of a certain individuals or populations.

Nutritional status: The condition of the body as a result of the intake, absorption and use of nutrition, as well as the influence of disease-related factors.

ABSTRACT

According to scientific research on newborn and young child feeding habits from underdeveloped nations, advancement is attainable with the use of efficient tactics and adequate resources. The health of children is still being compromised by substantial gaps in supplemental nutrition, nevertheless. Current studies on complementary feeding techniques and how they affect young children's nutritional status in Garowe, Somalia. Therefore, the main objective of this study was to determine knowledge and practices associated with complementary feeding among young children attending Gambool Health Centre, Garowe District, Puntland State, Somalia.

A cross-sectional study was carried out among 405 mothers with children aged 6-23 months attending Gambool Health Centre, Garowe District, Puntland State, 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 6-23 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, and anthropometric techniques were used to determine the nutrition status of the study children. Descriptive statistics were used to analyze. Normal test proportions were determined for socio-demographic and socio-economic variables. Chi-square was used for the analysis of the relationships between maternal knowledge on complementary feeding practice and other variables. Mean score and knowledge z-score was computed and used to group the respondents into three knowledge groups; low, moderate, and high knowledge score.

The study results showed the study population had medium socioeconomic status and the majority of the households were living at moderate wealth levels. Mother's knowledge on child complementary feeding practices was average at 58.2%, about 8.8% had low knowledge and 33% had high knowledge. About 85% of mothers had knowledge of exclusive breastfeeding while 79.8% knew about continued breastfeeding up to 2 years, 31% had knowledge of the frequency of breastfeeding and 42.5% of the mothers were exclusively breastfeeding and 71.8% of mothers breastfed their children on demand. About 10% of the children were stunted, 22.9% were wasting, and 19.2% were underweight. There was a significant relationship between maternal knowledge on complementary feeding and the household income ($p=0.003$). There was a significant relationship between child exclusive breastfeeding and wasting ($p=0.001$) and underweight ($p=0.030$). There was no significant relationship between maternal knowledge on complementary feeding and education ($p=0.393$) and mothers/caregiver's marital status ($p=0.493$). In conclusion, the prevalence of under-nutrition is still high among the children and is influenced by maternal knowledge on complementary feeding practices and also the complementary feeding practices.

CHAPTER ONE: INTRODUCTION

1.1 Background

Complementary feeding process should begin after the 6th month of life, since breastmilk alone is not sufficient to meet the growth and development needs of a newborn. For that reason other foods and drinks are considered necessary in combination with breastfeeding. The period for complementary feeding is first 2 years of life, even though breast milk might be consumed beyond 24 months of the child's life (Javalkar, 2018). Encouragement of exclusive breastfeeding is the only and mainly cheap intervention to diminish child illnesses and mortality in developing countries. After complimentary foods have been introduced at six months, breastfeeding must be continued and is a vital source of nutrients for the children. It gives approximately one-half of children nutritional requirements until the age of 12 months and able to give one third of the required nutrients during the second year of life. Breastfeeding remains to provide advanced valuable nutrients when compared to complementary diets, and furthermore provides children protection against diseases. Therefore, breastfeeding is necessary for infants up to two years and beyond with sufficient complementary feeding practices (Yonas *et al.,* 2015).

Adequate nutrition is a vital constituent for the infant health and normal growth for the first years of life. The initial 24 months of the infant's life is a vital indicator that guarantees the most favorable infant's growth and development (Mollaet *et al.,* 2017). Improper complementary feeding practices among children aged 6-23 months are the main causes of malnutrition (Kimiywe and Chege, 2015). Previous studies conducted in a different place on issues related with proper complementary feeding practices of infants aged two years demonstrate advanced mother and household head perception and understanding, improved family income, access to the media

channel, sufficient contacts of the prenatal and after birth, infant's gender and age, institutional delivery, less parity, mother livelihood, people living in big cities, awareness and frequency of complementary feeding as well as getting nutrition counselling during immunization as determinant factors for appropriate complementary feeding (Kassaet al., 2016).

Malnutrition is a huge problem in all areas of Somalia and shows in acute form in regions of famine, flood or localized conflict and clash. Food insecurity (mainly due to consecutive famine and conflict), quality of food, child feeding practices and poor family management practice (maintenance food in secure, germ-free conditions, the suitable storage of water, etc.) contribute to the poor nutritional status of children (WFP 2007). In Puntland state, Garowe district has a hot desert climate and normal daily temperatures range from 27 °C (80.6 °F) to 37 °C (98.6 °F).Rainfall in the region is meager and erratic, averaging 123 mm. As in the larger Somalia, Garowe districts experience four major time of year about which rural population and farming living rotate, known as: Jilal – starts from January to March; the severest arid period of the year; Gu – from April to June; the major rainy period; Xagaa – from July to September; the second dry season and Deyr – from October to December; the little and not as much of reliable rainy season (World Vision, 2016).

1.2 Statement of the Problem

Malnutrition in Somalia is a serious public health problem, negatively affecting growth, development, and livelihood of the population. The most recent analysis of the nutrition situation of the children in the country indicates that 16% of the total under five population in Somalia are acutely malnourished, with 4% percent being severely malnourished. Infant and maternal under-

nutrition in their acute and chronic forms continue to be a long-term problem in Somalia and the burden is high (GNC and SNC, 2014). Other studies have shown that inadequate complementary feeding (ICF) for children is an important contributor to childhood under-nutrition. However, the extent to which ICF is an important factor in Garowe district is unknown. In addition, the effect of other associated factors such as women workload, food security, and socio-demographic and economic factors need to be studied for the region. Moreover, micronutrient deficiencies amongst young children and women of childbearing age are also widespread (GNC and SNC, 2014). The contribution of complementary feeding to vitamin A and iron intake were also assessed during this study in order to estimate the correlation of micronutrient intake and child under-nutrition, which has not been previously assessed for the region.

1.3 Justification

This study was conducted to find out the factors associated with complementary feeding practice so that decision makers and NGO working in the district have information on the factors hence enabling them to lay strategies to overcome the existing problems. To contest the nutritional outcome of inadequate complementary feeding practice with the accurate set of interventions, policymakers require to have an improved synthesis of the factors associated with it. Neglecting such feeding practice can be problematic as it might cause long-term effects on the growth and future wellbeing of children. As a result of poor child feeding practices, mothers have often come to the clinic citing abdominal, respiratory and other common problems of their children. This study will therefore contribute important information that will help to design interventions and policies that will support the reduction or elimination of childhood malnutrition in Somalia.

1.4 Aim of the Study

To contribute towards the reduction of under-nutrition as a result of inappropriate complementary feeding practices among children 6-23 months old attending Gambool mother and child health center, Garowe district.

1.5 Purpose of the Study

The purpose of the study is to determine the factors that are associated with poor complementary feeding practices in Garowe district. The findings of the study will contribute to the efforts being made to promote the complementary feeding practice among children 6-23 months of age in Garowe district.

1.6 Objectives

1.6.1 General objectives

To assess the Knowledge and Practices Associated with Complementary Feeding Among Young Children Attending Gambool Health Centre, Garowe District, Puntland State, Somalia.

1.6.2 Specific objectives

1. To determine the demographic and socio-economic characteristics of mothers with children aged 6-23 months attending Gambool Health Centre, Garowe district.
2. To assess the mothers'/caregivers' knowledge on complementary feeding in Garowe district.

3. To establish nutritional and morbidity status of the children attending Gambool Health Centre, Garowe district.
4. To assess the mothers'/caregivers complementary feeding and hygiene practices in Garowe district.

1.7 Research question

1. What is the demographic and socio-economic characteristics of mothers with children aged 6-23 months attending Gambool Health Centre, Garowe district?

2. What are the mothers'/caregivers' knowledge and practices of complementary feeding in Garowe district?

3. What is the nutritional status of the children attending Gambool Health Centre, Garowe district?

1.8 Significance of the study

The study has produced data that may be helpful to the Ministry of Health (MoH) and other organizations working on child health survival programs. The data gathered may help in the development of appropriate treatments to enhance supplemental feeding, hence reducing child malnutrition in the target area and other similar areas. Additionally, the study has added insight to ongoing studies on complementary feeding.

1.9 Limitations of the study

In order to be representative of the overall population of the Garowe District, the sample was drawn from a health center rather than from households. This is because not all mothers in urban areas, particularly those from middle and upper socioeconomic groups, attend public health centers for child welfare clinics.

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 Puntland IDPs, assessed the prevalence of malnutrition and risk factors associated with malnutrition shows that the prevalence of malnutrition in Puntland 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).

2.2 Child feeding practices

Poor child 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 are 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 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 (Lucia, 2008).

2.3 Breastfeeding practices

2.3.1 Significance of breastfeeding

Breastfeeding has the potential to react to the children needs and it's active in its nutritive and defense reactions. The active nutritional reactions in breastfeeding are indicated by the milk of the mother of the premature birth infant being caliber different from that of full-term mother (Walker, 2004). Socio-economic and environmental factors participate to the raised-up prevalence of rotavirus diarrheas reflect dynamic and helpful defensive reactions in breastfeeding to the suckling children while immunologically, the advanced levels of rotavirus definite maternal antibodies in the breast milk of mothers in developing countries (Maria et al., 2006). Breast milk has many advantages in terms of children health and motor development, health of mother and chronic malnutrition threat. As the study foundation enlarges, and the perceptive of this subject develops, the supremacy of breast milk over other feeding routines for the entire of these results turn out to

be always comprehensible. These advantages come not at a charge; however, further monetary advantages for the household, the health systems, employers, and community (León-Cava 2002).

A different cohort study was established in India, Ghana, and Peru demonstrated that children who were not breastfed had a double advanced threat of mortality of which ever reason and a double advanced threat of being sick for whichever reason contrasted to individuals who mostly took breast milk (Korir 2013). Research conceded elsewhere in Chittagong, Bangladesh demonstrated that children who were absolutely breastfeeding from 0-6 months had a much inferior occurrence of diarrhea and acute respiratory infection (ARI) than those children who were not fully breastfeeding (Mihrshahi *et al.,* 2010).

Up till now breastfeeding rates worldwide by and large remain low. Only 43% of the globe children breastfed within 1 h of delivery and 40% of newborns aged 6 months or fewer are exclusively breastfed (Sankar *et al.,* 2015).

2.4 Complementary feeding practices

2.4.1 Outline of complementary feeding practices

Complementary feeding is a process starting feeding of solid foods and liquid along breastfeeding substitutes when breastfeeding or children formula alone is no longer adequate to meet the dietetic requirements of children, complementary feeding with breast milk promotes children health and development (Senarath *et al.,* 2012). The evolution of the infant from exclusive breastfeeding to balancing food is known as complementary feeding and covers the time 6- 23 months of age (Srivasatava *et al.,* 2018). introduction of the infant to solid and semi-solid diet at the age of 6

months, slowly increase on the quantity of diet given and frequency of feeding as the infant get mature, whereas nutrition status is the situation of the body as influenced by utilization of nutrient in use (Mukundi *et al.,* 2018). High-quality food and well feeding practice have a huge impact on an infant's life and on health and nutritional status of an infant (Shrestha *et al.,* 2004). The growth and development of the infant depend on giving proper feeding and care practice and is very vital for child health. These practices are for a particular period, with the accurate adhesion to the age brackets for feeding recommended (Pascale *et al.,* 2007). The major causes of the high death among newborns and young infants in the world are inappropriate complementary feeding, recurrent infections, and micronutrients deficiencies (Lartey 2008).

