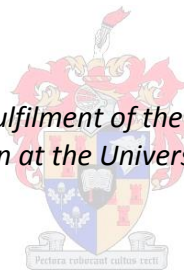


**COMPLEMENTARY FEEDING PRACTICES AND THE  
ANTHROPOMETRIC STATUS OF CHILDREN AGED SIX TO 23  
MONTHS AMONG THE PASTORALIST COMMUNITIES OF  
ISIOLO COUNTY, KENYA**

by

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## DECLARATION

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## ABSTRACT

**Introduction:** Adequate nutrition is vital to a child's development, with the period from pregnancy to two years of age being the most critical basis for future optimal growth, health and development. Current global public health recommendations on infant and young child feeding (IYCF) state that an infant should be exclusively breastfed for the first six months of life. Thereafter complementary foods should be introduced to the child's diet while they continue breastfeeding up to two years of age and beyond. Timing, type and quality are important considerations in complementary feeding, and if compromised, often result in malnutrition and mortality.

**Aim:** The aim of the current study was to determine complementary feeding practices and the anthropometric status of children aged six to 23 months among pastoralist communities of Isiolo County, Kenya.

**Methods:** Cross-sectional analytical study. Two-stage cluster sampling methodology was used to select a sample of 288 mother/caregiver-child pairs from pastoralist communities. The children were aged from six to 23 months. The mothers/caregivers were interviewed through a researcher-administered questionnaire. Weight and length measurements of the children were taken to establish their anthropometric status. Ethical approval to conduct the study was obtained from Stellenbosch University (South Africa) and Kenyatta University (Kenya). Permission to conduct the study was obtained from the Kenyan National Council of Science and Technology and the Isiolo County Commissioner.

**Results:** Overall, the prevalence of stunting and underweight among the children six to 23 months old was low according to the World Health Organization (WHO) classification for severity of malnutrition (19.1% and 7.3%, respectively) while the severity of wasting prevalence (5.2%) which, according to WHO thresholds, was medium. Of the children studied, 2.4% were overweight which was low. The percentage of children with stunting, wasting and underweight rates increased with an increase in age (measured in months). Complementary feeding practices were poor. Of the children participating in the study, 60.4% achieved minimum meal frequency, with 35.4% achieving minimum dietary diversity and 25.3% achieving the minimum acceptable diet. Significant relationships were found between socio-demographic factors (child gender, child age, caregiver's age and caregiver's education level), and complementary feeding practices ( $p < 0.05$ ). In addition to this, there was a significant association found between child gender and anthropometric status, whereby female children were more likely to have better anthropometric status than their male counterparts ( $p < 0.05$ ).

**Conclusion and recommendations:** The study established that among pastoralist communities, poor feeding practices starts early, thereby predisposing older children (18 – 23 months) to nutritional inadequacies. Interventions need to put more emphasis on nutrition-specific and nutrition-sensitive strategies focussing on the critical period from gestation to two years. Improving education levels for women in pastoralist communities may have a positive impact on the anthropometric status of the

child. Qualitative studies are necessary in order to identify specific sociocultural issues that might affect complementary feeding practices and anthropometric status such as gender bias in feeding practices.

## OPSOMMING

**Inleiding:** Voldoende voeding is noodsaaklik vir 'n kind se ontwikkeling, en die tydperk vanaf swangerskap tot tweejarige ouderdom lê die grondslag vir toekomstige optimale gesondheid, ontwikkeling en groei. Volgens huidige internasionale openbaregesondheidsaanbevelings oor die voeding van babas en jong kinders ("IYCF") behoort 'n baba die eerste ses maande uitsluitlik borsmelk te drink. Daarna kan aanvullende voedsel by die kind se dieet ingesluit word, hoewel borsvoeding tot op twee jaar of ouer moet voortduur. Tydsberekening, tipe en gehalte is belangrike oorwegings in aanvullende voeding. Indien hierdie drie faktore in gedrang kom, lei dit dikwels tot wanvoeding en selfs sterfte.

**Doel:** Die doel van hierdie studie was om die aanvullende voedingspraktyke en antropometiese status van kinders van ses tot 23 maande in die landelike gemeenskappe van die distrik Isiolo in Kenia te bepaal. **Metodes:** Die navorsing het uit 'n analitiese deursnee studie bestaan. 'n Respondentegroep van 288 moeder/versorger-kind-pare is met behulp van trossteekproefneming in twee stadiums uit landelike gemeenskappe gekies. Die kinders was tussen ses en 23 maande oud. Die navorser het aan die hand van 'n vraelys onderhoude met die moeders/versorgers gevoer. Die kinders se gewig en lengte is gemeet om hul antropometriese status te bepaal. Etiekgoedkeuring vir die studie is van die Universiteit Stellenbosch (Suid-Afrika) asook as Kenyatta-universiteit (Kenia) bekom. Die Keniaanse Nasionale Raad vir Wetenskap en Tegnologie en die distrikskommissaris van Isiolo het ook goedkeuring verleen.

**Resultate:** Die voorkoms van dwerg groei en ondergewig onder die kinders ses – 23 maande was oor die algemeen laag volgens die Wêreldgesondheidsorganisasie (WGO) klassifikasie vir die erns van wanvoeding (19,1% en 7,3% onderskeidelik) terwyl die voorkoms van uittering (5,2%), volgens die WGO-standaarde medium was onder die kinders wat bestudeer was. 2,4% was oorgewig, wat laag is. Die persentasie wanvoede kinders het saam met ouderdom (in maande) toegeneem. Aanvullende voedingspraktyke was swak. 'n Totaal van 60,4% van die kinderdeelnemers het aan minimum maaltyd gereedheid voldoen, 35,4% was binne die perke van minimum dieetdiversiteit, en 25,3% het die minimum aanvaarbare dieet gevolg. Die studie het 'n beduidende verband tussen sosiodemografiese faktore (kindergeslag en -ouderdom, en ouderdom en opvoedingsvlak van die versorger) en aanvullende voedingspraktyke ( $p < 0,05$ ) aan die lig gebring. Benewens, was daar 'n beduidende verband gevind tussen kindergeslag en antropometriese status, waardeur vroulike kinders meer geneig was om beter antropometriese status as hul manlike eweknieë te hê ( $p < 0,05$ ).

**Gevolgtrekking en aanbevelings:** Die studie het vasgestel dat swak voedingspraktyke in landelike gemeenskappe reeds vroeg in aanvang neem, wat gevolglik ouer kinders aan voedingstekorte blootstel. Daarom behoort intervensies sterker klem te plaas op voeding spesifieke en voeding sensitiewe strategieë wat fokus op die belangrike tydperk vanaf swangerskap tot tweejarige ouderdom. Die verbetering van opvoedingsvlakke onder vroue in landelike gemeenskappe kan 'n

positiewe invloed op kinders se antropometriese status hê. Kwalitatiewe studies word vereis om te bepaal watter spesifieke sosiokulturele kwessies dalk aanvullende voedingspraktyke en antropometriese status raak soos byvoorbeeld geslag bevooroordeeling in voedingspraktyke.

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## **CONTRIBUTIONS BY PRINCIPAL RESEARCHER AND FELLOW RESEARCHERS**

The principal researcher, Dorcas PA Amunga, developed the idea and the protocol. The principal researcher planned the study, undertook and supervised data collection by the enumerators, captured the data for analysis, analysed the data with the assistance of a statistician (Dr Justin Harvey), interpreted the data, and drafted the thesis. Mrs Lynette Daniels and Dr Sophie Ochola provided input during all the stages of the study and revised the protocol as well as the thesis.

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## DEFINITION OF KEY TERMS

<b>Adequate complementary foods:</b>	The term refers to the capacity of complementary food to provide sufficient energy, protein and micronutrients to meet a growing child's nutritional needs. <sup>1</sup>
<b>Anthropometric status:</b>	The status in question refers to the current body status of an individual, or to a population group, in terms of their state of nourishment (as regards the consumption and utilisation of nutrients), as assessed by body length and weight measurements (i.e. anthropometry) and age, in comparison with the World Health Organization Child Growth Standards related to those of the same age and gender. The anthropometric indicators used in this study were: length-for-age z-scores (stunting); weight-for-length z-scores (wasting and overweight); and weight-for-age z-scores (underweight). <sup>2</sup>
<b>Complementary feeding:</b>	Such feeding starts when the breast milk is no longer sufficient to meet the nutritional requirements of infants; therefore, other foods and liquids are introduced to the infant along with breast milk. <sup>3</sup>
<b>Complementary food:</b>	Any solid, semi-solid or soft food, whether manufactured or locally prepared that is suitable as a complement to breast milk (or to infant formula), when either becomes insufficient to satisfy the nutritional requirements of the infant is known as complementary food. <sup>3</sup>
<b>Continued breastfeeding at 1 year:</b>	The proportion of children, 12–15 months old, who are fed breast milk is covered by this term. <sup>4</sup>
<b>Continued breastfeeding at 2 years:</b>	The proportion of children, 12–23 months of age, who are fed breast milk is covered by this term. <sup>4</sup>
<b>Exclusive breastfeeding:</b>	Such breastfeeding refers to the ingestion of no other food or drink, not even water, apart from breast milk (including expressed milk, or that from a wet nurse) for the first 6 months of life, although the infant may receive oral rehydration solution, drops and syrups (vitamins, minerals and medicine). <sup>5</sup>
<b>Introduction of solid, semi-solid or soft foods:</b>	This is the proportion of infants, 6–8 months of age, who received solid, semi-solid or soft foods in the 24 hours preceding the survey. <sup>4</sup>
<b>Minimum acceptable</b>	This is the proportion of breastfed children, 6–23 months of age, who received the minimum dietary diversity and the minimum meal frequency

- diet:** the day before the survey and the proportion of non-breastfed children, 6–23 months of age, who received at least two milk feeds and obtained the minimum dietary diversity, (not including milk ) and the minimum meal frequency on the day prior to the survey.<sup>4</sup>
- Minimum dietary diversity:** This is the proportion of children, 6–23 months of age, who received foods from four or more food groups during the previous day. The seven food groups used for the tabulation of this indicator were: grains, roots and tubers, legumes and nuts, dairy products (milk, yoghurt and cheese), flesh foods (meat, fish, poultry and liver/organ meats), eggs, vitamin A rich fruits and vegetables, and other fruits and vegetables.<sup>4</sup>
- Minimum meal frequency:** This refers to the proportion of breastfed and non-breastfed children of 6–23 months of age who received solid, semi-solid or soft foods (but also including milk feeds for non-breastfed children) for the minimum number of times or more (with minimum being defined as twice for breastfed infants 6–8 months old, three times for breastfed children 9–23 months old, and four times for non-breastfed children 6–23 months old) on the previous day.<sup>4</sup>

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## LIST OF ABBREVIATIONS

ART	Anti-retroviral treatment
ASAL	Arid and semi-arid lands
CI	Confidence interval
DHS	Demographic Health Survey
EBF	Exclusive breastfeeding
ENA	Emergency Nutrition Assessment
EPI	Expanded Programme on Immunisation
FAO	Food and Agriculture Organization
FSAU	Food Security Analysis Unit
GAM	Global Acute Malnutrition
HAZ	Height-for-age z-score
HINI	High-impact nutrition interventions
HIV/AIDS	Human immunodeficiency virus/acquired immune deficiency syndrome
HREC	Health Research Ethics Committee
IYCF	Infant and young child feeding
KAP	Knowledge, attitude and practices
KDHS	Kenya Demographic Health Survey
LAZ	Length-for-age z-score
MDGs	Millennium Development Goals
MS	Microsoft
ORS	Oral rehydration solution
PPS	Proportional to population size
SAS	Statistical Analysis Software
SMART	Standardized Monitoring and Assessment of Relief and Transitions
SUN	Scaling Up Nutrition
SURMEPI	Stellenbosch University Rural Medical Partnership Initiative
UNICEF	United Nations Children's Fund
WAZ	Weight-for-age z-score
WHO	World Health Organization
WHZ	Weight-for-height z-score
WLZ	Weight-for-length z-score
SBCC	Social and behaviour change communication

# CHAPTER 1

## INTRODUCTION AND LITERATURE OVERVIEW

### 1.1 INTRODUCTION

Adequate nutrition is vital to a child's development, with the period from pregnancy to two years of age being the most critical basis for future optimal growth, health and development.<sup>6</sup> There is universal consensus on the importance of infant and young child feeding (IYCF) - meaning breastfeeding and complementary feeding as a key determinant of child nutrition.<sup>7</sup>

Current global public health recommendations on IYCF state that an infant should be exclusively breastfed for the first six months of life and that, thereafter, complementary foods should be introduced to the child's diet while they continue breastfeeding up to two years of age and beyond.<sup>1</sup> Exclusive breastfeeding (EBF) is defined as taking no food or drink, not even water, other than breast milk (including expressed milk, or that from a wet nurse) for the first six months of life, but allowing the infant to receive oral rehydration solution (ORS), drops and syrups (vitamins, minerals and medicines).<sup>5</sup> Complementary feeding involves the process that starts when breast milk is no longer sufficient to meet the nutritional requirements of infants, with other liquids and foods (i.e. complementary foods) are introduced to the infant, along with breast milk at the recommended age of six months, as the infant transitions to ingesting family foods.<sup>1</sup>

In the context of human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS), the World Health Organization (WHO) recommendations state that mothers who are known to be HIV-infected and who are on anti-retroviral treatment (ART) (and whose infants are HIV-uninfected, or of unknown HIV status) should exclusively breastfeed their infants for the first six months of life. Thereafter, they should introduce appropriate complementary foods, while continuing to breastfeed the infant for the first 12 months of life.<sup>8</sup> Breastfeeding should only cease once a nutritionally safe and adequate diet without breast milk can be assured.<sup>8</sup> If the infant and/or young child is already HIV-infected, mothers are strongly encouraged to breastfeed exclusively for the first six months of life and to continue breastfeeding until age two years and giving complementary foods, as per the guidelines applying to the general population.<sup>8</sup>

## **1.2 CURRENT KNOWLEDGE ON COMPLEMENTARY FEEDING**

### **1.2.1 Appropriate complementary feeding as an effective intervention for reducing undernutrition**

Breast milk, as the natural first food for infants, provides all the energy and nutrients that the infant needs for the first months of life.<sup>9</sup> Breast milk promotes sensory and cognitive development and has immunological properties that protect the infant against infectious and chronic diseases.<sup>9</sup> However, breastfeeding alone after six months of age is not sufficient to meet all the nutritional needs for a child, since breast milk can provide only up to half or more of a child's energy-related nutritional needs during the second half of the first year and up to one-third during the second year of life. Therefore, infants and young children require complementary foods to prevent undernutrition.<sup>9</sup>

The *Lancet's* first Maternal and Child Undernutrition series<sup>10</sup> identified a range of effective interventions after conducting a systematic review of more than 100 studies concentrating on the 'window of opportunity' of minus nine to 24 months, in terms of reducing death and disease and the avoidance of irreversible harm. After studying the programmatic feasibility and effectiveness of the interventions identified, the World Bank devised a more selective package of 13 highly cost-effective interventions, commonly referred to as the high-impact nutrition interventions (HINI) in the 36 highest burden countries identified by the *Lancet*.<sup>9</sup> The interventions concerned included the promotion of appropriate breastfeeding and of complementary feeding (see Table 1.1 below).<sup>10-11</sup>

Appropriate complementary feeding practices have been ranked among the top three interventions, with a 6% potential of reducing the prevailing rates of undernutrition and child mortality.<sup>11</sup>

**Table 1.1: Evidence-based direct interventions to prevent and treat undernutrition**

<p><b>Promoting good nutritional practices:</b></p> <ol style="list-style-type: none"> <li>1. Breastfeeding</li> <li>2. Complementary feeding for infants after the age of 6 months</li> <li>3. Improved hygiene practices, including hand-washing</li> </ol> <p><b>Provision of micronutrients for young children and their mothers (increasing the ingestion of vitamins and minerals):</b></p> <ol style="list-style-type: none"> <li>4. Periodic vitamin A supplements</li> <li>5. Therapeutic zinc supplements for diarrhoea management</li> <li>6. Multiple micronutrient powders</li> <li>7. Deworming drugs for children (to reduce the loss of nutrients)</li> <li>8. Iodised oil capsules, where iodised salt is unavailable</li> <li>9. Iodised oil capsules, where iodised salt is unavailable</li> </ol> <p><b>Provision of micronutrients through food fortification for all:</b></p> <ol style="list-style-type: none"> <li>10. Salt iodisation</li> <li>11. Iron fortification of staple foods</li> </ol> <p><b>Therapeutic feeding for malnourished children with special foods:</b></p> <ol style="list-style-type: none"> <li>12. Prevention, or treatment, for moderate undernutrition</li> <li>13. Treatment of severe undernutrition with ready-to-use therapeutic food</li> </ol> <p><i>Source: Scaling Up Nutrition: A Framework for Action.<sup>11</sup></i></p>
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### 1.2.2 Complementary feeding, malnutrition and mortality

The Global Strategy on IYCF<sup>1</sup> set down four key factors to consider when providing complementary foods, so as to ensure that the nutritional needs of infants are met. The factors concerned are:

- **Timeliness** – Complementary foods should be introduced when the need for energy and nutrients exceeds what can be provided through exclusive and frequent breastfeeding.
- **Adequacy** – Complementary foods should provide sufficient energy, protein and micronutrients to meet a growing child’s nutritional needs.
- **Safety** – Complementary foods should be hygienically stored and prepared and fed with clean hands (using clean utensils) and using neither bottles nor teats.
- **Proper feeding** – Complementary foods should be given in consistency with a child’s signals for appetite and satiety and keeping to age-appropriate meal frequency and feeding method, while actively encouraging the child, even during illness, to consume sufficient food, using fingers, a spoon, or self-feeding.<sup>1</sup>

When complementary foods are given, the type and quality of food that is given is an important consideration, because if it is compromised, the result is often poor nutrition.<sup>6</sup> In many developing countries, the transition period to family foods is often marked by growth faltering, by micronutrient

deficiencies and by such common childhood illnesses as diarrhoea and acute respiratory infections.<sup>6</sup> A study by Sawadogo, Martin-Prével, Savy, Kameli, Traissac and Traoré<sup>12</sup> that measured the association between feeding practices and nutritional status in rural Burkina Faso showed that feeding practices had a significant positive association with the height-for-age z-score (HAZ) for children aged between six and 23 months and with the weight-for-height z-score (WHZ) for children aged between 12 and 23 months.

Four-fifths of undernourished children live in just 36 countries, including Kenya, with cross-sectional studies showing that stunting levels are high, ranging from 30 to 50%.<sup>6, 10, 13</sup> According to estimates in the United Nations Children's Fund (UNICEF) State of the World's Children report<sup>14</sup> published in 2012, the statistics from Kenya indicate that 16% of the children are underweight, that 4% of the children are wasted and that 35% of the children are stunted. There is a progressive increase in stunting, underweight and wasting levels between six and 23 months (peaking at 12–23 months), with limitations in the quality and quantity of complementary foods being the single most important determining factor.<sup>6,10,13</sup> Complementary feeding support has been shown to have the capability to reduce stunting in children aged five years and under, with or without food supplementation, in both food secure and food insecure households.<sup>10</sup>

Rising incidences of overweight and obesity in children and adults are also a matter of serious concern,<sup>8</sup> and have been linked to poor complementary feeding practices.<sup>15-17</sup> Overconsumption of energy-dense foods may induce excessive weight gain in infancy, which has been associated with a twofold to threefold higher risk of obesity in school-age children.<sup>15</sup> Schack-Nielsen, Sorensen, Mortensen and Michaelsen's<sup>16</sup> study indicates that the risk of overweight at 42 years decreased, or tended to decrease, with the increasing age in months at the introduction of complementary feeding. Obesity and overweight pose a major risk for the development of serious diet-related chronic diseases, including type II diabetes, cardiovascular disease, hypertension, stroke and certain forms of cancer.<sup>18</sup>

Globally, maternal and child undernutrition is the underlying cause of approximately 3.5 million deaths annually.<sup>10</sup> In Kenya alone, it is estimated that poor IYCF practices contribute to more than 10 000 deaths each year from malnutrition.<sup>19</sup> A random effects meta-analysis that was used to estimate the increased risk of cause-specific morbidity and mortality in relation to two patterns of feeding (breastfeeding, or not) in children aged six to 23 months showed that there was a statistically raised risk of not breastfeeding for all-cause mortality and diarrhoea incidence.<sup>10</sup> While the majority of studies have established the link between suboptimal breastfeeding and mortality in the age period of six to 23 months, appropriate complementary feeding practices have also been shown to have an effect on reducing mortality, by means of the role that they play in preventing malnutrition.<sup>11,20</sup>

### 1.2.3 Complementary feeding practices

The WHO Indicators for assessing IYCF<sup>4</sup> practice guidelines identified 15 core and optional indicators that provide guidance on assessing IYCF practices (see Table 1.2 below).

**Table 1.2: IYCF core and optional indicators**

<p><b>Core indicators</b></p> <ol style="list-style-type: none"> <li>1. Early initiation of breastfeeding</li> <li>2. EBF under 6 months</li> <li>3. Continued breastfeeding at 1 year</li> <li>4. Introduction of solid, semi-solid and soft (complementary) foods during the age period 6–8 months</li> <li>5. Minimum dietary diversity, by means of measuring number of food groups consumed</li> <li>6. Minimum meal frequency that measures minimum number of times complementary foods and breast milk (or milk feeds, if not breastfeeding) consumed</li> <li>7. Minimum acceptable diet that combines both minimum meal frequency and minimum acceptable diet</li> <li>8. Consumption of iron-rich, or iron-fortified, foods</li> </ol> <p><b>Optional indicators:</b></p> <ol style="list-style-type: none"> <li>9. Whether child ever breastfed</li> <li>10. Continued breastfeeding at 2 years</li> <li>11. Age-appropriate breastfeeding</li> <li>12. Predominant breastfeeding under 6 months</li> <li>13. Duration of breastfeeding</li> <li>14. Bottle-feeding</li> <li>15. Milk feeding frequency for non-breastfed children</li> </ol> <p><i>Source: Indicators for assessing IYCF – Part 1: Definitions. WHO, 2007.<sup>4</sup></i></p>
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In Kenya, however, according to the Kenya Demographic Health Survey (KDHS) 2008–2009,<sup>6</sup> only 39% of children aged six to 23 months are fed in accordance with the following three core complementary feeding practices:- timely initiation of complementary foods, minimum dietary diversity and minimum meal frequency.