2.4.2 Recommended intakes of complementary foods for infants

The essential things to the development and growth of every infant to complete human possibility are sufficient dietary and suitable complementary feeding throughout first two of life (Mekbib *et al.,* 2014). Child feeding practices encompasses all together the breastfeeding in addition to the complementary feeding play a huge role in determining the nutritional status of the infant and the relation between undernourishment and newborn feeding has been well recognized (Satija *et al.,* 2015). Healthily infants aged 4 to 6 months with proper weight-for-age require around 95- 100 kcal/kg/day or in entirely 650-700 kcal/day. Children who exclusively breastfeed are reported to consume the same value of about 600 to 700 kcal/day. These suggested intakes are for healthy children from wealthy countries and include a 5% addition to envelop any underestimation of breastfeeding intake (Lucia, 2008).

2.4.3 Dietary diversity

Dietary Diversity is the utilization of four or more diet groups from the seven diet groups for advanced food value and to give on every day energy and nutrient necessities of the 7 suggested diet groups known as: (meat, fish, poultry and appendage meats); eggs; vitamin-A affluent fruits and vegetables; (Solomon *et al.,* 2017). Food assortment has long been documented by nutritionists as a key component of high-quality foods. Raising the diversity of diets consumed has been suggested by most dietary guidelines. For the reason that it is the consideration to ensure a satisfactory intake of critical nutrients and thus promote good health and nutrition (Nti., 2011). Utilization of diet from at any rate four diet groups on the previous daytime would stand for that in the majority households the infant had an elevated probability of food intake at minimum one living-origin diet and at minimum one crop or vegetable that day, also to a staple diet (grain, root or tuber (Solomon *et al.,* 2017).

In the developing countries, the most rigorous problems among poor peoples are meager and lack of dietary diversity, where diets are based supreme food for the wellbeing, growth, and development of the entire normal children (Ogunba, *et al.,* 2010).

On the other hand, socioeconomic status and household dietary diversity have a strong association and the relation between socioeconomic status and infant nutrition and growth results have long been recognized. Explanation of relations among infant nutritional status and dietary diversity is hence complicated detail both are strongly linked to family socioeconomic factors. The household with high wages and capital tend to have more dietary diversity; however, they are also likely to have improved access to health care and improved environmental circumstances (Arimond *et al.,* 2004).

2.4.4 Meal frequency

Meal frequency has critical importance to children health and in the protection of infections and malnutrition (Englund-Ögge *et al.,* 2017). Like macronutrient composition and quality, frequenting the meal and scheduling are a vital aspect of nutrition. On the other hand, the extremely high intake of food causes a threat of obesity and chronic diseases, and obesity is the leading cause of disability and death in developed countries (Kahleova *et al.,* 2017). In most developing world young infants are directly commenced to normal household food prepared of cereals or starchy foods. The quality of an infant's diet is reliant on meal frequency and food groups contained in the diet. There are powerful facts that proper meal frequency and food diversity practices guide to improved health and growth outcomes among infants (Tegegne *et al.,* 2017). On another hand, the generally held outlook that low consumption further frequently is good for weight management than consumption large food less frequently is not good for health as numerous recommendations (Kahleova *et al.,* 2017).

In breastfeeding, the lowest regularity was termed as: two times for breastfeeding children 6–8 months, three times for breastfed children 9– 23 months, and four times for non-breastfed children 6–23 months (Beyene *et al.,* 2015). A number of researches demonstrate that protein synthesis and accretion are heightened when protein-containing foods are consumed frequently throughout the day (Jon *et al.,* 2015).

2.5 Factors associated with complementary feeding practices

2.5.1 Socio-demographic and economic factors

Some socio-demographic factors such as maternal age, household wages, Religion Literacy level, educational level of the mother, sex of the infant might contribute nutritional status of an infant. However, could demonstrate different circumstances in urban areas due to the exclusive unpredictable urban environment (Omond 2016). It is well recognized that those with poorer levels of wages and education composes dietary preferences less consistent with dietary principal recommendations compared with their richer or sophisticated counterparts (McKinnon, 2014).

According to the research from the International Centre for Diarrheal Disease Research, Bangladesh (ICDDR.B) in Matlab, socioeconomic status (SES) is one of the most important factors that influence infant feeding. A number of investigations in 28 countries in the globe birthrate assessment reported that after adjustment for socioeconomic status, mother/caregivers' knowledge had the major influence on infant mortality, particularly after the first year of life (Roy *et al.,* 1993). However, scarcity and lack of adequate income are major factors in poor feeding condition, nutritional deficiencies are common even in families that are economically wealthy. To identify the attainable effect of different socio-economic and demographic variables n a pastoral population of relatively well-off areas of the country, efforts have been made to study the prevalence of under-nourished and related socio-economic and demographic status along with under five infants (Khanna *et al.,* 2017). In addition, the household can have an effect on dietary preference and on the possibility of appealing in physical activity and wellbeing manners (Russo *et al.,* 2012).

2.5.2 Maternal knowledge and perceptions

The Nutrition education informed mothers about the benefits and importance of breastfeedingand 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 ofall women had never attended school. Eighty-four percent of ever- married women had no education compared to 55 percent of never-married women.

2.5.3 Morbidity factors

To diminish completely the threat of the infant becoming unwell and suffering from serious infections, then exclusive breastfeeding is very important to the infant for the duration of the first six months of life and it also appreciably diminishes the chance of infant mortality in diarrhea, pneumonia and neonatal sepsis. It observed by way of breastfeeding collectively with complementary foods till the age of at least 12 months, and it also appreciably diminishes the chance of infant mortality in diarrhea, pneumonia and neonatal sepsis. For infants above, six months in age will develop malnutrition with a deficiency of carbohydrates, proteins, iron, vitamin A and zinc, if the foods consumption of breastfeeding and complementary feeding become insufficient and this leads morbidity of the children. (WHO *et al.,* 2011). Various researches In Timor-Leste, have shown the poor dietary diversity of complementary feeding practices to be associated with infant morbidity, while additional studies found infant suffering from Acute Respiratory Infections (ARIs) were further expected to have a complementary feeding of insufficient food variety and also not to have adequate food (Korir, 2013). Respiratory diseases and poor health might be a threat issue for asthma in infants and their related effects in relation to infant feeding need to be elucidated further (Oddy, *et al.,* 2003). Minor rates of a variety of newborn diseases including breathless lower respiratory tract diseases, pneumonia, and upper respiratory tract diseases has been associated with breastfeeding and the type of complementary food (Wright *et al.,* 1998). The defensive effect of breastfeeding against respiratory diseases is attributed to its numerous immune-biological components (Lamberti *et al.,* 2013).

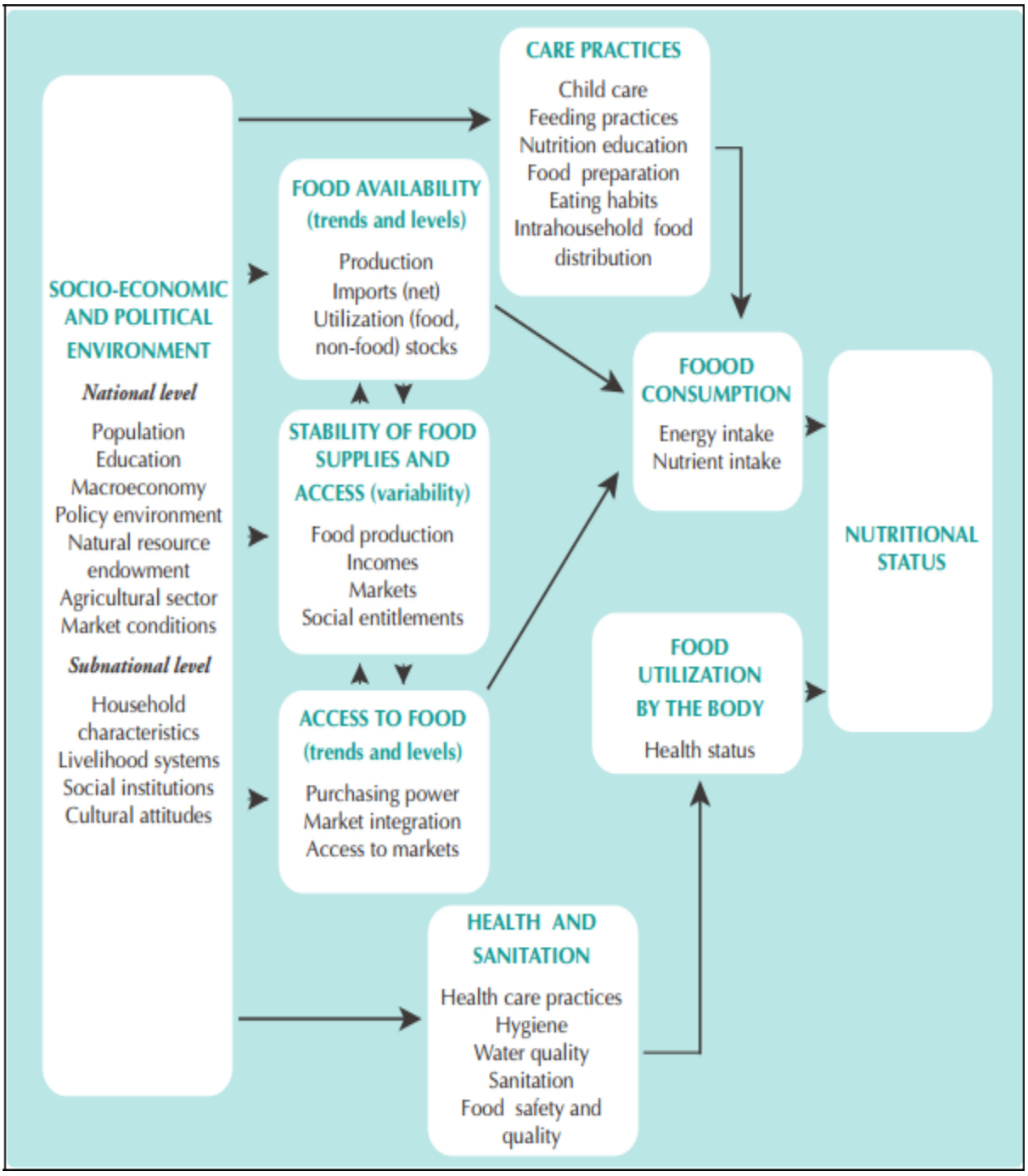

Figure 2.1 Nutritional status and associated factors conceptual framework (FSAU 2005).

2.6 Gaps in knowledge

There is restricted information on how to improve these recommendations for the local feeding sector in programs for the population. As well as, there are insufficient food knowledge and limited information on feeding practices on infants in Garowe District.

CHAPTER THREE: STUDY DESIGN AND METHODOLOGY

3.1 Study Setting and Design

3.1.1 Study setting

Garowe is the capital of Nugaal region and governmental center of Puntland state in north-eastern Somalia. Garowe is located in the Nugaal Valley, surrounded by gradually ascending high plateaus that usually arrive at height of 1,650 to 3,300 feet (500 to 1,000 m) above sea level on the north, west, and south. The western part of the same plateau is crossed by numerous valleys and dry watercourses. Goat and camel rearing form the basis of the economy. The broader Garowe district has an estimated total population of 190,000 residents. Administratively, the district is divided into seven divisions (FSNAU, 2012).

Garowe General Hospital serves Garowe residents in addition to serving as a referral hospital for Eyl, Burtinle and Dangoroyo districts. It has three sub-district hospitals including Qaran, Carafat and Akram and thirty (30) health centers including Somali, Kismayo, Altowba, Garowe Health Centre, Salaama etc (FSNAU, 2012).

The Gambol Maternal and Child Health Centre (GMCH) clinic conducts the antenatal and postnatal clinics at the hospital. Other services offered at the MCH in addition to conducting the above mentioned clinics includes dietary support, growth screening, HIV testing and counseling of expectant mothers, to evaluate their condition and family planning services. Training sessions are also conducted in the above areas and this is where breastfeeding and complementary feeding come in (FSNAU, 2012).

Figure 3.1 Map of the Garowe district, Puntland, Somalia

3.1.2 Study design

The research was descriptive, cross-sectional in nature and whose data were collected at the Gambool maternal child health center and sub-district health centers.

3.2 Study methodology

3.2.1 Study Population

The targeted study population consisted of mothers as respondents and their infants 6-23 months of age who hailed from Garowe district and were attending the Gambool maternal child health center and was interviewed so as to attain data with related to complementary feeding and other related problems while infants 2 years of age were evaluated to establish their nutritional status

3.2.2 Sample Size determination and sampling techniques

3.2.2.1 Sample Size Determination

The sample size was determined according to Fischer *et al.*, (1991) formula as follows:

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

Where:
n= Determined sample size
Z^2 = the standard normal deviation which is 1.96 for the 95% confidence interval P= the proportion of stunting prevalence in the target population will be 50%. d= degree of accuracy desired set as 0.05

Therefore:

$$n = \frac{(1.96)^2 \times (0.5) \times (0.5)}{0.05^2} = 384$$

Attrition 5% = 384/0.95
= 405

3.2.2.2 Sampling procedure

Multistage sampling was employed to choose the study population. At the first two phases Garowe district were selected using purposive sampling which was followed by a selection of Gambool maternal and child health center using the same method. A third phase, mothers with infants 6-23 months of age was selected at purposive. At the fourth phase 405mothers who are residents of Growe District with children 6-23 months of age was selected randomly and finally included in the study. The sampling technique used in the selection of the study sample is shown in figure 3.2.

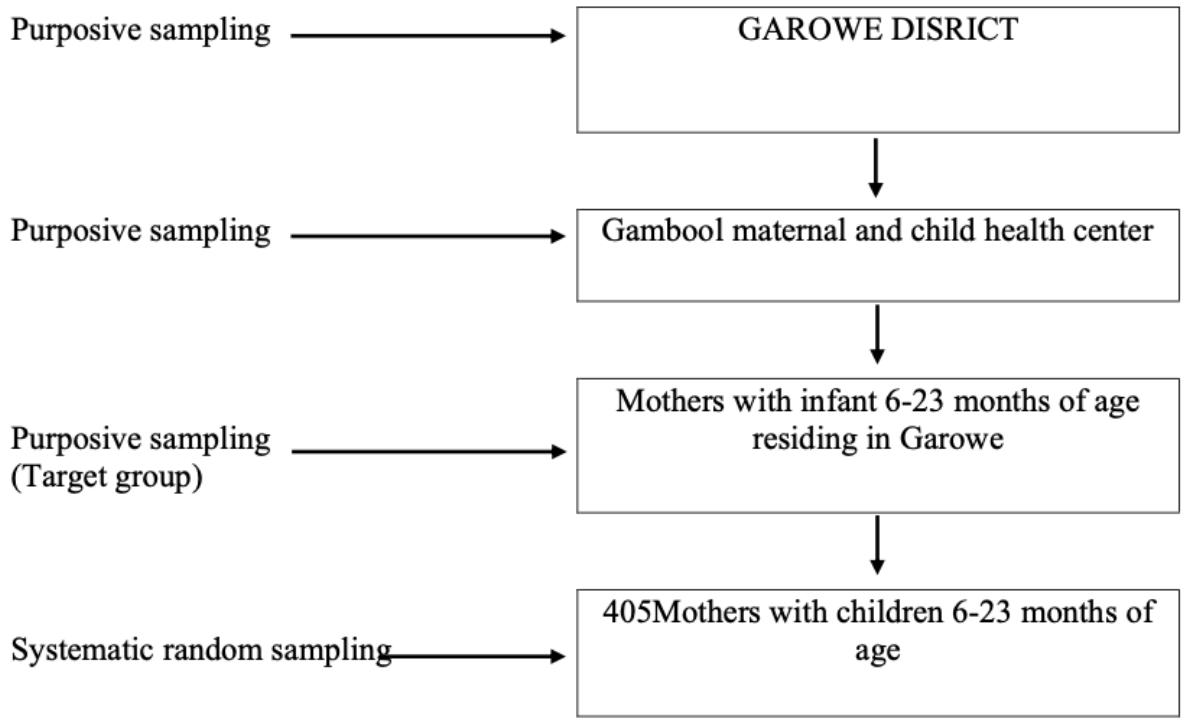

Figure 3.2: Diagram on the sampling procedure

3.2.2.3 Inclusion criteria

The study focused on Mothers/women caregivers and their infants 6-23 months of age who were residents of Garowe District.

3.2.2.4 Exclusion criteria

Suitable subjects who did not give consent and children of 2 years or below were excluded from the study.

3.3 Data collection methods

3.3.1 Quantitative and quantitative methods

A structured questionnaire was used to collect both qualitative and quantitative data. The questionnaire was pre-tested in a pilot study in Garowe Health Centre and was adjusted accordingly before its application for data collection.

3.3.2 Data collection tools

3.3.2.1 Questionnaire

A standard questionnaire was used, to make sure that the entire respondents was inquired precisely the same questions, in a same approach. 405 Planned interviews were was the major technique of data collection. The questionnaire has the following sections; socio-demographic and economic profile of the study household, individual dietary diversity score and food frequency questionnaire.

3.3.2.2 Age determination

Ages of infants was attained from clinic cards or infant health cards. For those without written identification, the information was given by the mother or respondent.

3.3.2.3 Anthropometric measurement

Anthropometric measurements of children were taken. These anthropologies included were height, weight and MUAC.

3.3.3 Data Quality Control Measures

Supervision of the enumerators was closely done to ensure they carried out the process correctly and solve any problems that arose during the exercise. There were daily briefs by the principal of investigator to make sure all actions went as planned. All the questionnaires were proof read for entirety and any anomaly at the end of the day. Calibration of the tools was done every day to make sure proper measurements were acquired. Pre-testing of the questionnaires was essential to guarantee the questions was asked in an accurate manner and obtain the exact responses.

3.3.3.1 Pre-testing of instruments

The pre-testing was performed to determine how long the interviews will take, how well the questions are understood by the respondents and to identify any mistakes that needed correction. After a review of the tools, all recommended correction was made before the main data collection exercise commenced.

3.3.3.2 Recruitment and Training of field Assistants

Three research assistants were recruited through referral from the nutritionist at the MCH clinic. They had a minimum secondary school education of Form IV, with two of them being university students on attachment. One of these two had prior experience in carrying out surveys hence they were able to understand the study population. Training took two days and was conducted by the principal investigator (**Appendix 4).**

3.3.4 Ethical and human rights consideration

Informed consent was acquired from each respondent before the interview The respondents were assured of confidentiality of the information was and were not be obliged to give their names. The permission to perform the research was acquired from the Ministry of Health in form of a research permit. Further consent was obtained from the Gambol Maternal and Child Health centre officer for use of the MCH facilities to interview the respondents.

3.3.5 Data Management and Analysis

3.3.5.1 Data entry and cleaning

Data was entered in coded form, cleaned and processed using the Microsoft Excel and SPSS (Statistical Package for Social Sciences). Both descriptive and inferential data analysis methods were used in the generation of the results of this study.

CHAPTER FOUR: RESULTS

4.1 Characteristics of the study population

4.1.1 Socio-demographic profiles of households

Four hundred and four (404) children aged 6-23 months were included in this study. The median age of the mothers was 31 years with the youngest and oldest mothers being 23 and 60 years old, respectively. Majority (76.6%) of the mothers were married, 13.7% divorced, 6.0% widowed while 2.7% were single and 1% were separated. More than half (66.5%) of the households had five to eight members, while (27.8%) had one to four members. The majority (46.3%) of the caregivers had primary level of education, (30.4%) had non-formal education, (10.7%) had secondary education and (12.2%) had university level (Table 4.1).

Table 4.1: Socio-demographic characteristics of the households

Socio-demographic characteristics	N=405	
	Number	Percent (%)
Gender of respondents		
Male	12	3
Female	388	97
Care giver age		
23-30	196	49.0
31-38	154	38.5
39-46	42	10.5
47-54	7	1.8
55 and above	1	0.3
Household size (persons)		
1-4	111	27.8
5-8	266	66.5
9-11	21	5.3
12 and above	2	0.5
Marital status		
Divorced	55	13.7
Married	307	76.6
Separated	3	1
Single	11	2.7
Widowed	24	6.0
Level of educational		
No formal	122	30.4
Primary	185	46.3
Secondary	43	10.7
Tertiary	49	12.2

4.1.2 Socio-economic characteristics of the household

More than half (56.4%) of the households depended on casual labour as their main source of income followed by formal employment (26.6%) while 17% had small-scale business. More than half (56.5%) of the households estimated to allocate about 50 - 69% of their income to food while 30.9% allocated 70% of their income to food and only 12.6% allocated the less than 50% of their income to food. Over three quarters (76.6%) of the households obtained food through buying from the market followed by food donation (20.7%), farming (2.3%) and lastly 0.04% obtained food from other sources. Over two quarter of the household's (56.6%) food was provided by father,

nearly half of the household's (40.7%) food was provided by mother, 2% food was provided by relatives and lastly 0.7% of households received food from grandparents. Majority (42.8%) of households had an average monthly income from all sources of above USD 150 - 200.

Table 4.2: Socio-economic profile of the household

Socio-economic characteristics	N=405	
	Number	**Percent (%)**
Main source of income		
Casual labor	226	56.4
Formal employment	106	26.6
Small scale business	68	17.0
Estimated % household of income allocated to food		
Largest percentage >70%	124	30.9
Medium percentage 50-70%	226	56.5
Smallest percentage <50%	50	12.6
How food is obtained		
Buying	307	76.6
Farming	9	2.3
Food aid/donation	68	20.7
Others	2	0.4
Provider of food in a household		
Father	226	56.6
Grandparent	3	0.7
Mother	163	40.7
Relatives	8	2
Monthly income in Dollar		
50 to 100$	29	7.2
100 to 150$	150	37.6
150 to 200$	171	42.8
200 to 250$	33	8.2
250 to 300$	11	2.7
300$ and above	6	1.5

4.2 Maternal knowledge on complementary feeding and practices

In this study, knowledge and questions were based on the guiding principles of complementary feeding for a breastfeeding child (PAHO/WHO, 2003). The study showed that most (85%) of the mothers had high knowledge on exclusive breastfeeding for the first 6 months and 79.8% of the mothers reported that infants and children should be breastfed for two years and beyond.

Over three quarter (79.1%) of the mothers thought children, one year old breastfed children should be fed two times a day, in the morning and evening. In addition, also 77.1% of the mothers said children should be fed when they are hungry (based on hunger cues).

A higher percentage (79.1%) of the mothers knew that at 6 months children should be introduced to complementary foods that are sieved and/or pureed for optimal intakes. Majority of the mothers had high knowledge on hygiene practices; washing hands before preparing food for a child (87%) and treating of water used for preparing foods and drinks for the child (87.3%).