#### 1.2.3.1 Introduction of solid, semi-solid or soft foods

The introduction of solid, semi-solid or soft foods (complementary foods) should be timely, that is, at six months of age, to ensure that infants meet their nutritional needs.<sup>3</sup> However, complementary feeding frequently begins too early and sometimes foods are nutritionally inadequate, or unsafe, as has been established in a number of studies.<sup>6, 1, 21-24</sup>

In the 2008–2009 KDHS, 32% and 60% of infants were introduced to complementary foods by two or three months and by four to five months respectively.<sup>6</sup> A study that was conducted by Macharia-Mutie,

Brouwer, Mwangi and Kok<sup>21</sup> in Mwingi District, Kenya indicated that 74% of the caregivers interviewed introduced complementary foods too early, meaning between one and three months.

Kimani-Murage, Madise, Kyobutungi, Mutua and Gitau, et al.<sup>23</sup> in a study that was conducted in the urban slums of Nairobi, Kenya, found that the mean age of introduction of solids was three-and-a-half months, with porridge and fresh, or powdered milk being introduced between the second and third months of life in 65% and 57% of children, respectively. Similarly, in another study that was conducted in northern Senegal by Gupta, Gehhri and Stettler<sup>24</sup> to assess the early introduction of water, as well as the complementary feeding and the nutritional status of children, the results showed that water was introduced to about 85% of the children during the first three months of life and that 62% of the children were fed complementary foods before they were six months old. All of these studies show that complementary foods are often given before the child attains the recommended six months of age.

### **1.2.3.2 Dietary diversity and meal frequency**

The WHO recommends that children aged six to 23 months should receive four or more of seven different food groups within a 24-hour period, to be able to attain a minimum dietary diversity.<sup>4</sup> The seven food groups are: grains, roots and tubers; legumes and nuts; dairy products; flesh foods; eggs; vitamin A rich fruits and vegetables; and other fruits and vegetables.<sup>4</sup> In contrast, a minimum meal frequency within 24 hours is attained when breastfed, or non-breastfed children aged six to 23 months receive solid, semi-solid or soft foods (but also including milk feeds for non-breastfed children), for a minimum number of times or more. The 'minimum' is stipulated as being twice for breastfed infants six to eight months, thrice for breastfed children nine to 23 months and four times for non-breastfed children six to 23 months.<sup>4</sup>

Studies conducted in most developing countries show that the recommended minimum dietary diversity and meal frequency is often not achieved.<sup>6, 22, 25-28</sup> The 2008–2009 KDHS established that, in Kenya, although almost two-thirds of children aged six to 23 months are fed the recommended minimum number of times (meal frequency), only 54% were being fed from the requisite number of food groups (recommended minimum dietary diversity), thereby predisposing them to various forms of macronutrient and micronutrient deficiencies.<sup>6</sup>

Evidence of poor dietary diversity has also been found in rural Tanzania by Mamiro, Kolsteren, Roberfroid, Opsomer and Van Camp,<sup>22</sup> with the findings concerned showing that that most complementary foods provided are mainly cereal-based. Similarly, in a study conducted by Sawadogo, Yves, Claire, Alain, Alfred and Serge, et al.,<sup>25</sup> it was found that the main complementary food given was porridge (for 46% of the children) and that foods were of low dietary diversity. Additionally, under half

of the children aged less than two years received the recommended minimum meal frequency of four different food groups per day.<sup>25</sup>

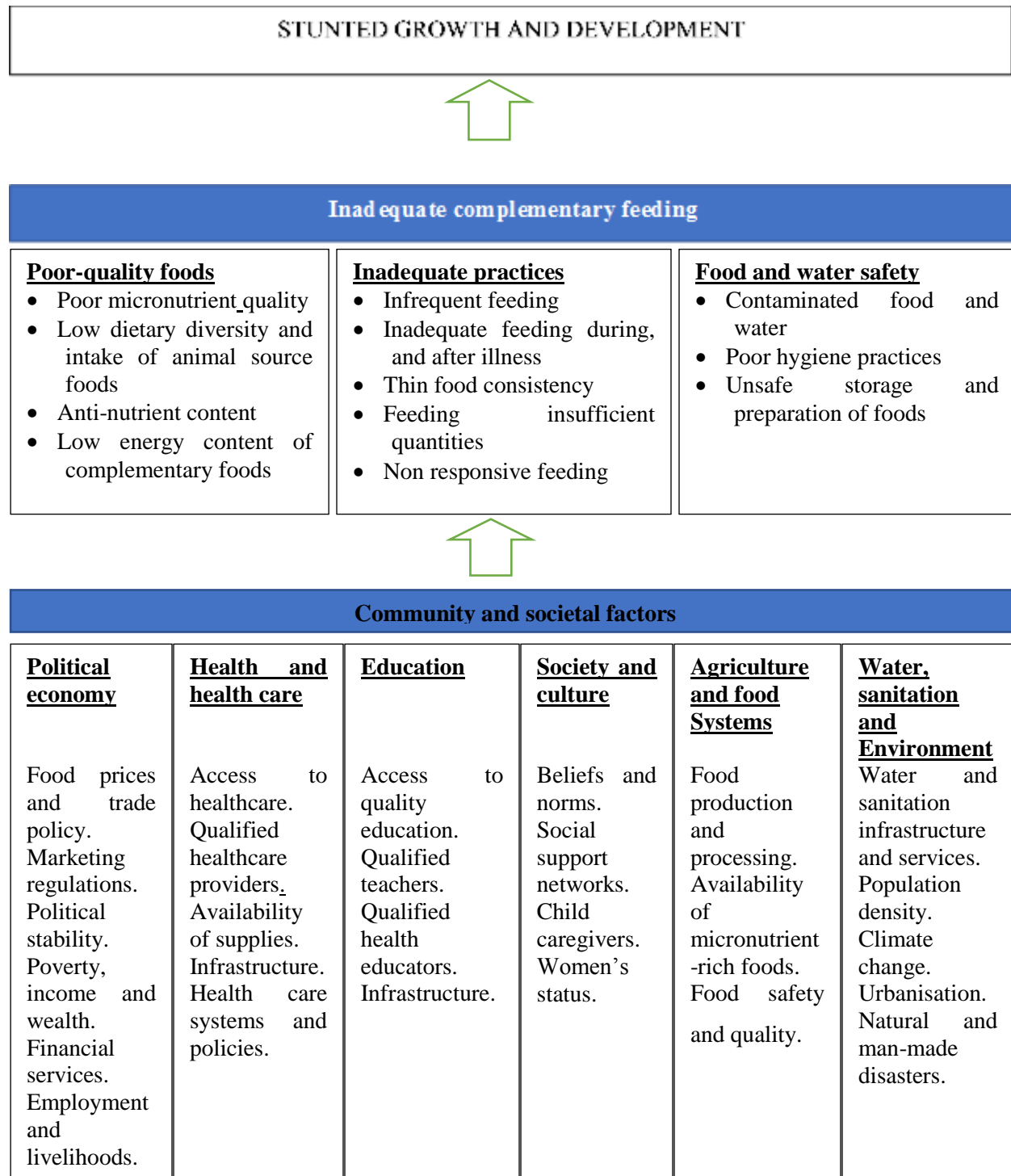
These findings are almost similar to those that have been made in surveys conducted in the pastoralist regions of Kenya, which have indicated a low percentage of children aged six to 23 months being fed according to the complementary feeding guidelines.<sup>26-28</sup> In the 2013 Integrated Health and Nutrition survey that was conducted in Merti, Kenya,<sup>28</sup> the results indicated that among children aged six to 23 months, only 16% achieved the minimum dietary diversity, with 49% of the children receiving the minimum meal frequency. The minimum acceptable diet, comprised of the minimum meal frequency and the minimum dietary diversity, was achieved in only 31% of the cases of children in the same study.<sup>28</sup>

#### **1.2.4 Determinants of feeding practices**

The social, demographic and geographical context in which the current study was conducted determined the key factors influencing IYCF practices in a specific area.<sup>21-32</sup>

In contextualising complementary feeding, Stewart, Iannotti, Dewey, Michaelsen and Onyango<sup>29</sup> developed a conceptual framework summarising six key community and societal factors that lead to inadequate complementary feeding and to subsequently stunted growth and development (see Figure 1.1 below). The underlying factors were: the political economy, health and health care; education; the society and culture, including beliefs; agriculture and food systems; as well as water, sanitation and environment. The latter further contributed to the immediate factors, namely poor-quality foods, inadequate practices to unsafe food and water supply.<sup>29</sup>





**Figure 1.1: WHO conceptual framework on childhood stunting: context, causes and consequences with an emphasis on complementary feeding<sup>29</sup>**

Community and societal factors have also been shown to influence feeding practices. In the study that was conducted in the informal settlements in Nairobi, Kenya by Kimani-Murage, Madise, Fotso,

Kyobutungi, Mutua and Gitau, et al.<sup>23</sup> significant factors that were found to be associated with suboptimal complementary feeding during infancy were the maternal marital status, the child's gender and the maternal education level ( $\rho < 0.05$  respectively). Single mothers experienced a 23% higher level of hazards involved with the introducing of complementary foods before six months of age than did their counterparts who were in unions.<sup>23</sup> Boys were more likely to be introduced to complementary foods at an earlier stage than were girls and mothers with at least a secondary-level education had 10% lower hazards with introducing complementary foods early on.<sup>23</sup>

In a study by Korir<sup>30</sup> on the determinants of complementary feeding practices and the nutritional status of children in an informal setting in Kenya, it was established that maternal age and knowledge were key determinants of complementary feeding, whereby the younger mothers (OR = 1.77,  $\rho = 0.030$ ) and maternal knowledge regarding the enriching of complementary foods (OR = 3.41,  $\rho = 0.040$ ) were significant predictors of the consumption of vitamin A rich foods, of minimum meal frequency and of minimum acceptable diet, respectively, among children aged six to 23 months.

In addition to the above, cultural factors and beliefs also play a role in determining complementary feeding practices. A study by Paul, Muti, Chasekwa, Mbuya, Madzima and Humphrey, et al.,<sup>31</sup> assessing complementary feeding messages that target cultural barriers in rural Zimbabwe, showed that the most common feeding problem was the limited variety of foods, which was blamed on the mother's beliefs, such as the belief that children 'can't chew or swallow', or that some foods cause such side effects as diarrhoea and constipation. Maternal beliefs influencing complementary feeding practices were also observed in the study by Macharia-Mutie, Brouwer, Mwangi and Kok,<sup>21</sup> in Mwingi District, Kenya. The study found that enriched porridge was believed to be 'very healthy for the infant' and hence it was the predominant complementary food given in the area, thus contributing to low dietary diversity.<sup>21</sup>

The seasonality of foods has also been shown to be an important determinant of complementary feeding practices in the rural African setting.<sup>21, 32</sup> According to a study by Sellen,<sup>32</sup> in rural East African pastoral populations, mothers determine feeding practices in response to such seasonal factors as the household availability of animal milk and maize.

### **1.2.5 Complementary feeding and the Millennium Development Goals**

The Millennium Development Goals (MDGs) are eight international development goals to be achieved by the year 2015 that were established following the Millennium Summit of the United Nations in 2000.<sup>33</sup>

**The Eight Millennium Development Goals**

1. To eradicate extreme poverty and hunger
2. To achieve universal primary education
3. To promote gender equality and empower women
4. To reduce child mortality
5. To improve maternal health
6. To combat HIV/AIDS, malaria, and other diseases
7. To ensure environmental sustainability
8. To develop a global partnership for development

The long-term effects of undernutrition due to poor complementary feeding practices have been established and these include impaired cognitive development, compromised educational achievement and low economic productivity which subsequently affect the achievement of MDGs 1, 2 and 4.<sup>11</sup>

MDG 1: Eradicate extreme poverty and hunger. The targets set for this goal are to halve the proportion of people living on less than a dollar a day and to achieve full and productive employment, and decent work for all, including women and young people. The intention also is to halve the proportion of people who suffer from hunger.<sup>33</sup> Therefore, a reduction in undernutrition is seen as enhancing productivity and thereby increasing economic growth.<sup>11</sup>

MDG 2: The intention with this goal is to achieve universal primary education, by means of ensuring that all boys and girls complete a full course of primary schooling.<sup>33</sup> Therefore, reducing undernutrition increases cognitive development and it contributes to learning and school completion rates.<sup>11</sup>

MDG 4: The reduction of child mortality through a two-thirds lowering of the mortality rate among children under five years of age is the intention of this goal.<sup>33</sup> There is empirical evidence indicating that the majority of child deaths in sub-Saharan Africa are related to undernutrition.<sup>11, 34</sup>

### **1.2.6 Strategies to enhance the effectiveness of complementary feeding interventions**

In Kenya, national surveys have established that complementary feeding practices are largely suboptimal, with complementary foods tending to be substandard in nutrient quality and being comprised of bulky starches that are low in nutrients that are vital for the growing infant.<sup>6, 35</sup> The *Lancet's* first series on Maternal and Child Nutrition, which was published in 2008, highlighted the importance of good nutrition during the first 1 000 days (from pregnancy to two years) and provided strong evidence of how to address

malnutrition effectively, through the use of cost-effective interventions, on which the Scaling Up Nutrition (SUN) movement is based.<sup>10, 36</sup>

The SUN movement advocates that multi-sectoral partnerships be entered into by bringing different groups of people together – governments, civil society, the United Nations, donors, businesses and scientists – in a collective action to improve nutrition, and, in 2012, Kenya becoming the thirtieth country in the world to join the SUN movement.<sup>36</sup> In addition to this, Kenya has a five-year action plan for nutrition (the National Nutrition Action Plan (NNAP) for 2012 – 2017) in place,<sup>37</sup> as well as the Maternal, Infant and Young Child Nutrition (MIYCN) 2013 policy and strategy documents.<sup>38</sup> The documents have identified goals, objectives and key strategies that are aimed at promoting adequate complementary feeding practices among children aged six to 23 months, with the intention of subsequently reducing the levels of malnutrition that are currently present in the country.<sup>35, 37-38</sup>

The policies and strategies also build on the current evidence that has been published in the second *Lancet* Maternal and Child Undernutrition series.<sup>39-40</sup> The series has identified a framework for action that includes a combination of specific actions for nutrition and nutrition-sensitive strategies, as well as that which creates an enabling environment for addressing the key underlying factors, so as to support the complementary feeding interventions (See table 1.3).<sup>36, 39-40</sup>

**Table 1.3: Specific actions for nutrition and nutrition-sensitive strategies**

<p><b>Specific Actions for Nutrition:</b></p> <p><b>Feeding practices &amp; behaviours:</b> Encouraging exclusive breastfeeding up to 6 months of age and continued breastfeeding together with appropriate and nutritious food up to 2 years of age and beyond.</p> <p><b>Fortification of foods:</b> Enabling access to nutrients through incorporating them into foods.</p> <p><b>Micronutrient supplementation:</b> Direct provision of extra nutrients</p> <p><b>Treatment of acute malnutrition:</b> Enabling persons with moderate and severe malnutrition to access effective treatment.</p>	<p><b>Nutrition-Sensitive Strategies:</b></p> <p><b>Agriculture:</b> Making nutritious food more accessible to everyone, and supporting small farms as a source of income for women and families.</p> <p><b>Clean water &amp; sanitation:</b> Improving access to reduce infection and disease</p> <p><b>Education:</b> Making sure children have the nutrition needed to learn and earn a decent income as adults.</p> <p><b>Employment &amp; social protection:</b> Ensuring employment practices and social protection schemes support good nutrition</p> <p><b>Health care:</b> Access to services that enable women &amp; children to be healthy</p>
<p><i>Source: Scaling Up Nutrition: An introduction to the Scaling Up Nutrition Movement.</i><sup>36</sup></p>	

As highlighted in the WHO contextual framework for stunting, complementary feeding practices are determined by a number of underlying factors.<sup>29</sup> Nutrition-sensitive programming, as identified by the second *Lancet* series,<sup>39</sup> has the ability to address the crucial underlying determinants of nutrition, as well as to be effective in reaching poor populations and to serve as a platform for the delivery of nutrition-specific interventions. Therefore, through nutrition-sensitive programming, progress may be made in improving nutrition by enhancing the household and community environment in which children can develop and grow and by increasing the effectiveness, coverage and scale of nutrition-specific interventions.<sup>39</sup>

By joining the SUN network and by formulating the NNAP 2012–2017, as well as the MIYCN policy of 2013 and the National Strategy for MIYCN (2012–2017), Kenya has created an enabling environment. Such an environment, as defined by the *Lancet*, serves to build and to sustain the momentum that is required for the effective implementation of actions that can reduce the existing levels of undernutrition.<sup>40</sup>

### **1.3 MOTIVATION FOR THE STUDY**

Pastoralists are people whose livelihoods depend on the well-being of their livestock.<sup>41</sup> Mobility to look for pasture and water is a key feature qualifying pastoralism.<sup>41</sup> Milk is an important component of the pastoralists' diet, and, when it is available, it is added to most complementary foods.<sup>42</sup> Children who live in pastoralist areas are, however, increasingly referred to as some of the most nutritionally vulnerable in the world.<sup>42</sup> In Kenya, some of the highest rates of malnutrition have been reported among the pastoralist communities.<sup>6, 26-28</sup> The Integrated Health and Nutrition survey results for Isiolo in 2011 revealed the global acute malnutrition (GAM) level to be at 16%, which is considered to be very high based on WHO classification for assessing severity of malnutrition by prevalence ranges among children under 5 years of age.<sup>26, 43</sup>

A lack of adequate complementary feeding data exist about pastoralist communities despite their vulnerability.<sup>26-28</sup> The majority of nutrition surveys that have been undertaken in sub-Saharan Africa have targeted children who were under five years old at the time, with the aim of measuring malnutrition, morbidity and mortality levels during emergency situations. The surveys in question have had minimal focus on appropriate sampling for IYCF indicators and also on assessing the relationship between complementary feeding and anthropometric status. Furthermore, few studies have sought to identify and to assess the socio-demographic and economic factors affecting the complementary feeding practices for six- to 23-month-old children that are unique to pastoralist communities.

This study, therefore, sought to obtain an understanding of the complementary feeding practices for children aged six to 23 months among the pastoralist communities and how they relate to the anthropometric status of those concerned. The study also sought to identify specific socio-demographic and economic factors contributing to poor feeding practices and thereby filling the information gap while simultaneously building upon the current knowledge on complementary feeding practices.

## **CHAPTER 2 METHODOLOGY**

### **2.1 AIM AND OBJECTIVES**

The purpose of the study was to determine the complementary feeding practices and the anthropometric status of children aged six to 23 months among the pastoralist communities of Isiolo County, Kenya.

#### **2.1.1 Primary objectives**

The objectives of the study were to:

1. Describe the socio-demographic and economic factors of caregivers of children aged six to 23 months among pastoralist communities.
2. Describe the complementary feeding practices of children aged six to 23 months among pastoralist communities.
3. Determine the anthropometric status of children aged six to 23 months among pastoralist communities.
4. Determine the relationship between complementary feeding practices and anthropometric status of children aged six to 23 months among pastoralist communities.
5. Determine the relationship between socio-demographic and economic factors and complementary feeding practices in children aged six to 23 months among pastoralist communities.
6. Make recommendations for the development of focused interventions targeting the pastoralist communities.

### **2.2 HYPOTHESES**

The following null hypotheses ( $H_0$ ) were tested:

1. There is no relationship between the complementary feeding practices and the anthropometric status of children aged six to 23 months among pastoralist communities.
2. There is no relationship between socio-demographic and economic factors and the complementary feeding practices in children aged six to 23 months among pastoralist communities.

### **2.3 STUDY PLAN**

#### **2.3.1 Study type**

A cross-sectional analytical study design was used in the study, in keeping with the researcher seeking to describe the complementary feeding practices and the anthropometric status of children aged six to 23

months old among pastoralist communities. The study was also aimed at determining whether there was a relationship between the variables concerned.

## **2.3.2 Study site and population**

### **2.3.2.1 Study site**

The study was conducted in Isiolo County (formerly Isiolo District), Kenya (Addendum A). The county is in the most central part of Kenya, covering an area of 25 000 km<sup>2</sup>, with an estimated population of 143 294 (consisting of 73 694 male and 69 600 female) persons.<sup>44</sup> It borders on Marsabit County to the north, on Wajir and Garissa counties to the east, on Tana-River and Meru counties to the south and on Samburu and Laikipia counties to the west. The county has three sub-counties; Merti, Isiolo, and Garbatulla.

The county is hot and dry during most months of the year, with an average rainfall of 580 mm, which, due to it being erratic and unreliable, cannot support perennial agricultural crops.<sup>26</sup> It is subject to a bimodal rainfall pattern.<sup>26</sup> The short rains, which are more reliable than the long rains, are experienced from mid-October to December, whereas the long rains are received from mid-March to June.<sup>26</sup> Due to the low rainfall levels, pastoralists are very vulnerable to drought. Isiolo is one of the counties that is classified as part of the arid and semi-arid lands (ASAL) of Kenya.<sup>26</sup> The major livelihood in the area is pastoral in nature, with about 70% of the population being involved in such pastoralist activities as the keeping of cattle, shoats, camels and donkeys.<sup>26</sup> The major economic activities for the people in the district are livestock-based. The largest pastoralist community in the county is the Borana (with other pastoralist communities including the Somali, the Turkana and the Samburu).<sup>26</sup>

### **2.3.2.2 Study population**

The study population is comprised of a dyad of both mother/primary caregiver and child aged six to 23 months old. The mothers/primary caregivers were, accordingly, the source of primary information for this study. The age category (six to 23 months) was identified because, according to the WHO guidelines, this is the target age range during which complementary feeding should start and be completed. In addition to this, the indicators for measuring IYCF practices focus on the periods of six to 23 months for complementary feeding practices.<sup>4</sup> By the start of 24 months of age, a child should already be capable of eating from the family pot. Furthermore, the effects of poor feeding, that is, delayed motor development, impaired cognitive function and poor school performance are largely irreversible after 24 months of age.<sup>45</sup>



### 2.3.3 Inclusion and exclusion criteria

#### 2.3.3.1 Inclusion criteria

- Households with children aged between six completed months and no more than 23 completed months (23.9) at the time of the study.
- The respondent in each case was either the mother of the index child, or the primary caregiver if the mother had died, or was not available to take part in the survey.
- The index child was living among pastoralist communities during the month of the study.
- The households from which the index child came must have been involved in pastoralist activities for longer than three months.

#### 2.3.3.2 Exclusion criteria

- Individuals who refused to be interviewed, that is who did not give their consent to be interviewed.
- Individuals who were visiting the communities in question were excluded from the study.
- Households/Individuals interviewed during the pilot study.
- Households involved in non-pastoral livelihoods, such as agriculture, casual labour, or formal employment.
- Caregivers who reported that their children were sick.