Less than half (37.4%) of the mothers thought bottle feeding was a better option for feeding non-breastfed children. More than two-quarter of the mothers (57.1%) indicated that sick children and those recovering from illness should be fed on diluted porridge or fruit juices.

Majority of the mothers reported the need for responsive feeding of complementary foods to ensure optimal intakes where (87%) thought that the mother should be the primary feeder of her child, while (81.1%) stated that the mother should assist her child to eat up to the age of two years.

Table 4.3: Maternal knowledge on complementary feeding

Aspects of mother's knowledge on complementary feeding	N = 405	
	n	%
Breastfeeding:		
Infants should be exclusively breastfed for the first 6 months of life	341	85.0
Breastfeeding continued up to 2 years and beyond	320	79.8
A child should be breastfed on demand	288	71.8
Complementary feeding (CF) practices:		
A breastfed child who is 12 months old should be fed solid foods two times per day	317	79.1
Meal frequency and energy density of CF:		
Mother or a caregiver should feed a child based on hunger cues	309	77.1
Consistency of CF		
A 6 months child should be fed on pureed or sieved foods	317	79.1
Safe preparation and storage of CF		
Hands should be washed before preparing children's food	349	87
Water for preparing food and drinks for children should be treated	350	87.3
Feeding bottles are the best option for feeding children who have refused to breastfeed	150	37.4
Feeding during illness		
Sick and recovering children should be fed porridge or diluted fruit juices only	229	57.1
Responsive feeding		
A mother should be the primary feeder of the child	349	87
Mother should assist a child to eat until 2 years	324	80.8

CF= Complementary Feeding; n = Number

4.2.1 Maternal knowledge score on complementary feeding

Mother's knowledge on complementary feeding was based on a two-point scales ("1", "0"). A score of "1" was awarded for a correct response while a score of "0" was awarded for a wrong response and a total score computed for each mother out of a maximum score of 20. The mothers' knowledge on complementary feeding was categorized into three; Low for those who had a score of 0-9; Average for those with a score of 10-13 and High for those who scored >14. More than two quarter (58.2%) of the mothers had average knowledge on complementary feeding, over one quarter (33%) of the mothers had high knowledge whereas a few (8.8%) of the mothers had low knowledge on complementary feeding practices (Table 4.4).

Table 4.4: Maternal knowledge score on complementary feeding

Maternal knowledge score	**N=405**	
	n	**%**
Low knowledge (0-9)	35	8.8
Average knowledge (10-13)	233	58.2
High knowledge (14-20)	132	33.0

4.3 Breastfeeding practices

Since complementary feeding is a period during which other foods or liquids are provided along with breast milk as defined by World Health Organization (WHO, 2006), breastfeeding was considered important. Almost all (98.5%) of the children in the study had been breastfed but at the time of the study it had declined to (86.6%). Majority (88%) of the mothers breastfed their children on demand while 12% breastfed according to timetable (Table 4.7).

Table 4.5: Breastfeeding practices of the children

Breastfeeding practices	N = 405	
	n	%
Ever breastfed	394	98.5
Still breastfeeding	347	86.8
How often should breastfeed the child		
On demand	352	88
According to timetable	43	12

4.4 Complementary feeding practices

In this study mother's complementary feeding practices were assessed using WHO indicators for infant and young child feeding practices for children 6-23 months (WHO, 2007). These indicators included: introduction of solid, semi-solid or soft foods to children aged 6-8 months, minimum dietary diversity, minimum meal frequency, consumption of iron-rich and iron-fortified foods and consumption of vitamin A - rich foods. Mother's hygiene during complementary feeding was also included since it was an important guiding principle during complementary feeding.

4.4.1 Introduction of solids, semi-solids and soft foods

Introduction of solids, semi-solids and soft foods to children at 6-8 months is an indicator of infant and young child feeding practices and an important aspect in complementary feeding. The proportion of breastfed infants 6–8 months of age who receive solid, semi-solid or soft foods indicate timely introduction of complementary feeding (WHO, 2007). Based on a 24-hour recall, 98.4% of the children, 6-8 months old had received solid or semi-solid foods (Figure 4.1).

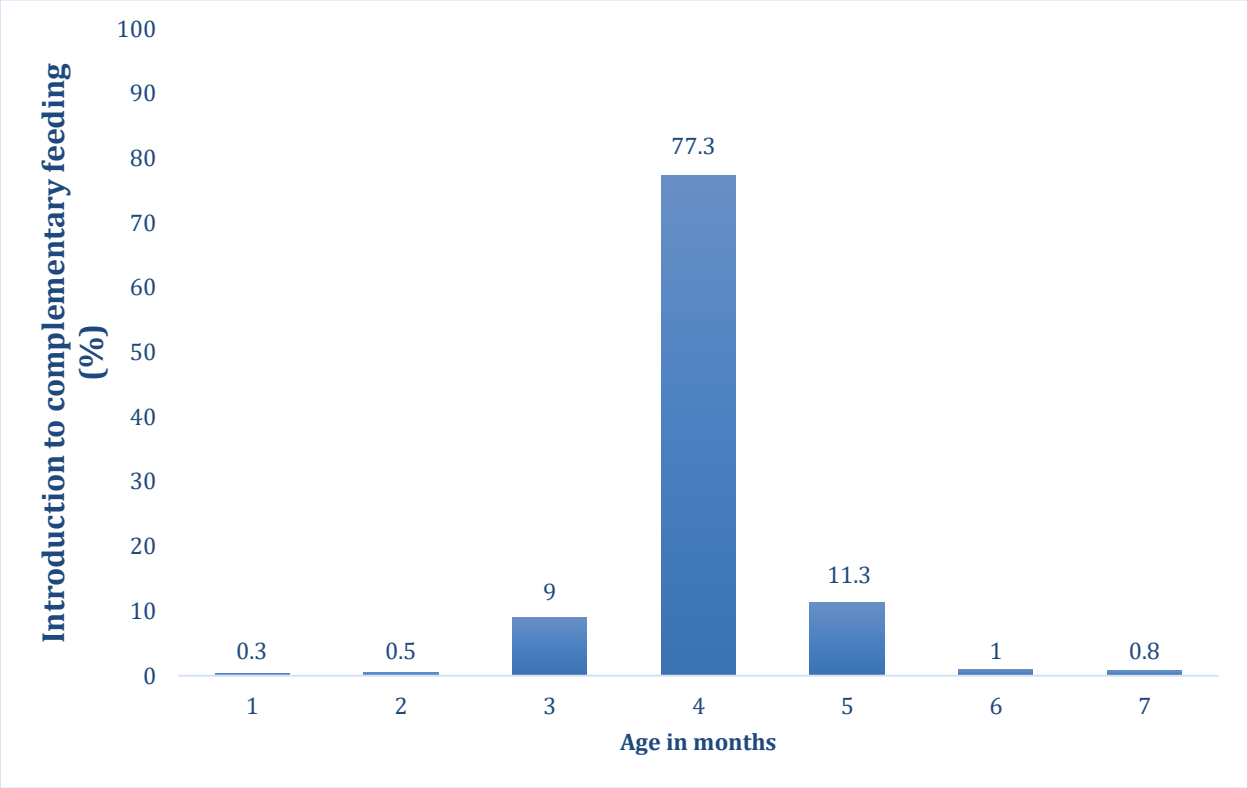

Figure 4.1: Introduction to complementary feeding (%)

4.4.2 Minimum meal frequency

Feeding frequency based on the breastfeeding status of a child 6-23 months is an important indicator of infant and young child feeding practices and an important aspect in complementary feeding. The WHO indicator for this variable was based on the breastfeeding status of the child of children 6–23 months of age. Breastfed infants 6–8 months old should receive solid, semi-solid, or soft foods 2 times per day inclusive of snacks. Whereas those who are not breastfed should receive these foods 3 times per day inclusive of snacks. Breastfed children 9–23 months old should eat semi-solid and or soft foods 3 times per day and those who are non-breastfed 4 times per day inclusive of snacks for non-breastfed children 6–23 months (WHO, 2007). Majority of the breastfed children 6-8 months old and 9-23 months old had attained the recommended minimum

meal frequency of 2 times and 3 times per day at 90.2% and 86.4%, respectively. Among the non-breastfed children 6-23 months old, those who had attained the minimum meal frequency were 83% (Table 4.6).

Table 4.6: Minimum meal frequency

Age in months	**N=405**	
	Frequency of feeding	**n (%)**
Breastfed children (N=347)		
6-8 months (n=82)	>2 times	8 (9.8%)
	2 times	74 (90.2)
9-23 months(n= 124)	3 times	229 (86.4%)
	<3 times	36 (13.6%)
Non breast-fed children (N=56)	<4 times	9 (17%)
6-23months(n=56)	≥4 times	44 (83%)

4.4.3 Consumption of iron-rich foods and vitamin-A rich fruits and vegetables

Consumption of vitamin A rich foods and iron rich foods are important in the overall growth and health of a child. Based on a food frequency assessment, children who had eaten paw paws, water melon, avocado, *sukuma wiki*, spinach, carrots and cowpeas leaves were considered to have taken vitamin A rich fruits and vegetables while those who had taken flesh meats (meat, fish, poultry and liver/organ meats) and green leafy vegetables had taken iron rich foods. Nearly two quarter (37.8%) of all the children had consumed vitamin A rich fruits and vegetables. Higher percentages were reported in the age of 18-23 months (55.2%), followed closely by children aged 11-17 months

(43.3%). The least was among children aged 6-11 months (22.6%) (Table 4.7). Vitamin A is an essential micronutrient for immune system and its deficiency can lead to severe illness and slow recovery from illness in children (United Nations Children's Fund, 2005). In this study iron source was considered as flesh meats (WHO, 2007). Its consumption was low as only (31.3%) of all the children had consumed. Children aged 6-11 months had the least consumptions (22.6%) of iron rich food, (43.3%) of the children aged 12-17 months and (55.2%) of the children aged 18-23 months had consumed iron rich foods (Table 4.7). Iron is an essential micronutrient that plays a critical role in many cellular functions and processes, including growth and development and that infants have smaller iron stores at birth which are depleted after 6 months (WHO, 2002).

Table 4.7: Consumption of vitamin A rich foods and iron rich foods

Children aged 6-23 months	**N=405**	
	n (%)	**n (%)**
Children 6-23 months (N=404)	**Iron-rich foods**	**Vitamin A-rich Foods**
Children 6-11 **months** (N=168)		
Consumed	38 (22.6%)	68 (40.5%)
Not consumed	130 (77.4%)	100 (59.5%)
Children 12-17 months (N=127)		
Consumed	55 (43.3%)	37 (29.1%)
Not consumed	72 (56.7%)	90 (70.9%)
Children 18-23 months (N=105)		
Consumed	58 (55.2%)	20 (19.0%)
Not consumed	47 (44.8%)	85 (81.0%)
Children 6-23 months (N=404)		
Consumed	151 (37.8%)	125 (31.3%)
Not consumed	249 (62.2%)	275 (68.7%)

4.4.4 Minimum dietary diversity

The consumption of a diverse diet suggests a possibility of a child to having taken a balanced diet which is an important aspect in the child's nutritional status. Minimum dietary diversity was established based on the number of food groups the index child consumed in the previous 24 hours prior to the data collection. Seven food groups as recommended by WHO (2007) were considered in the study. The food groups were: i) cereal, cereal products and tubers; ii) legumes and nuts; iii) dairy products; iv) meat and animal products; v) eggs; vi) vitamin A rich fruits and vegetables and vii) other fruits and vegetables. Majority of the children (97.5%) had eaten food prepared from cereal, cereal products and tubers. The intakes of vitamin A rich fruits and vegetables were 31.2%, iron rich foods intakes (flesh meats) was 37.8% while the consumption of other fruits was relatively higher (79.3%). Consumption of proteins was highest from milk products (94%), and lower in eggs (38%) and least for legumes (26.3%) (Figure 4.2).