### 2.3.4 Sample size determination and selection of sample

#### 2.3.4.1 Sample size determination

The sample size was calculated based on the following: the highest prevalence of a core complementary feeding indicator with a wide age range (i.e. six to 23 months), a confidence interval (CI), a desired precision, a design effect and an estimated population of children aged six to 23 months.<sup>4,46</sup>

**Table 2.1: Sample size determination**

Prevalence of the highest complementary feeding indicator (minimum meal frequency) <sup>41</sup>	49%
Confidence interval	95%
Desired precision	7
Estimated population of children aged 6–23 months	9 170

Using the above estimates, an appropriate initial sample size of 192 was obtained.<sup>47</sup> Since a cluster sampling methodology was applied, a design effect of 1.5 that had been used in a previous nutrition survey<sup>28</sup> conducted in the area was used for calculating the final sample size of 288.

#### 2.3.4.2 Selection of the sample

The selection of the sample took the form of a two-stage cluster sampling methodology, because the study was conducted in a large geographical rural area, with a dispersed population.<sup>48</sup>

The first stage involved the random selection of clusters that formed the sampling units.<sup>43</sup> The cluster, in this case, was the smallest geographical unit for which population data were available, namely sub-locations.<sup>48</sup> Clusters were randomly selected from the sub-locations, based on the use of the probability proportional to population size (PPS) method.<sup>48-49</sup> A sampling interval was calculated, based on the total population and the recommended 30 clusters.<sup>48</sup> The Emergency Nutrition Assessment (ENA) for the Standardized Monitoring and Assessment of Relief and Transitions (SMART) software was used to select the 30 clusters for inclusion in the study (Addendum B).<sup>48-49</sup> The names of the sub-locations and their population sizes were entered into the ENA software, which calculated the sampling interval and which randomly sampled the sub-locations to be included in the study. Sub-locations with a high population size had more than one cluster selected. An additional 10% of randomly selected clusters were included to be visited in case some of the clusters did not yield the required number of mother–child pairs, or in case some of the clusters were not accessible. With the assistance of the sub-location elders (chiefs), the sub-locations with more than one cluster were equally separated into the required number of clusters.

The second stage used the modified expanded programme on immunisation (EPI) method, because the households were scattered over a large area and accurate household numbers in so far as the sub-location data were concerned, were not available, hence making simple, or systematic, random sampling difficult.<sup>48</sup> In the modified EPI method, the total number of households to be visited per cluster was determined by dividing up the sample size by means of the selected number of clusters; hence, eight to 10 households were visited in each cluster. In the selected sub-locations, the teams met with the local leaders, who facilitated the process by means of providing a cluster guide.<sup>48</sup> The enumerators and the cluster guide went to the approximate centre of the selected cluster area, where they randomly chose a direction by spinning a bottle on the ground. The enumerators then walked in the direction indicated by the bottle; from the bottle to the edge of the cluster.<sup>48</sup> At the edge of the cluster, the bottle was once more spun, so as to provide a second direction in which to walk, in order to improve on the randomness of the selection process. The research teams walked along in the direction indicated, enumerating the houses along the way, until the edge of the cluster was reached. Using a table of random numbers, the first house to be visited was selected by drawing a random number between one and the number of households enumerated.<sup>48</sup> Subsequent houses were then selected based on proximity, with the household on the right of each household surveyed being selected, until the required total number of mothers/caregivers for the cluster had been interviewed.<sup>48</sup> Where the required number of eligible children could not be identified in

the selected direction, the procedure was repeated to obtain a different direction, until the targeted number of mothers/caregivers per cluster had been interviewed.

## 2.4 DEFINITION OF VARIABLES

### 2.4.1 Dependent variables

**Anthropometric status:** This status was defined in accordance with the following WHO indices and cut-off points that determined whether a child was well-nourished or malnourished: underweight (with weight-for-age z-score [WAZ] of -2, or lower); stunted (with a length-for-age z-score [LAZ] of -2, or lower); wasted (with a weight-for-length z-score [WLZ] of -2, or lower); and overweight (with a weight-for-length z-score of +2, or higher).<sup>2,50</sup> (See Addendum C.)

### 2.4.2 Independent variables

**Complementary feeding:** Such feeding was defined by the WHO 2007 indicators as being: the timely introduction of solid, semi-solid and soft foods; the achievement of minimum dietary diversity, minimum meal frequency and minimum acceptable diet; continued breastfeeding at one year; and continued breastfeeding at two years.<sup>4,50</sup> (See Addendum C.)

**Whether child ever breastfed:** This variable was defined by the WHO 2007 indicator that measures the proportion of children born in the last 24 months who have ever been breastfed.<sup>4,50</sup> (See Addendum C.)

**Age:** This variable was taken to mean the age in completed months, as indicated on the child's health card, or as calculated from a calendar of events chart based on the mother's/caregiver's recall. (See Addendum D.)

**Maternal/Caregiver's education level:** This level was defined by the highest education level that had been reached by the mother/caregiver of the index child.

**Economic status:** This status was determined by the number of livestock owned by the household, in terms of whether the livestock numbers had increased, or decreased, in the recent past.

## 2.5 TRAINING OF THE ENUMERATORS

The enumerators were taken through a two-day training period prior to the data collection process. The training was conducted using the following methodologies: a lecture; a demonstration; discussions; and by role play. (See Addendum E.) The content of the training was as follows:

The first day involved the training of the enumerators on the following aspects of the survey:

1. The objectives and the rationale of the study.
2. Research ethics regarding how to obtain the informed consent of the participants and how to ensure participant confidentiality.
3. Interviewing skills.
4. The interpretation and translation of the set questions into the local language, as well as the administration of the structured questionnaire and the recording of the interview.
5. How to correctly use the calendar of events and chart for calculating the age of the infants and young children in months.
6. The taking of anthropometric measurements, as well as the interpretation and the standardisation of the findings made by means of the anthropometric equipment used.
7. The ensuring of data quality and the correct use and calibration of anthropometric equipment, so as to minimise errors and to avoid bias.
8. The roles and responsibilities of the enumerators and of the principle researcher.

The enumerators practised how to ask questions in a standardised way in the local language, as well as how to take anthropometric measurements correctly on a child. In pairs, the enumerators took turns weighing and taking length measurements of a child, after which the supervisor compared their finding to the actual measurements of the child to check for accuracy and address the variances.

On the second day, the enumerators spent a practical field day in a village (Awarsitu village) that was not part of the actual data collection sites, so as to practice the process of selecting and approaching households, as well as how to translate questions into the local languages and how to take the anthropometric measurements of children on-site.

At the end of the practical field exercise, the data collection process and the lessons learnt were discussed, so as to establish a standardised way of administering the questionnaire. The questionnaires were modified, based on the feedback that was received from the fieldwork. The planning and the preparation for the five-day data collection was conducted and the schedule was shared with the enumerators before they were assigned to various teams.

## **2.6 DATA COLLECTION TOOLS**

The mother/primary caregiver was interviewed, using a modified and validated structured questionnaire (Addendum F), adopted from the WHO standard questionnaire for assessing IYCF practices,<sup>51</sup> and the Guidelines for Nutrition Assessments in Kenya.<sup>52</sup> The questionnaire, which was developed in English,

contained the following sections: household information; socio-demographic and socio-economic status; IYCF; and anthropometry.

### **2.6.1 Household information section**

The household size and the total number of eligible individuals (i.e. children aged six to 23 months) in a household to be included in the study were identified in this section of the questionnaire.

### **2.6.2 Socio-demographic and socio-economic status section**

Information on the socio-demographic and economic status of the households surveyed was provided by the mothers/caregivers, who were asked to respond to questions on: the age and the gender of the index child; the relationship of the primary caregiver to the child; and the age, the gender, the marital status as well as the level of education of the primary caregiver. The household livestock situation was also noted.

### **2.6.3 Infant and Young Child Feeding section**

IYCF practices were assessed using a set of questions that determined the fluids and the semi-solid, solid and soft foods consumed by the index child (whether at, or outside, the home), based on 24 hours recall. The liquid foods assessed included: breast milk; water; infant formula; other types of milk; juices; soup; fermented milk; thin porridge; and tea/coffee. An additional question was related to the frequency of liquids based on milk, such as infant formula. The solid, semi-solid and soft foods assessed were: grains, roots and tubers; vegetables; fruits; meat and meat products; eggs; legumes and nuts; milk products; oil and fats; sugary foods and condiments. The number of times that the index child had eaten the solid, semi-solid or soft foods during the preceding 24 hours was also assessed.

### **2.6.4 Anthropometry section**

The weight and length measurements of the index child taken were recorded in this section.

## **2.7 DATA COLLECTION METHODS**

The data collection process began after the mother/primary caregiver in the sampled household had been provided with information regarding the rationale of the study and after they had given their informed consent by means of signing, or placing their thumbprint, on the consent form (Addendum G and H).

The participant information leaflet and consent form was prepared in English and in the Kiswahili language. The leaflet and form were also translated into the Borana language by the enumerators, to facilitate the understanding of the respondents, who tended neither to understand English nor Kiswahili. The information leaflet contained information pertaining to: the confidentiality of the information

provided; the rationale of the study; the risks and benefits associated with participating in the study; and the role of the interviewee. The respondent was given the participant information leaflet for future reference.

The enumerators administered the questionnaire before proceeding to take the anthropometric measurements of the child. This assisted in helping the children involved to familiarise themselves with the enumerators. The questions were translated from English into the Kiswahili/Borana languages by the enumerators, depending on the respondent's level of understanding of the languages concerned.

The children's age was established using child health cards, or, in the absence of the cards, a calendar of events was used (Addendum D). The calendar of events was generated with the help of the local elders and key informants, such as nutrition officers, before the training of the enumerators and the data collection exercise began. The actual age of the children was verified using a pre-developed chart for calculating age in months (Addendum I).

Anthropometric measurements were taken using the collaborative efforts of the paired enumerators and the mother/primary caregiver in each case. The latter was asked to participate in the taking of anthropometric measurements to ensure that the child concerned remained calm.

The weight of the nude child was measured, using a graduated UNICEF hanging Salter scale that was marked out in kilograms and which weighed to an accuracy of 0.1 kg. The weighing pants were hung on the hook of the suspended scale, in a private area, whereupon the scale was calibrated to zero. The mother/primary caregiver was asked to remove the child's clothes and shoes, as well as any jewellery, to ensure that accurate weights were taken. The child was then placed gently into the weighing pants. One enumerator read the weight on the scale at eye-level height, while the other recorded the data on the questionnaire, hence, the measurements were taken using combined effort.

The incumbent's length measurements were taken using UNICEF wooden measuring height boards graduated in centimetres and fitted with a sliding foot piece. Length measurements were taken to the nearest 0.1 cm. Both of the enumerators and the mother/primary caregiver were involved in taking the measurements, so as to ensure quality and accuracy. The mother was first asked to remove the child's shoes and any hair ornaments/objects. The child was then placed gently on the board on his back, with the head against the vertical base of the board and with the feet flat against the foot piece. The mother/primary caregiver was then asked to support the child's head, while the other enumerator supported the child's legs and read out the measurements. After confirming the measurements, the second enumerator recorded them on the questionnaire.

### **2.7.1 Data quality control**

The quality of data during data collection was assured using the following procedures:

1. The taking of anthropometric measurements was standardised during the training of the enumerators.
2. The data were collected by the enumerators who worked in pairs, so as to ensure accuracy in the taking of the anthropometric measurements and in the recording of information.
3. The actual age in months was verified using a chart for calculating age in months (see Addendum I).
4. The hanging Salter scales were checked every day before the start of data collection and at the end of each day against a standard weight.
5. The calibration of the weighing scales was done with the pants already being hung before each measurement were taken.
6. The principal researcher randomly selected and visited 20% of the total number of households to be visited each day during the data collection process, so as to ensure that the correct data collection procedures were followed. The principle researcher checked the processes involved in administering the questionnaire, as well as the taking of anthropometric measurements, so as to ensure that the standardisation and the quality were consistent.
7. The principal researcher checked all the questionnaires that had been administered during the day at the end of each day for purposes of accuracy, quality and completeness, and initiated actions for follow-up where, for instance, gaps in the data were identified. In the event that a questionnaire was incomplete, the research team was asked to return to the specific household to collect the relevant/missing information from the respondent on the following day.

## **2.8 PRE-TEST**

A pre-test of the questionnaires was conducted in June 2013, at a purposely selected rural pastoralist village (the Kambi-Garba village), which did not form part of the study sample. The purpose of the pre-test was to assess the reliability of the data collection tools. A random sample of 10 mother-child pairs with similar characteristics as the actual study population was interviewed. Permission to visit the households concerned was sought from the local leader (i.e. the chief).

The pre-test involved all the different aspects of the data collection, meaning the establishing of rapport, and the requesting for consent to collect the data; the administering of the structured questionnaire; and the taking of the anthropometric measurements of the children aged six to 23 months. The findings of the pre-test were used to improve the questionnaire, through enabling the making of the necessary changes

that were recommended, as well as improving the effectiveness of initiating the interview, of the administering of the tool and the collecting of the anthropometric data at household level by the enumerators.

## 2.9 ANALYSIS OF DATA

The data obtained were entered into Microsoft (MS) Excel spreadsheets on a daily basis. The data on the socio-demographic and on the economic characteristics of the study population, complementary feeding practices and the anthropometric status of children were analysed with the help of a statistician using MS Excel, ENA, and Statistical Analysis Software (SAS), version 9.1.<sup>53</sup> The results are presented in the form of tables, histograms and pie charts.

Such descriptive summary statistics as frequencies, percentages, means and standard deviations were used to describe the characteristics of the study population, that is the child's and caregiver's age and gender, the caregiver's marital status and education level, the household livestock situation, as well as the complementary feeding practices (relating to the timely introduction of solid, semi-solid and soft foods; the minimum dietary diversity, meal frequency and acceptable diet); as well as whether the index child had ever been breastfed; and whether the index child was breastfeeding at one year, or at two years.

Anthropometric status was interpreted using WHO child growth standards. The cut-off points consisted of the following: a LAZ  $< -2$  was referred to as stunting; a low WLZ  $< -2$  was referred to as wasting; a high WLZ  $> +2$  was referred to as overweight; and a low WAZ  $< -2$  was referred to as underweight.<sup>2</sup>

The appropriate inferential statistics were used to determine the relationships and the associations between the variables concerned. The relationships between nominal variables were compared using chi-square tests (Pearson, Fisher's exact and M-L). The statistical significance between the variables was tested using a  $\rho$ -value of  $< 0.05$  and a 95% CI. To test the hypotheses, two-tailed tests were used.



## 2.10 BUDGET

Table 2.2 below indicates the budget for the study.

**Table 2.2: Budget**

ACTIVITY	UNIT COST (KSH)	AMOUNT	TOTAL COST (KSH)
<b>1. Literature review</b>			
Internet access	1 000/month	12 months	12 000
Library access (Kenya National Library)	80/month	6 months	480
<b>2. Application of ethical approvals</b>			
Printing costs	10	60 copies	600
Photocopying costs	2	568 copies	1 136
Spiral binding	50	12 copies	600
<b>3. Pilot study</b>			
Printing	10	10 copies	100
Photocopying	2	81 copies	162
<b>4. Training of enumerators (10) / Data collection</b>			
Notebooks	30	10	300
Ballpoint pens	10	10	100
Stamp pad and ink	100	2	200
Folders	50	5	250
Pencils	5	5	25
Sharpener	5	5	25
Printing costs	10	6 copies	60
Photocopying costs	2	2 770 copies	5540
Hardwood sticks from which to suspend the hanging Salter scales	300	5	1 500
Hall hire for purposes of training	5 000	1	5 000
Vehicle hire	10 000	10	100 000
Fuel	120/litre	274 litres	32 880
Allowance for training of research assistants 2 days (Ksh 500/day)	1000	10 people	10 000
Allowance for data collection for enumerators (10) for 5 days	1 000 pp	5 days	50 000
Allowance for cluster guides (25)	300 pp	25 clusters	7 500
Principle investigator field accommodation expenses	1 500	7	10 500
Miscellaneous expenses	5 000	1	5 000
<b>GRAND TOTAL</b>	<b>Kenya Shillings</b>		<b>243 958</b>
	<b>Rand</b>		<b>20 250</b>

Hanging Salter scales, pants, calibration weights of 1 kg and height boards were requested from the Sub-County Nutrition Officers in Isiolo County.

### 2.10.1 Source of funding

Funding for the study was received from a Stellenbosch University Rural Medical Partnership Initiative (SURMEPI) bursary. The funding period was from June 2012 to June 2014 (see Addendum J).

## **2.11 ETHICAL AND LEGAL ASPECTS**

### **2.11.1 Ethical approval and permissions**

Ethical approval to conduct the study was sought and received from the Health Research Ethics Committee (HREC) of the host institution, Stellenbosch University, South Africa, on 22 February 2013 (Ethics reference number: S12/11/302) and from Kenyatta University, which is an institution in the host country of Kenya on 15 May 2013 (Ethics reference number: PKU/109/E12). A research permit to conduct the survey was received, on application, from the National Council of Science and Technology on 11 June 2013 and from the County Commissioner of Isiolo County on 28 February 2013, in response to the submission of a letter of interest. (See addenda K to O.)

The local elders/administration at the sub-locations (i.e. the clusters), namely the chiefs, were informed of the rationale of the study before the start of data collection, so as to allow the study pairs to visit the households and to conduct the interview in their areas. Through the local elders, the community members also became aware of and receptive to the study that was being conducted in their area, resulting in them being able to assist with the locating of sampled households.

### **2.11.2 Informed consent**

The participants were each provided with a copy of the participant information leaflet containing the key study information, pertaining to the rationale, the nature, the benefits and the potential risks of the study. The information was relayed in simple language, and when needed, it was translated into the Borana language. The participants were also informed that they were free to withdraw from the study at any time. Participation in the study was free and voluntary, and accordingly, the mothers/caregivers who participated in the study provided their informed consent, by means of either signing, or placing their thumbprint on the consent form, after coming to an understanding of the participant information provided. (See addenda G and H.)

### **2.11.3 Participant confidentiality**

The maintenance of participant confidentiality, which was ensured by using coded numbers on the questionnaires to identify the child and household was highlighted in the consent form that each participant signed. The participants were each assured that the activity was solely for research purposes and that all information obtained would remain confidential.

## 2.12 TIME SCHEDULE

**Table 2.3: Time schedule**

YEAR	(PART OF) MONTH(S)	ACTIVITY
2012	January–September	Literature study and protocol development
	October	Proposal presentation
	November–December	Application for ethics approval from SUHREC
2013	January–February	
2013	March–June	Application for ethics approval/permissions from Kenyatta University ERC and from the National Council of Science and Technology
	12–14 June	Pre-test tools
	17–23 June	Training of enumerators and data collection
	24–30 June	Data entry
	July–September	Data analysis
	September–November	Thesis development
	December	Break
	2014	January–March
April–June		Submit second draft of research assignment (thesis) and review
July–September		Submit third draft of research assignment (thesis) thesis and make final corrections
30 September		Submit final draft of the research assignment (thesis) thesis
October		Language editing
1 November		Submit thesis for examination
2015	January	Review of examiners comments and submit final thesis
	February 11 <sup>th</sup>	Oral examination

## CHAPTER 3 RESULTS

### 3.1 SOCIO-DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

#### 3.1.1 Cumulative summary of child age and gender

Data on 288 children aged six to 23 months were collected, with the mean age of children, in months, being found to be 15 ( $\pm 5.56$ ). The age of children in months was further segregated into the following age categories: six to 11 months, 12 to 17 months and 18 to 23 months based on WHO guidelines for assessing IYCF indicators.<sup>4</sup> According to the age categories involved, 35% were aged six to 11 months, 29% were aged 12 to 17 months and 36% were aged 18 to 23 months.

The total number of male children was 48%, whereas the total number of female children was 52%. (See Table 3.1 below.)

**Table 3.1: Distribution of study children by age and gender (N = 288)**

Age in no. of months	Female n (%)	Male n (%)	Totals n (%)
6–11	47 (31.1)	54 (39.4)	101 (35.1)
12–17	47 (31.1)	36 (26.4)	83 (28.8)
18–23	57 (38.8)	47 (34.3)	104 (36.1)
<b>Total (6–23 months)</b>	<b>151 (52.4)</b>	<b>137 (47.6)</b>	<b>288</b>

#### 3.1.2 Caregiver's socio-demographic characteristics

The caregiver's socio-demographic characteristics that were measured were: caregiver's age, relationship with the child, marital status, and education. Nearly all the caregivers interviewed (99%) were women, whereas 1% was a man. The caregivers were predominantly mothers of the index child, with 95% of the caregivers being mothers to the index child, whereas 3% were the grandmother, 1% was the aunt and 0.6% was the father. (See Table 3.2 below.)

The age of the caregivers interviewed was between 16 and 70 years old. The mean caregiver age in years was 27 ( $\pm 7.64$ ). During analysis, the ages were further segregated into four different age categories, with the largest age group being between 25 and 35 years old, with 51% (n = 147), while the smallest age group contained those aged 17 years or younger, at 3% (n = 8).

The majority of the caregivers (58%) had never attended school, whereas 42% had had some form of education. Out of the 120 caregivers who had attended school, nearly all (96%) had only reached primary school level, whereas 3% had reached secondary school level and only 1% had reached tertiary level.

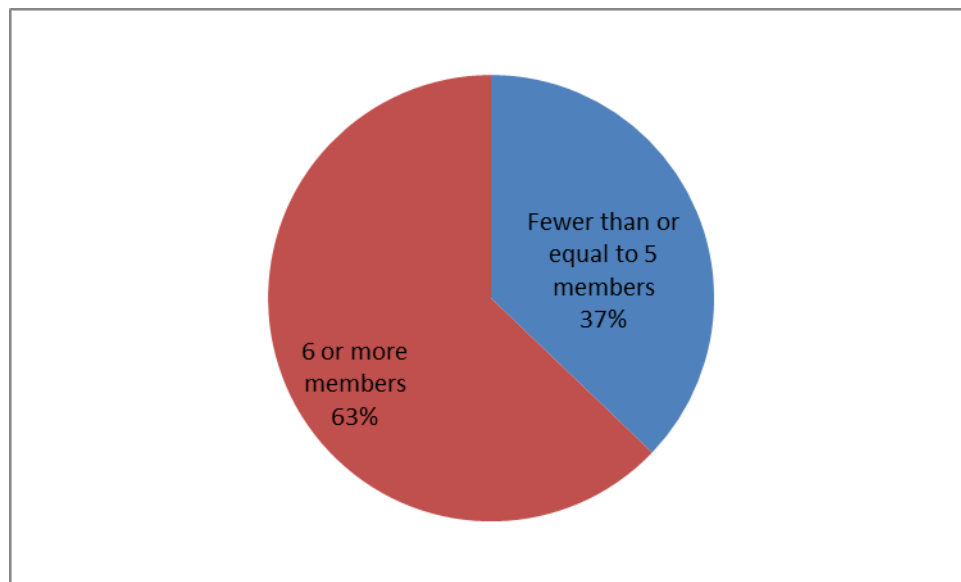
Most of the caregivers (93%) interviewed were married, whereas those in the other categories (single, widowed, separated/divorced) comprised 2%, respectively.