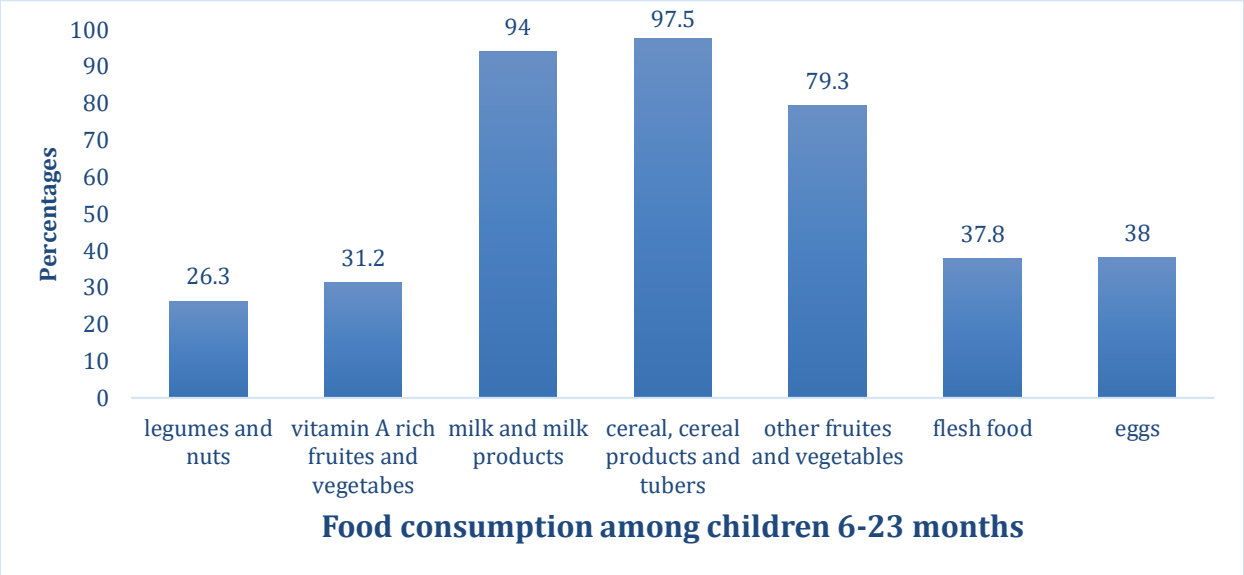

Figure 4.2: Food consumption among children 6-23 months

Children of 6–23 months of age both breastfed and non-breastfed who receive foods from 4 or more food groups are considered to have a diverse diet (WHO, 2007). Hence a minimum dietary diversity score was determined where three quarters (75.0%) of the children had received food from the four food groups and above with a mean (Standard deviation) dietary intake of 2.22 (0.82) (Table 4.8).

Table 4.8: Dietary diversity score for complementary feeding

dietary diversity score	**N=405**	
(children 6-23 months)	**N**	**(%)**
Children 6-23 months		
<4 food groups	100	25
≥4 food groups	300	75
Mean dietary diversity score (sd)	**2.22 (0.82)**	
children 6-11 months		
<4 food groups	63	37.5
≥4 food groups	105	62.5
Children 12-17 months		
<4 food groups	27	21.3
≥4 food groups	100	78.7
Children 18-23 months		
<4 food groups	10	9.5
≥4 food groups	95	90.5

4.5 Nutritional status of the children

4.5.1 Stunting (height-for-age) based on Z scores

Height-for-Age index is an indicator of linear growth retardation and cumulative growth deficits. Children who are below the -2 SD or – 2 Z-scores are considered short for their age (stunted) and are chronically malnourished, while children who are below -3 Z-scores are considered severely stunted (WHO, 2006). Stunting reflects failure to receive adequate nutrition over a long period of time and is also affected by recurrent chronic illness. In this study, 10% (95% C.I = 7.4 - 13.3%) of all the children were stunted with more boys 13.5 % (95% C.I. = 9.6 - 18.6%) than girls 5.6 % (95% C.I. = 3.1 - 10.0%) stunted. About one-tenth 7.5 % (95% C.I. = 5.3 - 10.5%) were moderately stunted, while 2.5 % (95% C.I. = 1.4 - 4.5%) were severely stunted (Table 4.9).

Table 4.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 401	**Boys** n = 222	**Girls** n = 179
Prevalence of stunting (<-2 z-score)	(40) 10.0 % (7.4 - 13.3 95% C.I.)	(30) 13.5 % (9.6 - 18.6 95% C.I.)	(10) 5.6 % (3.1 - 10.0 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(30) 7.5 % (5.3 - 10.5 95% C.I.)	(20) 9.0 % (5.9 - 13.5 95% C.I.)	(10) 5.6 % (3.1 - 10.0 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(10) 2.5 % (1.4 - 4.5 95% C.I.)	(10) 4.5 % (2.5 - 8.1 95% C.I.)	(0) 0.0 % (0.0 - 2.1 95% C.I.)

n=number, C.I = confidence intervals

4.5.2 Wasting (weight-for-height) based on Z scores

Wasting describes the current or short-term nutritional status due to inadequate dietary intake or recent episodes of illness causing loss of weight and the onset of malnutrition. Wasting is also referred to as acute malnutrition. Children whose weight- for- height is below -2 SD or -2 Z-score are considered thin or wasted and are acutely malnourished while children whose weight-for-height is below -3 SD or below -3 SD are considered severely wasted (WHO, 2006). The global wasting rate in this study was 22.9 % (95% C.I.=19.1 - 27.3%) with more boys 24.3 % (95% C.I. = 19.1 - 30.4%) than girls 21.2 % (95% C.I.=15.9 - 27.8%) wasted. About 19.2 % (95% C.I.=15.6 - 23.3%) of the children, were moderately wasted and 3.7 % (95% C.I.=2.3 - 6.1%) were severely wasted (Table 4.10).

Table 4.10: Prevalence of wasting based on weight-for-height z-scores by sex

	All n = 401	**Boys** n = 222	**Girls** n = 179
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(92) 22.9 % (19.1 - 27.3 95% C.I.)	(54) 24.3 % (19.1 - 30.4 95% C.I.)	(38) 21.2 % (15.9 - 27.8 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(77) 19.2 % (15.6 - 23.3 95% C.I.)	(43) 19.4 % (14.7 - 25.1 95% C.I.)	(34) 19.0 % (13.9 - 25.4 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(15) 3.7 % (2.3 - 6.1 95% C.I.)	(11) 5.0 % (2.8 - 8.7 95% C.I.)	(4) 2.2 % (0.9 - 5.6 95% C.I.)

4.5.3 Underweight (weight-for-age) based on Z-scores

Weight for age is a composite index of height- for-age and weight- for- height. It takes into account both acute and chronic malnutrition. Children whose weight for age are below-2SD or below -2 Z scores are considered underweight while children who are below -3SD of the Z-score are considered severely underweight. In this study 19.2 % (95% C.I.=15.6 - 23.3%) of the children were underweight, whereas higher percentages of boys 21.6 % (95% C.I.=16.7 - 27.5%) than girls 16.2 % (95% C.I.=12.7 - 19.9%) were underweight. About, 16.0 % (95% C.I.=9.8-17.7%.) of all the children were moderately underweight while 33.2 % (95% C.I.=1.9 - 5.5%) were severely underweight (Table 4.11).

Table 4.11: Prevalence of underweight based on weight-for-age Z-scores by sex

	All n = 401	**Boys** n = 222	**Girls** n = 179
Prevalence of underweight (<-2 z-score)	(77) 19.2 % (15.6 - 23.3 95% C.I.)	(48) 21.6 % (16.7 - 27.5 95% C.I.)	(29) 16.2 % (11.5 - 22.3 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(64) 16.0 % (12.7 - 19.9 95% C.I.)	(37) 16.7 % (12.3 - 22.1 95% C.I.)	(27) 15.1 % (10.6 - 21.1 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(13) 3.2 % (1.9 - 5.5 95% C.I.)	(11) 5.0 % (2.8 - 8.7 95% C.I.)	(2) 1.1 % (0.3 - 4.0 95% C.I.)

4.6 Morbidity prevalence among the children aged 6-23 months old

The infant morbidity status was determined based on a two-week recall by the mother. Slightly more than two quarters (60.2%) of the infants were reported to have been sick. Of those infants reported to have been sick, 50.6% had diarrhea, 28.6% suffered from vomiting, 5% had malaria, 9.5% had acute respiratory infections (ARIs) defined as colds, cough and difficulty in breathing; while 6.3% had skin infections (Table 4.12). Majority (83%) of mothers sought assistance when their children were sick mainly from public health facilities (53.6%) (Table 4.12).

Table 4.12: Child morbidity

Child morbidity	**N=405**	
	Frequency	**(%)**
Children sick in the past two week	**(N=241)**	**60.2**
Prevalence in common illness		
Diarrhea	122	50.6
Vomiting	69	28.6
Malaria	12	5
Fever, cough, difficulty in breathing	23	9.5
Skin infections	15	6.3
Assistance sought when child was sick (N=200)	**(N=200)**	**83**
Private clinic/Pharmacy	63	32.1
Public clinic	105	53.6
Community health worker	18	9.2
Others	10	5.1

Others- Tradition healers, CHWs, mobile clinics and local herbs

4.6.1 Household water utilization, sanitation and hygiene

Almost all (40.3%) the households reported to have been drinking tap water. Treatment of water before drinking was done by more than a quarter (31.5%) of the households and least through boiling (28.2%). Virtually all (100%) had access to a toilet facility with slightly below three quarters (60.3%) using traditional toilet. More than quarter of the respondents reported to have been washing their hands at the most critical times which are: after defecation/visiting the toilet (58.8%); before feeding the child (69.3%); before eating (79%) and before preparing food (31.8%) (Table 4.13).

Table 4.13: Household water consumption, hygiene and sanitation

Household water consumption, hygiene and sanitation:	**N=405**	
	N	**(%)**
Main source of drinking water:		
Tap water	161	40.3
Water treatment before drinking	126	31.5
Boiling	113	28.2
Access to toilet facility:		
Traditional toilet	246	61.3
Flush toilet	77	19.5
None bush	43	10.7
Digging hole	34	8.5
Hand washing:		
After defecation/visiting toilet	235	58.8
Before feeding the child	277	69.3
Before eating	319	79.8
Before preparing food	127	31.8

4.7 Factors associated with Complementary feeding practice

4.7.1 Relationship between complementary feeding practices and socio- economic and demographic factors

Demographic factors: sex of the child, mother's age and marital status, mother's education level, mother's occupation, main source of income for the household and their association with mother's complementary feeding practices was determined. Complementary feeding practices were determined by the following indicators: minimum meal frequency and minimum dietary diversity whereas introduction of solids, semi-solids and soft foods was left out since nearly all infants 6-8 months old had been introduced to complementary foods appropriately as recommended (WHO, 2007). Chi-square tests showed no significant associations between mother's complementary feeding practices and all the socio economic and demographic factors (Table, 4.14).

Table 4.14: Relationship between socio- economic and demographic factors and mothers complementary feeding practices

Characteristic N=405	Complementary feeding practices	Chi-square test; p value
Sex of the child	Frequency of feeding	**0.000***
	Minimum dietary diversity	**0.000***
Mother's age	Frequency of feeding	**0.097**
	Minimum dietary diversity	**0.493**
Mother's marital status	Frequency of feeding	**0.324**
	Minimum dietary diversity	**0.393**
Mother's education level	Frequency of feeding	**0.166**
	Minimum dietary diversity	**0.167**
Mother's occupation	Frequency of feeding	**0.409**
	Minimum dietary diversity	**0.073**
Household's source of income	Frequency of feeding	**0.111**
	Minimum dietary diversity	**0.003***

*Significant relationship at p-value <0.05

4.7.2 Relationship between mothers' knowledge and complementary feeding practices

Complementary feeding practices were investigated against mother's knowledge on complementary feeding (categorized into high, average and low knowledge). A chi-square test showed no significant relationship between mother's knowledge on complementary feeding and complementary feeding practices; minimum dietary diversity and minimum meal frequency (p-value=0.2 and p-value=0.5, respectively) (Table 4.15).

Table 4.15: The association between mother's knowledge on complementary feeding and complementary feeding practice

	N=405			
	Mothers' knowledge on complementary feeding			
Complementary feeding practices	**Low knowledge on CF**	**Average knowledge on CF**	**High knowledge on CF**	**Chi – square (p-value)**
	F(%)	**F(%)**	**F(%)**	
Minimum dietary diversity				
<4 food groups(n=60)	11(31.4)	50(21.5)	39(29.5)	0.151
≥4 food groups(n=226)	24(68.6)	183(78.5)	93(70.5)	
Minimum meal frequency				
< 2 times (n=264)	16(45.7)	91(39)	149(37.2)	0.450
≥ 3 times (n=22)	19(54.3)	142(61)	251(68.2)	

*****Significant relationship at p-value <0.05

4.7.3 Relationship between mother's knowledge on complementary feeding and child nutritional status

Mother's knowledge on complementary feeding practices based on 20 questions was computed and its association with child nutritional status investigated. A chi-square test showed a significant relationship between mothers‟ knowledge on exclusive breastfeeding and underweight and wasting status of their children (p=0.030 and p=0.001, respectively). Mothers who were not knowledgeable on exclusive breastfeeding for six months were more likely to have underweight and/or wasted children than the mothers who were knowledgeable on exclusive breastfeeding for six months.

Mothers who responded positively on feeding bottles as appropriate for feeding non-breastfed children were more likely to have underweight and/or wasted children (chi-square test; p=0.744 and p=0.002 respectively) than those who responded negatively (Table 4.16). There was no significant relationship between all the others aspects of mother's knowledge on complementary feeding and child nutritional status.

Table 4.16: Significant relationship between mother knowledge on complementary feeding and child nutritional status

Knowledge aspects on complementary feeding	N=405 Child nutritional status			Chi-square p-value
		Wasting		
Infants exclusively breastfeed for the 1st 6 months of life	Yes response	Wasted 78(22.9%)	Normal 263(77.1%)	0.001*
	No response	13(22%)	46(78%)	
		Underweight		
Infants exclusively breastfeed for the 1st 6 months of life	Yes response	Underweight 60(17.6%)	Normal 281(82.4%)	0.030*
	No response	17 (28.9%)	42(71.1%)	
		Wasting		
Feeding bottles are appropriate for feeding non-breastfed children	Yes response	Wasted 77(24%)	Normal 243(76%)	0.002*
	No response	14(17.5%)	66 (82.5%)	

*Significant relationship at p-value <0.05

4.7.4 Relationship between mothers' complementary feeding practices and child nutritional status

Relationships between child nutritional status (wasting, underweight and stunting) and complementary feeding practices in terms of minimum dietary diversity, minimum meal frequency and consumption of iron rich foods and vitamin A were investigated. Timely introduction of complementary foods (consumption of solid, semi-solid and soft foods for children 6-8 months old) and its association with child nutritional status was not investigated since nearly all (98.4%) the children aged 6-8 months had consumed a solid, semi-solid and soft food.) A chi-square test revealed a significant relationship between minimum dietary diversity, iron rich foods and underweight (p=0.002and p=0.057), respectively). Children who had consumed fewer meals in a day than recommended by WHO were more likely to be wasted and underweight than those who

were fed the minimum meal frequency as WHO recommendations (Table 4.17). There was no significant relationship between minimum meal frequencies, vitamin A composed foods and child nutritional status.

Table 4.17: The association between mothers' complementary feeding practices and child nutritional status

	N=405		
Mothers complementary feeding practices	**Child nutritional status**		**Chi-square p-value**
	Underweight		
Minimum dietary diversity	Underweight	Normal	
Achieved	48(16%)	252(84%)	0.002*
Not achieved	29(29%)	71 (71%)	
	Underweight		
Iron-rich foods	Underweight	Normal	
Consumed	21 (14%)	130 (86%)	0.057*
Not Consumed	56 (22.5%)	193(77.5)	

*Significant relationship at p-value <0.05

4.7.5 Intake of selected nutrient in among 6-23 Months old Children Attending Gambool Mother and Child Health Centre

Male children had a mean energy intake of 1,091.13kcal compared to females at 1,079.28 kcal. There was no significant association between energy intakes of females and males (p=0.93). The protein intake was also high among the girls (31.3g) than their female counterparts at 32.8%. The Zinc levels were higher for male than female at 3.54mg and 3.49mg, respectively. No significant association was observed between intakes of protein (p=0.84) and Zinc (p=0.95) between the males and females. Females had higher intakes of Vitamin C and iron and the males on the other hand had higher intakes of Vitamin A and Folate compared to their females' counterparts and. There was also no significant association observed for the intakes of Vitamin A, Folate and Iron at (p=0.65, p=0.88, p=0.45) (Table 4.18).

Table 4.18: Intake of selected nutrient in among 6-23 Months old Children Attending Gambool Mother and Child Health Centre

Nutrient taken	Mean ± SD	P-value
Energy (Kcal)		0.93
Male	1,091.13±899.04	
Female	1,079.28 ±973.40	
Protein (g)		0.84
Male	32.80±40.41	
Female	34.12±47.41	
Vitamin A retinol-met (µg)		0.65
Male	136.78±326.28	
Female	115.97±286.74	
Vitamin C (mg)		0.88
Male	27.06±54.76	
Female	28.30±58.23	
Folate (µg)		0.45
Male	126.85±132.45	
Female	113.76±96.55	
Iron		0.11
Male	30.73±139.43	
Female	84.61±305.59	
Zinc (g)		0.95
Male	3.54±4.70	
Female	3.49±6.26	

CHAPTER FIVE: DISCUSSION

5.1 Undernutrition

Undernutrition is estimated to be associated with 2.7 million child deaths annually or 45% of all child deaths. Infant and young child feeding is a key area to improve child survival and promote healthy growth and development. The first two years of a child's life are particularly important, as optimal nutrition during this period lowers morbidity and mortality, reduces the risk of chronic disease, and fosters better development overall (WHO 2006). There is limited scientific data on complementary feeding knowledge and its factors to the nutritional status of children aged 6-23 months old in Garowe in Somalia. Most of the studies have focused on breastfeeding practices while few studies focused on complementary feeding.

To improve infant and young child feeding practices, maternal factors in complementary feeding knowledge is considered keys. This study was carried out in an urban setting, among 404 mothers/caregivers and their children 6-23 months of age randomly selected from Gambool Health Centre. The study adopted a cross -sectional a study design to investigate the Factors in complementary feeding knowledge, perception and practices among children 6-23 months of age in Garowe district, Puntland state of Somalia

5.2 Socio-demographic and economic characteristics of mothers/caregivers of children 6-23 month

Majority of mothers were young with low levels of education and were housewives. These findings are comparable to those by Murage *et al.,* (2011) and Ochola (2008) conducted in Jigjiga town.

Education is one of the most important resources that enable women to provide appropriate care for their children, which is an important determinant of children's growth and development (Engle *et al*., 1996). Working outside the home is associated with early complementary feeding and cessation of breast feeding (Abbi et al., 1991). In the present study, low levels of education may have probably contributed to most of the mothers being housewives. A mother who spends most of the time at home with her child may be available to practice optimal feeding practices on her child (Leslie, 1998).

The major source of income for most households in this study was casual labor. Mothers reported that the household income was not adequate to provide for food and other necessities. The low incomes may therefore have contributed to the majority of the household's inability to achieve minimum meal frequency for the non- breastfed and minimum dietary diversity for the children.

5.3 Complementary feeding practices

5.3.1 Breastfeeding practices

In this study, almost all the children had been breast fed and this compares with UNICEF figures as reported in Somali infant and young child nutrition assessment report (2009) and by (Rahman *et al.*, 2018) This was also expected given that culturally Africans breastfeed their children. During complementary feeding, for infants and young children aged 6-23 months old, breastfeeding contributes significantly to the overall nutrient intake, fills most of the energy needs and remains an important source of vitamin A and C, as well as essential fatty acids and can provide to their total energy needs (Mukuria, *et al* 2006).

5.3.2 Timely introduction to solids, semi-solids and soft foods

The mothers introduced complementary feeding foods to their children timely; all the children 6-8 months had been appropriately introduced to solids, semi-solid and soft foods. This finding compares to those of in Mogadishu, Somalia (Mohamed, I. I. (2019) where all the children of this age had been introduced to complementary feeding. At the age of 6 months, an infant's need for energy and nutrients starts to exceed what is provided by breast milk, thus complementary foods are necessary to meet energy and nutrient requirements, (WHO, 2006b) and if complementary foods are not introduced when a child has completed 6 months of age, an infant's growth may falter (WHO, 2001).

Minimum dietary diversity

Dietary diversity has long been recognized as a key element of high-quality diets and increasing the variety of foods consumed is thought to ensure adequate intake of essential nutrients and thus promote good health and nutrition (Hatloy *et al.,* 1998). Majority of the children had eaten food prepared from grains, tubers and roots like porridge, rice, bread, potatoes. This is comparable to the Somalia national figures as reported in Somalia Demographic Health Survey (SDHS 2020) and in Butembo-Democratic Republic of Congo. This can be related to the fact that being a low-income community, the mothers would go for the cheaper foods which are usually grains/roots/tubers and their products and the fact that cereals form the staple food of any community. Porridge was also taken by almost all the children in this study since this is a common complementary food. Other studies have also reported the same findings; (Mbagaya, 2009) a study in the rural western Kenya and (Kumudha *et al.,* 2010) a study conducted in Utter Pradesh.

Consumption of iron-rich foods (flesh meats) was low. Being a resource poor community, foods of animal origin are most likely out of the financial reach for the majority of the households. The consumption of proteins was highest from dairy products mostly milk, concurring with the study findings by Hellen Keller International, (2010) in Batudu District of Nepal and Ekesa *et al.*, (2011) in Gitega (Burundi) and Butembo (Democratic Republic of Congo).

Minimum meal frequency

In this study majority of the non-breastfed children attained minimum meal frequency unlike their counterparts, the breastfed children. Frequent meals are required to ensure the child receives enough energy (PAHO/WHO 2003). In this study, over half of the mothers knew that children should be fed based on hunger cues which could be one of the influences on their feeding frequencies since some children may not necessarily show hunger cues.