**Table 3.2: Socio-demographic characteristics of the caregivers of the study children**

<b>Demographic characteristics (N = 288)</b>	<b>n</b>	<b>%</b>
<b>Caregiver's gender</b>		
Female	287	99.7
Male	1	0.3
<b>Caregiver's relationship to the index child</b>		
Mother	273	94.8
Father	2	0.7
Sister	0	0.0
Brother	0	0.0
Grandmother	9	3.1
Aunt	4	1.3
Neighbour	0	0.0
<b>Caregiver's age</b>		
36 years and older	29	10.1
25–35 years	147	51.0
18–24 years	104	36.1
17 years and younger	8	2.8
<b>Caregiver school attendance</b>		
Had attended school	120	41.7
Had not attended school	168	58.3
<b>Education level</b>		
College/Tertiary institution	1	0.4
Secondary school	4	1.4
Primary school	115	39.9
None	168	58.3
<b>Marital status</b>		
Single	6	2.1
Married	269	93.4
Separated/Divorced	7	2.4
Widowed	6	2.1

### 3.1.3 Household size

The respondents were asked to provide information on their household size (i.e. the number of people in the household). The mean household size was 6 ( $\pm 1.95$ ). The household size was segregated into two categories, that is, households with fewer than or with five members and with the other category consisting of households with six or more members. This categorization was based on the average household size of rural Kenyan households which is 5.<sup>6</sup> Figure 3.1 below indicates that most of the households, 63% (n = 181), had more than six members, whereas 37% (n = 107) had fewer than, or, five members.



**Figure 3.1: Distribution of the household size (N = 288)**

### 3.1.4 Household livestock situation

The number of livestock increased in the majority of the households (71%) during the reporting period, that is over the period of the preceding six months (December 2012 to May 2013) (see Table 3.3 below). The number of households reporting a decrease in the number of livestock and where the number of livestock was reported to have remained the same over the period in question were closely similar at 13% and 15%, respectively. Of the respondents, 2% stated that they 'did not know the status' of the livestock household situation.

**Table 3.3: Household livestock situation**

<b>Household livestock situation (N = 288)</b>	<b>n</b>	<b>%</b>
Increase in the number of livestock	204	70.8
Decrease in the number of livestock	37	12.9
Roughly equivalent number of livestock	42	14.6
Status of livestock unknown	5	1.7

Table 3.4 below shows that, in the case of nearly all (95%) of the households that reported an increase in the number of livestock, the reason for such an increase was their livestock having given birth.

**Table 3.4: Reasons for an increase in the number of household livestock**

<b>Reasons for an increase in the number of household livestock (N = 204)</b>	<b>n</b>	<b>%</b>
Livestock gave birth	197	94.7
Livestock bought in	4	1.9
Livestock received	6	2.9
Due to receipt of dowry	1	0.5
As the result of a raid on others	0	0.0
Due to receipt of donation	0	0.0
As the result of restocking	0	0.0

The number of household livestock was found to have decreased in only 37 households, with the main reasons for the decrease being either the sale of livestock, or their death, due to illness, at 57% and 36%, respectively (see Table 3.5 below).

**Table 3.5: Reasons for a decrease in the number of household livestock**

<b>Reasons for a decrease in the number of household livestock (N = 37)</b>	<b>n</b>	<b>%</b>
Livestock sold	24	57.1
Death of livestock, because of drought	3	7.1
Death of livestock, because of disease	15	35.7
As the result of a raid by others	0	0.0
Due to giving of a dowry	0	0.0

## **3.2 COMPLEMENTARY FEEDING PRACTICES**

### **3.2.1 Breastfeeding practices**

Tables 3.6 to 3.8 below show the breastfeeding practices engaged in by the mothers/caregivers concerned.

Almost all of the children surveyed, 97% (n = 278), had been breastfed, with the female children tending to be slightly more breastfed than were the male children, at 52% and 48% respectively (see Table 3.6 below).

**Table 3.6: Child ever breastfed**

<b>Child ever breastfed</b>	<b>n</b>	<b>%</b>
Children aged 6–23 months (N = 288)	278	96.5
Female (N = 278)	145	52.2
Male (N = 278)	133	47.8

Almost twice the number of female children continued breastfeeding at one year (63%) than did the male children (37%) (see Table 3.7 below).

**Table 3.7: Continued breastfeeding at one year**

<b>Continued breastfeeding at 1 year</b>	<b>n</b>	<b>%</b>
Children aged 12–15 months (N = 54)	51	94.4
Female	32	62.7
Male	19	37.3

Table 3.8 below shows that breastfeeding at two years declined to 64%, from 94% at one year. More female children (55%) than male children (45%) were breastfed at two years.

**Table 3.8: Continued breastfeeding at two years**

<b>Continued breastfeeding at 2 years</b>	<b>n</b>	<b>%</b>
Children aged 20–23 months (N = 77)	49	63.6
Female	27	55.1
Male	22	44.9

### 3.2.2 Introduction of solid, semi-solid and soft foods (complementary foods)

Nearly two-thirds (69%), of the children aged six to eight months had received solid, semi-solid and soft (complementary) foods at the time of study, with slightly more females (53%) than males (47%) having achieved this indicator (see Table 3.9 below).

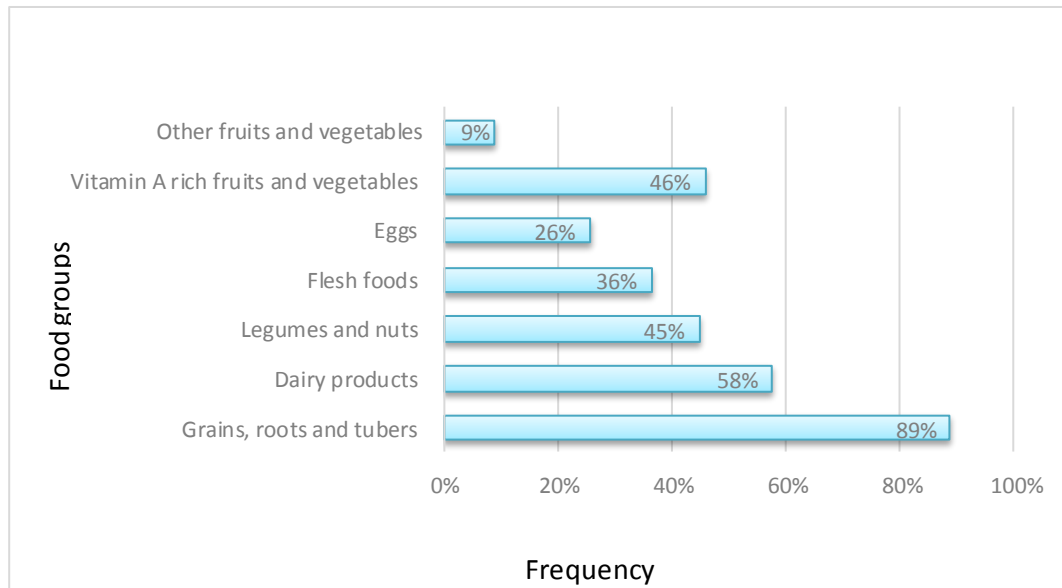
**Table 3.9: Introduction of solid, semi-solid and soft foods at six to eight months**

<b>Introduction of solid, semi-solid and soft foods</b>	<b>n</b>	<b>%</b>
Children aged 6–8 months (N = 52)	36	69.2
Female	19	52.8
Male	17	47.2



### 3.2.3 Food groups consumed in the last 24 hours

The study findings indicated that the highest consumed food groups, based on the 24-hour recall, were grains, roots and tubers at 89% (n = 256) and dairy products at 58% (n = 166). The least consumed food groups were other fruits and vegetables, at 9% (n = 25), and eggs, at 26% (n = 74) (see Figure 3.2 below).



**Figure 3.2: Food groups consumed by the study children, based on 24-hour recall**

### 3.2.4 Minimum dietary diversity

The minimum dietary diversity of complementary foods was determined based on seven food groups,<sup>23</sup> which are enumerated in Figure 3.2 above. Minimum dietary diversity is referred to as the consumption of four, or more of the seven food groups listed.<sup>4</sup> Under half of the study children (35%) were found to have achieved the minimum dietary diversity (34% and 41% for breastfed and non-breastfed children, respectively).

The indicator was further disaggregated into age groups of children aged six to 11, 12 to 17 and 18 to 23 months, with the percentage of children who had achieved this indicator increasing with an increase in age, in months. The minimum dietary diversity was highest at 18 to 23 months (47%), followed by 41% in the case of children aged 12 to 17 months and lowest for the children aged six to 11 months (19%) (see Table 3.10 below).

**Table 3.10: Minimum dietary diversity**

<b>Minimum dietary diversity</b>	<b>n</b>	<b>%</b>
<b>Children aged 6–23 months (N = 288)</b>	<b>102</b>	<b>35.4</b>
Breastfed children (N = 242)	83	34.3
Non-breastfed children (N = 46)	19	41.3
<b>Children aged 6–11 months (N = 101)</b>	<b>19</b>	<b>18.8</b>
Breastfed children (N = 96)	18	18.8
Non-breastfed children (N = 5)	1	20.0
<b>Children aged 12–17 months (N = 83)</b>	<b>34</b>	<b>41.0</b>
Breastfed children (N = 75)	32	42.7
Non-breastfed children (N = 8)	2	25.0
<b>Children aged 18–23 months (N = 104)</b>	<b>49</b>	<b>47.1</b>
Breastfed children (N = 71)	33	46.5
Non-breastfed children (N = 33)	16	48.5

### 3.2.5 Minimum meal frequency

The minimum meal frequency was determined by calculating the percentage of breastfed and non-breastfed children aged six to 23 months who received complementary foods (including milk feeds for non-breastfed children) a minimum number of times. The minimum in this case was defined as twice for breastfed infants of six to eight months, three times for breastfed children of six to 23 months and four times for non-breastfed children of six to 23 months.<sup>4</sup>

Over half of the children studied (60%) had achieved the minimum meal frequency (with non-breastfed and breastfed children achieving 65% and 60%, respectively). The minimum meal frequency was higher in children aged 18 to 23 months (67%) than it was in the other age categories (6–11 months and 12–17 months at 58% and 54%, respectively) (see Table 3.11 below).

**Table 3.11: Minimum meal frequency**

<b>Minimum meal frequency</b>	<b>n</b>	<b>%</b>
<b>Children aged 6–23 months (N = 288)</b>	<b>174</b>	<b>60.4</b>
Breastfed children (N = 242)	144	59.5
Non-breastfed children (N = 46)	30	65.2
<b>Children aged 6–11 months (N = 101)</b>	<b>59</b>	<b>58.4</b>
Breastfed children (N = 96)	56	58.3
Non-breastfed children (N = 5)	3	60.0
<b>Children aged 12–17 months (N = 83)</b>	<b>45</b>	<b>54.2</b>
Breastfed children (N = 75)	39	52.0
Non-breastfed children (N = 8)	4	50.0
<b>Children aged 18–23 months (N = 104)</b>	<b>70</b>	<b>67.3</b>
Breastfed children (N = 71)	49	69.0
Non-breastfed children (N = 33)	21	63.6

### 3.2.6 Minimum acceptable diet

The minimum acceptable diet is the cumulative proportion of children who achieved both minimum dietary diversity and minimum meal frequency, <sup>4</sup> with only 25% of the children having achieved this indicator (with 24% for breastfed and with 30% for non-breastfed). The percentage of children attaining a minimum acceptable diet was higher among the older children (18–23 months) (39%) than among the younger children, who attained 21% and 16% in the 12 to 17 months and the six to 11 months age groups, respectively (see Table 3.12 below).

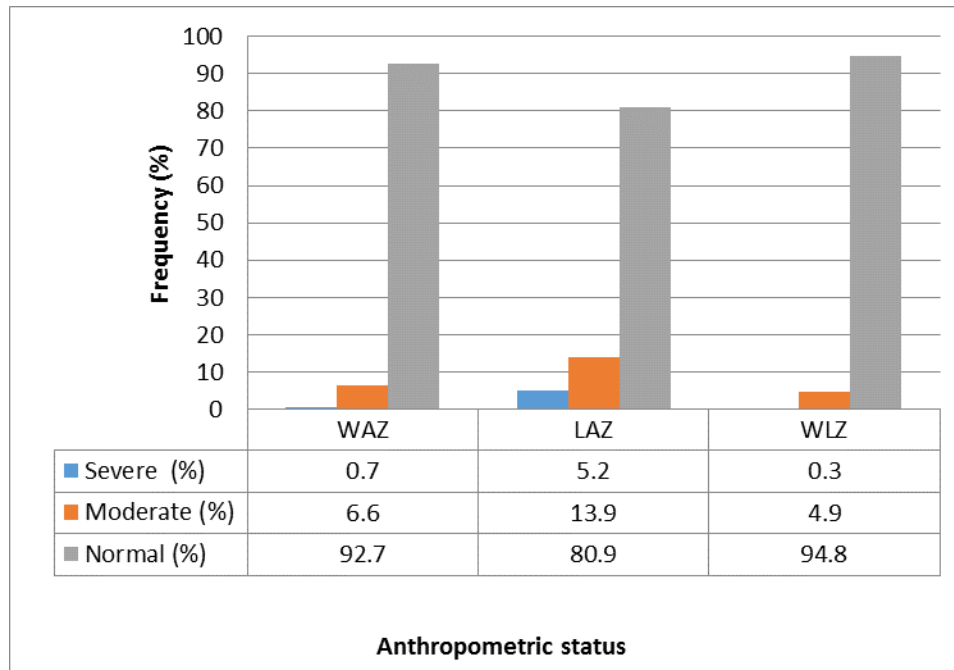
**Table 3.12: Minimum acceptable diet**

<b>Minimum acceptable diet</b>	<b>n</b>	<b>%</b>
<b>Children aged 6–23 months (N = 288)</b>	<b>73</b>	<b>25.3</b>
Breastfed children (N = 242)	59	24.3
Non-breastfed children (N = 46)	14	30.4
<b>Children aged 6–11 months (N = 101)</b>	<b>16</b>	<b>15.8</b>
Breastfed children (N = 96)	15	15.6
Non-breastfed children (N = 5)	1	20.0
<b>Children aged 12–17 months (N = 83)</b>	<b>17</b>	<b>20.5</b>
Breastfed children (N = 75)	16	21.3
Non-breastfed children (N = 8)	1	12.5
<b>Children aged 18–23 months (N = 104)</b>	<b>40</b>	<b>38.5</b>
Breastfed children (N = 71)	28	39.4
Non-breastfed children (N = 33)	12	36.4

### 3.3 ANTHROPOMETRIC STATUS

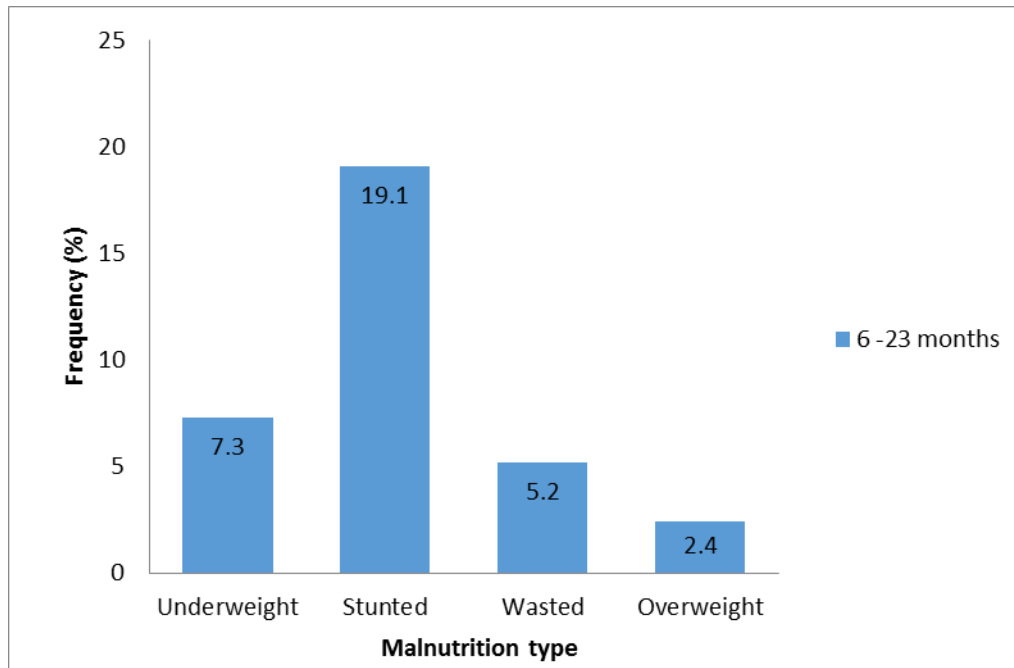
#### 3.3.1 Anthropometric indicators

Age, length and weight measurements were used to determine the anthropometric status of the children being studied, using the WHO 2006 cut-offs.<sup>2</sup> From the study, the majority (more than 80%) of the children measured were found to have normal anthropometric status. Of the children, 95% had normal WLZ, whereas 81% and 93% had normal LAZ and normal WAZ, respectively (see Figure 3.3 below).



**Figure 3.3: Anthropometric status of children aged six to 23 months**

When the data were further disaggregated so as to measure the percentage of children with malnutrition, as determined by the relevant anthropometric indicators, stunting was found to be the most prevalent form of malnutrition, at 19% ( $n = 55$ ). This percentage was followed by those who were underweight at 7% ( $n = 21$ ), and by those who suffered from wasting at 5% ( $n = 15$ ). The percentage of children who were overweight was the lowest at 2% ( $n = 7$ ) (see Figure 3.4 below).

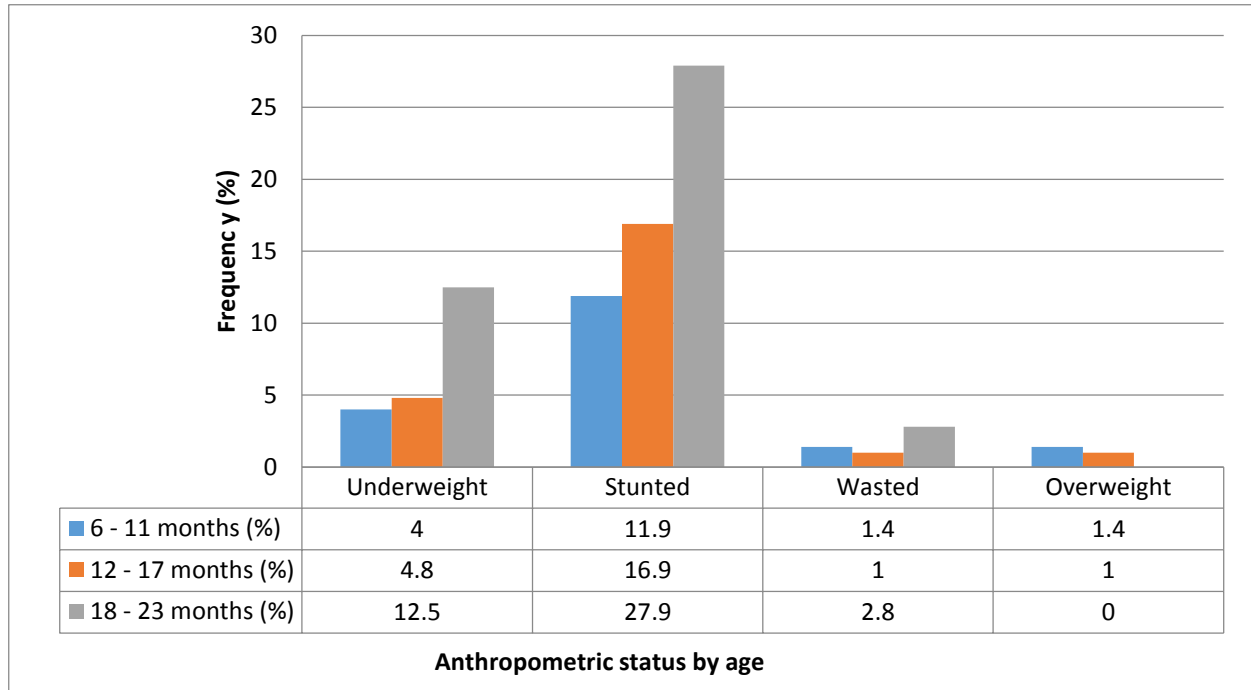


**Figure 3.4: Distribution of malnutrition among children aged six to 23 months**

### 3.3.2 Poor anthropometric status according to age

Generally, the percentage of children with poor anthropometric status increased with an increase in age, in months. Figure 3.5 below indicates the age group with the highest level of undernutrition (i.e. with poor anthropometric status) to have consisted of those who were aged 18 to 23 months ( $n = 104$ ). This group had a higher prevalence of underweight, stunting and wasting, as determined by the relevant anthropometric indicators.