Mothers/caregivers knowledge and perceptions on complementary feeding

Appropriate complementary feeding depends on accurate information and skilled support from the family, community and healthcare system. Inadequate knowledge on appropriate food and feeding practices is often a greater determinant of malnutrition than the lack of food thus significantly affecting the nutritional status of children (Sethi, *et al.*, 2003).

Almost all the mothers were knowledgeable on the duration of exclusive breast feeding, correct timing of introduction of complementary foods and duration of breastfeeding. The knowledge level on breastfeeding and the recommended duration of breastfeeding was lower comparable to the findings of mothers in Korogocho slums (Kipruto, 2013). UNICEF and WHO recommendations

stipulate that child be exclusively breastfed fed for 6 months and that breast feeding continues for two years and beyond (WHO, 2006a). Mother‟ knowledge on complementary food frequency, was that children should be fed based on hunger cues, ideal complementary feeding practices comprises of adequate meal frequency depending on whether the child is breasting (WHO, 2001). Majority of the mothers were aware of the importance of enriching complementary foods and providing a diverse diet to their children. This is an important aspect in the infant and young child feeding practice as evidenced in Korogocho slum (Kipruto, 2013).

Mothers did not know the correct flours for making child porridge as indicated in the National strategy on infant and young child feeding 2007-2010 (MOPHS, 2007-2008) that there is wide spread use of inappropriately constituted cereal and legume mixes in Somalia.

Hygienic practices during food preparation and feeding are critical for prevention of gastrointestinal illness (WHO, 2001). Mothers were knowledgeable on treating drinking water given to their children, but few of them thought washing of hands especially after returning from outside the house and after handling garbage was important. This trend can be closely related to their low levels of education and may be more on the scarcity of water in urban areas. Mothers reported challenges in obtaining water because it was scarce (water rationing in Garowe town) and expensive (S.Shs 10K per 20 liters).

Morbidity prevalence among the children

Morbidity burden was high with diarrhea and vomiting, being common in the study area which was comparable to studies by Moursi *et al.,* (2008) and Bhandari *et al.,* (2004) in urban areas in Madagascar and India respectively. High prevalence of morbidity especially diarrhoea and

vomiting may be due to the fact that very few households treated drinking water and the unhygienic environment in the slum.

The nutritional status of the children

Stunting rates of this study were lower than the national figures in children under five years. This was possibly because the study considered children aged 6-23 months old and also the fact the stunting rates increases with child age. Wasting was higher than the national figure. Underweight compared well with the national figure but was double the prevalence of underweight children in Puntland region. However, underweight prevalence was similar to underweight rates in Mogadishu as reported in SDHS.

Relationship between mother's knowledge and complementary feeding practices

A mother who is not knowledgeable on various aspects of complementary feeding is more likely to have a malnourished child (Sommerfelt *et. al*., 1994*).* In this study, mother's knowledge on complementary feeding practices was not related to feeding practices in terms of minimum meal frequency and minimum dietary diversity. This is in disagreement with the findings of a study conducted in Korogocho slum in which mother's knowledge on complementary feeding practices was related to minimum dietary diversity and minimum meal frequency (Kipruto, 2013). Hence the study's null hypothesis that there is no significant relationship between mother's knowledge on complementary feeding and her practices in complementary feeding for children aged 6-23 and the hypothesis rejected.

5.4 Relationship between mother's knowledge on complementary feeding and child nutritional status

Mother's nutritional knowledge is considered to have a great impact on the infant's nutritional status as she has the capacity to take diet related conscious decisions (Foote and Marriot, 2003). However, a combination of mothers" self-perception, assessment of infant's well-being, culture; food availability and financial status influence the actual complementary feeding, hence child nutritional status (Sellen, 2001). In the present study, mother's knowledge was related to child nutritional status. Mothers who knew the Infants exclusively breastfeed for the 1st 6 months of life were less likely to have Wasting children hence the rejection of the study null hypothesis that there is no significant relationship between mother's knowledge on complementary feeding and the nutritional status of their children aged 6-23 months.

5.5 Relationship between mothers' complementary feeding practices and child's nutritional status

Meeting the minimum dietary diversity and iron rich food consumption with better nutritional status of children. Several studies have shown a positive relationship between complementary feeding practices and child nutritional status. A recent study by (Kipruto, 2013) found that non-attainment of the minimum dietary diversity was a predictor of wasting in children 6-23 months. This study found a relationship between the minimum dietary diversity and child nutritional status (underweight).

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1Conclusions

The population comprises of young mothers with low levels of education and low socio-economic status. Maternal knowledge on complementary feeding is on the whole appropriate, however, there are gaps in appropriate feeding of the sick children and the appropriate use of mixed flours for making children's porridge.

Complementary feeding practices were satisfactory; in terms of introduction of solids, semi-solids and soft foods to children 6-8 months and minimum meal frequency especially for the breastfed children. Dietary diversity is low because of the limited socio-economic capability of the respondents to purchase a variety of foods. The prevalence of under-nutrition is still high among the children and is influenced by maternal knowledge on complementary feeding practices and also the complementary feeding practices.

6.2 Recommendations

6.2.1 Recommendations for policy and practice

i. Messages on the promotion of appropriate IYCF practices by the Ministry of Health and other organizations dealing with child health should emphasize: appropriate feeding of the sick child and those recovering from illness; the importance of dietary diversity and frequency of feeding especially for non-breastfed children, to improve child's growth and health.

ii. The Ministry of Health and Organizations involved in child health issues should explore factors which influence mothers' knowledge on complementary feeding hence child

nutritional status with a view of taking appropriate action to improve complementary feeding practices.

iii. Positive cultural beliefs on complementary feeding practices should be encouraged and negative ones discouraged.

6.3.2 Recommendations for further research

i. This study was done in an urban poor-resource setting among mothers recruited from a health facility and therefore the findings may not be representative of mothers from such a setting. It is therefore recommended that a similar study in a community setting be conducted to triangulate the findings of this study.

ii. There is need to conduct a longitudinal study to establish the whole array of factors that influence complementary feeding practices and over a period of time since this study only focused on mothers' knowledge and socio-economic factors.

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APPENDICES

APPENDIX1: QUESTIONNAIRE

Knowledge and Practices Associated with Complementary Feeding among Young Children attending Gambool Health Centre, Garowe District, Puntland State, Somalia.

[This questionnaire is designed for all children in the household who are more than 6 months (24 completed weeks) and less than 24 months of age. This includes other children from the same mother as well as children from other caregivers in the same household. Once you have completed the survey for one child, use a separate form for each and every other child less than 24 months of age who lives in the same household.]

ADMINISTRATIVE DETAILS

Date: _____ / _____ / 2019 *Day month*	Household Number
Questionnaire identity number	Team leader
Team number	Questionnaire checked by
Village name	

Background

[Make every effort to speak with the mother. If she is not available, speak with the primary caregiver responsible for feeding of the child.]

Are there any children in the household who are more than 6 months and less than 24 months of age? If YES, identify the mother/primary caregiver and continue:

SECTION A: HOUSEHOLD DEMOGRAPHIC AND SOCIO-ECONOMIC DATA

NB: The word _mother' refers to biological mother of the child or the primary caregiver of the child

[INSRUCTIONS ON HOW TO RECORD ANSWERS: Circle the number corresponding to the response that a mother gives. Record the appropriate response in areas where choices have not been given. All 'Any other' responses should be specified]

#	QUESTION	RESPONSES	CHOICES
A1	Sex of household head	Male Female	1 2
A2	Age of mother Marital status	…..……..Years	
A3	Marital status	Single Married Separated Widowed	1 2 3 4
A4	Occupation of household head (skip to A6 if the mother is the household head)	Not employed Employed (salaried) Small scale trading Casual labour Any other (specify)	1 2 3 4 5
A5	Occupation of mother	Not employed/house wife Employed (salaried) Small scale trading Casual labour Any other (specify)	1 2 3 4 5
A6	Education level of the household head	No education Primary Secondary Tertiary	1 2 3 4
A7	Household size (people who usually eat from the same pot)	…….. people	
A8	How many children do you have?	…….. children	
A9	How many children are below 5 years of age?	…….. children	
A10	Main source of family income	Formal employment Casual labour Small scale business	1 2 3

		Any other (specify)	4
A11	How is food obtained in the family? *[Probe for all responses]*	Farming Buying Food aid/donation Any other (specify)	1 2 3 4
A12	Who has the primary responsibility of providing food for the household?	Father Mother Grandparent Relatives Any other (specify)	1 2 3 4 5
A13	What is the estimated percentage of household income that is allocated to food?	Largest percentage Medium percentage Smallest percentage No specific allocation	1 2 3 4
A14	Who usually decides how family income is used?	Husband/Partner Wife/mother	1 2

		Any other (specify)	3
A15	Who usually decides on what food to be cooked each day in the household?	Husband/Partner Wife/mother Any other (specify)	1 2 3

SECTION B: CHILD'S DATA

[If there is more than 1 child 6-23 months in the household, identify each child's mother or primary caregiver starting with the youngest and arrange to interview her once. Section A of the interview schedule is completed. After you have completed the questionnaire for the first child, repeat from section B of interview schedule for the 2nd child, substituting the correct NAME for this child.]

[The household number (B1) must be the same for those children who are from the same household]

	QUESTION	**RESPONSES**	**CHOICES**
B1	Household Number	……..	
B2	Child Number	……..	
B3	What is your child's name? *[Use this NAME in remaining questions]* Please get his/her card	……..	
B4	Sex of the child	Male Female	1 2
B5	Child's date of birth *[If there is no documentary source,* *probe using memorable dates /calendar* *of events until a mother provides the* *most accurate answer]*	Date: _____ / ____/ 2019 *Day……..* *month……..*	
B6	Source of birth date	Child health card Mother/caregiver Any other source (specify)	1 2 3
B7	Order of birth of the child	……..	