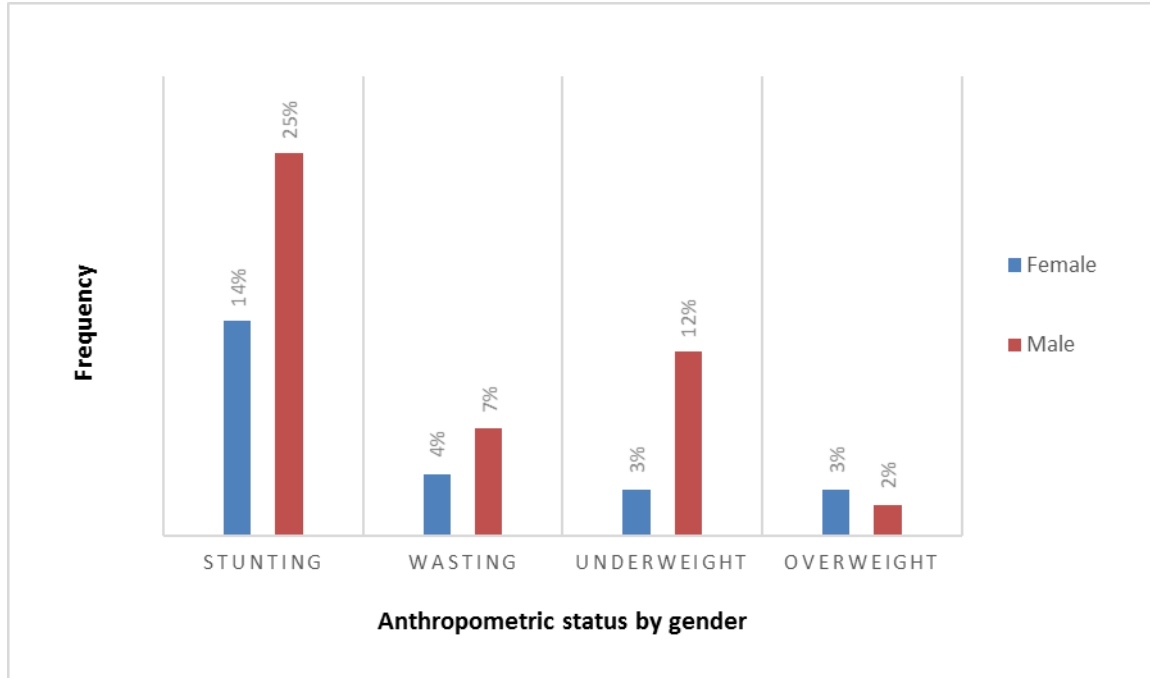
Of the children aged six to 11 months, 12 to 17 months and 18 to 23 months, 12%, 17% and 28% were, respectively, found to be stunted. Of the children aged six to 11 months, 12 to 17 months and 18 to 23 months, respectively, 4%, 5% and 13% were found to be underweight, whereas wasting and overweight was found to be present in under 5% of the children in all three age categories (i.e. 6–11 months, 12–17 months and 18–23 months). Overweight rates reduced with an increase in age (in months).



**Figure 3.5: Anthropometric status according to the age of children aged six to 23 months**

### 3.3.3 Anthropometric status according to gender

Overall, a higher percentage of male than female children were found to have a poor anthropometric status (consisting of underweight, wasting, or stunting). A slightly higher percentage of female (3%) than male (2%) children was noted as overweight (see Figure 3.6 below).



**Figure 3.6: Anthropometric status according to the gender of children aged six to 23 months**

### **3.4 RELATIONSHIPS BETWEEN VARIABLES**

#### **3.4.1 Socio-demographic and economic characteristics and complementary feeding practices**

The association between the socio-demographic and economic characteristics and the complementary feeding practices of children aged six to 23 months among pastoralist communities was determined using chi-square tests. The results that were obtained in this regard are indicated in Tables 3.13 to 3.22 below.

##### **3.4.1.1 Socio-demographic and economic characteristics and whether children ever breastfed**

The data were analysed using Pearson's chi-square test, which established significant relationships between whether a child ever breastfed and the caregiver's age ( $\rho = 0.000$ ; 95% CI); whether the caregiver had ever attended school ( $\rho = 0.039$ ; 95% CI) as well as caregiver's marital status ( $\rho = 0.001$ ; 95% CI). Caregivers who were older, who had had some form of education (i.e. who had attended school), or who were married were more likely to breastfeed than did their counterparts who were younger, who had never attended school, or who were not married (see Table 3.13 below).

**Table 3.13: Relationship between socio-demographic characteristics and whether children ever breastfed (N = 288)**

Socio-demographic and economic characteristics	df	Chi-square test; P-value
Child's gender		$\pi$ 0.624
Child's age	2	$\infty$ 0.274
Caregiver's age	3	$\infty$ 0.000*
Caregiver's schooling	1	$\infty$ 0.039*
Caregiver's education level	2	$\infty$ 0.978
Caregiver's marital status	3	$\infty$ 0.001*
Household livestock situation	3	$\infty$ 0.606

$\infty$  Pearson chi-square test;  $\pi$  Fisher's exact chi-square test; \*Significance at  $p < 0.05$

### 3.4.1.2 Socio-demographic and economic characteristics and continued breastfeeding at one year

A significant relationship was found between the child's gender and continued breastfeeding at one year ( $p = 0.018$ ; 95% CI). More female children breastfed at one year than did their male counterparts (see Table 3.14 below).

**Table 3.14: Relationship between socio-demographic and economic characteristics and continued breastfeeding at one year (N = 54)**

Socio-demographic and economic characteristics	df	Chi-square test; P-value
Child's gender		$\pi$ 0.018*
Child's age	2	$\infty$ 1.000
Caregiver's age	3	$\infty$ 0.938
Caregiver's schooling	1	$\infty$ 0.788
Caregiver's education level	2	$\infty$ 1.000
Caregiver's marital status	3	$\infty$ 0.968
Livestock situation	3	$\infty$ 0.868

$\infty$  Pearson chi-square test;  $\pi$  Fisher's exact chi-square test; \*Significance at  $p < 0.05$

### 3.4.1.3 Socio-demographic and economic characteristics and continued breastfeeding at two years

A significant relationship between the caregiver's marital status and continued breastfeeding at two years ( $p = 0.033$ ; 95% CI). Caregivers who were married, as compared to those who were not married were found to breastfeed their children for a longer period, until they were two years old. Education had no relationship with the duration of breastfeeding. (See Table 3.15 below.)



**Table 3.15: Relationship between socio-demographic and economic characteristics and continued breastfeeding at two years (N = 77)**

Socio-demographic and economic characteristics	df	Chi-square test; P-value
Child's gender	1	$\pi$ 0.897
Child's age	2	$\infty$ 1.000
Caregiver's age	3	$\infty$ 0.102
Schooling of caregiver	1	$\infty$ 0.895
Caregiver's education level	2	$\infty$ 0.555
Caregiver's marital status	3	$\infty$ 0.033*
Livestock situation	3	$\infty$ 0.173

$\infty$  Pearson chi-square test;  $\pi$  Fisher's exact chi-square test; \*Significance at  $p < 0.05$

#### 3.4.1.4 Socio-demographic and economic characteristics and the timely introduction of solid, semi-solid and soft foods (complementary foods)

No significant relationship was found between the socio-demographic and economic characteristics and the timely introduction of solid, semi-solid and soft foods ( $p > 0.05$ ) (see Table 3.16 below).

**Table 3.16: Relationship between socio-demographic and economic characteristics and the timely introduction of solid, semi-solid and soft foods (N = 288)**

Socio-demographic and economic characteristics	df	Chi-square test; P-value
Child's gender	1	$\infty$ 0.069
Child's age	2	$\infty$ 1.000
Caregiver's age	3	$\infty$ 0.167
Caregiver's schooling	1	$\infty$ 0.601
Caregiver's education level	2	$\infty$ 0.299
Caregiver's marital status	3	$\infty$ 0.439
Livestock situation	3	$\infty$ 0.802

$\infty$  Pearson chi-square test

#### 3.4.1.5 Socio-demographic and economic characteristics and minimum dietary diversity

A significant relationship was found between child age and minimum dietary diversity ( $p = 0.000$ ; 95% CI). A significantly higher percentage of older children (18–23 months) consumed  $\geq 4$  food groups (i.e. attained minimum dietary diversity) than the percentage of younger children (6–11 and 12–17 months) (see Table 3.17 below).

**Table 3.17: Relationship between socio-demographic and economic characteristics and minimum dietary diversity (N = 288)**

Socio-demographic and economic characteristics	df	Chi-square test; P-value
Child's gender		$\pi$ 0.905
Child's age	2	$\infty$ 0.000*
Caregiver's age	3	$\infty$ 0.053
Caregiver's schooling	1	$\infty$ 0.169
Caregiver's education level	2	$\infty$ 0.659
Caregiver's marital status	3	$\infty$ 0.737
Livestock situation	3	$\infty$ 0.212

$\infty$  Pearson chi-square test;  $\pi$  Fisher's exact chi-square test; \*Significance at  $p < 0.05$

#### 3.4.1.6 Socio-demographic and economic characteristics and minimum meal frequency

A significant relationship was identified between caregiver age and minimum meal frequency ( $\rho \leq 0.026$ ; 95% CI). A higher percentage of caregivers who were older, as compared to the younger mothers, provided a minimum meal frequency for their children (see Table 3.18 below).

**Table 3.18: Relationship between socio-demographic and economic characteristics and minimum meal frequency (N = 228)**

Socio-demographic and economic characteristics	df	Chi-square test; P-value
Child's gender		$\pi$ 0.539
Child's age	2	$\infty$ 0.653
Caregiver's age	3	$\infty$ 0.026*
Caregiver's schooling	1	$\infty$ 0.346
Caregiver's education level	2	$\infty$ 0.661
Caregiver's marital status	3	$\infty$ 0.947
Livestock situation	3	$\infty$ 0.818

$\infty$  Pearson chi-square test;  $\pi$  Fisher's exact chi-square test; \*Significance at  $p < 0.05$

#### 3.4.1.7 Socio-demographic and economic characteristics and minimum acceptable diet

A significant relationship was found between whether the caregiver had attended school and minimum acceptable diet ( $\rho \leq 0.028$ ; 95% CI). A higher percentage of caregivers who had had some formal education provided a minimum acceptable diet, as compared to the percentage of caregivers who had never attended school. (See Table 3.19 below).

**Table 3.19: Relationship between socio-demographic and economic characteristics and minimum acceptable diet (N = 288)**

Socio-demographic and economic characteristics	df	Chi-square test; P-value
Child's gender		$\pi$ 0.755
Caregiver's gender	2	$\infty$ 0.096
Caregiver's age	3	$\infty$ 0.095
Caregiver's schooling	1	$\infty$ 0.028*
Caregiver's education level	2	$\infty$ 0.473
Caregiver's marital status	3	$\infty$ 0.179
Livestock situation	3	$\infty$ 0.454

$\infty$  Pearson chi-square test;  $\pi$  Fisher's exact chi-square test; \*Significance at  $p < 0.05$

### 3.4.2 Relationship between socio-demographic and economic characteristics and anthropometric status

The relationships between variables were measured using chi-square tests. The results, as indicated in Tables 3.23 to 3.25 below show that there were some significant associations between the socio-demographic characteristics and anthropometric status ( $p \leq 0.05$ ; 95% CI).

#### 3.4.2.1 Socio-demographic and economic characteristics and the weight-for-age z-score (WAZ)

A significant association was identified between WAZ and the child's gender ( $p = 0.018$ ; 95% CI); caregiver's age ( $p = 0.007$ ; 95% CI); and the caregiver's education level ( $p = 0.000$ ; 95% CI). Female children were found to be better nourished (i.e. had a normal WAZ) than the male children. The caregivers who were older and who had a higher education level than the other groups studied had children with a better anthropometric status in terms of WAZ (see Table 3.20 below).

**Table 3.20: Relationship between socio-demographic and economic characteristics and WAZ**

Socio-demographic and economic characteristics	df	Chi-square test; P-value
Child's gender	2	$\infty$ 0.018*
Caregiver's gender	2	$\infty$ 0.961
Caregiver's age	6	$\infty$ 0.007*
Caregiver's schooling	2	$\infty$ 0.175
Caregiver's education level	4	$\infty$ 0.000*
Caregiver's marital status	6	$\infty$ 0.958
Livestock situation	6	$\infty$ 0.610

$\infty$  Pearson chi-square test; \*Significance at  $p < 0.05$

### 3.4.2.2 Socio-demographic and economic characteristics and the length-for-age z-score (LAZ)

Significant relationships were found between child gender and LAZ ( $\rho = 0.047$ ; 95% CI). Significantly more male, than female, children were stunted (see Table 3.21 below).

**Table 3.21: Relationship between socio-demographic and economic characteristics and LAZ**

Socio-demographic and economic characteristics	df	Chi-square test; P-value
Child's gender	2	$\infty 0.047^*$
Caregiver's gender	2	$\infty 0.888$
Caregiver's age	6	$\infty 0.418$
Caregiver's schooling	2	$\infty 0.430$
Caregiver's education level	4	$\infty 0.398$
Caregiver's marital status	6	$\infty 0.625$
Livestock situation	6	$\infty 0.560$

$\infty$  Pearson chi-square test; \*Significance at  $p < 0.05$

### 3.4.2.3 Socio-demographic and economic characteristics and the weight-for-length z-score (WLZ)

The study identified significant relationships between WLZ and the caregiver's schooling ( $\rho = 0.004$ ; 95% CI) as well as caregiver's education level ( $\rho = 0.000$ ; 95% CI). The children of caregivers who had had formal education had a better anthropometric status (normal WLZ) as compared to the children of caregivers who hadn't had formal education (see Table 3.22 below).

**Table 3.22: Relationship between socio-demographic and economic characteristics and WLZ**

Socio-demographic and economic characteristics	df	Chi-square test; P-value
Child's gender	3	$\infty 0.634$
Caregiver's gender	3	$\infty 0.994$
Caregiver's age	9	$\infty 0.562$
Caregiver's schooling	3	$\infty 0.004^*$
Caregiver's education level	6	$\infty 0.000^*$
Caregiver's marital status	9	$\infty 0.908$
Livestock situation	9	$\infty 0.968$

$\infty$  Pearson chi-square test; \*Significance at  $p < 0.05$

### 3.4.3 Relationship between anthropometric status and complementary feeding practices

The study found significant relationships between anthropometric status (WLZ) and complementary feeding practices ( $\rho \geq 0.05$ ), as presented in Tables 3.27 to 3.29.

### 3.4.3.1 The weight-for-age z-score (WAZ) and complementary feeding practices

No significant relationship was found between the WAZ and complementary feeding practices identified in the study (see Table 3.23 below).

**Table 3.23: Relationship between WAZ and complementary feeding practices**

Complementary feeding indicator	df	Chi-square test; P-value
Ever breastfed	2	∞0.215
Continued breastfeeding at 1 year	2	∞0.941
Continued breastfeeding at 2 years	2	∞0.840
Introduction of solid, semi-solid and soft foods	2	∞0.686
Minimum dietary diversity	2	∞0.240
Minimum meal frequency	2	∞0.217
Minimum acceptable diet	2	∞0.581

∞ Pearson chi-square test

### 3.4.3.2 The length-for-age z-score (LAZ) and complementary feeding practices

No significant relationship was found between the LAZ and complementary feeding practices identified in the study ( $p \geq 0.05$ ) (see Table 3.24 below).

**Table 3.24: Relationship between LAZ and complementary feeding practices**

Complementary feeding indicator	df	Chi-square test; P-value
Ever breastfed	2	∞0.664
Continued breastfeeding at 1 year	2	∞0.759
Continued breastfeeding at 2 years	2	∞0.360
Introduction of solid, semi-solid and soft foods	2	∞0.432
Minimum dietary diversity	2	∞0.317
Minimum meal frequency	2	∞0.960
Minimum acceptable diet	2	∞0.416

∞ Pearson chi-square test

### 3.4.3.3 The weight-for-length z-score (WLZ) and complementary feeding practices

A significant relationship was identified between the WLZ and continued breastfeeding at two years ( $p = 0.037$ ; 95% CI). Children who continued breastfeeding up to the recommended two years (and beyond) had a better anthropometric status (i.e. a normal WLZ), as compared to children who were not breastfed up to two years old (see Table 3.25 below).

**Table 3.25: Relationship between WLZ and complementary feeding practices**

<b>Complementary feeding indicator</b>	<b>df</b>	<b>Chi-square test; P-value</b>
Ever breastfed	3	$\infty$ 0.836
Continued breastfeeding at 1 year	2	$\infty$ 0.980
Continued breastfeeding at 2 years	3	$\rho$ 0.037*
Introduction of solid, semi-solid and soft foods	3	$\infty$ 0.743
Minimum dietary diversity	3	$\infty$ 0.569
Minimum meal frequency	3	$\infty$ 0.542
Minimum acceptable diet	3	$\infty$ 0.433

$\infty$  Pearson chi-square test;  $\rho$  M-L chi-square test; \*Significance at  $p < 0.05$

### 3.5 HYPOTHESES TESTING

- The null hypothesis that there is no relationship between complementary feeding practices and the nutritional status of children aged six to 23 months among pastoralist communities can neither be accepted nor rejected, since only one indicator, namely ‘continued breastfeeding at two years’, had a significant relationship with the weight-for-length z-scores (WLZ) ( $\rho \leq 0.05$ ; 95% CI).
- The null hypothesis that there is no relationship between socio-demographic and economic factors and complementary feeding practices in children aged six to 23 months among pastoralist communities is rejected, because a significant relationship was found between the following socio-demographic characteristics: caregiver’s age; caregiver’s schooling; caregiver’s marital status; child age and gender, with complementary feeding indicators ( $\rho \leq 0.05$ ; 95% CI).

## **CHAPTER 4 DISCUSSION**

In addition to investigating complementary feeding practices and anthropometric status among children living among pastoralist communities, the current study identified the main socio-demographic and economic characteristics that might determine complementary feeding practices and anthropometric status.

### **4.1 SOCIO-DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS**

Overall, the majority of the caregivers were women were aged between 25 and 35 years and were married. The percentage of caregivers who were married in this study was 93% which was a higher percentage than the Isiolo County estimate based on the Kenya 2009 population census<sup>44</sup> which stated that 33% of the Isiolo County population was married. Such differences may be because population census studied the whole population of Isiolo County while this study only assessed one community hence leading to variances in socio-demographic (particularly religious and cultural differences) and economic backgrounds while incorporating both urban and rural populations.

In addition to the above, most of the caregivers had never attended school and for those who had attended school, nearly all had only reached primary school level. This shows that the education level of the women living among pastoralist communities is quite low. Isiolo County, where the study was conducted lies in one of the areas of the country where infrastructure such as roads and schools is poorly developed which may affect the education enrolment numbers. Furthermore, pastoralist communities live in the rural areas of the country, hence, these results correspond to those in the KDHS 2008–2009,<sup>6</sup> which indicates that the educational attainment of women in urban areas tends to be higher (10%) than such attainment among their rural counterparts, at 5%. In another study that was conducted in an urban area, Korir<sup>30</sup> found higher education levels, with only 5.6% of the caregivers having no formal education. The low education levels might have an effect on complementary feeding practices in terms of influencing the level of knowledge and the extent of economic power wielded.

The average household size, numerically speaking, was six, with the results found in this study being similar to those that were discovered in a study by Macharia-Mutie, Brouwer, Mwangi and Kok<sup>21</sup> in a rural area of Mwingi, Kenya; who found the average household size to be 6.9 ( $\pm 2.5$ ). Most of the households reported an increase in the number of their livestock over the preceding six months prior to the study. Another survey that was conducted in a pastoralist community<sup>28</sup> during the same period also found similar results, with the number of livestock having increased over the preceding three months.

Livestock, being a key economic and food source for pastoralist communities might have an impact on complementary feeding practices, through increasing purchasing power as well as the availability of food, particularly milk in the household.

## **4.2 FEEDING PRACTICES OF CHILDREN AGED SIX TO 23 MONTHS**

Feeding practices vary according to the different contexts in which a study is carried out. In this study, seven indicators of feeding practices were assessed: whether a child ever breastfed; continued breastfeeding at one year; continued breastfeeding at two years; introduction to solid, semi-solid and soft foods (i.e. complementary foods); minimum dietary diversity; minimum meal frequency; and minimum acceptable diet.<sup>4</sup> The results of this study indicated that the complementary feeding practices were poor while breastfeeding practices (with the exception of continued breastfeeding at 2 years) were largely appropriate.

### **4.2.1 Breastfeeding practices**

Breastfeeding is common practice among African communities, as has been found in a number of empirical studies.<sup>6, 21-28, 30</sup> This study found similar results, in that nearly all the study children had been breastfed, with more female than male children being breastfed. These findings are similar to the findings that were made in the Integrated Health and Nutrition survey done in Isiolo,<sup>26</sup> which found a high percentage (98%) of children who had been breastfed. In addition, the national estimates for Kenya<sup>6</sup> found a high percentage of children to have been breastfed (97% for male children, with a slightly higher percentage of 98% for female children).

However, the proportion of children being breastfed dropped from 94% at one year, to 64% at two years. These results are similar to those that were discovered in a study by Korir<sup>30</sup> in an urban slum in Kenya, which found that while breastfeeding rates were lower than in pastoralist areas, breastfeeding rates also declined as the age increased at 69% and 32% in children aged one and two years respectively. The decline in breastfeeding with an increase in age could be attributed to the increase in consumption of other solid, semi-solid or soft foods, as identified in this study, as well as to increasing household and child care demands. Additionally, in this study, breastfeeding rates were found to be higher in the case of female children than they were in the case of male children, both at one year and at two years (significantly at one year). This also corresponds to the national estimates, which show that more female, than male children are breastfed.<sup>6</sup> Since the reasons for this phenomenon were not conclusively determined in this study, cultural practices, attitudes and beliefs might have a role to play in the variations of breastfeeding by gender.



#### **4.2.2 Timely introduction of complementary foods**

The WHO recommends that complementary foods be introduced at six months of age to ensure that the child obtains all the required nutrients.<sup>1</sup> However, this is often not the case in practice and most previous studies have documented an early introduction of complementary foods before the recommended period of six months.<sup>1, 21-24</sup> Such a study was one conducted by Macharia-Mutie, Brouwer, Mwangi and Kok,<sup>21</sup> the mean age of complementary food introduction was 2.45 ( $\pm$  1.7) months.

The current study found while two-thirds of the study children had been introduced to complementary foods at the time of the study (a higher percentage in female than male children); one-third (31%) of the study children aged six to eight months had not consumed complementary foods in the previous 24 hours indicative of late introduction of complementary foods.<sup>4</sup> In the context of pastoralist communities, the late introduction of complementary foods might be due to the challenges relating to access to food and availability as well as related difficulties that are encountered like increased maternal work-load as well to poor knowledge regarding infant feeding.

It is, therefore evident that the timely introduction of complementary foods is a challenge that might have an impact on the growth and development of the child, which particularly predisposes the child to poor nutritional status, in terms of both macronutrients and micronutrients.

#### **4.2.3 Minimum dietary diversity**

The recommended minimum dietary diversity for a child aged six to 23 months is consumption of  $\geq$  4 food groups over a period of 24 hours,<sup>4</sup> which ensures that a child who is aged above six months obtains the required amounts of micronutrients and macronutrients that are necessary for growth and development. Pastoralist communities tend to rely mainly on milk and on livestock products as well as on cereals for food.<sup>42</sup> Mamiro, Kolsteren, Roberfroid, Opsomer and Van Camp,<sup>22</sup> in a study in rural Tanzania, reported that most complementary foods provided in such a setting were cereal-based. Korir<sup>33</sup> found that porridge was the main diet for nearly all children aged six to 23 months who were studied in one of Nairobi's informal settlements. The national estimates, KDHS 2008–2009,<sup>6</sup> show that the most commonly used foods that are given to breastfeeding children who are under the age of three years include food made from grains (72%) and milk (51%). Such diets might potentially be lacking in the diversity that is required in terms of the consumption of all the food groups and their prevalence might also contribute to the inability to achieve recommended feeding practices.

In the current study, the food groups consumed were grouped into seven key categories, adopted from the Food and Agriculture Organization (FAO) guidelines for measuring household and individual dietary

diversity<sup>54</sup> and only two groups – namely grains, roots and tubers, and dairy products – were found to have been consumed by more than 50% of the sample on the previous day. These diets are potentially lacking in adequate amounts of micronutrients necessary for good health and nutrition.<sup>4</sup>

Overall, the minimum dietary diversity was achieved by less than two-eighths (35%) of the children surveyed. The findings on minimum dietary diversity in this study differed from the Kenyan national estimates<sup>6</sup> for rural areas where pastoralist communities live, in terms of which the percentage achieving this indicator was higher, at 51%, than in the current study. The difference between the findings of this study and those relating to the other rural households in Kenya can be due to the fact that the present study was conducted in a pastoralist community that lives in a remote, dry area and which, therefore, experiences challenges relating to the access to and the availability of a variety of foods often thereby resulting to food insecurity.<sup>55</sup>

When the results in this study were further split up according to age group, the percentages of children meeting the minimum dietary diversity were 47%, 41% and 19% for children aged 18 to 23 months, 12 to 17 months and six to 11 months, respectively. This decreasing trend is similar to the findings that were made in the study Aemro, Mesele and Birhanu<sup>56</sup> conducted in Ethiopia and which found that dietary diversity was 17%, 11% and 5% for 18 to 23 months, 12 to 17 months and six to 11 months, respectively. The percentage of children consuming  $\geq 4$  food groups in the course of a day was found to increase with an increase in age indicating that appropriate complementary feeding practices start much later than the recommended age of six months. This may be due to challenges relating to knowledge, attitude and practices (KAP) as identified in a KAP survey on IYCF practices conducted by Food Security Analysis Unit (FSAU)<sup>57</sup> in a pastoralist community in Somalia. In the KAP survey, from 12 – 24 months, most children are considered old enough to feed on the family food, while between 6-12 months, children are mostly fed on breastmilk, animal milk and porridge.<sup>57</sup>

#### **4.2.4 Minimum meal frequency**

According to WHO recommendations,<sup>4</sup> a minimum meal frequency is attained when complementary foods are consumed: twice for breastfed infants of six to eight months; thrice for breastfed children of nine to 23 months; and four times for non-breastfed children of six to 23 months. The percentage of children attaining the minimum meal frequency in this study was found to be 60%, which was almost double the percentage that was achieved for minimum dietary diversity. These results are almost similar to the KDHS 2008–2009<sup>6</sup> results regarding the national estimate for minimum meal frequency for children aged six to 23 months living in rural households, which was 63%.

A higher percentage of children aged 18 to 23 months achieved the recommended minimum meal frequency (67%), as compared to the achievements of the other age categories, of six to 11 months (58%) and 12 to 17 months (54%). This can be attributed to the reduction in continued breastfeeding of infants at two years (20–23 months), as can be seen in this study, which might increase the consumption of complementary foods.

#### **4.2.5 Minimum acceptable diet**

The WHO-recommended minimum acceptable diet relates to achieving the minimum dietary diversity and the minimum meal frequency for breastfed and non-breastfed children aged six to 23 months of age.<sup>4</sup> In this study, only a quarter of the children (25%) attained the minimum acceptable diet. These results are comparable to the results that were obtained in the study by Khanal, Sauer and Zhao<sup>58</sup> in Nepal, where the level of attainment of the minimum acceptable diet was low. The low percentage of children attaining the minimum acceptable diet in the present study indicates that the complementary foods that were provided to children aged six to 23 months among pastoralist communities at the time of the study were both of poor quality and of insufficient quantity.

A higher percentage of children who were aged between 18 and 23 months attained the minimum acceptable diet (39%), compared to the other children from the younger age categories (6–11 and 12-17 months) who achieved 16% and 21% respectively. The reduction in breastfeeding in older children due to maternal workload and/or pregnancy including beliefs that a child aged 12-24 months is now able to eat more family foods as identified in the KAP survey conducted in a pastoralist community in Somalia<sup>57</sup> may also be a contributory factor to the higher percentage achieved for minimum acceptable diet in older children (18-23 months).

### **4.3 ANTHROPOMETRIC STATUS OF CHILDREN AGED SIX TO 23 MONTHS**

The study measured the anthropometric status of the children aged six to 23 months, using weight, length and age to identify the prevalence of stunting, wasting, underweight and overweight. Overall, the majority of the children had normal anthropometric status.

#### **4.3.1 Stunting**

The results showed that the severity of the stunting prevalence (19.1%) was low when compared to WHO thresholds (with a low prevalence of stunting being < 20%).<sup>43</sup> Furthermore, the prevalence that was found in this study was lower than the national estimate, since, according to the KDHS,<sup>6</sup> the level of stunting is 35% (interpreted as a high severity of stunting prevalence).<sup>43</sup> Similarly, an Integrated Health and Nutrition survey<sup>28</sup> that was conducted in an almost similar pastoralist community in Kenya found a

stunting level of 25% (interpreted as a medium severity of stunting prevalence).<sup>46</sup> The variation in stunting rates might be due to the sample characteristics' differences, with the other two studies measuring stunting levels for children aged six to 59 months, whereas the current study measured stunting in children who were six to 23 months old.

In the current study, the percentage of children with stunting who were aged six to 23 months old increased with an increase in age. This finding is comparable with the other national Demographic Health Surveys (DHS) that have been undertaken in 14 different developing countries (including Kenya), where, overall and for each country, the prevalence of stunting increased with increase in age group (6–11, 12–17, 18–23 months).<sup>59</sup>

As is illustrated in the WHO conceptual framework for childhood stunting, the main cause of stunting is chronic inadequate complementary feeding, which subsequently leads to both short-term and long-term health, nutritional and economic consequences.<sup>29</sup> The *Lancet* 2008 series highlighted that appropriate complementary feeding practices have the capability to reduce stunting in children aged five years and under – with or without food supplementation – and in both food-secure and food-insecure households by 6%.<sup>10</sup> Therefore, the higher stunting levels in children aged 18 to 23 months (as compared to 6-11 and 12-17 months) among the pastoralist communities might be due to the poor complementary feeding practices that were identified in this study and which tend to start early in life.

#### **4.3.2 Underweight**

In this study, the severity of underweight prevalence was low among children aged six to 23 months (7.3%) when compared to the WHO global thresholds for underweight (in terms of which a low prevalence of underweight is < 10%).<sup>43</sup> When the indicator was further split up into age categories, children aged 18 to 23 months were found to have a higher percentage of underweight, as compared to the other groups (6–11, 12–17 months) as presented in figure 3.5 above. This increasing trend had a close similarity to the trend in the weighted total prevalence of underweight in 14 low-income countries, which was found by Marriott, White, Hadden, Davies and Wallingford.<sup>59</sup> Similar to stunting, higher underweight levels among children aged 18 to 23 months might be an indication of poor complementary feeding practices that start early on in an infant's life, prior to attaining this age.

#### **4.3.3 Wasting**

The proportion of children aged six to 23 months with wasting was 5.2%. According to the WHO wasting prevalence thresholds, this percentage is considered to indicate a medium severity of wasting (medium severity being between 5 and 9%).<sup>43</sup> The findings of the present study were, however, lower than those of

the other studies that had been conducted in a similar study area, targeting pastoralist communities (in terms of the 2011 and 2013 Integrated Health and Nutrition surveys),<sup>26, 28</sup> which found higher prevalence levels of acute malnutrition (15.7% and 10.5% respectively). The difference between the studies could have been due to the difference in age group of the study sample, with the other studies having focused on children aged under five years, which might have had an effect on the overall nutritional status of the population.

#### **4.3.4 Overweight**

In the current study, the percentage of children who were found to be overweight was 2.4%, with slightly more overweight female, than male children. The higher percentage of breastfeeding rates in female than male children as identified in this study may have contributed to this. Although limited data exist on the prevalence of overweight among pastoralist communities, a higher percentage of overweight was also found among female than male children (5.0% and 4.3%, respectively) in the KDHS 2008–2009.<sup>6</sup>

#### **4.4 RELATIONSHIP BETWEEN COMPLEMENTARY FEEDING PRACTICES AND ANTHROPOMETRIC STATUS AMONG CHILDREN AGED SIX TO 23 MONTHS**

A lower percentage of children aged between six and 11 months and between 12 and 23 months achieved all the three key complementary feeding practices (minimum dietary diversity, minimum meal frequency and minimum acceptable diet) than did their 18 to 23-month-old counterparts. Evidence has shown that one of the main causes of child undernutrition is poor dietary quality and quantity;<sup>6, 29-30, 59</sup> therefore, the higher percentage of children with poor feeding practices in the younger age categories (6–11 and 12–27, months) might have contributed to the higher percentage of poor anthropometric status in the 18 to 23 months age category.

The study identified significant relationships between continued breastfeeding at two years and WLZ ( $p \leq 0.05$ ), but no significant relationships were identified between LAZ and WAZ and complementary feeding practices. This is contrary to the current evidence, suggesting that the relationship between nutritional status and complementary feeding practices is significant.<sup>6, 25, 59-60</sup> In the study by Sawadogo, Yves, Claire, Alain, Alfred and Serge, et al.<sup>25</sup> that was conducted in rural Burkina Faso, the findings showed that feeding practices had a positive correlation with nutritional status (with significant positive association being found between feeding practices and HAZ for children six to 23 months and WHZ for children 12–23 months).

Likewise, a review that was conducted by Marriott, White, Hadden, Davies and Wallingford, et al.,<sup>59</sup> of 14 DHS data sets from poor countries found that dietary diversity and meal frequency was associated with a significantly lower risk of both stunting and underweight ( $\rho < 0.001$ ). In Arimond and Ruel's<sup>61</sup> review of 11 DHS in low-income countries, associations between dietary diversity and HAZ were found to be significant as a main effect in seven of the 11 countries studied. The differences that were found in the present study might be due to the difference in study sample, since the other surveys were national surveys. Additionally, the present study was conducted in one community and context and it, therefore, did not take care of the diversity of factors influencing complementary feeding practices such as socio-demographic, economic as well as KAP present in the context of national surveys.

## **4.5 SOCIO-DEMOGRAPHIC AND ECONOMIC FACTORS ASSOCIATED WITH COMPLEMENTARY FEEDING PRACTICES**

The current study measured a number of socio-demographic and economic characteristics that included age, gender and caregiver's relationship with the index child, marital status, education level, household size as well as the household livestock situation in the context of pastoralist communities.

### **4.5.1 Caregiver's age**

The study found that caregiver's age is a key factor that is associated with complementary feeding practices. Older mothers (i.e. mothers who were above 25 years in age) breastfed for longer than did the younger mothers and achieved the minimum dietary diversity and the minimum meal frequency ( $\rho < 0.05$ ). Similar findings on the role that the caregiver age plays in complementary feeding practices were found by Khanal, Sauer and Yun Zhao<sup>58</sup> in Nepal, in terms of which younger mothers (i.e. mothers who were 30–34 years at the time of their pregnancy) were less likely [OR 0.220; 95% CI (0.079–0.616)] to provide the recommended acceptable diet than were the mothers who were  $\geq 35$  years old. Increased knowledge among the older mothers, as a result of prior experience in relation to the younger mothers, might have led to improved feeding practices.

### **4.5.2 Child's age**

In the current study, child age was associated with anthropometric status. The rates of stunting, underweight and wasting increased with an increase in age (in months), while the rate of overweight reduced with an increase in age (in months). However the increases were not statistically significant ( $\rho > 0.05$ ). When comparing the age in months and the indicator minimum dietary diversity, a significant positive correlation was found between an increase in child age and an increase in the percentage of children who consumed the recommended number of food groups (minimum meal frequency).

While the 18 to 23 months age category contained the highest percentage of children who attained the three complementary feeding indicators (minimum dietary diversity, minimum meal frequency and minimum acceptable diet), the group also had higher percentages of undernutrition (in terms of stunting, underweight and wasting) as compared to the other age groups of six to 11 months and 12 to 17 months. The higher percentages of the three complementary feeding indicators and high undernutrition levels for the 18 to 23 months age category in the study might be attributable to the delayed achievement of appropriate complementary feeding and to the effects of long-term poor feeding practices, which might have begun during pregnancy.<sup>62</sup>

The above-mentioned results are similar to those that were found in the DHS review of 14 countries, which was conducted by WHO<sup>59</sup>, which found that the prevalence of stunting was higher with each successive increase in age group (0–5, 6–11, 12–17, 18–23 months). Similarly, the study by Aemro, Mesele and Birhanu,<sup>56</sup> which was conducted in Ethiopia, found that the age of child in months was significantly associated with dietary diversity and with meal frequency ( $p \leq 0.001$ ).

### **4.5.3 Child's gender**

The present study found that girls tended to be fed better than boys. Timely introduction to solid, semi-solid or soft foods at six to eight months occurred more often in females than it did in males, although the difference was not statistically significant ( $p > 0.05$ ). Breastfeeding rates were also higher among girls than they were among boys, with more female children being breastfed than were male children at one year ( $p < 0.05$ ). The results obtained are comparable to those that were obtained in a study that was conducted in the urban slums of Nairobi by Kimani-Murage, Madise, Fotso, Kyobutungi, Mutua and Gitau, et al.,<sup>23</sup> who found that boys were more likely to be introduced to complementary feeding early (before six months) than were girls.

The differences in feeding patterns in the present study might have resulted to the poor anthropometric status obtained, which tended to be higher in the case of male children than it was in the case of their female counterparts. According to the KDHS 2008–2009, male children tend to be more stunted than female children, since the national results indicated that the rate of stunting in Kenya stood at 37% for male children and at 33% for female children at the time of the aforesaid study.<sup>6</sup> Similarly, Gupta, Gehri and Stettler<sup>24</sup> found that the male gender was associated with a higher prevalence of wasting, as well as with a trend towards higher prevalence of stunting than with the female gender. Although the cause of the feeding disparities between the genders was not studied, cultural issues and beliefs might have played a key role in leading to such disparities.

#### 4.5.4 Caregiver's education level

The education levels of the caregivers were found to be low in the current study. Over half of the caregivers had never attended school, and, in the case of those who had attended school, the majority (96%) had only reached primary level. The findings of the study indicated that caregiver characteristics are associated with complementary feeding practices, and subsequently with the child's anthropometric status, since significant correlation was identified between caregiver education level and WAZ ( $\rho \leq 0.05$ ). Caregivers with a higher education level had children with normal WAZ and WLZ.

The findings of this study correspond with those of other studies, which have also found that caregiver education level plays a significant role in meeting the appropriate complementary feeding practices for children aged six to 23 months.<sup>56, 63-64</sup> In a study by Vaahtera, Kulmala, Hietanen, Ndekha, Cullinan and Salin, et al.,<sup>63</sup> the measuring of breastfeeding and complementary feeding practices in rural Malawi showed that better adherence to infant feeding recommendations was associated with increased maternal level of education.

Similarly, in the study by Aemro, Mesele and Birhanu,<sup>56</sup> in Ethiopia, women with primary and secondary education respectively were 67% and 70% less likely to practise inadequate dietary diversity ([OR = 0.314; 95% CI: 0.226, 0.438] and [OR = 0.296; 95% CI: 0.156, 0.562]) than were those with no formal education at all. Mothers with a primary education and with a secondary and above education were 42% and 63% less likely to meet meal frequency inadequately, compared with mothers with no education (OR = 0.579) and (OR = 0.364), respectively.<sup>56</sup> A study that was conducted in Ethiopia by Shumey, Demissie and Berhane<sup>64</sup> also found similar results in relation to the significance of maternal education in determining feeding practices, in terms of which education level was found to be an independent predictor of the timely initiation of complementary feeding.

#### 4.5.5 Caregiver's marital status

In the current study, caregivers were found predominantly to be in marriage unions, there being a statistically significant association between marital status and breastfeeding practices ( $\rho < 0.05$ ). Kimani-Murage, Madise, Fotso, Kyobutungi, Mutua and Gitau, et al.'s<sup>23</sup> study, which was conducted in Nairobi, also found significant associations between maternal marital status and breastfeeding practices. Such associations might have been due to the perceived better psychological and physical support system at household level for the mother, which encourages improved feeding practices, than in mothers who are not in marriage unions.



#### **4.5.6 Household livestock situation**

The economic characteristics studied in this research were in relation to the livestock status of the household concerned, since the study focused on pastoralist communities. All households interviewed practised pastoralism. Livestock numbers had increased over the last six months in the majority of the households (71%), with a resultant positive impact on the economic status of the household, which was then able to sell livestock and livestock products to purchase other food commodities.

The increase in livestock might have been due to the timing of the study, which was conducted in the month of June, with the month in question being characterised by increased calving/lambing rates and by subsequently increased milk yields.<sup>65</sup> In the pastoralist communities, milk is a key component of the diet,<sup>45</sup> hence the increased yields might have had an influence on the good nutritional status in more than 80% of the children, though the finding was not statistically significant ( $\rho > 0.05$ ).

### **4.6 STRENGTHS AND LIMITATIONS OF THE STUDY**

#### **4.6.1 Strengths**

1. The study was able to identify meaningful insights, leading to an improved understanding, of the significant relationships between complementary feeding practices, anthropometric status and the socio-demographic characteristics of the pastoralist communities.
2. The use of enumerators who knew the local language. All the enumerators were fluent in the local language (Borana), and this helped to ensure the accurate translation of questions.

#### **4.6.2 Limitations**

1. Due to the time and financial constraints, the researcher was able to assess patterns in only one pastoralist community (keeping in mind that Isiolo County hosts three pastoralist communities).

## **CHAPTER 5**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 CONCLUSIONS**

Appropriate complementary feeding is crucial in determining short-term and long-term effects on the human being. The study found that while the IYCF practices relating to breastfeeding (whether child ever breastfed, breastfeeding at one year and breastfeeding at two years) were largely appropriate (except for continued breastfeeding at 2 years), according to the WHO 2007<sup>4</sup> guidelines, a relatively low percentage of children achieved the three core complementary feeding practices (minimum dietary diversity, minimum meal frequency and minimum acceptable diet). Poor complementary feeding practices were found to start early in life. The prevalence of stunting and underweight were low according to the WHO severity of malnutrition prevalence ranges; while the severity of wasting prevalence found to be medium.<sup>43</sup> The study also indicated that while there was a significant association between anthropometric status and breastfeeding at two years, such socio-demographic factors as caregiver's age, child gender and caregiver's education level were also associated with feeding practices and with the subsequent anthropometric status of children aged six to 23 months, among pastoralist communities. Child gender and the caregiver's education level were the key socio-demographic characteristics that were associated with complementary feeding practices and with anthropometric status.

#### **5.2 RECOMMENDATIONS**

The following are the recommendations based on the study findings obtained:

##### **5.2.1 Interventions**

1. The adult education/literacy programmes being implemented by the government in pastoralist communities should target women, so as to support women empowerment efforts and subsequently increased economic power. This is because maternal education level was associated with both higher achievement of appropriate complementary feeding practices and with the child's anthropometric status in this study.
2. Nutrition-sensitive strategies and focus on the first 1 000 days of life: The HINI that are implemented by the Ministry of Health and by humanitarian organisations should be integrated into Food Security and Livelihood programmes that are implemented in the pastoralist areas by other line government ministries and by their developmental partners, so as to provide an effective platform from which to provide nutrition education on dietary diversity thereby

contributing to household and individual food security. Additionally, households with pregnant mothers, infants and young children should be a key vulnerability and targeting criterion for the enrolment into such programmes.

3. HINI should integrate social and behaviour change and communication (SBCC) programmes to promote and sustain appropriate IYCF child feeding practices, particularly with regards to dietary diversity and to the inappropriate (too early, or too late) introduction of complementary foods. Doing so would address the underlying causes of poor complementary feeding practices that relate to KAP particularly cultural practices.
4. Mother support groups, which are implemented at the health facility level and/or community level by the government and by humanitarian organisations should prioritise the recruitment of relatively young mothers, who would stand to benefit a great deal from the practical information conveyed, in terms of maternal, infant and young child nutrition.

### **5.2.2 Research**

1. Multi-disciplinary qualitative studies should be conducted to determine the sociocultural aspects influencing feeding practices, such as why boys, in comparison to girls, tend to be fed poorly in pastoralist communities. The current study showed that girls tended to be fed better than boys in the communities concerned. Establishing the reason for the gender bias in feeding practices would facilitate the gaining of insight into which evidence-based interventions should be put in place.