SECTION C: CHILD'S ANTHROPOMETRIC DATA

	ANTHROPOMETRIC MEASUREMENT	**FINDINGS**
C1	Weight of the child *(to the nearest 0.1gms)*	……..kgs
C2	Length of the child (to the nearest 0.1 cm)	……..……cms

SECTION D: CHILD MORBIDITY IN THE LAST TWO WEEKS

	QUESTION	RESPONSES	CHOICES	SKIP
D1	Has the child been sick in the past 2 weeks?	Yes No	1 2	E1
D2	If Yes which? *(More than one response possible)*	Diarrhoea Vomiting Fever with chills like malaria Fever, cough, difficulty in breathing Intestinal parasites Measles Eye infections Skin infections Accident Malnutrition Stomachache Tooth ache Other (Specify)	1 2 3 4 5 6 7 → 8 9 10 11 12 13	
D3	When the child was sick did you seek assistance?	Yes No	1 2	E1
D4	If YES Where? *(More than one response possible)*	Traditional healer Community health worker Private clinic/Pharmacy Shop/Kiosk Public clinic Mobile Clinic Relative or friend Local herbs NGO/FBO	1 → 2 3 4 5 6 7 8 9	

SECTION E: HOUSEHOLD WATER CONSUMPTION, SANITATION AND HYGIENE

	QUESTION	**RESPONSES**	**CHOICES**	
E1	What is your main source of drinking water?	River Water tap Boreh ole Unprotected well Protected well Tanke r Other (Specify)	1 2 3 4 5 6 7	
E2	Do you do anything to the water before drinking it? *(Probe for all responses)* *(More than one response possible)*	Boilin g Use traditional herbs Use chemicals Filters/Sieves Decan t Nothing done Others (Specify)	1 2 3 4 5 6 7	
E3	Does your house hold have access to a toilet facility?	Yes No	1 2	E5
E4	If YES, What type of toilet facility? *(Observe also)*	Bucke t Traditional pit latrine Ventil ated improved pit latrine Flush toilet Other (specify)	1 2 3 4 5	
E5	If NO, where do you go/use? (probe further)	Bush Open field Near the river Behind the house Other specify	1 2 3 4 5	
E6	How are children's faeces disposed? (*Observe*)	Dispo sed off immediately and hygienically	1	

		Not disposed (scattered in the compound)	2	
		Others (Specify)	3	
E7	At what occasions do you wash your hands (Multiple answers possible)	After defecation/visiting toilet	1	
		Before feeding the child	2	
		Before eating	3	
		Before preparing food	4	
		When I think they are dirty	5	
		When water is available	6	
		Other (Specify)	7	

SECTION F: CHILD FEEDING HISTORY

	QUESTION	RESPONSES	CHOICES	SKIP
F1	Did you ever breastfeed *[Name]*?	Yes	1	F3
		No	2	F2
		DNK	3	
F2	If No, why?	No milk	1	
		Did not want to breast Feed	2	F8
		Traditional beliefs (child will die)	3	
		Other (Specify)	4	
F3	If yes, how soon after birth did you put *[Name]* on the breast?	If less than an hour	00	
		If less than 24 hours record number of Hours	…..Hrs	
		If more than 24 hours record number of Days	…..Days	
		If mother does not know Record	88	
F4	During the first 3 days after delivery, did you give *[Name]* the fluid/liquid that came from your breasts?	Yes	1	
		No	2	
		DNK	3	
F5	Yesterday during the day or at night, did *[Name]* consumed breast milk from you	Yes	1	
		No	2	
		DNK	3	

	or someone else?			
F6	Are you still breastfeeding [Name]?	Yes No	1 2	F8
F7	If No how old was the child when you stopped breastfeeding?	.....months.		
F8	Was *[Name]* given any vitamin drops or other medicines as drops yesterday during the day or at night?	Yes No DNK	1 2 3	
F9	Was *[Name]* given ORS yesterday during the day or at night?	Yes No DNK	1 2 3	
F10	Was *[Name]* given Micronutrient sprinkles or Lipid based nutrient supplement yesterday during the day or at night?	Yes No DNK	1 2 3	

F11. Please describe everything that *[Name]* ate yesterday during the day or night, whether at home or outside the home.

[Keep probing 'Anything else?' until the respondent says 'nothing else.']

[If respondent mentions mixed dishes like a sauce or stew, probe: What ingredients were in that [MIXED DISH]? Probe: 'Anything else?' Until respondent says 'nothing else']

[If foods are used in small amounts for seasoning or as a condiment, include them under the condiments food group.]

[If a food recalled by the respondent is not listed in any of the food groups below, write the food in the box labeled 'other foods' at the end of this section.]

INSTRUCTIONS FOR RECORDING RESPONSES

As the respondent recalls each food, underline the food in the food group below.

Once the respondent tells you everything s/he remembers the child eating yesterday during the day or at night, look at each food group. If one or more foods in a food group are underlined, circle 'Y' in the column to the right.

Now return to the list of foods. Is there any food groups with no 'Y' circled? Read the entire list of food items in that line to the respondent. If s/he indicates that one or more of the foods has been given to the child, underline that food and circle 'Y.' if none of the foods has been given to the child, circle 'N.' if the mother does not remember or does not know, circle 'DNK.'

NB: Every line must have a code.

No	Question and filters	Codin g	categories(circle as applicable)		
			Yes	No	DNK
A	Porridge, bread, rice, noodles, or other foods made from Grains	A …	1	2	8
B	Pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside	B ….	1	2	8
C	White potatoes, white yams, cassava, or any other foods made from roots	C ….	1	2	8
D	Any dark green leafy vegetables	D …	1	2	8

E	Ripe mangoes, ripe papayas, or (insert other local vitamin A-rich fruits)	E ….	1	2	8
F	Any other fruits or vegetables	F….	1	2	8
G	Liver, kidney, heart, or other organ meats	G …	1	2	8
H	Any meat, such as beef, pork, lamb, goat, chicken, or duck	H …	1	2	8
I	Eggs	I….	1	2	8
J	Fresh or dried fish, shellfish, or seafood	J….	1	2	8
K	Any foods made from beans, peas, lentils, nuts, or seeds	K ….	1	2	8
L	Cheese, yogurt, or other milk products	L ….	1	2	8
M	Any oil, fats, or butter, or foods made with any of these	M ….	1	2	8
N	Any sugary foods such as sweets, chocolates, candies, pastries, cakes, or biscuits	N ….	1	2	8
O	Condiments for flavor, such as chilies, spices, herbs, or fish powder	O ….	1	2	8

P	Insects e.g termites	P ….	1	2	8
R	Other foods				

	QUESTION	RESPONSES	CHOICES
F12	How many times did *[Name]* eat solid, semi-solid or soft foods other than liquids yesterday during the day or at night? *[Small snacks and small feeds such as one* *or two bites of mother's or sibling's food should not be counted]*	[If caregiver answers 7 or more times, record 7] [If caregiver doesn't know, record 88]	**….times** DNK 88
F13	Did *[Name]* drink anything from a bottle with a nipple yesterday or last night?	Yes No DNK	1 2 3

SECTION G: MATERNAL KNOWLEDGE ON COMPLEMENTARY FEEDING PRACTICES G1. What is the importance of breastfeeding to a child?

_____

_____

_____

_____

G2. Do you believe that a baby can survive on breast milk alone without even water?

If YES, for how long? (Indicate in months)_____

If, NO, Why?

_____
_____
_____
_____
_____

G3. At what age in months should semi-solid, solid and soft foods be introduced to a child?

_____

_____
_____

Why should they be introduced at this time?

_____

_____

_____

G4. What are the risks of starting complementary feeding too late?

_____
_____
_____
_____

G5. How many times should a mother breast feed a child after 6 months?

_____
_____

G6. For how long should a mother breastfeed a child before stopping?

_____
_____
_____

G7. Is it essential for a child to consume a diverse diet? If yes why? And how many varieties of food a child should consume every day? *[Let the mother list the varieties]*

_____
_____

_____
_____

G8. How many times should you feed your child on complementary food each day?

_____
_____
_____
_____

G9. Why is it critical to ensure high standards of hygiene when preparing complementary feeds?

_____
_____
_____

G10. Is it important to enrich or make your child's food more energy and nutrient dense? (If YES or NO why?)

_____
_____
_____

G11. How do you prepare flour before you cook porridge for your child? (Probe on the importance of fermenting flour or germinating grain and dangers of mixing different types of flour)

_____
_____

_____

G12. What is your opinion about the inclusion of animal source food in a child's diet?

APPENDIX 2: ACTIVITY AND DATA ANALYSIS MATRIX

	Data/ Variables (Quantitative/Qualitative)	**Method**	**Tools**	**Analysis process/ statistical tests (SPSS).**
SO 1	To establish socio-demographic, ecologic and economic characteristics of the mothers having children 6-23 months of age	Interviews	Questionnaire	Mean, range (histogram, box plots and charts), X2, t-test, ANOVA, Bivariate analysis and correlation
SO 2	To assess mother's knowledge and perception and practices of complementary feeding in Garowe district	Interviews	Questionnaire/ FGD	Frequencies/percentage, correlation,
SO 3	To assess mothers' nutritional status, breastfeeding practices, access to health services and the typical daily activities of the mother.	Measurements	MUAC, height board, weighing scale	Percentages/ frequencies, ANOVA, regression, correlation

SO 4	To determine the household food security	Interviews	FFQ	Percentages and frequencies

APPENDIX 3: RECRUITMENT AND TRAINING OF FIELD ASSISTANTS

Training protocol for field assistants

Training Objectives

1. Toelaborate the objectives of the study to the enumerators.
2. To give enumerators brief summary of topic of study.
3. To provide them with practical skills of the questionnaire management.
4. To provide them with the consultation procedure.
5. To train the enumerators on the ethical considerations and keep away from getting emotional about information given by the subject.
6. To prepare enumerators on how manage the questionnaire.
7. To give details on data collection methods.
8. To make acquainted the recruited field assistants with the survey protocol.

Preparation to be done by the trainer

1. Organize for the proper hall/ under shade for the training to take place
2. To get ready the training curriculum which include among other sides subject material, duration of the sessions and training routines to be used e.g. brainstorming, lectures and discussion etc.
3. Preparation of training techniques such as , note books, pens, erasers, flipcharts, blackboard and questionnaire photocopying

Training protocol for field assistant on day one

Objectives	Activities	Time	Materials
To give a brief explanation on the overall objectives of the study	Lecture	30 minutes	Summarized handout Flipcharts, marker
To give a brief introduction of the topic	Lecture and discussion	2 hours	Pens,note books Pencils, erasers, papers
Snacks and coffee break		15 minutes	Wallets, sample
To familiarize the enumerators with every protocols and reaffirm on the importance of proper data collection.	Lecture, discussion and demonstrations	2 hours	questionnaires etc.
Lunch		1 hours	
To go through the questionnaire to be conversant.	Lecture and discussion	1 hour	
To equip the enumerators with interviewing techniques	Brainstorming, discussion, questions and answers and role playing	2 hours	

Training protocol for field assistant on day two

Objectives	Activities	Time	Materials
Recap from the previous day session.	Brief revisit the topics covered.	30 minutes	Summarized handout Flipcharts, marker Pens,note books Pencils, erasers, papers Wallets, sample questionnaires etc.
To edify ethical issues to be observed and after the study to ensure that subjects rights are protected.	Discussion and lecture.	1 hour	
To equip the enumerators with practical interviewing skills.	Demonstration and role playing	2 hours	
Lunch time		1 hour	
To equip the enumerators with practical interviewing skills.		3 hours	
To discuss practical constraints during the survey and experiences sharing	Discussion	1 hour	
Conclusion	Summing up for the actual survey scheduled for the next day	30 minutes	

APPENDIX 4: INFORMED CONSENT FORM

Introduction and consent form for a study on **Knowledge and Practices Associated with Complementary Feeding among Young Children attending Gambool Health Centre, Garowe District, Puntland State, Somalia.**

Investigator:

Hello, my name is _____and I am working in collaboration

with Abdisalan Mohamed Abdi from the University of Nairobi, Department of Food Science, Nutrition and Technology, Applied Human Nutrition Programme. I am conducting a research survey that seeks to determine **Knowledge and Practices Associated with Complementary Feeding among Young Children attending Gambool Health Centre, Garowe District, Puntland State, Somalia.**

Purpose

The information you provide will be only used to asses' the factors associated in complementary feeding practices and nutrition status of children 6-23 months of age in Garowe District, Puntland State of Somalia

Confidentiality

Information given will be kept confidential and used to prepare a dissertation which will not include any specific name. Reference numbers will be used to link you name and your answers without identifying you.

Benefits

The benefits of this study is that the information will be useful in knowing nutrition content of foods used for complementary feeding in Garowe District.

By signing or approving this consent indicates that you understand what will be expected of you and you are willing to participate in the survey.

May I begin now?

Signature of respondent _____

Signature of interviewer_____

Date_____