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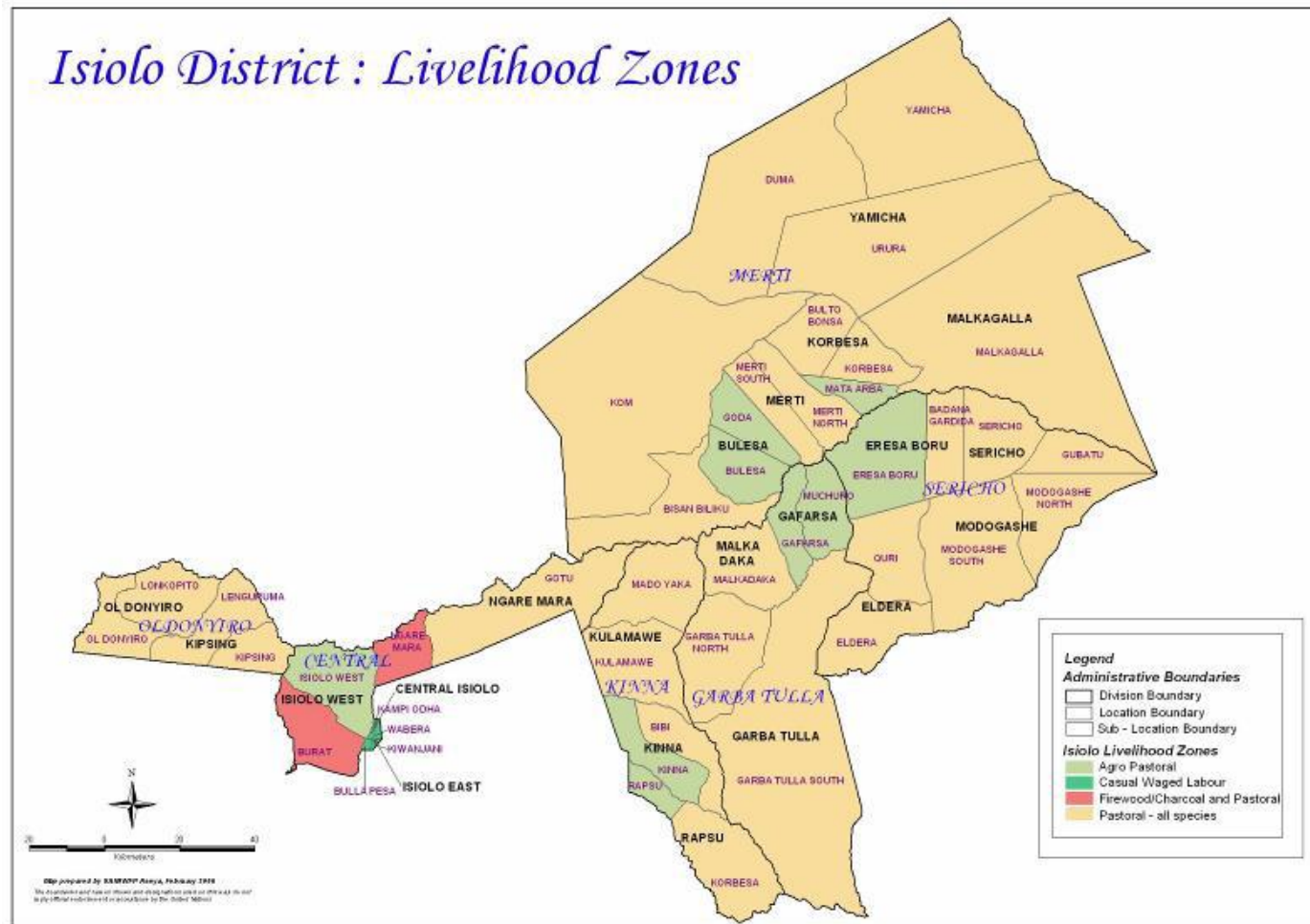


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**ADDENDUM A:  
MAP OF ISIOLO COUNTY (FORMERLY ISIOLO DISTRICT)**



## ADDENDUM B: CLUSTER LIST

<b>GEOGRAPHICAL UNIT (SUB-LOCATION)</b>	<b>POPULATION SIZE</b>	<b>ASSIGNED CLUSTER</b>
Merti North	4823	1, 2, 3, 4, 5, 6
Merti South	2510	7, 8, 9
Bisan Biliqo	1349	10, 11
Kom	528	-
Malkagalla	2176	12, 13, 14
Korbesa	1810	15, 16
Matarba	503	17
Bulto Bansa	753	18
Yamicha	1571	19
Duma	357	20
Urura	1057	21
Sericho	3617	22, 23, 24, 25
Gubatu	1170	26, 27
Iresaboru	1971	28, 29
Badana	1021	30

The cluster list was generated using ENA software.

## ADDENDUM C: DEFINITIONS OF VARIABLES

INDICATOR	DEFINITION	NUMERATOR	DENOMINATOR
<b>Stunting</b>	Percentage of children aged 6–23 months old who are below minus two (moderate, and severe), and who are below minus three (severe), standard deviations from median length for age, in terms of the WHO Child Growth Standards	Number of children aged 6–23 months old who are (a) below minus two standard deviations (moderate and severe), and (b) below minus three standard deviations (severe), from median length for age, in terms of the WHO Child Growth Standards	Total number of children aged 6–23 months old
<b>Wasting</b>	Percentage of children aged 6–23 months old who are below minus two (moderate and severe), and who are below minus three (severe), standard deviations from median weight for length, in terms of the WHO Child Growth Standards	Number of children aged 6–23 months old who are (a) below minus two standard deviations (moderate and severe), and (b) below minus three standard deviations (severe), from median weight for length, in terms of the WHO Child Growth Standards	Total number of children aged 6–23 months old
<b>Underweight</b>	Percentage of children aged 6–23 months old who are below minus two (moderate and severe), and who are below minus three (severe), standard deviations from median weight for age, in terms of the WHO Child Growth Standards	Number of children aged 6–23 months old who are (a) below minus two standard deviations (moderate and severe), and (b) below minus three standard deviations (severe), from median weight for age, in terms of the WHO Child Growth Standards	Total number of children aged 6–23 months old
<b>Overweight</b>	Percentage of children aged 6–23 months old who are above two (moderate and severe) standard deviations from median weight for length, in terms of the WHO Child Growth Standards	Number of children aged 6–23 months old who are above two standard deviations (moderate and severe) from median weight for length, in terms of the WHO Child Growth Standards	Total number of children aged 6–23 months old
<b>Introduction to solid, semi-solid and soft foods</b>	Percentage of infants aged 6–8 months old who received solid, semi-solid or soft food	Number of infants aged 6–8 months old who received solid, semi-solid or soft food during the previous day	Total number of infants aged 6–8 months old
<b>Minimum meal frequency</b>	Percentage of children aged 6–23 months old who received solid, semi-solid or soft foods (including milk feeds for non-breastfed children) the minimum number of times or more [for breastfed children, 'minimum' is defined as twice for infants aged 6–8 months old, and thrice for children aged 9–23 months old; for non-breastfed children, 'minimum' is defined as four times for children aged 6–23 months old]	Number of breastfed children aged 6–23 months old who received solid, semi-solid or soft foods the minimum number of times, or more, during the previous day	Total number of breastfed children aged 6–23 months old
		<b>AND</b>	
		Number of non-breastfed children aged 6–23 months old who received solid, semi-solid or soft foods (including milk feeds) the minimum number of times, or more, during the previous day	Total number of non-breastfed children aged 6–23 months old
<b>Minimum dietary diversity</b>	Percentage of children aged 6–23 months old who received foods	Number of children aged 6–23 months old who received foods from	Total number of children aged 6–23

INDICATOR	DEFINITION	NUMERATOR	DENOMINATOR
	from four, or more, food groups	four, or more, food groups during the previous day	months old
<b>Minimum acceptable diet</b>	Percentage of children aged 6–23 months old who received a minimum acceptable diet (apart from breast milk) (composite indicator)	Number of breastfed children aged 6–23 months old who received at least the minimum dietary diversity, and the minimum meal frequency, during the previous day	Total number of breastfed children aged 6–23 months old
		<b>AND</b>	
		Number of non-breastfed children aged 6–23 months of age who received at least two milk feedings, and who obtained at least the minimum dietary diversity, not including milk, and the minimum meal frequency, during the previous day	Total number of non-breastfed children aged 6–23 months old
<b>Whether child ever breastfed</b>	Proportion of children who were born during the preceding 24 months who were ever breastfed	Number of children who were born during the preceding 24 months who were ever breastfed	Total number of children who were born in the preceding 24 months
<b>Continued breastfeeding at 1 year</b>	Percentage of children aged 12–15 months old who were fed breast milk	Number of children aged 12–15 months old who breastfed during the previous day	Total number of children aged 12–15 months old
<b>Continued breastfeeding at 2 years</b>	Percentage of children aged 20–23 months old who were fed breast milk	Number of children aged 20–23 months old who were breastfed during the previous day	Total number of children aged 20–23 months old

**Sources:**

<sup>4</sup>World Health Organization. (2007). Indicators for assessing IYCF – Part 1: Definitions.

<sup>50</sup>United Nations Children’s Fund (2013) Improving Child Nutrition: The Achievable Imperative for Global Progress.

## ADDENDUM D: CALENDAR OF EVENTS

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MONTH			2011		2012		2013
January		24		17	Cash transfer by Red Cross	5	
February		23		16		4	
March	Long rains	24		15		3	
April		23		14		2	
May		22		13	Malezi Bora campaign/ ACF survey	1	
June		24		12	Madaraka Day month	0	Data collection month
July		23	Italian died at Dadachalafe	11	Shifters at Kom shoot out		
August		22	Ramadhan	10	Ramadhan		
September		21	Eid Al Fitr/Gotu (katus) tragedy	9	Raila visits Merti		
October	Short rains	20	Eid Al Adha	8			
November		19	Malezi-Bora & anti-polio campaign	7	Measles & Malezi-Bora campaign		
December		18	World's AIDS Day Floods in Merti (1-5 Dec,)	6	World's AIDS Day		

## ADDENDUM E: TIMETABLE FOR ENUMERATOR TRAINING

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**Study:** Complementary feeding practices and the anthropometric status of children aged six to 23 months among the pastoralist communities of Isiolo County, Kenya

**Principal investigator:** Dorcas Amunga

TIME	ACTIVITY/TOPIC
<b>DAY 1</b>	
07:30–8:00	Introduction of participants, and the setting of norms
08:00–8:30	Rationale, purpose, and design of the study
08:30–9:15	Research ethics and interviewing skills
09:15 –10:00	Determination of age using child health card, and calendar of events
10:00–10:30	Break
10:30 –13:00	Data collection tools/methods <ol style="list-style-type: none"> <li>1. Participant and consent form</li> <li>2. Questionnaire</li> <li>3. Anthropometric measurements</li> </ol>
13:00 –14:00	Break
14:00 –15:30	Role play
15:30–16:00	Ensuring data quality
16:00–16:30	Roles of enumerators and team leader
<b>DAY 2</b>	
08:00–13:00	Practical experience in a nearby village (Awarsitu)
13:00 –14:00	Break
14:00–16:00	Feedback from field trip, and planning for data collection exercise (routing, teams, days)



**ADDENDUM F:**  
**QUESTIONNAIRE TO DETERMINE COMPLEMENTARY FEEDING PRACTICES AND THE NUTRITIONAL STATUS OF CHILDREN AGED SIX TO 23 MONTHS AMONG THE PASTORALIST COMMUNITIES OF ISIOLO, KENYA**

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**BASIC DATA**

Questionnaire number:  ____ ____ ____  County: _____ Division: _____ Sub-location : _____	Date of survey : ____/____/____ dd/mm/yy Team number: _____ Cluster number: _____ Household number: _____
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**SECTION 1: HOUSEHOLD INFORMATION**

1. Please tell me the name and gender of each person who lives here, starting with the head of the household.

Line #	Name	Is ( <i>NAME</i> ) male or female? <i>TICK</i>		How old is ( <i>NAME</i> )? How old was ( <i>NAME</i> ) on his/her last birthday? Record age in number of completed years 98 = DK (only for > 50-year-olds)	Eligible for complementary feeding module (under 2 years old)	
		(3) M	(3) F	(4)	Circle line number if HH member is under 2 years old	For each child under 2 years old Who is the primary caregiver ( <i>NAME</i> )? Record line number. of caregiver
(1)	(2)			(4)	(5)	(6)
1				____ ____	1	____ ____
2				____ ____	2	____ ____
3				____ ____	3	____ ____
4				____ ____	4	____ ____
5				____ ____	5	____ ____

6				_ _ _	6	_ _ _
7				_ _ _	7	_ _ _
8				_ _ _	8	_ _ _
9				_ _ _	9	_ _ _
10				_ _ _	10	_ _ _
11				_ _ _	11	_ _ _
<b>PLEASE ENTER TOTAL NUMBER OF ELIGIBLE BENEFICIARIES IN THE HOUSEHOLD.</b>						
Total (eligible beneficiaries)					Number of children aged under 2 years old	
					_ _ _	

**IF THERE ARE ELIGIBLE INDIVIDUALS, CONTINUE WITH QUESTIONS.**

**IF NOT, THANK THE RESPONDENT AND PROCEED TO NEXT HOUSEHOLD.**

**SECTION 2: SOCIO-DEMOGRAPHIC AND SOCIO-ECONOMIC STATUS SECTION**

NO.	QUESTIONS	CODING CATEGORIES	SKIP
	Line number of caregiver of child (from column 6 of household information):	_ _ _	
	Name of primary caregiver (from column 2 of household information):	_____	
	Age of primary caregiver:	_ _ _	
2	What is your relationship with the child?  <i>CIRCLE RESPONSE</i>	Mother ..... [ 1 ] Father ..... [ 2 ] Sister ..... [ 3 ] Brother ..... [ 4 ] Grandmother ..... [ 5 ] Aunt ..... [ 6 ] Neighbour ..... [ 7 ] Other ..... [ 8 ]	
3	Have you ever attended school?	Yes ..... [ 1 ] No ..... [ 2 ]	GO TO 5
4	What is the highest level of school completed?	College/Tertiary institution..... [ 1 ] Secondary school..... [ 2 ] Primary school..... [ 3 ]	
5	What is your marital status?	Single..... [ 1 ]	

		Married ..... [ 2 ] Separated/Divorced ..... [ 3 ] Widowed..... [ 4 ]	
<i>I would like to ask questions relating to the livestock situation in your household.</i>			
6	Does the household own livestock? ( <i>Chicken not included</i> )	Yes..... [ 1 ] No..... [ 2 ]	GO TO 10
7	Has the size of the livestock herd changed over the last 6 months? (Nov – Apr)  <i>IF IT REMAINED THE SAME, OR ‘DON’T KNOW’, GO TO QUESTION 9.</i>	Increased..... [ 1 ] Reduced ..... [ 2 ] Remained the same ..... [ 3 ] Don’t know ..... [ 4 ]	GO TO 8 GO TO 9
8	If the size of the livestock herd has increased, what are the reasons for the increase?  <i>(Multiple responses are acceptable.)</i>	Livestock gave birth ..... [ 1 ] Livestock bought ..... [ 2 ] Livestock received..... [ 3 ] Raid on others..... [ 4 ] Dowry received..... [ 5 ] Donation received..... [ 6 ] Restocking ..... [ 7 ] Other (specify)..... [ 8 ]	
9	If the size of the livestock herd has decreased, what are the reasons for the decrease?  <i>(Multiple responses are acceptable.)</i>	Livestock sold..... [ 1 ] Death from drought ..... [ 2 ] Death from disease ..... [ 3 ] Raid from others ..... [ 4 ] Dowry paid ..... [ 5 ] Other (specify)..... [ 6 ]	

**SECTION 3: INFANT AND YOUNG CHILD FEEDING SECTION**

*THIS SECTION IS ADMINISTERED TO THE PRIMARY CAREGIVER (USUALLY THE MOTHER) OF THE ELIGIBLE CHILDREN. IF THERE IS MORE THAN ONE ELIGIBLE CHILD IN THE HOUSEHOLD, A SEPARATE QUESTIONNAIRE MUST BE COMPLETED FOR EACH CHILD.*

<p>(This information is entered after identifying the eligible children from the household information.)</p> <p>Name of child (from column 2 of household information): _____</p> <p>Gender of child (from column 3 of household information (1 = Male; 2 = Female):    _____ _____ </p>
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Line number of child (circled in column 5 of household information: \_\_\_\_\_)

I would like to ask some questions about ( <b><i>NAME OF ELIGIBLE CHILD</i></b> )			
NO.	QUESTIONS	CODING CATEGORIES	SKIP
10a	<p>In what month and year was (<b><i>NAME</i></b>) born? (When is his/her birthday?)</p> <p><i>IF THE RESPONDENT DOES NOT KNOW THE EXACT BIRTH DATE, ASK:</i></p> <p>Does (<b><i>NAME</i></b>) have a health/vaccination card with the birth date recorded?</p> <p><i>IF THE HEALTH/VACCINATION CARD IS SHOWN AND THE RESPONDENT CONFIRMS THAT THE INFORMATION IS CORRECT, RECORD THE DATE OF BIRTH, AS DOCUMENTED IN THE CARD.</i></p>	<p>DAY..... ____ ____ </p> <p><i>IF DAY IS NOT KNOWN, ENTER '98'.</i></p> <p>MONTH..... ____ ____ </p> <p>YEAR.... ____ ____  ____ ____ </p>	<p><i>IF MONTH AND YEAR NOT KNOWN, GO TO Q10b.</i></p>
10b	<p>Use calendar of events to identify the month and year of birth.</p> <p><i>ASK IF THE DATE OF BIRTH IS NOT KNOWN / IF NO HEALTH/VACCINATION CARD IS AVAILABLE.</i></p>	<p> ____ ____ / ____ ____ ____ ____ </p> <p>MM / YY</p>	
11	<p>How many months old is (<b><i>NAME</i></b>)?</p> <p><i>RECORD AGE IN NUMBER OF COMPLETED MONTHS.</i></p> <p><i>CHECK CONSISTENCY BY CONFIRMING WHETHER THE YEAR AND MONTH RECORDED IN Q10 ARE CONSISTENT WITH THE AGE IN MONTHS IN Q11 AND SOLVE ANY INCONSISTENCIES. IF THE BIRTH DATE WAS RECORDED ON A HEALTH CARD, THE CARD MAY BE USED AS THE <b>CORRECT</b> DATA SOURCE.</i></p>	<p> ____ ____ </p>	
12	<p><i>CHECK QUESTION 11. IS THE CHILD AGED 6–23 MONTHS?</i></p>	<p>YES.....[ 1 ]</p> <p>NO .....[ 2 ]</p> <p>DON'T KNOW .....[ 8 ]</p>	<p>END MODULE</p> <p>END MODULE</p>
13	<p>Has (<b><i>NAME</i></b>) ever been breastfed?</p>	<p>YES.....[ 1 ]</p>	

		NO .....[ 2 ]			
		DON'T KNOW .....[ 8 ]			
I would like to ask about what liquids ( <i>NAME</i> ) may have had yesterday during the day or at night.					
14	<i>[READ EACH ITEM ON THE LIST, STARTING WITH BREAST MILK.]</i>		YES	NO	DK
A	Breast milk		1	2	8
B	Plain water		1	2	8
C	Infant formula ( <i>Nan/Cerelac/Mamex</i> ) Number of times [ ____ ]		1	2	8
D	Other milks ( <i>tinned milk, powdered or fresh milk, e.g. Safariland, Halwa, Nido</i> ) Number of times [ ____ ]		1	2	8
E	Juices or juice drinks? ( <i>Quencher, Highlands, Afia, Cola, Savannah, Tamu-Tamu</i> )		1	2	8
F	Soup		1	2	8
G	Fermented milk / sour milk / yoghurt Number of times [ ____ ]		1	2	8
H	Thin porridge		1	2	8
I	Tea/Coffee (white)		1	2	8
J	Other liquids, e.g. black tea, herbal drinks		1	2	8
Please describe everything that ( <i>NAME</i> ) ate yesterday during the day or night, whether at home or outside the home, even if it was combined with other foods.					
<i>IF FOOD IS NOT LISTED IN ANY OF THE FOOD GROUPS BELOW, WRITE DOWN THE NAME OF THE FOOD IN THE BOX LABELLED 'OTHER FOODS'. IF FOODS ARE USED IN SMALL AMOUNTS FOR SEASONING OR AS A CONDIMENT, INCLUDE THEM UNDER THE CONDIMENTS FOOD GROUP.</i>					
Yesterday during the day or night, did ( <i>NAME</i> ) drink/eat any ( <b>FOOD GROUP ITEMS</b> )?					
15			YES	NO	DK
A	Porridge, bread, rice, pasta or other foods made from grains	A .....	1	2	8
B	Pumpkin, carrots, yellow yams, butternut or sweet potatoes that are yellow or orange inside	B.....	1	2	8
C	White potatoes, arrowroot, 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 pawpaw, guava	E.....	1	2	8
F	Any fruits or vegetables like bananas, melons, oranges, avocados, tomatoes, passion fruit	F.....	1	2	8
G	Liver, kidney, heart or other organ meat	G.....	1	2	8
H	Any meat such as beef, camel, pork, lamb, goat, chicken	H.....	1	2	8
I	Eggs	I.....	1	2	8
J	Fresh or dried fish	J.....	1	2	8
K	Any foods made from beans, peas, lentils, soybeans, pulses	K.....	1	2	8
L	Cheese, yoghurt, sour milks, 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 chocolates, sweets, pastries, biscuits, cakes	N.....	1	2	8
O	Condiments for flavour, e.g. chillies, spices, herbs or fish powder	O.....	1	2	8
<b>OTHER FOODS:</b> PLEASE WRITE DOWN OTHER FOODS IN THIS BOX THAT THE RESPONDENT MENTIONED BUT ARE NOT IN THE LIST ABOVE:					
16	How many times did ( <b>NAME</b> ) eat solid, semi-solid or soft foods other than liquids yesterday during the day or night to make the child full?	NUMBER OF TIMES  _ _ _ _ _   DON'T KNOW.....[98]			

**SECTION 4: ANTHROPOMETRY**

NO.	QUESTIONS	CODING CATEGORIES	SKIP
17	Weight of ( <b>NAME</b> ). Record in kg (+/-100g) (##. #)	KG  _ _ _ _ _	
18	Length of ( <b>NAME</b> ) Record in cm (+/- 0.1cm) (###. #)	CM  _ _ _ _ _	

**END MODULE. THANK THE RESPONDENT.**

**ADDENDUM G:  
PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM  
(ENGLISH VERSION)**

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**TITLE OF THE RESEARCH PROJECT:**

COMPLEMENTARY FEEDING PRACTICES AND THE ANTHROPOMETRIC STATUS OF CHILDREN AGED SIX TO 23 MONTHS AMONG THE PASTORALIST COMMUNITIES OF ISIOLO COUNTY, KENYA

**REFERENCE NUMBER: S12/11/302| PKU/109/E12 OF 2013**

**PRINCIPAL INVESTIGATOR: AMUNGA, DPA**

**ADDRESS: 102294-00101, NAIROBI, KENYA**

**CONTACT NUMBER: 0721753050**

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the study staff any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails, and how you could be involved in it. Also, your participation is **entirely voluntary**, and you are free to decline to participate in the project. If you say that you do not wish to participate in the project, doing so will not affect you negatively in any way whatsoever. You are also free to withdraw from the project at any point, even if, at first, you do agree to take part in it.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University and Kenyatta University**. It will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, and according to the South African/Kenyan Guidelines for Good Clinical Practice, and the Medical Research Council (MRC) Ethical Guidelines for Research.

**What does this research study concern?**

The research study will be conducted in Isiolo County, Kenya, in villages where people are involved in pastoralism. Thirty villages will be randomly selected, and the respondents will be the mother/primary caregiver of children aged six to 23 months old living within these villages. In total, 288 children are needed to form the study sample and 10 households will be visited in each village.

The project aims to identify feeding practices for children aged six to 23 months among pastoralist communities and the nutritional status of these children. The provision of this information to the

government and to other agencies working in the area should enable more focused interventions to take place in future than have occurred in the past.

The respondents (mothers/primary caregivers) involved will be identified randomly. Once a village has been randomly selected, 10 households with children aged six to 23 months will be randomly identified for the interview. Before the start of the interview, the mother/primary caregiver will be required to give informed consent for the interview to take place. The set questions relating to the feeding practices of their children and the caregiver details shall be asked during the interview. The child shall then be measured through taking weight and length measurements. No medication shall be given before, during, or after, the interview.

**Why have you been invited to participate in the study?**

You have been invited to participate in the study because you meet the criteria for a study participant who is living in a household that is involved in pastoralist activities and who has a child aged six to 23 months.

**What will your responsibilities be in regard to the study?**

Your responsibilities as a participant in the study will be to provide your consent to take part in the study, to answer the questions asked by the research team and to assist in keeping your child calm while the weight and length measurements are being taken.

**Will you benefit from taking part in this research?**

No immediate personal benefits will be awarded for taking part in this research. By taking part in the research, however, you will help to provide benefits for the community as a whole, as the results of the study will be able to serve as a guide, in terms of the recommending of focused interventions, or in terms of improving such interventions that are currently in place and that target the intended age group of children.

**Are there any risks involved in you taking part in this research?**

There are minimal or no risks involved in taking part in this research because it involves only administering a questionnaire and taking weight and length measurements using weighing scales and a height board, respectively.

**If you do not agree to take part in the study, what alternatives do you have?**

Participation in the study is voluntary. However, if you do **not** agree to take part in the study, you will be **encouraged** to visit the nearest health facility/outreach centre for your child's weight and length measurements to be taken regularly, so as to determine his/her nutritional status and to be educated on



complementary feeding practices. This is because there are health facilities/outreach centres within reach of the study population and the sample.

**Who will have access to your medical records?**

Your (and your child's) information will only be accessed by the research team who will treat it with confidentiality and who will ensure that it is protected. All the participants' information that is included in the final report or published will remain anonymous.

**What will happen in the unlikely event of some form of injury occurring as a direct result of your taking part in this research study?**

Taking part in this research study has no/minimal risks since it involves asking you questions and taking the weight and length measurements for your child. However, in the unlikely event of some form of injury occurring, insurance cover provided by Stellenbosch University will be made available to you.

**Will you be paid to take part in this study and are there any costs involved for you, in terms of you taking part in the study?**

You will neither be paid for taking part in the study, nor will there be any costs involved for you, if you do take part in it.

**Is there anything else that you should know or do in relation to the study?**

If you have any concerns or complaints that have not been adequately addressed by the study staff you can contact the following:

Stellenbosch University Ethics Research Committee: +2721-938 9207

Kenyatta University Ethics Review Committee: +254 208710901/12 ext 57357

Lynette Daniels: +27825136409

Sophie Ocholla: 0721449803

You will also receive a copy of this information and consent form for your own records.

**CONSENT FORM**

**Declaration by participant**

By signing below, I ..... agree to take part in a research study entitled (Complementary feeding practices and the anthropometric status of children aged six to 23 months among the pastoralist communities of Isiolo County, Kenya).

I declare that:

- I have read this information and consent form, or I have had it read to me, and it is written in a language in which I am fluent and with which I am comfortable.
- I have had a chance to ask questions about the study and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary**, and I have not been pressurised into taking part in it.
- I may choose to leave the study at any time and I shall neither be penalised, nor prejudiced, in any way for not taking part in it.
- I may be asked to leave the study before it has finished if the study doctor or the researcher feels that it is in my best interests to do so, or if I do not follow the study plan, as agreed to.

Signed at (*place*) ..... on (*date*) ..... 2013

.....  
*Signature/thumbprint of participant*

.....  
*Signature of witness*

**Declaration by investigator**

I (*name*) ..... declare that:

- I explained the information in this document to .....
- I encouraged him/her to ask questions about the study and I took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above.

Signed at (*place*) ..... on (*date*) ..... 2013

.....  
*Signature of investigator*

.....  
*Signature of witness*

**ADDENDUM H:  
NAKALA YA KUOTA HABARI KWA MSHIRIKEI NA FOMU YA IDHINI  
(KISWAHILI VERSION OF PARTICIPANT INFORMATION LEAFLET  
AND CONSENT FORM)**

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**NAKALA YA KUTOA HABARI YA MSHIRIKI**

**MADA YA UTAFITI:**

COMPLEMENTARY FEEDING PRACTICES AND THE ANTHROPOMETRIC STATUS OF CHILDREN AGED SIX TO 23 MONTHS AMONG THE PASTORALIST COMMUNITIES OF ISIOLO COUNTY, KENYA

**Nambari ya Rejea: S12 / 11/302 | PKU/109/E12 YA 2013**

**Mkuu wa uchunguzi:** AMUNGA, DPA

**Anuani:** 102294-00,101, NAIROBI, KENYA

**Simu:** 0721753050

Umealikwa kushiriki katika utafiti. Tafadhali chukua muda wakusoma taarifa iliyotolewa hapa, ambayo itakupa maelezo ya utafiti huu. Unaweza kuuliza wafanyakazi wa utafiti maswali yoyote kuhusu sehemu yoyote ya utafiti huu ambayo hujaelewa. Ni muhimu uridhike kikamilifu na kuelewa wazi kile ambacho utafiti huu unahusu na jinsi gani wewe unaweza kushiriki. Pia, ushiriki wako ni kwa hiari kabisa na unaweza pia kukataa kushiriki. Hakuna athari zozote iwapo utakataa kushiriki. Unaweza pia kujiondoa kwenye utafiti wakati wowote.

Utafiti huu umepitishwa na Kamati ya Utafiti wa Afya katika Chuo Kikuu cha Stellenbosch na Chuo Kikuu cha Kenyatta na itafanyika kulingana na miongozo ya kimaadili na kanuni za Azimio la Kimataifa la Helsinki, Afrika Kusini na Miongozo ya Kenya kwa ajili ya Utendaji Bora Hospitali na Baraza la Utafiti wa Matibabu.

**Utafiti huu unahusu nini?**

Utafiti huu utafanyika katika kaunti ya Isiolo, Kenya katika vijiji ambapo watu hushiriki katika ufugaji. Vijiji 30 vitachaguliwa. Washiriki watakuwa ni wamama/walezi msingi na watoto wenye umri wa kati ya miezi sita hadi 23. Kwa ujumla, watoto 288 wanahitajika kwa huu utafiti kuunda sampuli ya utafiti.

Mradi una lengo la kubaini mazoea ya lishe kwa watoto wenye umri wa miezi kati ya 6–23 miongoni mwa jamii za wafugaji na hali ya lishe ya watoto hawa. Hii itawezesha kutoa taarifa kwa serikali na mashirika mengine yanayo fanya kazi katika eneo lao ili kutoa hatua zaidi.

Washiriki (mama/walezi msingi) wata tambuliwa kwa njia ya nasibu. Baada ya kijiji kuchaguliwa, kaya 10 na watoto wenye miezi kati ya sita hadi 23 wata tambuliwa kwa ajili ya mahojiano. Kabla yakuanza kwa mahojiano, mlezi atatakiwa kutoa ridhaa. Maswali kuhusiana na mazoea ya kulisha watoto wao yataulizwa, kisha mtoto atapimwa uzito na urefu kuchukuliwa. Hakuna dawa yoyote itakayopewa kwa washiriki.

### **Mbona umealikwa kushiriki?**

Umealikwa kushiriki kwa sababu wewe una vigezo vinavyotatikana kwa utafiti huu yaani unaishi katika kaya inayoshiriki katika shughuli za ufugaji na kuwa una motto mwenye umri wa kati ya miezi 6–23.

### **Majukumu yako yatakuwa yapi?**

Majukumu yako kama mshiriki yatakuwa: kutoa idhini ya kuwa katika utafiti, kujibu maswali unayoulizwa na timu ya utafiti na kusaidia katika kumtuliza motto wakati uzito na urefu wake unapochukuliwa.

### **Je, kuna manufaa yoyote kushiriki katika utafiti huu?**

Hakuna faida binafsi yakushiriki katika utafiti huu. Kushiriki katika utafiti huu hata hivyo, utatoa faida kwa jamii nzima kwa sababu matokeo yatakayoibuka yanauwezo wa kuchangia katika kupendekeza hatua mpya au kuboreshwa kwa hatua zinazotumika sasa kwa miradi inayolenga afya ya watoto.

### **Je, kuna hatari ya kushiriki katika utafiti huu?**

Hakuna hatari yoyote ukishiriki katika utafiti huu kwa sababu utakuwa ukihusisha urefu wa mshiriki peke yake.

### **Ukikataa kushirikikatitakutafiti, kuanjiambadala?**

Kushiriki ni kwa hiari, hata hivyo kama umekataa kushiriki unaombwa utembelee hospitali mara kwa mara ili upate kujua hali ya motto wako inaendelea vipi na upate mafunzo kuhusu lishe bora.

### **Je, nani wataona kumbukumbu yako ya matibabu?**

Habari yako (na habari ya mtoto wako) itaonekana na timu ya utafiti pekee na watatumia kumbukumbu hii kwa njia ya siri na kuhakikisha kuwa ni salama. Taarifa zote za washiriki ambazo zitawekwa kwa ripoti ya mwisho au kuchapishwa zitabaki bila majina.

**Nini kitafanyika mtoto wako akiumia (au wewe) kwa kushiriki katika utafiti huu?**

Kushiriki katika utafiti huu hauna hatari yoyote. Hatari kama ipo ni ndogo sana kwa sababu utafiti unahusu tu kuulizwa maswali na kuchukua vipimo kwa motto wako. Hata hivyo, iwapo mshiriki atapata kuumia, bima zitatolewa na Chuo Kikuu cha Stellenbosch kwako.

**Je, utalipwa au kuna gharama yoyote kushiriki?**

Hapana. Hautalipwa na hautapata gharama yoyote ukishiriki.

Je, kuna kitu kingine ambacho unapaswa kujua au kufanya?

Kama una matatizo yoyote au malalamiko ambayo hayakushughulikiwa na wanaofanyakazi ya utafiti unaweza kuwasiliana nasi ukitumia nambari za simu zifuatazo:

Chuo Kikuu cha Stellenbosch Kamati ya Utafiti wa Maadili: +2721-938 9207

Kamati ya Uchunguzi wa Maadili - Chuo Kikuu cha Kenya: +254208710901/12 ext 57357

Lynette Daniels: +27825136409

Sophie Ocholla: 0721449803

Utapata nakala ya taarifa hii na fomu ya idhini kwa ajili ya kumbukumbu yako.

## **FOMU YA IDHINI**

### **Azimio la mshiriki**

Kwa kutia sahihi hapa chini, mimi ..... nakubali kushiriki katika utafiti huu  
(*Complementary feeding practices and nutritional status of children aged six to 23 months among pastoralist communities in Isiolo County, Kenya*)

Mimi natangaza kwamba:

- Nimesoma au nilisomewa habari hii na imeandikwa katika lugha ambayo mimi naelewa.
- Nilikuwa na nafasi ya kuuliza maswali na maswali yangu yote yamejibiwa.
- Naelewa kwamba kushiriki katika utafiti huu ni kwa hiari na sikushinikizwa kushiriki.
- Ninaweza kuchagua kuondoka kwa utafiti wakati wowote bila kudharauliwa kwa njia yoyote.
- Mimi naweza kuulizwa kuondoka kwa utafiti kabla ya kumaliza kazi hiyo, kama daktari wa utafiti au mtafiti anahisi ni kwa maslahi yangu bora, au kama mimi sikufuata mpango wa utafiti, kama ilivyokubaliwa.

Mahali..... (tarehe) ..... 2013

.....  
*Sahihi/randi ya kidole ya mshiriki*      *Sahihi ya shahidi*

### **Azimio la mchunguzi**

Mimi (jina)..... natangaza kwamba:

- Nilieleza habari iliyo katika hati hii kwa.....
- Nilimsihi aulize maswali na nilichukua muda wa kutosha kujibu maswali yake.
- Nimeridhika kwamba ameelewa vya kutosha masuala yote ya utafiti.

Mahali..... (tarehe) ..... 2013

.....  
*Sahihi ya mpelelezi*      *Sahihi ya shahidi*

**ADDENDUM I:**  
**CHART FOR CALCULATING AGE (IN MONTHS)**

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**NB:** Please cross-check against the date of the birth of the child, and the date of the data collection, to establish the actual age of the infant in months.

<b>DATE OF BIRTH</b>	<b>AGE IN MONTHS</b>
July 2011	23
August 2011	22
September 2011	21
October 2011	20
November 2011	19
December 2011	18
January 2012	17
February 2012	16
March 2012	15
April 2012	14
May 2012	13
June 2012	12
July 2012	11
August 2012	10
September 2012	9
October 2012	8
November 2012	7
December 2012	6

## ADDENDUM J: CONFIRMATION OF AWARD: SURMEPI GRANT

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# SURMEPI



Stellenbosch University/Rural Medical Education Partnership Initiative

23 July 2012

Dear Dorcus

### CONFIRMATION OF AWARD: SURMEPI GRANT

This letter serves to confirm that you have been awarded a SURMEPI grant for Masters' studies for the period July 2012 – June 2014. Congratulations!

The award comprises two annual payments of R30 000 each. Payment for year two will be subject to you meeting the requirements as set out in the accompanying 'SURMEPI Grant acceptance' document which you are required to complete and return to Mrs Debbie Harrison [[debbie@sun.ac.za](mailto:debbie@sun.ac.za)] before 13 August 2012. Kindly note that no transfer of funds can take place before we are in receipt of this signed document and your relevant cost centre details. Please also keep the attached 'SURMEPI Postgraduate Grant Report' template on file for use when reports are due.

Within the next few weeks you will also receive details of the SURMEPI mentorship and postgraduate support activities which you are encouraged to participate in.

Kindly contact Dr Susan van Schalkwyk ([scvs@sun.ac.za](mailto:scvs@sun.ac.za)) should you have any enquiries with regard to this grant.

We wish you all the best for your studies.

Yours sincerely

**Prof J Nachega**  
Principal Investigator: SURMEPI

**Prof M de Villiers**  
Principal Investigator: SURMEPI

Cc: Dr S van Schalkwyk

Verbind tot Optimale Gesondheid – Committed to Optimal Health

SURMEPI  
Peebus/PO Box 19063 \* Tygerberg 7505 \* Suid-Afrika/South Africa  
Tel +27 21 638 8633 \* Faks/Fax: + 27 21 638 8670  
E-pos/E-mail: [moodleyk@sun.ac.za](mailto:moodleyk@sun.ac.za)/[debbie@sun.ac.za](mailto:debbie@sun.ac.za)



## ADDENDUM K: STELLENBOSCH UNIVERSITY – HEALTH RESEARCH ETHICS COMMITTEE APPROVAL NOTICE

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UNIVERSITEIT•STELLENBOSCH•UNIVERSITY  
jou kennisvenoot • your knowledge partner

### Approval Notice Response to Modifications- (New Application)

22-Feb-2013  
AMUNGA, Dorcas Peris

Ethics Reference #: S12/11/302

Title: COMPLEMENTARY FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN AGED 6-23 MONTHS  
AMONG PASTORALIST COMMUNITIES OF ISIOLO, KENYA

Dear Miss Dorcas AMUNGA,

The **Response to Modifications - (New Application)** received on **21-Jan-2013**, was reviewed by members of **Health Research Ethics Committee 2** via Expedited review procedures on **04-Feb-2013** and was approved.

Please note the following information about your approved research protocol:

Protocol Approval Period: **04-Feb-2013 -04-Feb-2014**

Please remember to use your **protocol number (S12/11/302)** on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

#### **After Ethical Review:**

Please note a template of the progress report is obtainable on [www.sun.ac.za/rds](http://www.sun.ac.za/rds) and should be submitted to the Committee before the year has expired. The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit. Translation of the consent document to the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372  
Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

#### **Provincial and City of Cape Town Approval**

Please note that for research at a primary or secondary healthcare facility permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Contact persons are Ms Claudette Abrahams at Western Cape Department of Health ([healthres@pgwc.gov.za](mailto:healthres@pgwc.gov.za) Tel: +27 21 483 9907) and Dr Helene Visser at City Health ([Helene.Visser@capetown.gov.za](mailto:Helene.Visser@capetown.gov.za) Tel: +27 21 400 3981). Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.  
For standard HREC forms and documents please visit: [www.sun.ac.za/rds](http://www.sun.ac.za/rds)

If you have any questions or need further assistance, please contact the HREC office at 0219389207.

#### **Included Documents:**

Application Form  
Cover Letter  
Protocol  
Synopsis  
Investigators declaration  
Checklist

Sincerely,

Mertrude Davids

**ADDENDUM L:  
KENYATTA UNIVERSITY – ETHICS REVIEW COMMITTEE  
APPROVAL LETTER**

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KENYATTA UNIVERSITY  
ETHICS REVIEW COMMITTEE

Fax: 8711242/8711575  
Email: [kuerc.chairman@ku.ac.ke](mailto:kuerc.chairman@ku.ac.ke)  
[kuerc.secretary@ku.ac.ke](mailto:kuerc.secretary@ku.ac.ke)  
Website: [www.ku.ac.ke](http://www.ku.ac.ke)

P. O. Box 43844  
Nairobi, 00100  
Tel: 8710901/12

Our Ref: KU/R/COMM/51/169

Date: May 9<sup>th</sup>, 2013

Dorcas Anunda Amunga  
University of Stellenbosch,  
Stellenbosch, South Africa

Dear Ms. Amunga,

APPLICATION NUMBER PKU/109/E12 OF 2013 – ‘COMPLEMENTARY FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN AGED 6-23 MONTHS AMONG PASTORALIST COMMUNITIES OF ISOLO, KENYA’.

**1. IDENTIFICATION OF PROTOCOL**

The application before the committee is with a research topic, ‘Complementary Feeding Practices and Nutritional Status of Children Aged 6-23 Months Among Pastoralist Communities of Isolo, Kenya’ received on 5<sup>th</sup> April 2013.

**2. APPLICANT**

Dorcas Anunda Amunga  
University of Stellenbosch,  
Stellenbosch, South Africa

**3. SITE**

Isiolo, Kenya

**4. DECISION**

The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines, and is of the view that against the following elements of review,

- (i) Scientific design and conduct of study,
- (ii) Recruitment of research participant,
- (iii) Care and protection of research participants,
- (iv) Protection of research participant’s confidentiality,
- (v) Informed consent process,
- (vi) Community considerations.

AND APPROVED and that the research may Proceed ON CONDITION that you incorporate its advise below.

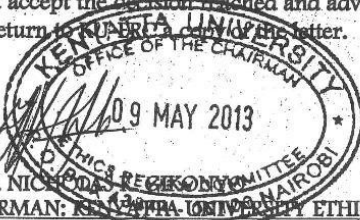
5. ADVICE/CONDITIONS

With respect to matters of scientific design and conduct of study and recruitment of research participants, the following specific conditions must be fulfilled in writing before an approval can be granted. The manner of fulfilling these should be outlined and submitted to KU-ERC as soon as possible.

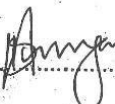
1. Isiolo "County" should be included in the title.
2. The Exclusion criteria suggest a medical examination for chronic conditions and metabolic disorders; you should state which medical doctor or qualified personnel will do the screening.
3. A pretest should be conducted instead of a pilot test.
4. The work plan should be updated.
5. Indicate that approval will also be sought from KU-ERC.
6. Authority to conduct research should be sought from NCST and not Isiolo County.
7. The contacts of supervisors and KU-ERC should be disclosed in the consent form.
8. There should be a Borana or Kiswahili translation of the consent form.

When replying, kindly quote the application number above.

If you accept the decision reached and advice and conditions given please sign in the space provided below and return to KU-ERC a copy of the letter.

  
PROF. NICHOLAS K. MURUGA  
CHAIRMAN: KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE

I DORCAS A. AMUNGA accept the advice given and will fulfill the conditions therein.

Signature  Dated this day 10 of MAY 2013.

**ADDENDUM M:  
LETTER TO THE ISIOLO COUNTY COMMISSIONER REQUESTING  
PERMISSION TO VISIT HOUSEHOLDS IN THE COUNTY**

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Dorcas Amunga  
PO Box 102294-00101  
Nairobi  
25 February 2013

To,  
The County Commissioner  
PO Box 3-60300  
Isiolo County

Dear Sir

**RE: Request for Permission to Conduct a Nutrition Study in Isiolo County**

I am a Master of Nutrition student at Stellenbosch University, South Africa. As part of my degree, I am required to undertake research into nutrition. My research title is: *Complementary feeding practices, and the anthropometric status of children aged six to 23 months among the pastoralist communities of Isiolo County, Kenya.*

The period between six and 23 months of age is critical, as it is the period during which the child is introduced to new foods which, if it is not done correctly, predisposes the child to malnutrition, disease, and death. Complementary feeding practices in Kenya are below par, according to Health Demographic Surveys that were previously undertaken. The aim of my study is to determine the complementary feeding practices that occur with and the anthropometric status of children aged six to 23 months living in Isiolo County, and the socio-demographic and socio-economic factors influencing these complementary feeding practices. This will aid in identifying any existing gaps in the associated nutrition and development, and it will also aid in developing focused interventions.

Children aged six to 23 months will, therefore, be the study participants and the data collection will be conducted on 288 participants from selected sub-locations in the Merti and Sericho divisions. Ethical

clearance has already been received from the Stellenbosch University Health Research Ethics Committee (Ethics no. S12/11/302). Find attached the approval notice.

It is in this regard that I humbly request permission to undertake the study within your county. For further information, or clarification, I can be contacted on telephone number 0721753050 and/or at [dorcasmunga@gmail.com](mailto:dorcasmunga@gmail.com).

Thank you in advance.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Dorcas Amunga', with a stylized initial 'D'.

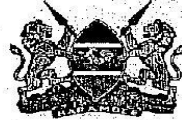
Dorcas Amunga

**ADDENDUM N:  
PERMISSION LETTER FROM THE ISIOLO COUNTY COMMISSIONER**

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**OFFICE OF THE PRESIDENT**

Telegrams 'DISTRICTER' Isiolo  
Telephone: Isiolo 064-52011.  
isiolocc@yahoo.com  
Fax :064- 52160  
*When replying please quote*



OFFICE OF THE  
COUNTY COMMISSIONER  
P.O. BOX 3  
ISIOLO.

Ref: No. CORR 3/1/44  
*and dates*

28<sup>th</sup> February, 2013

**TO WHOM IT MAY CONCERN.**

**RE: PERMISSION TO CONDUCT A NUTRITION STUDY IN ISIOLO COUNTY**

***DORCAS AMUNGA ID/NO. 23128283; ADM. NO. 16592743***

The above named is a Masters Student at Stellenbosch University, South Africa, studying Nutrition.

She is currently undertaking research in Nutrition in Isiolo County.

This office has given her permission to carry out the research.

Please accord her maximum co-operation so as to accomplish her research objectives, a gesture which shall be much appreciated.

A handwritten signature in black ink, appearing to be 'Mburu S. M.', written over a circular stamp or seal.

Mburu S. M.  
For: County Commissioner,  
**ISIOLO COUNTY.**

**ADDENDUM O:  
RESEARCH AUTHORISATION LETTER FROM THE NATIONAL  
COUNCIL OF SCIENCE AND TECHNOLOGY, KENYA**

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